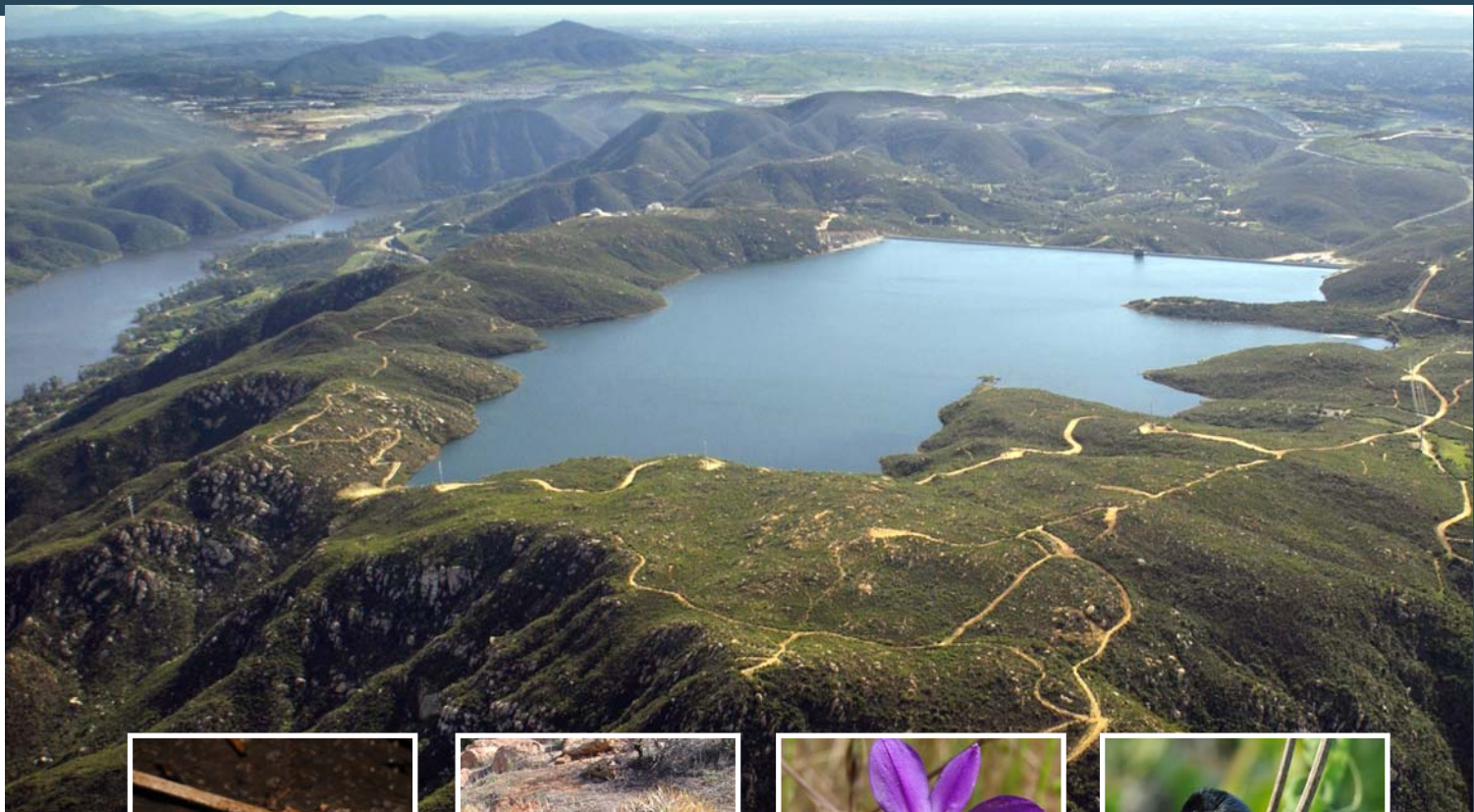


San Diego County Water Authority

Subregional Natural Community Conservation Plan/ Habitat Conservation Plan (NCCP/HCP)



**SAN DIEGO COUNTY WATER AUTHORITY
SUBREGIONAL NATURAL COMMUNITY
CONSERVATION PLAN/HABITAT
CONSERVATION PLAN (NCCP/HCP)**

PREPARED FOR:

**United States Fish and Wildlife Service
and
California Department of Fish and Game**



***San Diego County
Water Authority***

PREPARED BY:

**San Diego County Water Authority
and
RECON Environmental, Inc.**

October 2010

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- I: CDFG Lake or Streambed Alteration Conditions
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Executive Summary

The mission of the San Diego County Water Authority (Water Authority) is to provide a safe, reliable water supply to its Member Water Agencies serving the San Diego region. Construction of new facilities undertaken through the Capital Improvement Program (CIP), facility upgrades, and Operation and Maintenance (O&M) activities are necessary for the Water Authority to fulfill its mission.

The Water Authority has prepared this Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP, or Plan) pursuant to Section 2800 *et seq* of the Fish and Game Code (NCCPA) and section 10(a) of the Endangered Species Act (ESA) of 1973, as amended. The purpose of this Plan is to fulfill the requirements for issuance of incidental take authorization under Section 2835 of the NCCPA and an incidental take permit under section 10 of ESA. The Plan identifies the types of activities proposed for coverage and an assessment of expected impacts. The Plan would not preclude the Water Authority from processing federal permits and state permits with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG), respectively (collectively the Wildlife Agencies), if required for individual future projects that are not covered by this Plan.

This Plan proposes to cover 26 plant species and 37 wildlife species for a total of 63 Covered Species. Three additional species, Orcutt grass (*Orcuttia californica*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Munz's Onion (*Allium munzii*), are Major Amendment Species. The Plan addresses potential impacts to sensitive resources associated with new construction and typical expansion of existing infrastructure; ongoing installation, use, maintenance, and repair of its aqueduct and water conveyance, treatment, and storage systems; and acquisition of new and management/monitoring of all existing Preserve Area lands throughout the Plan Area.

The Plan Area, approximately 992,000 acres in western San Diego and southwestern Riverside counties, comprises the area within which all incidental take will occur and be permitted. With the exception of implementing the Tijuana River Valley wetland creation project, the Planned Projects and nearly all Covered Activities will occur within the Probable Impact Zone (PIZ), which is identified as 1,000 feet on either side of the pipelines or facilities, or approximately 64,600 acres along the existing pipeline rights-of-way, and other appurtenant water conveyance, storage, and treatment facilities. A larger area, the Survey Area, which comprises the area on one mile of either side of the pipelines and facilities, was analyzed for potential impacts from Covered Activities. Planned and Future Projects and other Covered Activities are estimated to impact up to 373 acres of habitat that will require mitigation over the 55-year term of the Permit. The Permits will encompass all of the Plan Area except that the Riverside County portion will be a Major Amendment Area for all future projects. Projects will be implemented

consistent with the process described in Section 6.0, and Future Projects and/or Activities outside of the Survey Area covered by the Plan will be approved pursuant to the amendment process described in Section 8.0. Planned Projects are expected to permanently impact approximately 71 acres of native vegetation, and Future Projects/Activities and O&M are projected to impact up to 183 acres of native vegetation. In addition, one Existing Project (Pipeline 6), is currently being re-evaluated, and if an alternative alignment is selected an estimated 119 acres of impacts may occur, and would be mitigated per the Plan. Within approximately 1,920 acres of Preserve Area committed to be preserved by the Plan, 1,220 acres have been set aside as compensation for previously permitted projects, and approximately 700 acres are available or will be created to be used as credits to compensate for project impacts to upland and wetland habitats. In addition, the Water Authority has previously conserved 1,147 acres of regionally important habitat lands, the Managed Mitigation Areas (MMAs), that contribute to the baseline of conservation within the Plan Area.

To ensure the protection and conservation of Covered Species, the Plan includes measures designed to avoid or minimize potential impacts to biological resources and to provide appropriate mitigation where impacts are unavoidable. The Water Authority's managed Preserve Area provides important areas for conserving Covered Species, and the MMAs and some rights-of-way provide habitat connectivity in areas where little natural habitat remains. Six Habitat Management Areas (HMA) which make up the Preserve Area have been or will be established from which mitigation credits will be deducted to compensate for impacts from Covered Activities. The Plan identifies approximately 373 acres of impacts to vegetation communities that require mitigation. Impacts from Covered Activities (Planned and Future Projects) would occur over the 55-year permit period.

Plan Overview

The following provides a summary of the NCCP/HCP sections.

Section 1.0—Introduction

This section provides an overview of the Water Authority's mission and identifies the governing documents and policies that dictate how project activities are prioritized and defined. It identifies the purpose and need for the Plan, its goals, and summarizes its regulatory obligations. It also identifies key elements of the Water Authority's environmental policies and state and federal environmental regulations that influence CIP project development and O&M activities. Member Water Agencies are not signatories to this Plan and the Implementing Agreement (IA), nor are impacts by underlying landowners of Water Authority rights-of-way and easements covered by this Plan.

Section 2.0—Region of Plan Coverage

The Plan Area includes the Water Authority's service area, containing the Water Authority's 24 Member Water Agencies. The Plan Area (992,000 acres) covers roughly the western third of San Diego County and the extreme southwestern portion of Riverside County in the vicinity of Lake Skinner. Within the Plan Area, planned and future Covered Activities are expected to occur mostly within one-mile of existing facilities and rights-of-way. The Plan Area includes locations of facilities and projects outside of the Water Authority's service area, such as the Carryover Storage and San Vicente Dam Raise projects.

Section 3.0—Relationship to Other Conservation Plans

This Plan Area overlaps with numerous existing and in-process NCCP/HCPs in San Diego County and several NCCP/HCPs in western Riverside County. The Plan is designed to be compatible with other conservation plans in the region, and the Water Authority will avoid and/or minimize impacts to existing preserve lands to the maximum extent feasible.

Section 4.0—Plan Area Biology and Land Use

The Plan Area encompasses diverse geographic, topographic, and climatic conditions that support a great variety of vegetation communities. Land use and vegetation data bases for San Diego and western Riverside counties were compiled and evaluated to develop the Plan Area vegetation map. Upland and wetland communities have been identified within the Plan Area. Over 500,000 acres of the Plan Area are developed, disturbed, or agricultural areas. The Plan's Preserve Area provides important, managed conservation sites for Covered Species and assists in building and connecting larger, biologically-diverse preserve lands

Section 5.0—Covered Activities

Within the Plan Area, the Water Authority is responsible for developing new water transmission, storage, treatment, supply, and flow management facilities, in addition to conducting O&M Activities and Emergency Actions. In addition, the Water Authority and its Preserve Area managers will be responsible for managing and monitoring the conserved habitat lands. These Covered Activities are organized into four categories: (1) CIP projects covered for construction and expansion, (2) O&M and Rights-of-Way management activities, (3) Emergency Actions, and (4) Preserve Area management activities. Potential incidental take of the Covered Species and anticipated impacts to sensitive habitats are identified and assessed.

Section 6.0—Conservation Plan

The Plan describes a conservation strategy specifying discrete goals and objectives. It identifies the Covered Species and the rationale and process for approving incidental take of Covered Species. Measures designed to avoid and minimize incidental take are described. Mitigation measures are specified through the use of “tiering” by vegetation community types and different mitigation ratios to compensate for identified impacts to Covered Species and sensitive vegetation communities. These measures ensure that conservation/mitigation occurs in rough step proportion with impacts. Conservation and mitigation measures include commitment of the Preserve Area, use of habitat/species credits owned by the Water Authority, possible acquisition of additional habitat, habitat restoration, and avoidance/minimization measures. Monitoring and adaptive management of the Preserve Area are specified. All of these commitments provide the basis for issuance of state and federal take permits.

Section 7.0—Funding of the Plan

This Plan will be funded through existing financial management policies and programs maintained by the Water Authority and by previous contributions provided by the Water Authority. Implementation of this Plan will be funded as a capital cost under the CIP Mitigation Program, individually approved CIP project budgets, and/or the annual operating budget of the Water Resources Department. The Mitigation Program is an element of the CIP; its purpose is to develop and implement short term and long term comprehensive strategies to address sensitive natural resources, including regulatory permitting in support of CIP projects’ construction schedules and budgets. The Water Authority estimates its long-term financial needs based on the CIP, and adopts a two-year budget cycle to address short-term funding and expenditures. The Water Authority’s costs include staff and consultant time. Management and monitoring of the Preserve Area will be conducted by the Preserve Area managers with endowment funds provided by the Water Authority per written agreements.

Section 8.0—Amending the Plan and Addressing Changed and Unforeseen Circumstances

Changes to this Plan are expected to be required during the permit term. Expected modifications to the Plan will be processed as Minor Amendments (no change to Plan commitments and no Permit amendment required) or Major Amendments (substantial change to Plan commitments and Permit amendment required).

The Plan may, under certain circumstances, be modified without amending its associated IA or Permits, provided such amendments are minor in nature, the effect on the Covered Species involved and the levels of take are not greater than those described in this Plan and provided for by the Permits, and the action is otherwise

consistent with the Plan, IA, and associated Permits. Major Amendments to the Plan would be required to increase take of any Covered Species, add a species to the Covered Species list, alter the Plan Area, or add or modify a Covered Activity at a scope and scale that could not be processed as a Minor Amendment.

The permit period is 55 years. Prior to expiration of the initial permit or renewal period, the Water Authority will notify the Wildlife Agencies of its intent to renew the terms of the plan and provide documentation of the compliance status of the permit.

This Plan includes categories of Changed Circumstances and clear definitions of conditions or events that qualify as Changed Circumstances. In defining a Changed Circumstance, the Water Authority must determine what level of impact within a Changed Circumstances category is foreseeable and what level, intensity, or extent is unforeseen. All other conditions or events not defined as Changed Circumstances are by definition Unforeseen Circumstances.

Section 9.0—References Cited

Section 10.0—List of Preparers

Appendix A—Implementing Agreement

The IA outlines the conditions, duties, and responsibilities of the Water Authority and Wildlife Agencies under this Plan.

Appendix B—Covered Species Analyses

Appendix B addresses species-specific conservation and management conditions that must be met for the species to be adequately conserved by the Plan. The evaluation describes conservation goals and strategies, findings and conditions for coverage, background information, a conservation analysis, and management actions for specific plant and animal species. Background species information includes distribution, abundance, and trends, threats and limiting factors, and special considerations. The conservation analyses include conservation and take levels, and effects on population viability and species recovery, if feasible. Attachments to this appendix include the Declining Amphibian Populations Task Force (DAPTF) Fieldwork Code of Practice and the Report of Independent Science Advisors, which was prepared in accordance with the requirements of the Natural Community Conservation Planning Act (NCCPA), as amended 2003.

Appendix C—Water Authority Covered Projects Descriptions

Water Authority Covered Activities include the construction of new CIP facilities, expansion of existing facilities, and O&M of existing CIP facilities. Appendix C identifies Existing and/or Planned Projects proposed for coverage under this Plan.

Appendix D—Selected Sections from the Water Authority General Conditions and Standard Specifications

Appendix D includes relevant sections of the Water Authority's 2005 edition of *General Conditions and Standard Specifications*. Included as an appendix are topics referenced in the Plan, including Section 02110—Clearing and Grubbing, Section 02140—Dewatering, Section 02229—Blasting, Section 02270—Temporary Erosion Control, and Section 02940—Revegetation.

Appendix E—Example of Standard Grant of Easement to the San Diego County Water Authority

Appendix E is an example of a Standard Grant of Easement to the San Diego County Water Authority. It is a documentary transfer that gives the Water Authority the legal right to use the land as described in the Grant.

Appendix F—Pre-activity Survey Form

The Pre-activity Survey Form is used to document the presence or absence of sensitive resources on or in the vicinity of a project area and determine which avoidance, minimization, and mitigation measures to employ at a Covered Activity site. An Environmental Surveyor will survey the project site, conduct pre-activity studies, flag sensitive zones and habitats prior to the commencement of construction or maintenance activities, confirm/specify avoidance, minimization and mitigation measures, and monitor the site as required.

Appendix G—State Water Resources Control Board Fact Sheet for Water Quality Order 2003-0007

Appendix G includes background information and instructions for the National Pollutant Discharge Elimination System (NPDES) permit and submittal requirements for linear underground/overhead projects.

Appendix H—California Invasive Plant Council (Cal-IPC) Invasive Plant Inventory

The California Invasive Plant Council (Cal-IPC) published a list of *Exotic Pest Plants of Greatest Ecological Concern in California*. First published in 1999, this list is referred to as the Cal-IPC List. In 2006, this list was updated and published as the *Invasive Plant Inventory*. Appendix H contains the updated version which includes more detailed information on invasive species' impacts and distribution, more transparent criteria for the rating system, and more thorough documentation for each assessment.

Appendix I—CDFG Lake or Streambed Alteration Conditions

The Water Authority and CDFG have developed procedures to streamline the process for notifying, submitting, and approving projects that are subject to Fish and Game Code Sections 1602 and 1603 (lake and streambed alteration activities).

Appendix J—Conservation Bank Agreement

Appendix J includes a formal mitigation banking agreement for the San Miguel HMA and Crestridge HMA. This appendix also includes the mitigation credit ledger sheets for the San Miguel HMA and Crestridge HMA.

Appendix K—Preserve Area and MMA Locations

The Water Authority developed a series of figures that indicates the location of each of the HMAs and MMAs.

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Acronyms and Definitions

Acronyms and Terms

°C	degrees Celsius
AD161	Assessment District 161
APP	Aqueduct Protection Program
BCLA	Biological Core and Linkage Area
BEPA	Bald and Golden Eagle Protection Act of 1940
BLM	Bureau of Land Management
BMPs	Best Management Practices
BMR	Boundary Modification Report
BO	Biological Opinion
BRCA	Biological Resource Core Area
BSRA	Biologically Significant Resource Area
Board	San Diego County Water Authority Board of Directors
Cal-IPC	California Invasive Plant Council (formerly the California Exotic Pest Plant Council or CalEPPC)
Caltrans	California Department of Transportation
Camp Pendleton	Marine Corps Base Camp Pendleton
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
cfs	cubic feet per second
CSP	Carryover Storage Project
DAPTF	Declining Amphibian Populations Task Force
Db	Decibels
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act (Federal)
ESP	Emergency Storage Project
FCF	Flow Control Facility
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FPA	Focused Planning Area
FRS	Flow Regulatory Structure
FY	Fiscal Year
HCP	Habitat Conservation Plan

Acronyms and Definitions

HGL	Hydraulic Grade Line
HMA	Habitat Management Area
HMP	Habitat Management Plan
Hp	Horse power
I-5	Interstate 5
I-8	Interstate 8
I-15	Interstate 15
I-805	Interstate 805
IA	Implementing Agreement
IID	Imperial Irrigation District
INRMP	Integrated Natural Resource Management Plan
IPM	Integrated pest management
ITP	Incidental Take Permit
JWA	Joint Water Agencies
LMSE	La Mesa–Sweetwater Extension
LSAA	Lake or Streambed Alteration Agreement
LUP	Linear Underground/Overhead Projects
Master Plan	Regional Water Facilities Master Plan, 2002
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station Miramar
Member Water Agencies	Public agencies supplied water by the Water Authority
Mg	Million gallons
Mgd	million gallons per day
MHCP	Multiple Habitat Conservation Program (North San Diego County cities)
MHPA	Multi-Habitat Planning Area
MMA	Managed Mitigation Area
MSCP	Multiple Species Conservation Program (San Diego County)
MSHCP	Western Riverside County Multiple Species Habitat Conservation Plan
MTRP	Mission Trails Regional Park
MW	Megawatts
MWD	The Metropolitan Water District of Southern California
NCCP	Natural Community Conservation Plan
NCCPA	Natural Community Conservation Planning Act
NCDP	North County Distribution Pipeline
NCMSCP	North County Multiple Species Conservation Program
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWR	National Wildlife Refuge
O&M	Operation and Maintenance
OMWD	Olivenhain Municipal Water District

PAMA	Pre-approved Mitigation Area
PAMP	Preserve Area Management Plan
PAR	Property Analysis Record
PCCP	Pre-stressed Concrete Cylinder Pipe
PCF	Pressure Control Facility
Plan	Water Authority NCCP/HCP
Plan Area	Lands covered by the Water Authority Plan Permits
PIZ	Probable Impact Zone
PSF	Pre-activity Survey Form
Refuge	San Diego National Wildlife Refuge Complex
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SB	Senate Bill
SDG&E	San Diego Gas & Electric
Service Area	The geographic area served by the Water Authority and its Member Water Agencies
SR-52	State Route 52
SR-54	State Route 54
SR-94	State Route 94
SR-395	State Route 395
SR-905	State Route 905
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TNC	The Nature Conservancy
UCSD	University of California San Diego
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Water Authority	San Diego County Water Authority
Wildlife Agencies	USFWS and CDFG
WTP	Water Treatment Plant

Definitions

Acre-Feet: The amount of water needed to cover one acre one foot deep (approximately 325,800 gallons).

Adaptive Management: The use of information gathered through monitoring and from other sources to adjust management strategies and practices that provide for the conservation of Covered Species and habitats; this process is also used to develop measures for responding to changed circumstances and unforeseen circumstances. The adapted management measures must be consistent with the goals and objectives of the Plan and the terms and conditions of the Permits.

Administrative Changes: Modifications to the Plan that are not expected to result in a substantial change to the Plan commitments or an increase in the level of take of Covered Species provided under the existing Permits. Administrative Changes may consist of, but are not limited to, clerical changes to the Plan, vegetation mapping and species occurrence updates, and minor adaptive management changes.

Aqueduct Protection Program (APP): A Water Authority program that provides for the inspection and electronic measurement of PCCP integrity. The APP data will indicate the sections of pipelines that need replacement or relining.

Arizona Crossings: A rock or cement roadbed crossing a creek at grade.

Bald and Golden Eagle Protection Act (BEPA): BEPA means the federal Bald and Golden Eagle Protection Act (16 U.S.C. Section 668 *et seq.*) and all rules, regulations and guidelines promulgated pursuant to that Act.

Biologically Significant Resource Area (BRSA): Habitat areas that support rare vegetation types and species, greater species diversity, are part of core areas of habitat or function as key linkages or corridors for species. These types of habitat areas are generally the focus for conservation by this Plan and other conservation plans. This Plan uses the term “biologically significant resource area” to include the following types of habitat areas within the Plan Area:

- an upland or wetland habitat management area (e.g., all existing Water Authority-committed lands in this Plan);
- areas that have been designated in approved (or in-approval stage) conservation plans as biological resource core areas, pre-approved mitigation areas, corridors/linkages or equivalent designated/defined terms.

Blow off: A valve and outlet pipe or pumping connection installed at a low point in the pipeline to allow draining of a pipeline for interior inspection or repair. The valve is

typically housed in an above ground concrete vault approximately 5 feet in diameter.

California Invasive Plant Council (Cal-IPC): A non-profit organization dedicated to “protecting California’s wildlands from invasive plants through research, restoration, and education.” Cal-IPC was formerly known as the California Exotic Pest Plant Council, or CalEPPC. Founded in 1992, CalEPPC changed its name to the Cal-IPC in 2002. In 1994, CalEPPC published *Exotic Pest Plants of Greatest Ecological Concern in California* known as the “weed list” (Revised 1999). Plants are classified by invasiveness and current extent. In 2006, the weed list was updated and published as the *Invasive Plant Inventory*.

Candidate Species: A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that the CDFG or USFWS has formally noticed as being under review for addition to the list of threatened or endangered species.

California Department of Fish and Game (CDFG): The California Department of Fish and Game, a department of the California Resources Agency.

Capital Improvement Program (CIP): San Diego County Water Authority’s program to fulfill the goal to provide the necessary facilities for a safe, reliable, and operationally flexible water storage, treatment, and delivery system.

California Environmental Quality Act (CEQA): The California Environmental Quality Act (Pub. Resources Code Section 21000 *et seq.*) and all rules, regulations and guidelines promulgated pursuant to that Act.

California Endangered Species Act (CESA): The California Endangered Species Act (California Fish and Game Code, Section 2050 *et seq.*) and all rules, regulations and guidelines promulgated pursuant to that Act.

Carryover Storage Project (CSP): Carryover storage refers to a process of accumulating water during wet seasons/years when it is plentiful and keeping it in storage for use in subsequent dry years when there is a shortage. The CSP is necessary to increase the reliability and flexibility of the region’s water supply through the year 2030. The purpose of the CSP is to establish an additional 100,000 acre-feet of carryover water storage for the region.

Changed Circumstances: Changes in circumstances affecting a Covered Species or the geographic area covered by the NCCP/HCP that can reasonably be anticipated by the Parties and that can reasonably be planned for in the NCCP/HCP. Changed Circumstances and planned responses to Changed Circumstances are more particularly defined Section 8.0 of the NCCP/HCP. Changed Circumstances do not include Unforeseen Circumstances.

Clean Water Act: Federal Act (33 U.S.C 1251 *et seq.*), including all regulations promulgated pursuant to that Act. The Clean Water Act is the cornerstone of surface water quality protection in the U.S. The statute employs a variety of regulatory and non-regulatory tools aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."

Clearing: The cutting and removal of above-ground vegetation, by any means, without disturbance to the soil and root system.

Compatible Use: A land use or activity that will not permanently interfere with the Preserve Area, MMAs, linkage system, and biological resources, including Covered Species and habitats. If the extent and type of proposed impacts would not threaten the integrity of the Preserve Area, MMAs, or biological resources, or increase take, then the uses are compatible. The MSCP and MHCP Subregional Plans identify linear utilities, including support facilities, as being conditionally compatible with designated preserve lands. According to these plans, a land use is considered potentially compatible if it is a lower intensity use, such as a utility corridor, and adheres to development and design guidelines to ensure that it will not permanently interfere with preserve lands. Existing and Planned Projects within designated or proposed preserve lands of other plans in the region are considered compatible under this Plan.

Consistent with other plans, this Plan defines compatible uses as those that will not permanently interfere with the Preserve Area, MMAs, linkage system, and biological resources, including Covered Species and habitats. If the extent and type of impacts would not significantly threaten the integrity of the preserve or biological resources, then the facilities are compatible. Incompatible uses are those that will result in significant, unmitigable impacts to preserve lands.

Compliance Monitoring. Compliance Monitoring, also known as Implementation Monitoring, is a process to ensure that strategies and treatments are implemented in accord with Permit requirements.

Conditionally Compatible: A land use or activity (e.g., locating a water supply line or infrastructure component within an existing/designated conservation area) undertaken pursuant to the Plan and within the Preserve Area or other conservation reserve lands that may require implementation of additional conservation measures to demonstrate conformance with the preserve or reserve area goals.

Conservation Strategy: All of the conservation and management measures described in Section 6.0 of the NCCP/HCP and as further required by the Permits to minimize, mitigate, and monitor the impacts to Covered Species, plus all reporting requirements described in Sections 6.12 and 8.10 of the NCCP/HCP, and the Plan's responses to Changed Circumstances described in Section 8.8.1 of the NCCP/HCP.

Contingencies: Certain events and outcomes that are expressly anticipated in the Plan and which, if they occur, will require specific actions or adjustments to how certain measures are implemented.

Core Population of Species: Relatively large population of sensitive species that is considered to be critical to the survival of the species on a regional scale.

Covered Activities: Those project activities: construction, facility operations and management, and conservation and management activities (including all ground-disturbing projects and activities that may occur within the Permit (Plan) Area described in Sections 5.0 and 6.0 of the NCCP/HCP) to be carried out by the Water Authority and its contractors in the Permit Area that may result in Authorized Take of Covered Species (with exception of two species not subject to incidental take) during the term of the NCCP/HCP, and that are otherwise lawful.

Covered Projects: A type of Covered Activity that involves land use and development performed by the Water Authority in conformance with this Plan. Covered Projects are a subset of Covered Activities and are discussed in Section 5.0 and Appendix C of this Plan.

Covered Species: The species, listed and non-listed, whose conservation and management are provided for by the NCCP/HCP and for which limited take is authorized by the Wildlife Agencies pursuant to the Permits, with the exception of two species that are not subject to incidental take (see Covered Species Not Subject to Incidental Take). Covered Species are listed in Section 6.0 of the NCCP/HCP.

Creation: The establishment of vegetation types, habitat conditions, and diversity of plant species on lands where it previously did not exist.

Draindown: A maintenance activity that involves stopping flow and draining water from a pipe or other structure to allow an internal inspection. Water is released through blow offs or other structures in a controlled manner to prevent erosion in adjacent drainages. Draindowns are typically performed in a 10-day work period, three to five times per year.

Drawdown: The controlled lowering of underground or surface water levels as a result of the withdrawal of water. Consequently, users may not have access to water without drilling deeper wells or installing reservoir outlet structures in deeper water.

Drill-seeding: A planting technique that utilizes a piece of equipment, towed by a tractor, to create a hole of specified depth, plant a seed and cover the hole in a continuous manner.

Easement: A property right afforded to a person or entity to use or prevent use of another person's real property.

Effectiveness Monitoring. A process to evaluate the degree to which the biological system responds to management activities as expected.

Emergency Actions: Emergency actions are required when there is an immediate threat to life or property. Emergency actions are required when a facility or structure has failed or is about to fail and requires immediate action to minimize or prevent catastrophic failure of all or part of the water treatment, storage, or delivery system. Emergency actions may be required as a result of natural disaster or other damage to facilities. Conditions in this category are those that immediately threaten the integrity of the aqueduct and water distribution system (see also Urgent Repairs).

Emergency Storage Project (ESP): A project designed to improve the reliability of the region's existing water supply system by adding approximately 90,000 acre-feet of emergency water storage in San Diego County. The Project includes construction, re-operation, and expansion of various dams and reservoirs. It also includes construction of associated pipelines, pump stations, and ancillary structures to distribute water throughout the region.

Endangered Species: Pursuant to the ESA (Section 3(6)), the term "endangered species" means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man. Pursuant to Fish and Game Code (Section 2062) "Endangered Species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

Enhancement: Activities conducted in existing habitats that increase one or more specific functions and/or values.

Environmental Impact Report (EIR): A document prepared in accordance with CEQA. The purpose of an EIR is to provide state and local agencies and the general public with detailed information on the potentially "significant" environmental effects which a proposed project is likely to have; to adopt ways which the significant effects may be minimized; and to indicate alternatives to the project. A public comment period is provided, which encourages the involvement of private citizens in the CEQA process (see also Environmental Impact Statement).

Environmental Impact Statement (EIS): A detailed written statement required by NEPA containing an analysis of environmental impacts of a proposed action and alternatives considered, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and

enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources. The purpose of an EIS is to require federal agencies to take into consideration the effects of their actions on the environment before finalizing a particular proposal. A public comment period is provided, which encourages the involvement of private citizens in the NEPA process. The EIS and EIR are frequently prepared jointly as a single document.

Environmental Surveyor: An individual possessing a B.S. or B.A. degree in wildlife management, ecology, zoology, botany, biology, restoration ecology, or similar education and training, and at least two years of field experience in southern California. Additional specific qualifications may depend on the type and location of the project or activity, the habitat and species involved, and measures and activities requiring assessment and/or monitoring. Qualifications and selection of an Environmental Surveyor will be approved solely by the Water Authority. More than one Environmental Surveyor may work on any particular project at a given time to ensure Water Authority activities comply with the Plan.

Existing Project: Projects that have already been approved/permitted by the Wildlife Agencies. For the most part, Existing Projects will be implemented under existing permits and approvals, except for those Existing Projects that propose alternative alignments or project components that would not be covered under existing permits, or a Covered Species occurs at the project site that was not covered by the previous approval. Therefore, Existing Projects with proposed footprints or design considerations that sufficiently deviate from existing alignments or capacity are also proposed for coverage under this Plan.

Facilities: Any physical structure, grouping of structures, stationary or mobile equipment or device used by the Water Authority to convey, store, or treat water, or generate or transmit electricity, including appurtenances thereto.

Feasible: Feasible means the action can be implemented and completed considering environmental, economic, engineering/technological, regulatory and social factors. The Water Authority will document opportunities to avoid and minimize impacts from Covered Activities and adopt those that do not cause extensive additional costs or time delays or additional conservation commitments beyond those specified in this Plan.

Federal Endangered Species Act of 1973 (ESA): The Federal Endangered Species Act of 1973, as amended (16 U.S.C Section 1531 *et seq.*) and all rules, regulations, and guidelines promulgated pursuant to that Act.

Fully Protected Species: Any species identified in Sections 3511, 4700, 4800, 5050 or 5515 California Fish and Game Code.

Future Project and/or Activity: Projects and/or activities that were not designated as CIP budgeted projects at the time of Plan approval. Site-specific impacts and Take information were not available to analyze, and the impacts/Take analysis is based on projecting the existing trend of facility build-out and O&M Activities associated with Existing and Planned Projects to the maximum Plan term (55-years).

Grading: The mechanical movement of soil by excavating or filling.

Grubbing: The removal of native vegetation by any means, including removal of the root system.

Habitat: The physical location where a particular taxon of plant or animal lives and its surroundings, both living and non-living. The term includes the presence of a group of particular environmental conditions surrounding an organism including air, water, soil, mineral elements, moisture, temperature, and topography.

Habitat Conservation Plan (HCP): A habitat conservation plan prepared pursuant to section 10 of FESA.

Habitat Management Area (HMA): Area of land and/or water subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. HMAs may support habitat credits or upland and/or wetland areas that are eligible to be used as mitigation for Covered Activities pursuant to this Plan. A HMA typically: 1) provides long-term conservation values for Covered Species and contributes to regional conservation; 2) is protected by a conservation easement or other legal mechanism; 3) is managed under a formal habitat management plan by qualified natural resource managers, and 4) is adequately funded to assure management for a specified term. The combined HMAs make up the Preserve Area.

Incidental Take Permit (ITP): A permit issued under section 7 of the ESA to a federal party undertaking an otherwise lawful project that might result in the take of an endangered or threatened species. Application for an incidental take permit that is associated with an HCP is subject to certain requirements, including preparation by the permit applicant of a conservation plan that meets the findings for issuance of a 10(a)(1)(B) permit.

Implementing Agreement (IA): The legal agreement between the Water Authority and the Wildlife Agencies that ensures implementation of the Water Authority Plan. This document binds each of the parties to perform the obligations, responsibilities, and various tasks assigned, and provides remedies and recourse should any of the parties fail to perform.

Incompatible Use: Incompatible uses are those that will result in unavoidable and unrecoverable significant impacts to preserve functions.

Listed Species: A species (including a subspecies or a distinct population segment of a vertebrate species) that is listed as endangered or threatened under ESA or CESA.

Major Amendment: A modification to the Plan that would increase Take of a Covered Species, add a species to the Covered Species list, significantly alter the Plan Area, add or modify a Covered Activity at a scope and scale that could not be processed as a Minor Amendment, or another action that is otherwise significantly inconsistent with the Plan, IA, and associated Permits. Major amendments will require amending the section 10(a)(1)(B) permit and/or NCCPA permit, and possibly the IA.

Major Amendment Area – Riverside County: Future Projects and O&M Activities in Riverside County could not be analyzed and permitted at the time of the implementation of the NCCP/HCP; therefore, Riverside County has been designated as “Major Amendment Area.” A number of pre-existing HCPs and the Western Riverside County Multiple Species Habitat Conservation Plan in this area did not include public infrastructure as “conditionally compatible” activities as do the San Diego County NCCP/HCPs and, without specific alignments, inclusion of those as Covered Activities was not achievable pursuant to the Permit requirements. Therefore, those activities will be processed as Major Amendments if they have impacts to Covered Species. Only the Pipeline 6 alignments and associated PIZ within Riverside County are excluded from the Major Amendment Area.

Major Amendment Species: Three species, California Orcutt grass (*Orcuttia californica*), Munz’s onion (*Allium munzii*), and vernal pool fairy shrimp (*Branchinecta lynchi*), would be considered for coverage under a Major Amendment for the Riverside County portion of the Plan Area (see Major Amendment Area – Riverside County above). Analysis conducted for the Plan determined that these three species are known to primarily occur in the Plan’s Major Amendment Area in Riverside County and would not be included in the proposed incidental take permits. Therefore, the appropriate process for potential take of Orcutt grass, Munz’s onion, and vernal pool fairy shrimp would be through the Major Amendment process for the Riverside County portion of the Plan Area.

Managed Mitigation Area (MMA): A property that was acquired and/or funded by the Water Authority as biological resource mitigation for the Emergency Storage Project or other project, and provides baseline conservation associated with this Plan. Property selection was conducted in coordination with the Wildlife Agencies and/or local governments participating in regional conservation, assuring that the MMA was a priority acquisition that significantly contributed to regional conservation. MMAs do not provide mitigation credits, but contribute to the baseline conservation of the Plan.

Member Water Agencies: Public agencies that receive some or all of their water from the Water Authority, including Carlsbad Municipal Water District, City of Del Mar, City of Escondido, Fallbrook Public Utility District, Helix Water District, Lakeside Water District, City of National City (member of Sweetwater Authority), City of Oceanside, Olivenhain Municipal Water District, Otay Water District, Padre Dam Municipal Water District, Camp Pendleton Marine Corps Base, City of Poway, Rainbow Municipal Water District, Ramona Municipal Water District, Rincon del Diablo Municipal Water District, City of San Diego, San Dieguito Water District, Santa Fe Irrigation District, South Bay Irrigation District (member of Sweetwater Authority), Vallecitos Water District, Valley Center Municipal Water District, Vista Irrigation District, and Yuima Municipal Water District. These agencies are not signatories to this Plan or the Implementing Agreement.

Migratory Bird Treaty Act (MBTA): The federal Migratory Bird Treaty Act (16 U.S.C. Section 703 *et seq.*) and all rules, regulations, and guidelines promulgated pursuant to that Act. This Plan will serve as the basis for incorporating the MBTA Special Purpose Permit into the 10(a) permit.

Minor Amendment: A modification to the Plan resulting in effects on the Covered Species involved and the levels of take that are not greater than those described in this Plan and provided for by the Permits, and the action is otherwise consistent with the Plan, IA and associated Permits. Minor Amendments shall not require amending the section 10(a)(1)(B) permit and/or NCCPA permit.

Monitoring Program: A program within an approved NCCP/HCP that provides periodic evaluations of monitoring results to assess the adequacy of the mitigation and conservation strategies or program (Fish and Game Code Section 2805(g)).

Multi-Habitat Planning Area (MHPA): Defined by mapped boundaries and/or by quantitative targets for habitat conservation within the MSCP Subregional Plan Area, where preserve planning is focused and within which permanent conservation of habitat lands will be accomplished.

Multiple Habitat Conservation Program (MHCP): A comprehensive subregional conservation plan covering seven municipal jurisdictions of northwestern San Diego County: Carlsbad, Escondido, Encinitas, Oceanside, San Marcos, Solana Beach, and Vista. Each jurisdiction is responsible for developing its own Subarea Plan.

Multiple Species Conservation Program (MSCP): A comprehensive subregional plan covering southwestern San Diego County. Subarea plans within the MSCP include: Chula Vista, La Mesa, Santee, Poway, City of San Diego, and in unincorporated County of San Diego.

Narrow Endemic Species: Covered species that are highly restricted by their habitat requirements, range, and/or other ecological factors. These species are listed in Section 6.0.

National Environmental Policy Act (NEPA): Federal Act (42 USC 4321–4345) requires federal agencies to evaluate and disclose the proposed project's effects on the environment, along with alternatives. Federal activities requiring NEPA review include allocation of federal funds, issuance of federal permits, or federal regulatory decisions. For Water Authority projects, NEPA involvement is typically for wetland or endangered species issues. This Plan will provide the basis for biological mitigation programs for projects subject to NEPA. The EIR/EIS will analyze the effects of approving the Plan.

Natural Community Conservation Planning Act (NCCPA): The California Natural Community Conservation Planning Act (Fish and Game Code, Section 2800 *et seq.*), as amended on January 1, 2003, and all rules, regulations, and guidelines promulgated pursuant to that Act.

National Environmental Policy Act (NEPA): The National Environmental Policy Act (42 U.S.C. Section 4321 *et seq.*) and all rules, regulations and guidelines promulgated pursuant to that Act.

NCCP Permit: A permit issued by CDFG pursuant to the NCCPA providing take authorization for species whose conservation and management is provided for in an approved NCCP plan (i.e., Covered Species). NCCP permits may authorize take of any species, regardless of its listing status, with the exception of all species fully protected pursuant to Fish and Game Code, Sections 3511, 4700, 5050, and 5515, and mountain lion (*Felis concolor*), which is specially protected (Section 4800).

NCCP/HCP (Plan): The Habitat Conservation Plan/Natural Community Conservation Plan prepared by the Water Authority and approved by the Wildlife Agencies under section 10 of ESA and Section 2835 of the California Fish and Game Code.

No Surprises Assurance (Rule): The guarantee that, provided Permittees are properly implementing the terms and conditions of the HCP, the IA, and the Permit, the USFWS can only require additional mitigation for Covered Species beyond that provided for in the HCP as a result of Unforeseen Circumstances in accordance with the "No Surprises" regulations at 50 C.F.R., Sections 17.22(b)(5) and 17.32(b)(5). Essentially, non-federal landowners are assured that if Unforeseen Circumstances arise, the USFWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee.

Operations and Maintenance (O&M): Activities performed by the Water Authority include (but are not limited to) facility security and surveillance; access road

Acronyms and Definitions

maintenance, repair, re-establishment, and upgrades; stream crossing improvements (Arizona Crossings); culvert replacement and cleaning; mowing; protection of underground facilities in waterways; fire protection; herbicide application; weed abatement in mitigation areas; tree trimming and removal; pest control; and draindowns. A complete summary of O&M Activities is included in Section 5.0.

Permanent Impacts: Permanent Impacts are those which result in the permanent removal of vegetation that cannot be mitigated onsite through revegetation and other restoration efforts.

Permit Area: The portion of the Plan Area where the Water Authority has obtained authorization from the Wildlife Agencies for the Authorized Take of Covered Species while carrying out Covered Activities.

Permits: Collectively the federal incidental take permit issued by USFWS to the Water Authority pursuant to section 10(a)(1)(B) of ESA, as it may be amended from time to time, and the State take permit issued to the Water Authority pursuant to Section 2835 of the California Fish and Game Code, as it may be amended from time to time.

Permittee: The San Diego County Water Authority.

Plan Area: Lands covered by the Water Authority Plan Permits. The Plan Area encompasses the Water Authority's exterior Service Area boundary and those lands that extend northward into Riverside County within a one-mile area on each side of the water delivery systems originating at Lake Skinner and Diamond Valley Reservoir that serve San Diego County, as well as exterior boundaries of other facilities within San Diego County that are outside the Service Area boundary. The Plan Area encompasses approximately 992,000 acres.

Planned Project: Planned Projects are known projects that have not been approved/permitted by the Wildlife Agencies but have been analyzed under this Plan. Planned Projects, which include the current CIP, are Covered Activities under this Plan.

Preserve (Preserve Lands): A geographic area that is dedicated and accepted as permanent habitat conservation area and is managed for biological resources.

Preserve Area: The combined acreage of the HMAs and any future permanently conserved or managed lands (e.g. HMAs) that are subsequently added to the Plan's commitments as a result of satisfying mitigation obligations pursuant to the Plan.

Preserve Area Management Plan (PAMP): Management plans prepared for the Water Authority Preserve Areas that provide detailed descriptions of the land management actions, restrictions, and practices that will be undertaken to maintain effective habitat for the Covered Species.

Probable Impact Zone (PIZ): An area including the rights-of-way and other facility properties, together with a 1000-foot strip of land on each side of the rights-of-way, and the outer edge of other facility properties, where most of the planned or future Covered Activities would occur. The PIZ encompasses existing facilities and lands owned by or under the control of the Water Authority including infrastructure rights-of-way (with and without underlying fee ownership), together with MWD's rights-of-way originating at Lake Skinner and Diamond Valley Reservoir that serve San Diego County, and a 1000-foot area on each side of rights-of-way and 1,000-foot area around the boundaries of nonlinear facilities. The PIZ encompasses approximately 64,600 acres.

Regional Water Facilities Master Plan (Master Plan): Prepared by the Water Authority in 2002, the Master Plan functions as a road map for implementing cost-effective major capital improvements needed to serve forecasted water demands through 2030.

Resources Agencies: Agencies responsible for regulating laws pertaining to natural resources. Resource agencies in this document refer to USFWS, USACE, and CDFG.

Restoration: The re-establishment of vegetation types, habitat conditions, and diversity of plant species on lands where natural habitats once existed but have been removed, either from human induced or natural events.

Rights-of-way: Existing and future land where structures, pipelines and access routes used by the Water Authority or MWD are located. Existing Water Authority rights-of-way occupy approximately 2,900 acres of land. Rights-of-way may be held in fee ownership or as an easement; approximately 90 percent are Water Authority's rights-of-way are easements and 10 percent are Water Authority fee-owned parcels. Portions of the Water Authority's existing rights-of-way remain undeveloped (i.e., lacking either active agricultural or urban land uses), with some areas retaining native vegetation (generally recovered areas of prior pipeline construction).

Road Rut Vernal Pool: Shallow, water-filled depressions that form on dirt roads in areas where vernal pool complexes historically have been identified. Ponding may occur in areas with repetitive compaction of the soils, such as access roads and adjacent to facility structures. Ponded road ruts are generally sparsely vegetated or unvegetated and are often distinguished from vernal pools by the absence of vernal pool indicator plant species (such as *Psilocarphus brevissimus*, *Downingia cuspidata*, *Eleocharis macrostachys*, and *Callitriche* spp.). However, ponded road ruts have the potential to support sensitive vernal pool wildlife species, including fairy shrimp species and spadefoot toad.

Section 4(d) Rule: The regulation concerning the coastal California gnatcatcher (*Polioptila californica californica*) published by USFWS on December 10, 1993, and codified at 50 C.F. R. 17.41 (b) pursuant to the ESA, which describes the conditions

under which the incidental take of the coastal California gnatcatcher in the course of certain land use activities is lawful.

Section 7: A section of the federal Endangered Species Act that describes the responsibilities of federal agencies in conserving threatened and endangered species and provides for consultation between a federal agency and the USFWS to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species.

Section 10: A section of the federal Endangered Species Act that allows for the incidental take of endangered and threatened species of wildlife by non-federal entities. Section 10(a)(2)(B) of the ESA requires an applicant for an incidental take permit to submit a conservation plan that specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts. Conservation plans prepared under the ESA, including this Plan, are known as HCPs.

Section 404: A provision of the Clean Water Act (CWA), codified in 33 USC 1251–1376, through which USACE regulates the discharge of dredged or fill material into Waters of the U.S., including wetlands and jurisdictional non-wetland waters. Permits for impacts to wetlands or jurisdictional non-wetland waters are issued through Section 404 of the CWA. If the permit action may affect federally listed species, USACE is required to consult under section 7 of the federal ESA prior to 404 permit issuance.

Section 1600: Section 1600 *et seq.* of the Fish and Game Code regulates alteration of streambeds through issuance of a Streambed Alteration Agreement. This regulation applies to all lakes, rivers, streams, and streambeds that show signs of intermittent water flow. This process is subject to CEQA, and may include project changes and mitigation measures.

Section 2835: Section 2835 of the Fish and Game Code allows CDFG to authorize incidental take in an approved NCCP. Take may be authorized for any identified species whose conservation and management is provided for in the plan, whether or not the species is listed as threatened or endangered under the state Endangered Species Act, with the exception of state Fully Protected species.

Sensitive Biological Resources: Sensitive species (listed and/or considered rare within the region), sensitive habitats (see definition below), wetlands, and the Preserve Area.

Sensitive Habitats: Habitats considered to be rare or threatened in the region, support sensitive plant and wildlife species, and/or are under the protection of federal and state policies or regulations.

Service Area: The geographical area where the Water Authority sells water to its Member Water Agencies. The Service Area corresponds to the combined municipal and water district jurisdictional areas served by the twenty-four Member Water Agencies.

Subregional Plan: Planning areas within the coastal sage scrub ecologic unit for a group of related jurisdictions (e.g., MSCP for the County of San Diego and City of Chula Vista, MHCP for North County cities, and Joint Water Agencies for three southern San Diego County water agencies). Subregional plans provide processes, guidelines, and other features that are common to all jurisdictions for their use in creating individual subarea plans. Subregional plans are prepared with the input of all participating jurisdictions and relevant regulatory resource agencies.

Subarea Plan: Prepared by individual jurisdictions using the guidelines and policies provided in a Subregional Plan. Subarea plans describe specific conservation, management, land use, and facilities siting actions that a jurisdiction will take to implement the goals and policies provided in the Subregional Plan. Describes how the jurisdiction will use their existing project review and approval process to ensure the implementation of the Subregional Plan. Used as the basis for the Implementing Agreement.

Survey Area: A planning designation within the Plan Area that provides the basis for determining which species would be appropriate for inclusion in the Covered Species list. The Survey Area encompasses existing facilities and lands owned by or under the control of the Water Authority including infrastructure rights-of-way (with and without underlying fee ownership), together with MWD's rights-of-way originating at Lake Skinner and Diamond Valley Reservoir that serve San Diego County, and a one-mile area on each side of rights-of-way and facilities.

Take (Taking): Take and Taking have the same meaning provided by FESA and its implementing regulations with regard to activities subject to FESA, and also have the same meaning provided in the California Fish and Game Code with regard to activities subject to CESA and NCCPA.

Take Authorization: Incidental take authority granted pursuant to the ESA and/or Section 2835 of the state NCCPA.

Temporary Impacts: Impacts in areas which can be revegetated and restored at the conclusion of the Covered Activity. For the purposes of this Plan, there are two types of temporary impacts: one-time disturbance and repeated disturbance. Mitigation for one-time disturbance is mitigated onsite through planting and restoration efforts. Mitigation for repeated disturbance would require mitigation according to established ratios for permanent impacts for the initial disturbance, and subsequent disturbance would only require that the area is revegetated; no additional offsite mitigation would be required.

Threatened Species: A species designation under ESA or CESA defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Unforeseen Circumstances: Unforeseen Circumstances under the Federal Permit means changes in circumstances affecting a Covered Species or geographic area covered by the NCCP/HCP that could not reasonably have been anticipated by the plan developers and USFWS at the time of the plan's negotiation and development, and that result in a substantial and adverse change in the status of a Covered Species. Unforeseen Circumstances under the State Permit means changes affecting one or more species, habitat, natural community, or the geographic area covered by a conservation plan that could not reasonably have been anticipated at the time of plan development, and that result in a substantial adverse change in the status of one or more Covered Species.

Urgent Repairs: Actions required when a facility or structure is compromised and requires repairs to remain functional. Urgent repairs are those that do not pose an immediate threat to life or property, but are among the top priorities of the Water Authority to ensure continued service, as they have the potential to jeopardize the integrity of the water treatment, delivery, and storage system if deferred (see also Emergency Actions).

U.S. Army Corps of Engineers (USACE): Agency of the U.S. Department of Defense charged with administering the Clean Water Act.

U.S. Fish and Wildlife Service (USFWS): The United States Fish and Wildlife Service, an agency of the United States Department of Interior.

Validation Monitoring: A process to determine if predictive models or conditions outlined in the conservation analysis adequately protect the Covered Species within the Plan Area. Used to track trends in population performance measures and confirm that as environmental attributes change, wildlife and plant populations respond as predicted.

Vegetation Tier(s): Categories into which ecologically/biologically-similar or similarly rare vegetation communities are grouped. This Plan uses tiers that are generally comparable to those used in other conservation plans within San Diego County.

Vernal Pool: Seasonal wetlands that form in depressions on soils above a water-restricting layer of soil or rock. Plant and animal taxa endemic to vernal pools are those which can adapt to a unique cycle of flooding, temporary ponding, and drying (also see Road Rut Vernal Pool).

Vernal Pool Habitat: In this Plan, Vernal Pool Habitat means the seasonal wetland defined as a Vernal Pool together with its contributing upland watershed.

Water Authority: The San Diego County Water Authority; established following the passage of the County Water Authority Act of 1943. As a regional public agency, the Water Authority's mission is to provide a safe, reliable water supply to the San Diego region.

Wetlands: Generally defined as those areas that are inundated or saturated by surface or ground water at a frequency or duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include those vegetation communities and land cover types listed under "Wetland Habitats" in Table 6-5.

Wildlife Agencies: USFWS and CDFG.

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1.0 Introduction

The San Diego County Water Authority (Water Authority) is responsible for providing a safe, reliable water supply to the San Diego region. In order to effectively and efficiently execute its mission and to streamline environmental compliance, it is imperative that the Water Authority achieve a high degree of certainty with respect to environmental regulations and policies when conducting its activities.

At present, no single environmental issue has greater potential to impact Water Authority actions, or holds more uncertainty with respect to the implementation of those actions, than obtaining permits for project impacts to federally and/or state-listed endangered and threatened species. The San Diego region has more rare, threatened, and endangered species than any comparable land area in the continental United States, and has been identified as a major “hot spot” for biodiversity and species endangerment (Dobson et al. 1997; Myers et al. 2000). San Diego County is also a rapidly growing region. This combination of high biodiversity, large numbers of rare and unique species, and rapid growth and urbanization has led to conflicts between development and conservation.

The traditional project-by-project process for addressing listed species issues is time-consuming, costly, and potentially ineffective for the species. The project-by-project approach results in piecemeal mitigation efforts and uncoordinated conservation of scattered habitat areas. In recent years, the Water Authority has addressed as many as 16 federally and/or state-listed species during the planning, constructing, and/or maintenance of facilities. The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG), collectively referred to as the Wildlife Agencies, are working with local agencies and jurisdictions to develop and implement regional planning and conservation programs that preserve and link habitats to ensure region-wide protection of species and ecosystems. The Water Authority has determined that development of this Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP, or Plan) will result in a greater degree of project planning and implementation certainty for the Water Authority and more effective conservation for the Plan’s Covered Species. Additionally, the Plan will provide continuing support to other regional conservation plans by providing a more comprehensive approach to conservation efforts.

Under this Plan, conservation and management of Covered Species will occur under a comprehensive approach that contributes to the ongoing conservation and management efforts in San Diego County and southwestern Riverside County. This Plan addresses only Water Authority projects, which are not covered by any other plan. Mitigation for Water Authority project impacts will provide species conservation that is in addition to that provided/required by other plans. This approach ensures that conservation efforts are directed to those areas most critical to maintain ecosystem function and species

1.0 Introduction

viability. The Plan provides avoidance, minimization, and mitigation measures for the conservation of Covered Species and commits key Water Authority habitat lands for the benefit of Covered Species. Water Authority lands include the Preserve Area, Managed Mitigation Areas (MMAs), undeveloped rights-of-way, and habitat in and around facilities. These lands provide connectivity to other open space lands and supplement habitat conservation (NCCP/HCP reserve systems) in the region.

1.1 San Diego County Water Authority

This section provides background information on the Water Authority, including its history, mission, key planning documents, approach to environmental policies, and existing agreements with the Wildlife Agencies.

1.1.1 Mission and Background

The Water Authority was established following passage of the County Water Authority Act of 1943 by the California legislature. The County Water Authority Act provides for the organization, incorporation, and government of county water authorities, authorizing and empowering such authorities to acquire water and water rights, and to construct, operate and manage works and property, to incur bonded indebtedness therefore, to provide for the taxation of property therein, and the performance of certain functions relating thereto any officers of county within which any such authority may be located, to provide for addition of areas thereto, and the exclusion of areas therefrom (Stats. 1943, c., 545, p. 2090.) The County Water Authority Act describes the powers of a county water authority, including acquire by grant, purchase, bequest, devise or lease, and hold, enjoy, lease, or sell or otherwise dispose of, any real and personal property of any kind within or without the authority and within and without the state necessary or convenient to the full exercise of its powers; acquire, construct or operate, control, and use any works, facilities, and means necessary or convenient to the exercise of its powers, both within and without the authority, and within and without the state, and perform all things necessary or convenient to the full exercise of the powers granted in this act. The authority to exercise the power of eminent domain to take any property necessary to carrying out the powers granted is in the County Water Authority Act.

The County Water Authority Act allows county water authorities to utilize any of their waters, and works, facilities, improvements, and property used for the development, storage, or transportation of water, to provide, generate, and deliver hydroelectric power, and may acquire, construct, operate, and maintain any and all works, facilities, improvements, and property necessary or convenient for that utilization.

Furthermore, the County Water Authority Act allows for the following: “an authority located within San Diego County may acquire, construct, own, operate, control, or use,

within or without, or partially within or partially without, its territory, works or parts of works for supplying its member public agencies, or some of them, with gas or electricity, or both gas and electricity, and may do all things necessary or convenient to the full exercise of these powers.”

The Water Authority provides the imported water supply to San Diego County. Historically, residences and businesses relied on local water supplies to meet their needs. Increased water demands for World War II military and civilian activities in the county led to passage of the County Water Authority Act and the formation of the Water Authority as a regional entity to seek ways to supplement local water supplies. The Water Authority became a member agency of the Metropolitan Water District of Southern California (MWD) in 1946 to gain access to Colorado River water. The Water Authority continues to purchase imported water from MWD today, with water deliveries from the Colorado River and the Sacramento-San Joaquin River Delta area in Northern California.

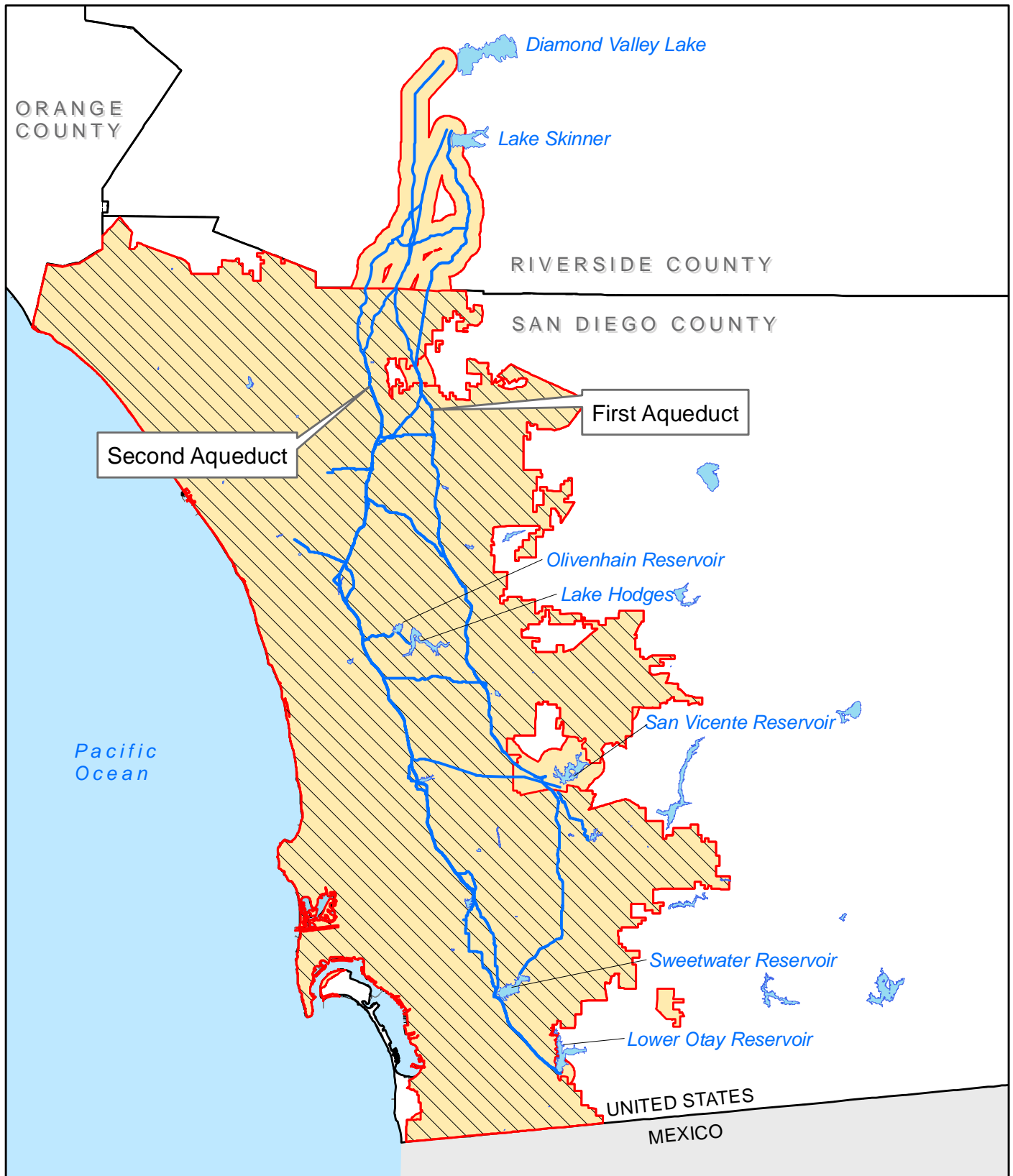
The mission of the Water Authority is to provide a safe and reliable supply of water to approximately three million people who live and work in the San Diego region. To accomplish this mission, the Water Authority must maintain and operate existing facilities, plan and construct new facilities, and respond to projected future regional water demands. During the past 10 years, the Water Authority has diversified its water supply to continue the supply of safe, reliable water to meet the region’s demands. This diversification includes the following:

- A water transfer agreement with Imperial Irrigation District (IID) to improve water supply reliability;
- Conservation, water recycling, and groundwater development programs to maximize local water supplies;
- A Regional Water Facilities Master Plan (Master Plan) that identifies future water demands and the facilities required to meet those demands. The Master Plan highlights seawater desalination as the preferred alternative; and,
- A Capital Improvement Program (CIP) to enhance the water delivery system, including the Emergency Storage Project (ESP).

In the future, the Water Authority will continue to explore new water supply options to enhance reliability. The Water Authority will continue to adapt and transform in order to provide the water and infrastructure needed to sustain the region’s quality of life.

1.1.2 Water Authority Planning Documents

The Water Authority supplies water to 24 Member Water Agencies through the First Aqueduct (two pipelines) and Second Aqueduct (three pipelines) (Figure 1-1). The



- NCCP/HCP Plan Area
- Water Authority Service Area Boundary
- Existing/Planned Aqueducts and Pipelines

FIGURE 1-1
Water Authority Plan Area and Service Area

Member Water Agencies are not signatories to this NCCP/HCP or the associated Implementing Agreement (IA) and will be required to obtain their own California Endangered Species Act/Endangered Species Act (CESA/ESA) authorization for their activities. The Water Authority's Service Area is the geographical area where it provides water to its Member Water Agencies (see Figure 1-1). The Service Area corresponds to the combined areas served by the 24 Member Water Agencies. The total length of pipelines in the Water Authority's Service Area is approximately 286 miles. These pipelines carry both treated and untreated water to San Diego from MWD's storage, treatment, and conveyance facilities in southwestern Riverside County.

To ensure that the Water Authority is able to fulfill its mission, the Water Authority prepares, reviews, and updates the following documents and plans:

- **Regional Water Facilities Master Plan (Master Plan)**, to serve as a roadmap for implementing major capital improvements necessary to ensure a safe and reliable water supply through 2030 and beyond;
- **Capital Improvement Program (CIP)**, to determine how best to provide the facilities necessary for meeting water demands;
- **Long-range Financing Plan**, to determine how to best provide the funds necessary to implement the various programs; and,
- **NCCP/HCP**, to protect biological resources while conducting the activities necessary to provide a safe and reliable water supply to the region.

1.1.2.1 Regional Water Facilities Master Plan (Master Plan)

The Master Plan develops, evaluates, and analyzes facility options and recommendations to meet future water demands. As a system-wide program, the Master Plan focuses on long-term planning rather than construction of individual projects. The Water Authority prepared and approved a Master Plan that evaluated the ability to meet its mission through 2030 (Water Authority 2002). The evaluation was based on current plans for water supply and facility improvements, with consideration of additional facility improvements and new facilities needed to cost-effectively meet the Water Authority's mission. The Master Plan is intended to serve as the road map for implementing major capital improvements needed by the Water Authority to meet demands through 2030. Based on recommendations in the Master Plan, the CIP is developed and updated on an annual basis. The implementation of a specific CIP project is determined initially during the Water Authority's biennial budget cycle. A project's implementation prioritization may be changed from year to year based on evaluation of data collected and analyzed by the Water Authority. Adding a major capital improvement project to the CIP that is not identified in the Master Plan requires specific action by the Water Authority's Board of Directors (Board), and such a request would be supported with appropriate

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documentation. The Board certified the Final Program Environmental Impact Report (FPEIR) for the Master Plan on November 20, 2003 (Water Authority 2003), and approved the identified projects for planning purposes. The Water Authority's CIP list of planned projects is typically updated annually, but projects may be added by the Board of Directors at any time.

1.1.2.2 Capital Improvement Program (CIP)

The CIP is designed to meet the Water Authority's mission of providing a safe and reliable supply of imported water (Water Authority 2004a). The CIP is reviewed on an annual basis and has the flexibility to be adjusted for changes in demand projections, economic factors, and the needs of Member Water Agencies. These changes may result in the addition or deletion of projects to the CIP and/or the acceleration, modification, or delay of project schedules. The current CIP includes the construction of new projects and the expansion of existing facilities.

The individual projects in the CIP are subject to environmental review under the appropriate California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA) requirements. Where new or expanded service is proposed, the projects have been examined in conjunction with existing demand, as well as planned land uses of the land use authority in the specific portions of the Water Authority's Service Area. In each of these reviews, the cumulative effects of Water Authority actions are evaluated with other projects that have occurred or are planned for the local project area.

Certain projects within the CIP have existing approvals and/or permits under separate actions. These permits allow for impacts to one or more Covered Species. For example, project construction and operation and maintenance (O&M) activities affecting a specific Covered Species, such as the coastal California gnatcatcher (*Polioptila californica californica*), may be addressed under previous Biological Opinions (BOs). Where the Wildlife Agencies have already issued incidental take authorizations for Covered Species addressed by projects that have already been permitted, no additional approvals are required under this Plan. Existing BOs are described in detail in Section 1.1.4.

Those Covered Species not previously authorized may be covered for projects under this Plan. In addition, if there are changes to the project that would result in take to a Covered Species not covered by the existing approvals and permits, the Water Authority would seek coverage under this Plan. Therefore, it is important to distinguish between those projects that are already permitted and those projects which require coverage under this Plan.

Water Authority projects are classified as Existing, Planned, and Future Projects. Each of these project categories is described below. Table 1-1 summarizes projects based on their type and identifies existing permit status.

1.1.2.2.1 Existing Projects

Existing Projects refer to those facilities and water system components which are constructed or in the process of being constructed under existing permits and approvals. Existing facilities include, but are not limited to: flow control facilities (FCF), aqueduct structures and pipelines, dams and reservoirs, flow regulatory structures (FRS), and pump stations. Construction may or may not be complete for Existing Project facilities. For phased projects, Existing Projects refer to those phases which have been completed or for which construction is expected to commence prior to the approval of this Plan. Required permits for construction, including permits for incidental take of federally and/or state-listed Covered Species, have already been authorized. Unless otherwise noted, this Plan would cover O&M Activities for Existing Projects.

Existing Projects were permitted based on an agreed-upon site, design, project footprint, or alignment. If the Water Authority proposes project changes that could result in new or previously unidentified impacts, any additional impacts would be offset consistent with this Plan. In this case, the existing approvals would be subject to review. In addition, if Covered Species not observed during the original permit process are observed at an Existing Project site, the impacts to Covered Species will be addressed consistent with this Plan.

Several of the Water Authority's larger projects may involve regional entities, facilities operated by Member Water Agencies, and multiple jurisdictions with land use control. Due to updated projections for water demand or storage, as well as land use considerations, certain proposed alignments or projects may undergo changes that were not considered or covered under the existing approvals and permits. Where Existing Projects propose alternative alignments or add project components that are not covered under existing permits, these changes and any measures to offset additional impacts will conform to the conservation strategy and avoidance, minimization, and mitigation measures of this Plan.

Certain Existing Projects contain terms or conditions in their permits that relate to the type or timing of construction and O&M Activities (such as work outside the breeding

**TABLE 1-1
SUMMARY OF PROPOSED COVERED PROJECTS AND PERMIT STATUS**

Projects	Project Status	Permit Status
Flow control facilities (FCF)		
San Diego 12 Expansion	Planned	--
San Diego 24/25/26 FCF	Planned	--
System Regulatory Storage		
Hubbard Hill FRS	Planned	--
North County Distribution Pipeline FRS	Planned	--
Slaughterhouse Terminal Reservoir Tank	Planned	--
First and Second Aqueduct and other Pipelines		
Second Crossover Pipeline	Planned	
Pipeline 6 ⁴	Existing	Permitted under BO 1-6-93-F-28 ¹
Restore Untreated Water Delivery in La Mesa-Sweetwater Extension	Planned	--
Ramona Reservoir Bypass	Planned	--
Conversion of Pipeline 3 to Untreated Water; Crossover to Miramar	Planned	--
Long-Term Replacement/Relining of Pre-stressed Concrete Cylinder Pipeline	Existing	Permitted under BO 1-6-93-F-28 ¹
Pipeline 4 Relining	Existing	Permitted under BO 1-6-93-F-28 ¹
Pipeline 3 Relining	Existing	Permitted under BO 1-6-93-F-28 ¹
Escondido-Vista WTP Connection		
a. Escondido-Vista Pipeline Connection	Planned	--
b. Escondido-Vista Pump Station	Planned	--
c. Escondido-Dixon Pipeline	Planned	--
Poway Pump Station and Treated Water Connection	Planned	--
Pump Stations		
San Diego 17 Pump Station	Planned ¹	--
Lower Otay Pump Station	Planned	--
Pump Stations for Pipeline 3 and Pipeline 4	Existing	Permitted under 1-6-97-F-13 ¹
Padre Dam Pump Station Expansion	Planned	--
Water Treatment Plants		
Twin Oaks Valley Water Treatment Plant	Existing	No permits required
Dam/ Reservoir		
San Vicente Dam Raise	Existing	A portion of this project associated with the ESP is permitted under BO 1-6-97-F-13, and under BO 2008B0061-2008F0732; implementing this project as one action requires coverage under the Plan. ²
Olivenhain-Hodges Pumped Storage O&M	Existing	Permitted under BO 1-6-97-F-13 ³
Lake Hodges and San Vicente	Existing	Permitted under BO 1-6-97-F-13 ³
Wetland Mitigation		
Tijuana River Valley (MHA) Wetlands Mitigation Project	Planned	--
San Luis Rey River (MHA) Wetland Mitigation Project	Planned	--

¹ Species covered: coastal California gnatcatcher.

² Species covered: coastal California gnatcatcher, least Bell's vireo, and arroyo toad.

³ Species covered: coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, arroyo toad, and quino checkerspot butterfly. Olivenhain Reservoir is not covered under BO 1-6-97-F-13.

⁴ An alternative alignment is being considered for this project.

season). These existing permits continue to apply. In addition, certain types of O&M Activities for Existing Projects (such as mowing for the ESP under BO 1-6-97-F-13) have permit coverage; however, the Water Authority is seeking comprehensive coverage for its entire water conveyance, storage, and treatment system (including any associated energy generating components) under this Plan. As mentioned above, Existing Projects with proposed footprints or design considerations and timing that sufficiently deviate from existing alignments or capacity will comply with this Plan.

1.1.2.2 Planned Projects

Planned Projects, which include the current CIP (Figure 1-2), do not currently have permits and involve activities which could result in incidental take; therefore, Planned Projects are proposed for coverage under this Plan.

Planned Projects apply to facilities and water system components that are in the planning or design phase for which a purpose and need, as well as approximate or definite project locations, have been identified. Planned Projects could apply to new construction or modification of existing facilities. As an example, a Planned Project could include upgrades or expansion of the footprint or capacity of an existing facility. Planned Projects are considered in the conservation analysis and proposed for coverage under this Plan. Planned Projects may or may not require environmental review through CEQA and/or permits through the Wildlife Agencies, depending on their location and the impacts identified.

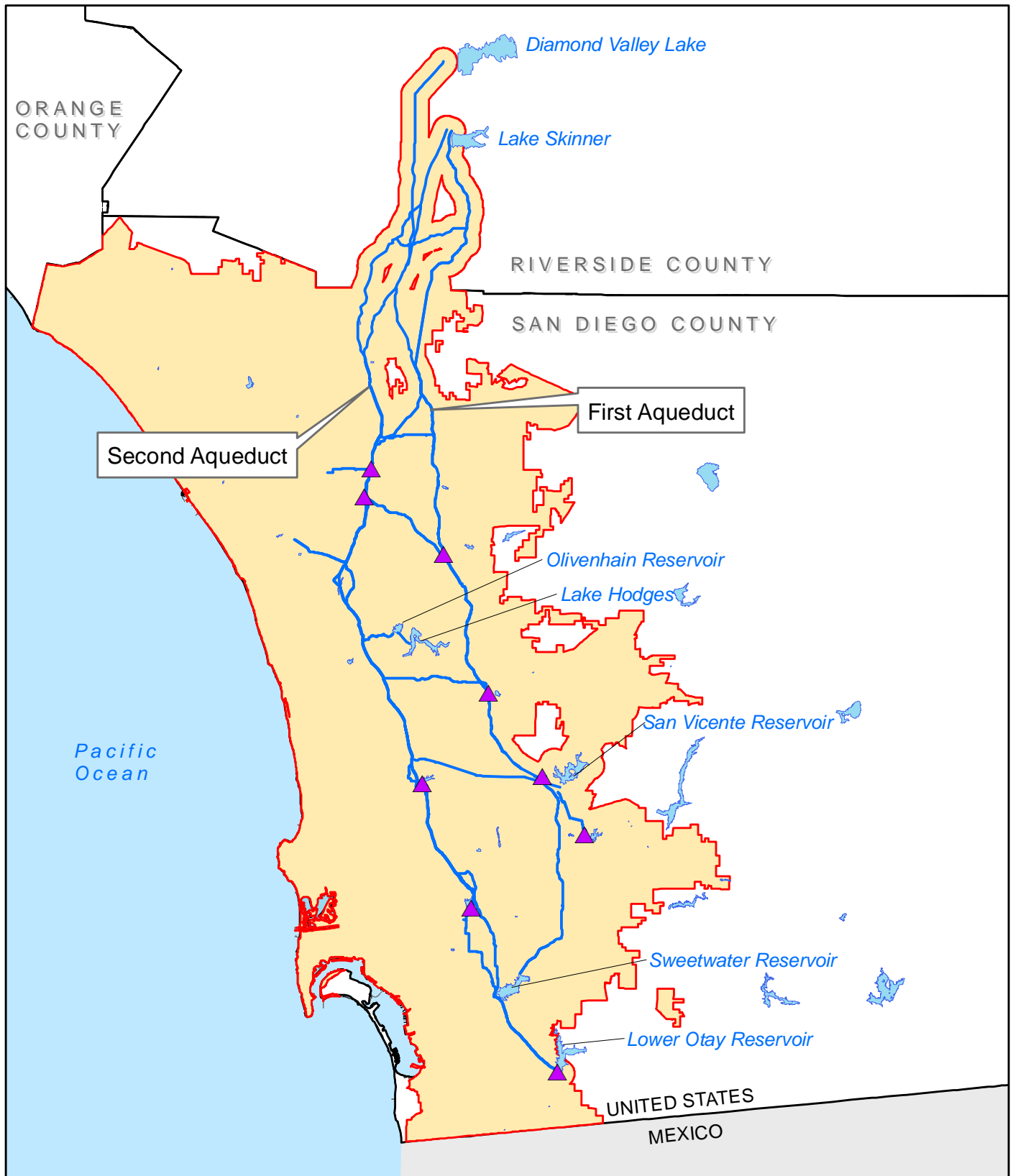
1.1.2.3 Future Projects

Future Projects and/or Activities are those that were not designated as CIP budgeted projects at the time of Plan approval. Site-specific impacts and take information were not available to analyze, and the impacts/take analysis is based on projecting the existing trend of facility build-out and O&M associated with Existing and Planned Projects to the maximum Plan term (55 years)

Future Projects and/or Activities could involve Covered Activities for existing or new facilities or O&M and would be subject to the amendment process for take coverage.

1.1.2.3 Long-range Financing Plan

The Long-range Financing Plan is a policy document that guides how the Water Authority funds its CIP and operations over an extended period of time (Water Authority 2004b). The Long-range Financing Plan is comprehensive, with sections devoted to revenues, expenditures, funds, capital financing, financial planning, and investments. It is supported by a Financial Rate Modeling program, which helps develop



- NCCP/HCP Plan Area
- Existing/Planned Aqueducts and Pipelines
- CIP Projects



FIGURE 1-2
Planned CIP Projects

the most cost-effective financial strategy to fund capital projects and operating costs. The Long-range Financing Plan uses a blend of fixed and variable revenues and, through careful adherence to financial policies, ensures revenue stability. Reliance on the Long-range Financing Plan assures adequate funding of the Water Authority's commitments identified in this Plan

One of the primary uses for the Long-range Financing Plan is to serve as the capital financing roadmap for the issuance and repayment of debt. It is also an effective marketing tool to attract new investors. As the Water Authority moves forward with the execution of its CIP, the debt policy will be reviewed to ensure that it has the necessary tools to provide the best mix of financing.

1.1.3 Environmental Policies and Procedures

The Water Authority's actions are governed by a number of environmental programs, state and federal regulations, and legislative mandates designed to ensure protection of environmental quality while allowing the Water Authority to meet its water supply obligations. The Water Resources Department is responsible for ensuring that Water Authority activities conform to applicable environmental policies and regulations. As described in Section 6.0 (and Appendix B), the Water Authority has developed a set of environmental policies (narrow endemic species, vernal pools, etc.) and project requirements (avoidance, minimization, etc.) that improve conservation for species proposed to be covered by this Plan.

In partnership with Member Water Agencies, the Water Authority meets the region's water supply needs by diversifying the region's water supply sources, and building, maintaining, and operating critical water facilities in a cost effective and environmentally sensitive manner (Water Authority 2008). The Water Authority maintains an important role in the development of programs to benefit the environment while carrying out its mission. The Water Authority has directed financial assistance and representation to the development of regional NCCP/HCP planning goals.

1.1.4 Existing Biological Opinions and Mitigation Areas

Federal ESA compliance for Water Authority projects has resulted in the issuance of five BOs from USFWS and the establishment and/or acquisition of compensation areas, a Preserve Area, and MMAs, which are discussed in detail in Section 6.0. These habitat acquisition areas also serve as mitigation in compliance with state environmental regulations.

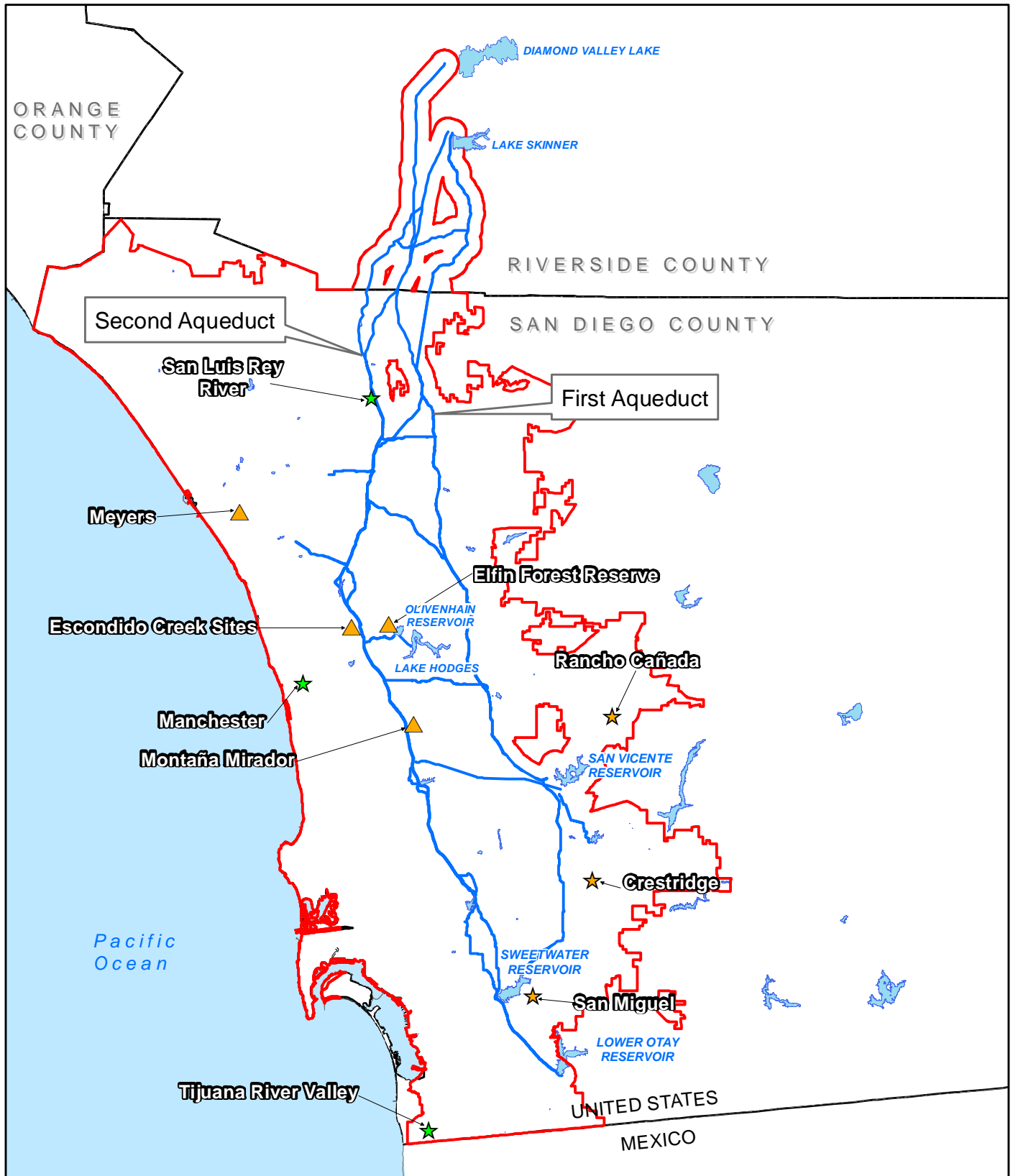
The Preserve Area includes both existing and proposed upland and wetland Habitat Management Areas (HMAs); other habitat areas may be added to the Preserve Area in

the future to meet conservation objectives (Figure 1-3). MMAs are conserved habitat lands acquired by the Water Authority for previously approved projects and are important biological areas. Both the Preserve Area and MMAs are significant contributions to regional conservation efforts. These conserved lands were purchased by the Water Authority to fulfill current and planned mitigation needs for CIP projects. Although initially purchased by the Water Authority, the perpetual management of these lands was subsequently transferred to the Wildlife Agencies or other local government agencies. Therefore, the Wildlife Agencies or local governments function as the landowners and land managers of the Water Authority's Preserve Area and MMAs. The Water Authority also contributed to the regional conservation efforts by providing funding for regional vegetation mapping used for the preparation of conservations plans by local land use agencies.

The BOs were prepared to address impacts to listed species as the result of Water Authority projects. The first BO (1-6-93-F-28), issued in 1993, addressed impacts to coastal California gnatcatcher (gnatcatcher) from 12 CIP projects. The second BO (1-6-97-F-13), issued in 1997, addressed impacts to 14 species from the ESP. The third BO (FWS-SD 1373.2), issued in 2001, related to the Moreno-Lakeside Pipeline project and addressed impacts to the gnatcatcher and arroyo toad (*Bufo californicus*). The fourth BO (2007-B-14/2007-F-22), issued in 2007, addressed impacts to the least Bell's vireo (*Vireo bellii pusillus*) and San Diego fairy shrimp (*Branchinecta sandiegonensis*) from related CIP projects at Mission Trails Regional Park. The fifth, and most recent, BO (2008B0061-2008F0732), issued in 2008, addressed impacts to the gnatcatcher, least Bell's vireo, and arroyo toad related to the Carryover Storage and San Vicente Dam Raise project (CSP). The terms and conditions of existing BOs (1-6-93-F-28, 1-6-97-F-13, FWS-SD 1373.2, 2007-B-14/2007-F-22, and 2008B0061-2008F0732) are not altered by the terms and conditions of this Plan. The terms and conditions in the previous BOs have been or will be implemented by the Water Authority and are made part of this Plan's commitments to assure their implementation and will be incorporated (by reference) into the BO for this Plan. If for any reason this Plan is not approved, or subsequently revoked, suspended or terminated, the existing BOs remain in effect.

1.1.4.1 Biological Opinion for the Capital Improvement Program; Covering the Coastal California Gnatcatcher

In 1993, a BO (1-6-93-F-28) was issued by USFWS to address impacts to the gnatcatcher resulting from CIP projects as part of a section 7 consultation between the Navy and USFWS (USFWS 1993). Of the 12 CIP projects covered by this BO, one is located within the Water Authority right-of-way on Marine Corps Air Station (MCAS) Miramar. The consultation included the CIP, except for three projects (ESP, Beeler Canyon Pipeline, and North County Treatment Plant) that did not have sufficient information at the time to adequately evaluate impacts. The BO addressed 12 projects



- NCCP/HCP Plan Area
- ~ Existing/Planned Aqueducts and Pipelines
- ★ Wetland HMA Sites
- ★ Upland HMA Sites
- ▲ Upland MMA Sites



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considered to have an impact to habitat occupied or potentially occupied by the gnatcatcher. The projects include: Ramona Pipeline; Sweetwater Bypass and Flow/Pressure Control Facility; San Marcos Pipeline; La Mesa/Lemon Grove Pipeline; Scripps Ranch Pipeline; Lower Otay Pipeline; Mission Trails Pipeline and Flow Regulatory Structure; Pipeline 2A and Pump Station; San Diego Pipeline No. 6; Rancho Peñasquitos Pipeline and Diversion Structure; Helix Treatment Plant Expansion; and the North County Distribution Pipeline. Two of these projects (Sweetwater Bypass and Ramona Pipeline) had already been completed at the time of BO issuance, yet were mitigated as though they had not been constructed. This BO outlined measures to avoid and minimize construction and operation impacts to the gnatcatcher and coastal sage scrub. In addition, the BO included a habitat-based compensation program for impacts to Diegan coastal sage scrub. The BO concluded that the listed CIP projects would not likely jeopardize the continued existence of the gnatcatcher. Compensation measures were identified to avoid and minimize adverse effects resulting from project construction and operation.

1.1.4.2 Biological Opinion for the Emergency Water Storage Project; Covering 13 Species

In 1997, a BO (1-6-97-F-13) was issued by USFWS to address impacts resulting from the Water Authority's ESP for issuance of a Section 404 permit from the U.S. Army Corps of Engineers (USACE) (USFWS 2001). Of the 14 species addressed, the BO concluded that the ESP project is not likely to jeopardize the continued existence of the 13 evaluated species, and one species was determined not to be within the project's boundaries. Mitigation measures were identified to avoid and minimize adverse effects resulting from project construction and operation. This BO included an extensive habitat-based compensation program for impacts to species and habitats.

1.1.4.3 Biological Opinion for the Moreno-Lakeside Pipeline Project

In 2001, a BO (FWS-SD-1373.2) was issued by USFWS to address impacts resulting from the Water Authority's Moreno-Lakeside Pipeline Project for issuance of a Section 404 permit from USACE (USFWS 2001). The BO concluded that the project was not likely to jeopardize the continued existence of the gnatcatcher or arroyo toad. Mitigation measures were identified to avoid and minimize adverse effects resulting from project construction.

1.1.4.4 Biological Opinion for the Flow Regulatory Structure, Pipeline Tunnel, and Stabilized Crossing Project, Mission Trails Regional Park

In 2007, a BO (2007-B-14/2007-F-22) was issued by USFWS to address impacts resulting from the Water Authority's Flow Regulatory Structure, Pipeline Tunnel, and Stabilized Crossing Project for issuance of a Section 404 permit from USACE (USFWS 2007a). The BO concluded that the project is not likely to adversely affect the gnatcatcher or Quino checkerspot butterfly (*Euphydryas editha quino*); is not likely to jeopardize the continued existence of the least Bell's vireo or San Diego fairy shrimp; is not likely to result in adverse modification of least Bell's vireo habitat; and does not affect designated or proposed critical habitat for the San Diego fairy shrimp. Conservation measures were identified to avoid and minimize adverse effects resulting from project construction and operation.

1.1.4.5 Biological Opinion for Carryover Storage and San Vicente Dam Raise Project

In 2008, a BO (2008B0061-2008F0732) was issued by USFWS to address impacts resulting from the Water Authority's Carryover Storage and San Vicente Dam Raise Project for issuance of a Section 404 permit from USACE (USFWS 2008). The BO concluded that the project as designed may affect, but is not likely to adversely affect, the Quino checkerspot butterfly and San Diego thornmint (*Acanthomintha ilicifolia*); and is not likely to jeopardize the continued existence of the gnatcatcher, least Bell's vireo, or arroyo toad. In 2009, Quino checkerspot butterfly was recorded during a pre-construction survey; therefore, USFWS amended the BO to cover this species.

1.1.4.6 Habitat Management Areas (HMA)

The Water Authority has acquired mitigation credits or mitigation rights in three existing upland properties and one wetland property. Upland properties include: the 261.05-acre Crestridge HMA, the 1,186-acre San Miguel HMA, and the 390-acre Rancho Cañada HMA. The Manchester (Wetland Mitigation Site) HMA was completed in 2005, and resulted in the creation of 7.78 acres of wetland habitats. The number of available mitigation credits is less than indicated, because portions of these properties have been designated to mitigate specific approved projects. The Rancho Cañada HMA is not intended to provide debitable mitigation credits under this Plan. The location of each HMA is depicted on figures in Appendix K.

Tijuana River Valley HMA and San Luis Rey River HMA are wetland creation projects currently in the design and planning phases with tentative construction start dates of September 2011 and September 2015, respectively. The Tijuana River Valley HMA project will create approximately 40 acres of wetlands and riparian habitats, and the San

1.0 Introduction

Luis Rey River HMA project conceptually may provide 30 acres of wetlands and riparian habitats. The number of available mitigation credits at the Tijuana River Valley HMA project will be less than indicated, because a portion of these acres have been allocated to mitigate specific approved projects.

These sites will provide additional conservation to mitigate Covered Activities' impacts to Covered Species and sensitive habitat areas. This Plan and the IA will serve as formal recognition by the Wildlife Agencies that these sites have suitable mitigation credits to mitigate for Covered Species and sensitive habitats, subject to confirmation by the Water Authority and Wildlife Agencies that the sites meet specified standards of habitat structure, as well as land protection, management, funding, and reporting identified in Section 6.0.

All existing conservation credit areas and HMAs are or will be managed by entities other than the Water Authority (San Luis Rey River HMA has not progressed to a state to determine who will be the ultimate long-term site manager). The wetland creation projects are Covered Activities under this Plan. Section 6.8 provides detailed information on these properties.

1.1.4.7 Managed Mitigation Areas (MMA)

To satisfy the requirements of BO 1-6-97-F-13 and to offset impacts to upland habitats that would result from implementation of the ESP project, the Water Authority acquired all or a portion of the following properties: Myers (35 acres), Montaña Mirador (325 acres), and Meyerhoff and Rohan (Escondido Creek Uplands) (37 acres). By agreements with the city of Oceanside, city of San Diego, and county of San Diego, fee ownership of the properties and management responsibilities were conveyed to the respective local governments. In addition, the Water Authority acquired the Elfin Forest Recreational Reserve (Elfin Forest Reserve; 750 acres) as part of the Olivenhain dam and reservoir portion of the ESP, and retains ownership of the property. The Olivenhain Water District manages the property, with 85.85 percent of the management funds provided by the Water Authority and Olivenhain MWD funding the balance.

Although these MMAs are distinct from the HMAs in that they will not provide mitigation credits for future impacts, these properties represent important habitat linkages and strategic contributions to regional conservation efforts. Section 6.9 provides additional information on these properties, and figures in Appendix K show the location of each MMA.

1.2 NCCP/HCP Plan

The Water Authority is a regional public facility provider mandated to serve the water needs of the San Diego region. The Water Authority responds to demographic forecasts prepared by the San Diego Association of Governments (SANDAG) and the service demands of its Member Water Agencies, which in turn respond to the planning activities of local municipalities, county governments, and military reservations that have land use regulatory authority. With a state mandate to provide service and limited land use authority, the Water Authority's actions are not directly growth inducing. However, certain Water Authority's actions serve planned growth, and the Water Authority acknowledges the regional benefits of participating with other public facility providers, municipalities, and county, state, and federal agencies in the development and implementation of regional conservation planning programs. The Water Authority has acquired crucial habitat areas and contributed significant fiscal resources to the various subregional planning efforts from the earliest inception of these programs. The Water Authority is committed to support those programs, whose conservation value will be augmented by this Plan, which includes the contribution, preservation and management of target habitat lands.

1.2.1 Purpose and Need

The purpose and need of the Plan are to increase the level of certainty regarding mitigation and endangered species permitting so that the Water Authority can efficiently fulfill its mission, including the need to conduct construction, O&M, and rights-of-way activities for various Covered Activities. This will be accomplished by implementing a streamlined approach to project permitting and environmental compliance for Water Authority activities. The current project-by-project, species-by-species approach for obtaining federal and state incidental take permits and authorizations will be replaced by this long-term, multi-species NCCP/HCP that will result in a more comprehensive approach to conservation of Covered Species and habitat, and will improve the efficiency and effectiveness of Water Authority conservation efforts.

1.2.2 Plan Goals

In developing this Plan, the Water Authority is establishing and implementing a long-term agreement between the Water Authority, USFWS, and CDFG for the conservation and management of Covered Species and their habitats. This agreement will allow the Water Authority to implement its CIP projects, O&M Activities, rights-of-way activities, and other authorized activities (Covered Activities) described in Section 5.0 and Appendix C, and continue to execute its mission of providing a safe and reliable water supply to the region. The Plan identifies the Preserve Area and MMAs acquired by the Water Authority

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which contribute to regional conservation efforts, and measures which ensure the persistence of Covered Species within the Plan Area.

Key goals of this Plan have been identified as:

1. Provide for habitat and species diversity through the identification and protection of preserve lands in and around Water Authority facilities for the benefit of Covered Species;
2. Identify and implement environmentally sensitive methods for planning, constructing, operating, and maintaining projects (Covered Activities) that minimize impacts;
3. Provide conservation measures that meet the environmental needs of the Covered Species, based on the best available scientific information;
4. Provide a monitoring and reporting plan;
5. Provide an adaptive management program with measurable objectives for specific species; and,
6. Provide adequate funding to implement the requirements of this conservation plan.

The IA for the Plan, which is included as Appendix A, outlines the terms and conditions to ensure that activities conducted under the Plan will adequately protect and mitigate the incidental take of Covered Species and habitat. The IA was prepared by the Water Authority for review and approval by the Wildlife Agencies concurrent with the Plan.

This Plan functions independently of, but complements, other conservation plans prepared by local governments, public agencies, or private parties, even in areas where plan boundaries overlap. This Plan covers activities outlined in Section 5.0, including O&M Activities, right-of-way activities, and covered CIP project construction. In addition, this Plan contains an amendment process that provides mechanisms for the following: updates and additions of activities and projects; expansion of the region of Plan coverage and boundaries to cover activities of future facilities, if necessary; and for adding species to be covered as information becomes available or as the need arises.

Covered Activities will be implemented pursuant to the requirements of this Plan and will, to the maximum extent feasible, conform with and not adversely affect the conservation provisions of habitat conservation plans implemented by other entities. Although not anticipated, if there is a conflict between provisions of other conservation plans concerning implementation of a Covered Activity or effects on Covered Species, the Wildlife Agencies will coordinate with the affected permittees of each plan to determine the appropriate regulatory course of action to maintain compliance with each plan.

This Plan is designed to satisfy the legal requirements of both CDFG and USFWS under the Natural Community Conservation Planning Act (NCCPA) and the ESA for incidental take of Covered Species and Critical Habitat during otherwise lawful activities conducted by the Water Authority. This Plan identifies measures to conserve habitat and to minimize and compensate for impacts such that Water Authority actions would not appreciably reduce the survival and recovery of federally and/or state-listed, candidate, or otherwise Covered Species. In addition, this Plan provides measures which will contribute to the recovery of listed species. Further, the Plan provides substantive conservation measures for Covered Species. To achieve the Plan goals, measurable objectives for each Covered Species were developed (Appendix B).

1.3 NCCP/HCP Plan Framework and Coverage

1.3.1 Plan Development and Approach

This NCCP/HCP is intended to complement other regional habitat conservation efforts and to serve as a framework document to assist other Water Authority Member Water Agencies to participate in the NCCP/HCP process.

This Plan was developed through the process of:

1. Identification of the Plan Area, including the Preserve Area and areas within which plan impacts are most likely to occur (Probable Impact Zone [PIZ] and Survey Area);
2. Identification of Covered Species for which incidental take will be sought;
3. Identification of Covered Species that will require a Major Amendment;
4. Identification of habitats in the Plan Area and the relationship of Covered Species to the representative habitats, including any special requirements for species occurring in the Plan Area;
5. Identification of Water Authority activities proposed for coverage, including an assessment of impacts that are expected to occur;
6. Development of measures to conserve habitat and to avoid and minimize impacts to Covered Species;
7. Evaluation of the adequacy of these measures to ensure that Water Authority activities will not appreciably reduce the likelihood of survival and will contribute to the recovery of Covered Species;

1.0 Introduction

8. Identification of Covered Species adequately conserved under the Plan's provisions;
9. Identification of a means to monitor, adaptively manage, and fund implementation of the Plan's measures; and,
10. Identification of a process for addressing future needs for Plan amendments, and for Changed and Unforeseen Circumstances.

1.3.2 Plan Coverage and Term

This Plan will cover Water Authority activities conducted within the Plan Area (see Figures 1-1 and 1-2) and will function independently of the NCCPs and/or HCPs of local governments or other water districts (e.g., Joint Water Agencies [JWA] NCCP/HCP) that overlap the Plan Area. Where Covered Activities are conducted within easements, permits issued pursuant to this Plan shall apply only to Water Authority Covered Activities, and are not conveyed to the underlying property owner.

Riverside County has been designated as "Major Amendment Area." Therefore, Covered Activities in Riverside County, excluding Pipeline 6, will be processed as Major Amendments if they have impacts to Covered Species. Only the Pipeline 6 alignments and associated PIZ within Riverside County are excluded from the Major Amendment Area since Pipeline 6 is an Existing Project with a certified EIR that has fulfilled its mitigation requirements and obtained its endangered species permits.

After extensive evaluation, it was determined that this Plan would cover 63 Covered Species (26 plant species and 37 wildlife species). Three species, Orcutt grass (*Orcuttia californica*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Munz's Onion (*Allium munzii*), are Major Amendment Species. Analysis conducted for the Plan determined that the appropriate process for potential take of these species would be through the Major Amendment process for the Riverside County portion of the Plan Area. The list of Covered Species is presented in Section 6.2, conservation measures are outlined in Sections 6.4 through 6.10, and species accounts/details of the conservation measures are provided in Appendix B. Incidental take would only be authorized within the Plan Area when conducted and mitigated in a manner consistent with the terms outlined in this Plan and associated documents.

This Plan and associated IA are required to obtain an incidental take permit (ITP) issued by USFWS and a NCCP Permit issued by CDFG for the take of Covered Species and federally designated and proposed critical habitat, which is incidental to otherwise lawful activities undertaken by the Water Authority. This Plan does not authorize any projects. Projects must be authorized by the Water Authority Board and are subject to environmental reviews, including CEQA and NEPA as appropriate. As applicable,

projects must also comply with Section 404 of the Clean Water Act and Section 1600 of the Fish and Game Code.

This Plan's permit term is 55 years. Each extension term would require a request by the Water Authority and subsequent written approval by USFWS and CDFG. This Plan has been developed with flexibility to accommodate future Water Authority projects and related O&M Activities. Terms for extension beyond 55 years would require a re-analysis and re-adoption of the Plan.

1.4 Public Review Opportunities, Procedures, and Requirements

The adoption and implementation of this Plan provides for various public notices, review, and comment opportunities. Public review and comment can occur during Plan adoption, project environmental review processes, and Plan amendments.

The Plan, IA, and state and federal permits issued in support of this NCCP/HCP require public review pursuant to CEQA and NEPA. An EIR/Environmental Impact Statement (EIS) for this Plan has been prepared and made available to the public.

Subsequent to approval of this Plan, public review will occur through required individual project environmental review documents; also, documents addressing plan modifications, such as major and some minor amendments to the Plan, will be circulated as appropriate. Documents undergoing public review during the CEQA/NEPA process would be placed on file at the Water Authority, and would be available for review by the public.

Also, an annual status report summarizing actions implemented pursuant to the Plan will be provided to the Wildlife Agencies and made available to the public.

1.5 Alternatives to this Subregional NCCP/HCP Plan

Two alternatives to this Plan were considered and are summarized with a brief discussion of benefits and drawbacks.

1.5.1 No Action/No Permit Alternative

The No Action/No Permit Alternative would consist of not taking any specific measures to address endangered and threatened species issues arising as a result of Water Authority activities. The Water Authority would continue to comply with applicable

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environmental programs and prior agreements to address impacts to biological species and habitats that might result from Water Authority activities. Under the No Action/No Permit Alternative, the Water Authority would remain subject to "take" prohibitions of the ESA and CESA, and would continue to obtain individual permits and management authorizations for listed species on a project-by-project basis. The Water Authority would comply with federal and state ESAs, and existing or future BOs.

The No Action/No Permit Alternative would continue the current project-by-project, species-by-species approach used by the Water Authority to obtain federal and state incidental take permits and authorizations. There are several ways in which the Water Authority would seek compliance with state and federal ESA. Where feasible, the Water Authority would attempt to redesign or modify its actions to avoid impacts to either state- or federally listed species. Where impacts from proposed activities are unavoidable, the Water Authority may obtain coverage for impacts to federally listed species through a section 7 consultation for projects that also are federal actions. If the Water Authority proposes activities which could result in the incidental take of a federally listed species, but where there is no federal action associated with the project, the Water Authority may be required to prepare an HCP that addresses federally listed species only in support of an application for a permit from USFWS pursuant to section 10(a)(1)(B) of the ESA (e.g., a Low-Effect HCP or Medium Effect HCP). Similarly, unavoidable impacts to state listed species would require the Water Authority to obtain a permit under Section 2081 of CESA.

The No Action/No Permit Alternative would not implement comprehensive conservation measures to address endangered and threatened species issues arising as a result of Water Authority activities. It would not be required to apply the same levels of mitigation and conservation to unlisted species (or possibly not have to explicitly mitigate for impacts to certain unlisted species), would not necessarily mitigate for impacts to certain vegetation communities (certain chaparral and non-native grassland communities), and potentially could elect to mitigate in areas that are not specifically part of the regional conservation effort.

Under this alternative, the Water Authority would meet the demands of regional water supply by continuing to construct, expand, operate, and maintain facilities and rights-of-way while obtaining individual take permits for each activity. Current and future activities of the Water Authority under the No Action/No Permit Alternative would be the same as those covered under the Proposed Plan Alternative. Individual project construction and expansion would be implemented through the Water Authority's CIP as guided by the Master Plan. Construction and expansion of CIP Projects and O&M Activities would be conducted in accordance with the Water Authority's existing protocols for industry-accepted planning, engineering, construction, and environmental impact minimization practices.

The Water Authority has already acquired mitigation/conservation properties (i.e., the Preserve Area). These properties were strategic purchases that provide mitigation for previously approved projects and future projects, and support regional conservation efforts. Under the No Action/No Permit Alternative, management of the Preserve Area would be conducted in accordance with the requirements of existing BOs. Because the Water Authority has already secured the Preserve Area, those which have available mitigation credits or are planned to create habitat could be used to offset impacts from Planned and Future Projects. The Water Authority would not commit the 275 acres of “additional conservation habitat” as a contribution to regional conservation, but could elect to use those habitat acres as credits for future Water Authority projects or establish a conservation bank and sell credits.

1.5.2 Full Species List Alternative

The Full Species List Alternative would commit the Water Authority to the conservation and management of a larger list of Covered Species. The Water Authority would request a section 10(a)(1)(B) permit from USFWS and Section 2835 take authorization by CDFG for incidental take for the full list of species analyzed, which is a total of 89 species (42 plant species and 47 wildlife species). Similar to the approach of the Proposed Plan Alternative, the Water Authority would continue to comply with applicable environmental programs and prior agreements, such as the existing BOs. The Full Species List Alternative, unlike the No Project Alternative, provides a benefit to the proposed Covered Species. Current and future activities of the Water Authority would be the same as those covered under the Proposed Plan Alternative. Individual project construction and expansion would be implemented through the Water Authority’s CIP as guided by the Master Plan. Construction and expansion of CIP Projects and O&M Activities would be conducted in accordance with the Water Authority’s existing protocols for industry-accepted planning, engineering, construction, and environmental impact minimization practices.

All elements and commitments of the Plan would apply to the Full Species List Alternative, with additional measures required for the full list of species. The Plan identifies the types of Water Authority activities that would be covered under the Plan and Permits, including conservation measures to avoid, minimize, and mitigate potential biological impacts and permanent commitments to manage and monitor established and proposed properties in the Preserve Area.

The NCCPA encourages protection of multiple species and their habitats. This alternative is similar to the Proposed Plan Alternative because the Water Authority would propose a mechanism to address not only federally and/or state-listed species, but other species that have been identified as having a likelihood to become listed during the proposed term of the Permits. The Proposed Plan includes a Conservation Analysis which addressed 89 species (see Appendix B), but concluded that only 63 of those

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species could be “covered.” Three additional species, Orcutt grass (*Orcuttia californica*), vernal pool fairy shrimp (*Branchinecta lynchi*), and Munz’s Onion (*Allium munzii*), are Major Amendment Species. The benefit to covering more species is that even if some species have a low likelihood of becoming listed as threatened/endangered, inclusion on the Covered Species list directs added conservation toward these species. The Plan’s minimization, avoidance, and mitigation during projects and protection in the Preserve Area would apply to a larger list of species. However, providing adequate conservation and protection for the full list of species would require more information to determine what additional conservation is necessary to cover the species. To justify the Full Species List Alternative, the Water Authority would be required to conduct/fund additional research and survey work to supplement existing species information, acquire additional habitat to add to the Preserve Area, and modify/augment management and monitoring activities. Substantial uncertainty exists regarding the time and funds that would be needed to develop the species’ basic biological information and management needs, additional preserve lands that may be needed to justify covering those species, as well as the risks that the Water Authority faces regarding not covering those additional species during the permit term. If the Water Authority pursued the Full Species List Alternative, potentially several years may be required for data collection and analysis and additional preserve land acquisitions to justify coverage. During that time, conservation and management would not be provided by implementing the Plan.

1.5.3 Reduced Plan Area Alternative

The Reduced Plan Area Alternative would call for a reduced Plan Area that only encompasses the PIZ and a reduced species list that covers only those species that are known to occur in the PIZ. The Plan Area that would be permitted would be limited to the PIZ, encompassing approximately 64,600 acres, and the Covered Activities under this alternative would be the same as those covered under the Proposed Plan Alternative. The Reduced Plan Area Alternative would allow the Water Authority to adopt the Plan as currently proposed, only with coverage proposed for those 39 species that are known to occur within the PIZ.

The Preserve Area conserved by this alternative would encompass the same HMAs as the Proposed Plan and the Full Species List Alternatives. The USFWS would consider issuing a section 10(a)(1)(B) permit and CDFG would consider authorizing a section 2835 take authorization for incidental take only for species that are known to occur in the PIZ as they are analyzed in Appendix B of the Plan, which is a total of 39 species (18 plant species and 21 wildlife species). This alternative would provide conservation for fewer species than covered in the Proposed Plan and the Full Species List Alternatives.

Under this alternative, the Water Authority would continue to comply with applicable environmental programs and prior agreements, such as the existing BOs. As described

above, the Plan identifies the types of Water Authority activities which would be covered under the Plan and Permits, and includes conservation measures to avoid, minimize, and mitigate potential biological impacts, including deducting credits from the Preserve Area. All elements contained within the Plan, as described under the Proposed Plan, would apply under this alternative with the measures in the Plan implemented for the 39 species.

The Water Authority would have a mechanism to address not only federally and/or state-listed species, but those species which have been identified as having any likelihood to become listed during the proposed term of the permit. The benefit to providing coverage only for Planned Projects/Activities within the Water Authority's rights-of-way and fee-owned lands is that it would provide certainty for both the Water Authority and USFWS regarding take authorization and minimization, avoidance, and mitigation measures for those projects already planned for in the CIP. However, by restricting the Plan Area to the PIZ, the Water Authority would have take authorization only within the PIZ; therefore, separate permits would need to be obtained for projects conducted outside of the PIZ.

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2.0 Region of Plan Coverage

2.1 Establishment of NCCP/HCP Boundaries

2.1.1 Water Authority Service Area

The Water Authority Service Area extends over 920,463 acres of western San Diego County (see Figure 1-1) and is subject to change due to annexations. The Water Authority and its Member Water Agencies currently own and operate facilities within and outside the Service Area described above that are crucial for providing a safe, reliable water supply to the San Diego region. While the Water Authority primarily undertakes projects independent of Member Water Agencies' projects, it also has a policy of participating in proposed facilities that benefit two or more Member Water Agencies when the total cost would be lower than if two separate facilities were built. As a result, Water Authority interests are widely distributed within the boundaries of its Service Area and the Plan Area.

2.1.2 Water Authority Plan Area

The Water Authority is the county of San Diego's only importer of water, and it also works cooperatively with its Member Water Agencies to develop local water supplies and reduce water demand through regionally coordinated conservation programs. The Plan Area encompasses the Service Area and those lands that extend northward into Riverside County within a one-mile area on each side of the First and Second Aqueducts originating at Lake Skinner and Diamond Valley Reservoir, as well as a one-mile area on each side of the rights-of-way, and exterior boundaries of other facilities within San Diego County that are outside the Service Area boundary (see Figure 1-1). The Plan Area also includes isolated landholdings that were never annexed by the Water Authority, but that are otherwise entirely surrounded by the Service Area, such as the Water Authority's Elfin Forest Reserve property. These lands comprise the Plan Area, which covers approximately 992,000 acres of land in San Diego and southern Riverside counties.

Currently, water imported by the Water Authority flows through the MWD Diamond Valley Lake/Lake Skinner storage system in southwestern Riverside County. MWD pipelines carry water from Lake Skinner to their delivery points in San Diego County. Therefore, the Water Authority is including a portion of southwestern Riverside County within its Plan Area boundaries, given that Riverside County facilities are critical elements of the regional water import system. In the future, the Water Authority may construct its own pipeline/appurtenant facilities from one of these reservoirs to its San

2.0 Region of Plan Coverage

Diego County facilities. Also, the Water Authority may determine to construct the extension of Pipeline 6 from Temecula to its San Diego County facilities using an alternative route than the approved (and already mitigated) alignment. None of these projects is included in or covered by another conservation plan. For these reasons, the Plan Area includes portions of southwestern Riverside County. This Plan includes Pipeline 6 alternative alignments in its analysis of potential impacts and will process approval of any Pipeline 6 alignment within Riverside County as a conditionally covered activity under the Minor Amendment process. No other Covered Activities will be processed in the Riverside County portion of the Plan except by a Major Amendment (see Section 8.4).

In addition to evaluating future water supply needs, the Water Authority also focuses on existing system reliability issues. Therefore, the Water Authority's interests include lands outside of the defined confines of its Service Area. As an example, the Water Authority's interests include the MWD pipeline corridor between Diamond Valley Lake/Lake Skinner and the northern service boundary, and the existing joint Pipeline No. 6 project. The Water Authority also has an interest in the safe and reliable operation of reservoirs located in eastern San Diego County owned by Member Water Agencies (e.g., San Vicente Reservoir, El Capitan Reservoir, and Loveland Reservoir) and is presently conducting an expansion project at the San Vicente Reservoir. The relationship of this Plan to joint projects that are planned/implemented by Member Water Agencies is described in Sections 6.0 and 8.0.

The Water Authority has been evaluating opportunities for reservoir and groundwater basin development, as well as other options to increase the water supply (e.g., water recycling and seawater desalination). Presently, 75-90 percent of the region's water supply is imported from outside the Water Authority's Service Area. It is anticipated that future management and development of existing local surface and groundwater facilities will play a key role in meeting future water demand. As a result, the protection of activities within and around these facilities is of strategic interest to the Water Authority.

2.1.2.1 Major Amendment Area – Riverside County

Within the Plan Area, the area within Riverside County (with the exception of the Pipeline 6 project area) is designated as a Major Amendment Area. Because Future Covered Activities (Projects and O&M Activities) in Riverside County could not be analyzed and permitted at the time of the implementation of the NCCP/HCP, an area of approximately 48,700 acres in Riverside County within the Plan Area has been designated as "Major Amendment Area." Future Covered Activities within the Major Amendment Area in Riverside County of the Plan Area will be processed as Major Amendments, with the exception of the Pipeline 6 alignments and their associated PIZ. Pipeline 6 alignments and associated PIZ are an exception: Pipeline 6 is an Existing Project with a certified EIR that has fulfilled its mitigation requirements and obtained its

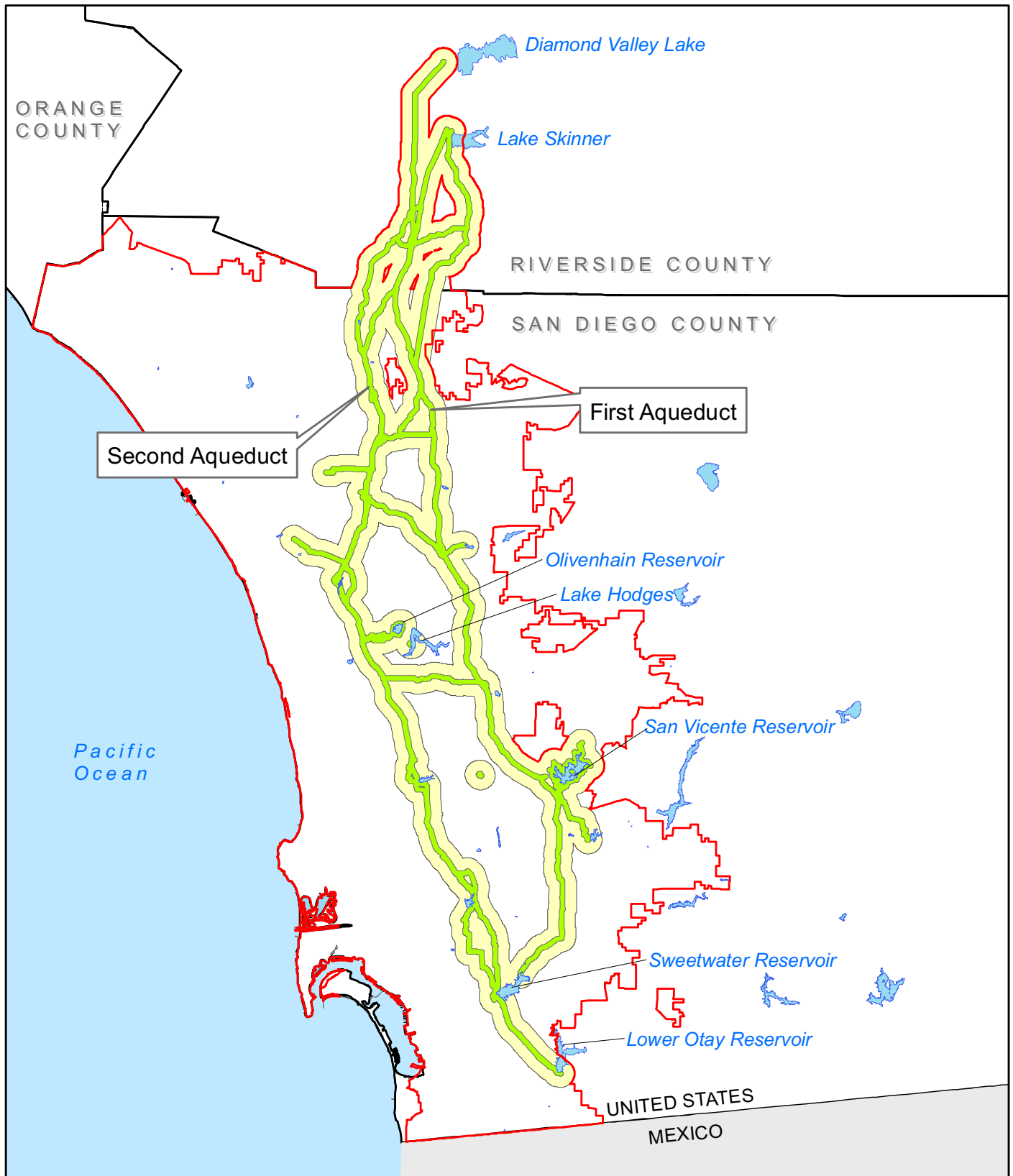
endangered species permits. This Plan includes those alternative alignments in its analysis of potential impacts and will process approval of any Pipeline 6 alignment within Riverside County as a conditionally covered activity under the Minor Amendment process.

2.1.3 Survey Area and Probable Impact Zone (PIZ)

Within the Plan Area, the Water Authority has identified a Survey Area and PIZ within which the majority of covered activities are anticipated to be located and incidental take would occur (Figure 2-1). The Survey Area encompasses existing facilities and lands owned by or under the control of the Water Authority including infrastructure rights-of-way (with and without underlying fee ownership), together with MWD's rights-of-way originating at Lake Skinner and Diamond Valley Reservoir that serve San Diego County, and a one-mile area on each side of rights-of-way and facilities. The Survey Area was delineated as the area within the Plan where the proposed Covered Species' are expected or likely to exist and where take potentially could occur. It is a planning tool used to provide the basis for determining which species would be appropriate for inclusion in the Covered Species list.

The nature of the Water Authority's water supply system dictates that Planned and Future Projects (and O&M Activities) will be mostly located along or close to the system's rights-of-way and other infrastructure. For that reason, the Plan identifies a PIZ in which most of the planned and future impacts are expected to occur. The PIZ includes 1,000 feet on either side of the rights-of-way/facilities. At present, the area of the PIZ is approximately 64,600 acres (approximately six percent of the Plan Area); however, it should be noted that the potential impacts from Covered Activities are expected to be much less (see Section 5.0 for specific descriptions of Covered Activities and Appendix C for the list and maps of Planned Projects).

Planned Projects are expected to impact approximately 71 acres of native vegetation that requires mitigation; nearly all of the project impacts are expected to occur within the PIZ or Survey Area. In addition, Future Projects/Activities and O&M are estimated to impact up to 183 acres of native vegetation within the Survey Area or PIZ that require mitigation. In addition, a potential alternative to Pipeline 6, with impacts up to 119 acres of mitigatable vegetation communities within the Survey Area or PIZ, may be approved and covered under this Plan. In total, this Plan identifies approximately 373 acres of impacts to habitats that require mitigation and may support Covered Species. Pipeline 6 is an Existing Project (discussed in Appendix C, Section 3.1.2) that has addressed its impacts for the current alignment, but that alignment currently is being reevaluated. Although it is probable that a substantial portion of the vegetation impacts associated with an alternative alignment would be temporary, all impacts are assumed to be permanent for the purpose of the Plan's vegetation community impact assessment.



- NCCP/HCP Plan Area
- Probable Impact Zone (PIZ)
- Survey Area



FIGURE 2-1
Survey Area and Probable Impact Zone

Within the approximately 1,920 acres of Preserve Area committed by the Plan, 1,220 acres have been set aside to mitigate previous projects, and approximately 700 acres are available or will be created to be used as credits to compensate project impacts to upland and wetland habitats that result from this Plan.

The rights-of-way may be augmented (e.g., increasing rights-of-way along the aqueducts) from year to year based on acquisition needs for Covered Activities. The Water Authority will maintain and update the boundaries of the rights-of-way and facilities and submit updated maps and acreage along with annual reporting requirements (see Section 6.0).

The Water Authority also acknowledges that some future facilities (i.e., Covered Activities) may be planned and located outside of the PIZ and Survey Area (e.g., water treatment plant together with its conveyance pipeline and pump stations), but within the Plan Area. This Plan requires that such projects be addressed with the Minor Amendment process described in Section 8.0.

2.1.4 Preserve Area and MMAs

The Plan Area includes large, biologically important areas that will be committed by the Plan. The three upland and three wetland HMAs comprise the formal Preserve Area that will be managed for the Covered Species in conformance with this Plan. The MMAs are habitat lands previously conserved by the Water Authority for specific projects and managed by other entities for a limited subset of the Covered Species. Both the Preserve Area and MMAs contribute to the regional conservation efforts in San Diego County (see Figure 1-3 and Appendix K). The Plan covers incidental take of Covered Species that may occur during implementation of approved monitoring and management activities on the Preserve Area, with the exception of State (CDFG) and Federal (USFWS) Preserve Area Managers. Where CDFG and USFWS Preserve Area Managers require incidental take authorizations for monitoring and management activities, such authorizations will be provided through applicable State and Federal regulatory mechanisms.

For the purpose of this Plan, the San Luis Rey River HMA wetland mitigation site is presented as an approximate location and acreage. The exact parcels, or portions of parcels, for the wetland mitigation site that contribute to the Preserve Area will be accounted for as planning proceeds and wetlands are established.

It is anticipated that adding new lands to function as Preserve Area or augmenting (increasing) a specific Preserve Area will be through a Minor Amendment process.

2.2 Future Modifications to the Plan Area

It is anticipated that the Plan Area will need to be modified to reflect Service Area annexations, future facilities, rights-of-way adjustments, additions to the Preserve Area, etc. To amend the Plan to include new lands for coverage under this Plan, it will be necessary to meet criteria identified in Section 8.0 for Major Amendments.

3.0 Relationship to Other Conservation Plans

3.1 Water Authority NCCP/HCP

The Water Authority began to prepare this Plan in 1995, at a time when other jurisdictions and regional utilities in southern California were preparing NCCP/HCPs in response to recently issued NCCPA and Coastal Sage Scrub Process Guidelines and Conservation Guidelines. Those guidelines presumed that a number of independent planning areas would be established and plans would be prepared to address conservation and management of the coastal sage scrub community. Preparing the plans under the same set of guidelines would establish the mechanism for coordinating these conservation efforts. Subsequent amendments to the NCCPA in 2003 required the Water Authority to prepare its Plan so that it would be comparable to the approved subregional plans in San Diego County. As described in Section 1.0, the Water Authority's Plan was developed to function as an independent permitting process for Water Authority projects and activities (i.e., Covered Activities), but one that is consistent with and complementary to the other plans. This Plan is not a land-use-based plan and does not impose new regulations on local, state, federal, or independent land-use agencies, private citizens, or other parties of interest within the Plan Area.

3.2 Conservation Plans in the Region

The geographical areas covered by other regional conservation plans within the Plan Area are listed in Table 3-1 and illustrated in Figure 3-1.

3.2.1 San Diego Multiple Species Conservation Program

The MSCP Subregional Plan, finalized in August 1997, is a comprehensive, long-term habitat conservation plan that addresses multiple species' habitat needs and the preservation of native vegetation in 12 jurisdictions of southwestern San Diego County. The MSCP Subregional Plan encompasses 582,000 acres, establishes a 172,000-acre preserve system, and covers 86 species of plants and animals. The Subregional Plan identifies preserve lands where conservation planning is directed and where permanent conservation of habitat will be accomplished through individual Subarea Plans.

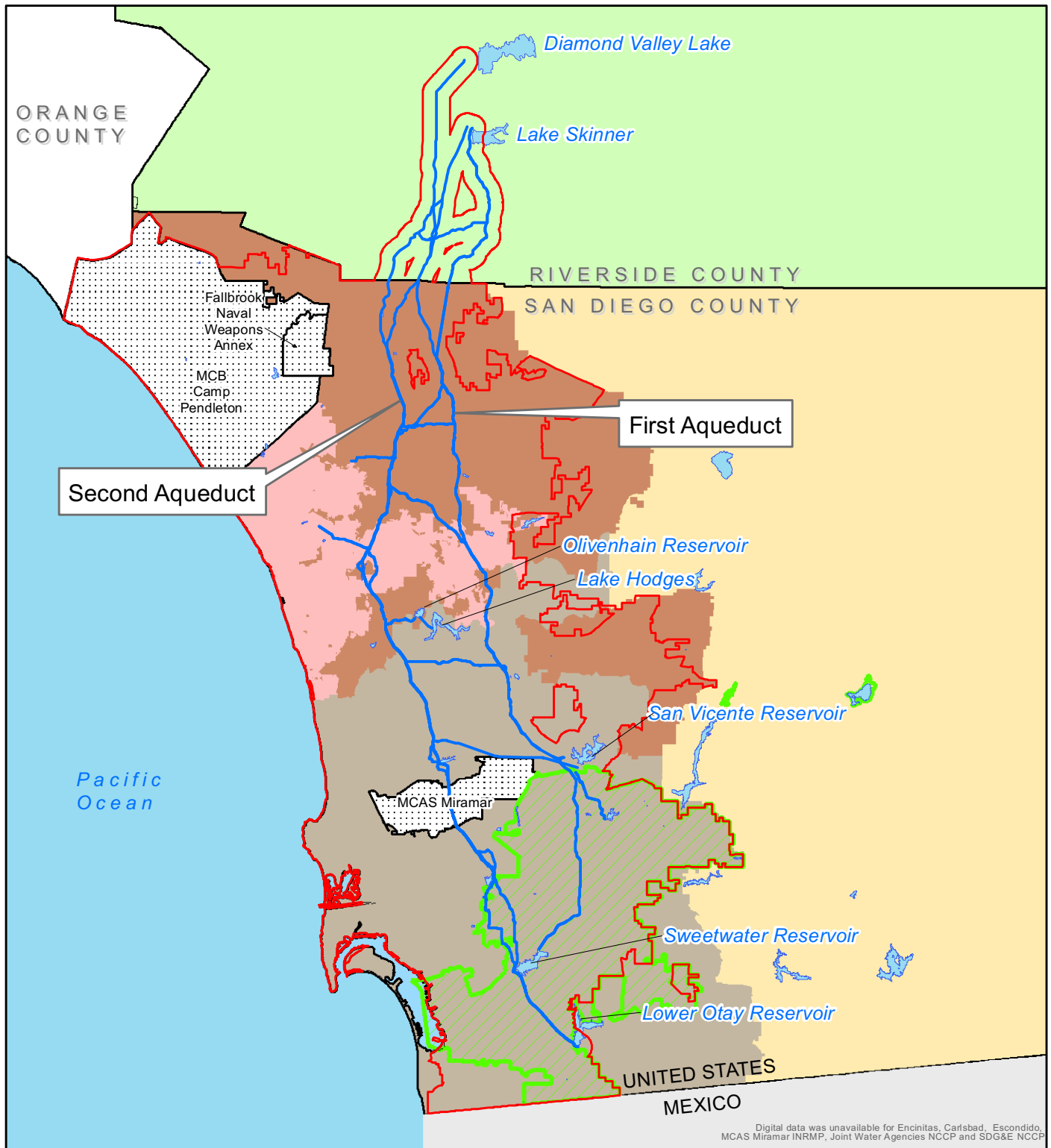
The MSCP Subregional Plan is implemented through local Subarea Plans that are approved or in process as indicated on Table 3-1. The MSCP North County Plan

**TABLE 3-1
CONSERVATION PLANS WITHIN THE PLAN AREA**

Subregional Plan	Abbreviation	Subarea Plans	Status*
Multiple Species Conservation Program	MSCP	City of Chula Vista	Approved 2005
		City of La Mesa	Approved 1999
		City of Poway	Approved 1996
		City of San Diego	Approved 1998
		City of Coronado	No Progress
		City of Del Mar	No Progress
		City of El Cajon	No current progress on draft plan
		City of Santee	In Preparation
		City of National City	N/A [†]
		City of Imperial Beach	N/A
Draft MSCP North County_Plan		City of Lemon Grove	N/A
		South County Subarea Plan	Approved 1998 In Preparation
Draft MSCP East County_Plan			Early Planning
North County Multiple Habitat Conservation Plan	MHCP	City of Carlsbad	Approved 2004
		City of Encinitas	In Preparation
		City of Escondido	In Preparation
		City of Oceanside	In Preparation
		City of San Marcos	In Preparation
		City of Solana Beach	No Progress
		City of Vista	In Preparation
Western Riverside County Multiple Species Habitat Conservation Plan	MSHCP	None	Approved 2004
Joint Water Agency Subregional Conservation Plan	JWA NCCP/HCP	Helix Water District	In Preparation
		Padre Dam Municipal Water District	In Preparation
		Sweetwater Authority	In Preparation
		Otay Water District	In Preparation
San Diego Gas & Electric Subregional NCCP	SDG&E NCCP	None	Approved 1995

* Current NCCP status can be accessed at: www.dfg.ca.gov/habcon/nccp/status.html

[†] Indicates jurisdictions that are not participating in the subregional plan.



Digital data was unavailable for Encinitas, Carlsbad, Escondido, MCAS Miramar INRMP, Joint Water Agencies NCCP and SDG&E NCCP

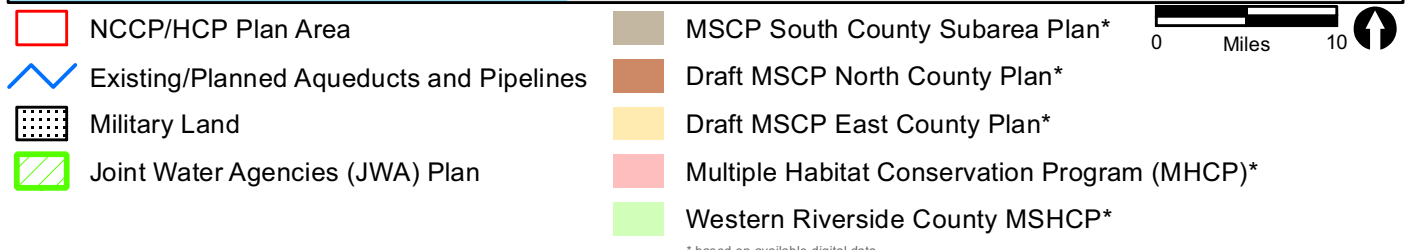


FIGURE 3-1
Conservation Plan Boundaries
in the NCCP/HCP Plan Area

3.0 Relationship to Other Conservation Plans

is currently in preparation to cover unincorporated areas of San Diego County north of the San Dieguito River, Elfin Forest and Harmony Grove, northeast of Marine Corps Base Camp Pendleton (Camp Pendleton), DeLuz, Fallbrook, Rainbow, Pauma Valley, Lilac, Valley Center, Rancho Guejito, and the majority of Ramona. The MSCP East County Plan, much of which is outside this Plan Area, is in the early planning process to cover unincorporated areas of San Diego County east of the MSCP and MSCP North County Plan areas.

3.2.2 San Diego Multiple Habitat Conservation Program

The MHCP is a conservation planning program covering seven municipal jurisdictions of northwestern San Diego County: Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista. The MHCP Subregional Plan was adopted by SANDAG in 2003. Its goal is to conserve approximately 19,000 acres of habitat, of which roughly 8,800 acres (46 percent) are already in public ownership and contribute toward the habitat preserve system for the protection of 56 covered species, 19 of which are narrow endemics. The MHCP has identified Focused Planning Areas (FPA) where permanent conservation of resources for covered species and their habitats will be accomplished. Each jurisdiction is responsible for developing their own Subarea Plan, and each Subarea Plan has specific covered species and narrow endemic species lists.

3.2.3 Western Riverside County Multiple Species Habitat Conservation Plan

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional habitat conservation plan focusing on conservation of species and their associated habitats in western Riverside County. The MSHCP was approved by the Wildlife Agencies in 2004. A total of 146 sensitive plant and wildlife species are covered under the plan. Of that total, 118 species are considered to be adequately conserved under the MSHCP; the remaining 28 species are conditionally covered. Sixteen plant species are classified as narrow endemic species. The MSHCP plan area encompasses approximately 1.26 million acres (1,966 square miles); it includes all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, as well as the jurisdictional areas of the cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, and San Jacinto. The county of Riverside has prepared individual preserve plans for each region within the county to guide implementation of the MSHCP. The MSHCP Conservation Area includes approximately 347,000 acres on existing Public/Quasi-Public Lands, and approximately 153,000 acres of Additional Reserve Lands (RCIP 2003).

3.2.4 Joint Water Agencies NCCP/HCP

The JWA draft NCCP/HCP describes how the Padre Dam Municipal Water District, the Helix Water District, the Sweetwater Authority, and the Otay Water District will manage their lands to conserve natural habitats and species while continuing to provide their mandated water services. The JWA plan addresses 50 animal species and 28 plant species, for a total of 78 species. The Subregional Plan will serve as an umbrella document for the Subarea Plans of these water districts and any water districts approved to participate in the future. A series of public workshops were held in summer 2004, and input from independent scientists was completed in late 2006 (State of California 2006c).

3.2.5 San Diego Gas & Electric NCCP/HCP

San Diego Gas & Electric's (SDG&E's) NCCP/HCP was approved in 1995 and addresses potential impacts to sensitive resources associated with SDG&E's ongoing installation, use, maintenance, and repair of its gas and electric systems, and typical expansion to those systems throughout SDG&E's easements in their existing service area (San Diego and southern Orange counties). The SDG&E NCCP/HCP includes mitigation measures and operational protocols designed to avoid potential impacts to biological resources. In addition, appropriate mitigation is provided to ensure the protection and conservation of covered species where impacts are unavoidable (SDG&E 1995). SDG&E's properties and easements play an important role in the plan region in providing habitat connectivity in areas where little natural habitat remains. The SDG&E NCCP/HCP covers 110 species, 18 of which are considered narrow endemic species. The SDG&E NCCP/HCP allows for up to 400 acres of impacts in natural areas over the 50-year permit period. A 240-acre mitigation bank, from which mitigation credits are deducted, was established at the inception of the plan. SDG&E has recently completed an amendment to their federal HCP permit (not the NCCP) to add the quino checkerspot butterfly as a covered species.

3.2.6 Assessment District 161 Multiple Species Subregional Habitat Conservation Plan

Multiple jurisdictions as well as private entities are participants in the Assessment District 161 (AD161) Multiple Species Subregional Habitat Conservation Plan associated with the buildout of residential, commercial and light industrial facilities, schools, parks, associated infra-structure, and public projects in western Riverside County. A key goal of this plan is to maintain linkages between the Lake Skinner Core and the Lake Mathews multiple species reserve system and ensure a regional preserve design in western Riverside County. The AD161 plan covers 21 species and addresses impacts to 2,028 acres of suitable habitat (including coastal sage scrub, chaparral, coast live oak woodland, riparian habitat, stream bed, non-native grassland, eucalyptus woodland, and agricultural land) for the covered species. Mitigation for impacts to covered species

include the conservation of 1,450 acres within the plan area. Many of these acres are occupied by species proposed for coverage under the plan.

3.3 Coordination within Military Lands

It is the intent of this Plan to provide conservation and management for impacts by Covered Activities to Covered Species and their habitats, including where those activities occur on military lands. Recognizing that military lands are managed independently from this Plan, the Water Authority expects that compliance with implementing the Plan's requirements will be consistent with species and habitat requirements in the resource management plans for military installations, but those installations may impose additional mitigation measures at their discretion in addition to what is required by this Plan. Military lands within the Water Authority Plan Area include Camp Pendleton, Fallbrook Naval Weapons Station, and MCAS Miramar. There are currently no Water Authority facilities on Camp Pendleton or the Fallbrook Naval Weapons Station. Potential future projects include an agreement to build 15,000 feet of pipeline, which may be constructed by Camp Pendleton under their Integrated Natural Resources Management Plan (INRMP). The Second Aqueduct crosses MCAS Miramar. Military installations support important natural resource areas and are unique in their land uses since they conduct a variety of operation and training exercises.

Camp Pendleton, Fallbrook Naval Weapons Station, and MCAS Miramar are required to coordinate with USFWS to integrate resource management needs with military missions/mandates. MCAS Miramar must implement its INRMP, which was last updated in 2006. To ensure continued ability to provide a safe and reliable water supply, while ensuring compatibility with military operations, the Water Authority will continue to coordinate its Covered Activities with MCAS Miramar and Camp Pendleton.

In general, temporary impacts associated with activities at existing Water Authority facilities that occur on military lands would be minimized by restoration of disturbed areas. Permanent impacts will be mitigated off-site at a Water Authority Preserve Area established for off-site mitigation or through project-specific mitigation, in consultation with MCAS Miramar and Camp Pendleton.

3.4 Coordination within Preserve Lands

The Water Authority has operated facilities in San Diego County since 1944. The majority of Water Authority facilities pre-date the NCCP/HCP planning efforts within San Diego and Riverside counties. Some facilities and rights-of-way, predominantly pipelines, are located within habitat areas that subsequently have been designated as preserve lands by other entities as part of their HCPs. Those plans acknowledge that

regional public facilities, including roads, landfills, and other infrastructure (e.g., public water systems), would be incorporated in such a way to allow the preserve lands to function. This Plan includes commitments and specific measures to avoid, minimize, and mitigate for impacts to all habitat lands, whether part of this Plan or other plans (see Sections 6.4 and 6.5).

This Plan designates a Preserve Area and MMAs that were acquired by the Water Authority as mitigation for prior, Existing, and Planned Projects. All of the habitat in the MMAs has been used to mitigate past projects; some of the HMA's in the Preserve Area have used a portion of their habitats for past projects but have residual habitat credits; only the San Luis Rey and Tijuana HMA's have not used any portion of their (future) habitat for past projects. All of these lands provide for conservation and management of Covered Species and their habitat in addition to the mitigation areas. The Water Authority maintains a ledger for each Preserve Area to track the amount of compensation (typically measured in acres of habitat) assigned to past and existing projects against the total compensation provided by the individual Preserve Area. This tracking system prevents an over allocation of a given habitat type or vegetation tier, and this information will be reported to the Wildlife Agencies on an annual basis. This Plan identifies potential impacts by Covered Activities (primarily new facilities construction) to existing preserve lands, provides an analysis to assess impacts to all habitats throughout the Plan Area, and identifies avoidance, minimization, and mitigation measures to reduce and compensate for those impacts. The Water Authority will avoid and/or minimize impacts to existing preserve lands to the maximum extent feasible. However, improvements and/or repairs to existing facilities located within preserve lands are periodically required for the Water Authority to conduct its mission.

This Plan identifies and describes mitigation guidelines and ratios for impacts to all covered habitat impacts in Section 6.0. Similar to other plans in southern California, the mitigation obligation varies with the sensitivity of the habitat (vegetation) type and its location. The mitigation obligations are comparable to those plans.

3.4.1 Temporary Impacts in Preserve Lands

Water Authority Covered Activities are expected to cause temporary impacts within some of the preserve lands that have been or will be established by the regional conservation plans. Temporary impacts may be a one-time disturbance during construction or a repeated disturbance during routine O&M activities within rights-of-way and around facilities. In areas where one-time temporary impacts occur, the Water Authority would restore the area to its original condition; native species will be used except in locations where the surrounding area is landscaped with non-native species. If the Water Authority determines there will be repeated disturbances to an area, the Water Authority may treat the area of repeated disturbance as a permanent impact and mitigate off-site by debiting from a Water Authority Preserve Area established for that

3.0 Relationship to Other Conservation Plans

purpose. Future impacts to the same area will be revegetated on-site with no additional requirement for off-site mitigation. The Water Authority will then be limited to conducting on-site revegetation for subsequent disturbances. The decision to classify a disturbance as repeated will be made by the Water Authority on a case-by-case basis taking into account known future activities at that same location.

Revegetation and other measures pertaining to minimization and mitigation within preserve lands are outlined in Section 6.0. Verification that the post-project condition meets conservation goals and success criteria will be determined by the Water Authority, and success outcome documented in the annual report.

3.4.2 Permanent Impacts in Preserve Lands

Water Authority Covered Activities will be planned to avoid permanent impacts to preserve lands to the maximum extent feasible. The MSCP and MHCP Subregional Plans identify linear utilities' infrastructure, including support facilities, as being conditionally compatible with preserve lands designations (County of San Diego MSCP Plan, Section 1.9; City of San Diego MSCP, Section 1.4.1). Consistent with other plans, this Plan defines compatible uses as those that will not permanently interfere with the preserve lands, linkage system, and biological resources, including Covered Species and habitats. If the extent and type of impacts would not significantly threaten the integrity of the preserve lands or biological resources, then the facilities are compatible. Incompatible uses are those that will result in significant, unmitigable impacts to preserve lands. As noted in Section 2.1.2, except for Pipeline 6, Covered Activities in Riverside County will be processed as Major Amendments.

This Plan identifies subsurface pipelines, expansions of existing surface storage or water management facilities, and new, localized impact surface facilities, including new enclosed storage, pumping, or confined water management facilities, as compatible Covered Activities when undertaken in accordance with the impact avoidance, minimization, and mitigation measures outlined in Section 6.0. New surface storage facilities and surface conveyance systems are potentially incompatible within preserve lands. To determine that a Covered Activity is compatible, the Water Authority must demonstrate to the Wildlife Agencies that surface facilities will not permanently:

- Impact the preserve lands and cause a significant reduction in the population size/extent of a Covered Species identified in this Plan or another plan;
- Block or otherwise substantially impair the connectivity of habitats for wildlife movement or genetic exchange by a Covered Species as anticipated with the initial preserve system design;

- Reduce or jeopardize the continued existence of a Covered Species or other federal or state listed species, including impacting the ability of a core population of a species to breed, forage, or find shelter; or,
- Substantially interfere with the goals of the preserve management or planned enhancement of a Covered Species within preserve lands.

The Water Authority will make a compatibility determination based on the criteria above and submit it to the Wildlife Agencies for their concurrence before the project can be implemented as a Minor Amendment (Section 8.3) or Major Amendment (Section 8.4). To achieve compatibility, avoidance and minimization measures may be taken either during project design or, if biologically appropriate, as mitigation through deductions from a Preserve Area established for that purpose or by acquiring mitigation/conservation land that will be permanently conserved and managed. On-site avoidance/minimization measures and habitat-based mitigation measures are discussed in Section 6.0. Species-specific mitigation measures and conditions are presented in the Conservation Analysis (Appendix B).

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4.0 Plan Area Biology and Land Use

4.1 Setting

The NCCP/HCP Plan Area covers approximately 992,000 acres in western San Diego County and southwestern Riverside County. This diverse geographic landscape includes flat, relatively gentle slopes on the coastal terraces, mesas, broad river valleys, and steep hills and mountains in the inland portions. Topographical features include coastal beaches; mesas, canyons and rolling hills; plains, buttes, and plateaus; foothills and mountains; and rivers, creeks and drainages. Steep canyons are associated with drainages that have cut through hills and mesas. Intermittent streams flow down the slopes into canyons, eventually merging with one of the several major rivers that terminate in lagoons and estuaries near the Pacific Ocean.

San Diego County has a Mediterranean climate characterized by warm, dry summers and mild, wet winters. Annual precipitation in the NCCP/HCP area varies from less than 11 inches near the coast to more than 25 inches farther inland near the Laguna Mountains. The Plan Area contains more than 100 different soil types that range in texture and qualities, such as erodibility and expansion. The range in soil types is a result of many factors, including the underlying bedrock, temperature, saturation, and plant cover.

As a result of diverse topography and microclimates, a number of unique habitats and vegetation communities that support a host of native plant and wildlife species occur within the Plan Area. Nevertheless, human activities have modified many of the region's plant communities and replaced large tracts of native vegetation with agriculture and urban development, especially in the western portion of the Plan Area.

The Water Authority has fee ownership or easements/rights-of-ways in the Plan Area. Many facilities and easements in the Plan Area are located along the linear aqueduct system that traverses north-south routes from southwestern Riverside County to southern San Diego (see Figure 1-2).

4.1.1 Database Development

Information on the vegetation communities and Covered Species addressed in this Plan was developed from reviews of existing GIS data bases (primarily the San Diego County SanGIS database and California Natural Diversity Database, CNDDDB), previously prepared regional conservation plans for San Diego and western Riverside counties, species occurrence records from the San Diego Natural History Museum, and field assessments by Water Authority staff and environmental contractors. This information addresses biological information collection recommendations by the Independent

4.0 Study Area Biology and Land Use

Science Advisors and represents the best available scientific information for the vegetation communities and Covered Species.

The SanGIS database is maintained by the county and city of San Diego and was created or obtained from many sources. Some data was created from tabular digital files; some data was digitized from paper maps; and other data was entered using coordinate geometry tools. It includes over 400 geographic data layers, such as vegetation, land use/zoning, roads, parcels, etc. SanGIS staff is responsible for coordinating with other data maintainers to ensure currency and accuracy for all participants. All of the SanGIS geographic data is within San Diego County. The accuracy of the data varies between themes and within themes depending on the source documents used to create the data. Most of the source documents used for SanGIS data was at one inch equals 200 feet or one inch equals 400 feet, making it more accurate than many other GIS data sources. According to SanGIS's website, the SanGIS data has an overall accuracy of plus or minus 10 feet.

CNDDDB is a "natural heritage program" and is part of a nationwide network of similar programs overseen by NatureServe (formerly part of The Nature Conservancy). All natural heritage programs provide location and natural history information on special status plants, animals, and natural communities to the public, other agencies, and conservation organizations. The data help drive conservation decisions, aid in the environmental review of projects and land use changes, and provide baseline data helpful for endangered species recovery efforts and research projects.

The goal of the CNDDDB is to provide the most current information available on California's most imperiled elements of natural diversity and to provide tools to analyze these data. The CNDDDB concentrates its work on areas with active NCCP/HCPs, and high priority areas identified by CDFG and other biologists. The primary method of data dissemination is via the computer application RareFind, which allows for complex querying and reporting by the user. For GIS users, a shapefile of the entire CNDDDB dataset is available.

Information was also obtained from the MSHCP, San Diego MSCP, and San Diego MHCP. Conservation plans prepared under those programs provided relevant information on land use, vegetation distribution, and species occurrences.

The San Diego Natural History Museum (SDNHM) maintains extensive records for plant and animals occurrences in San Diego County. Records were reviewed to update and fill-in apparent gaps in species' information after the preceding information sources were utilized.

As projects and activities were conducted by the Water Authority since inception of the Plan, biological specialists have field-verified vegetation conditions, disturbed areas, and uses over portions of land both within and outside the various rights-of-way and facilities.

This site-specific data is continually refined and updated as projects are planned and implemented.

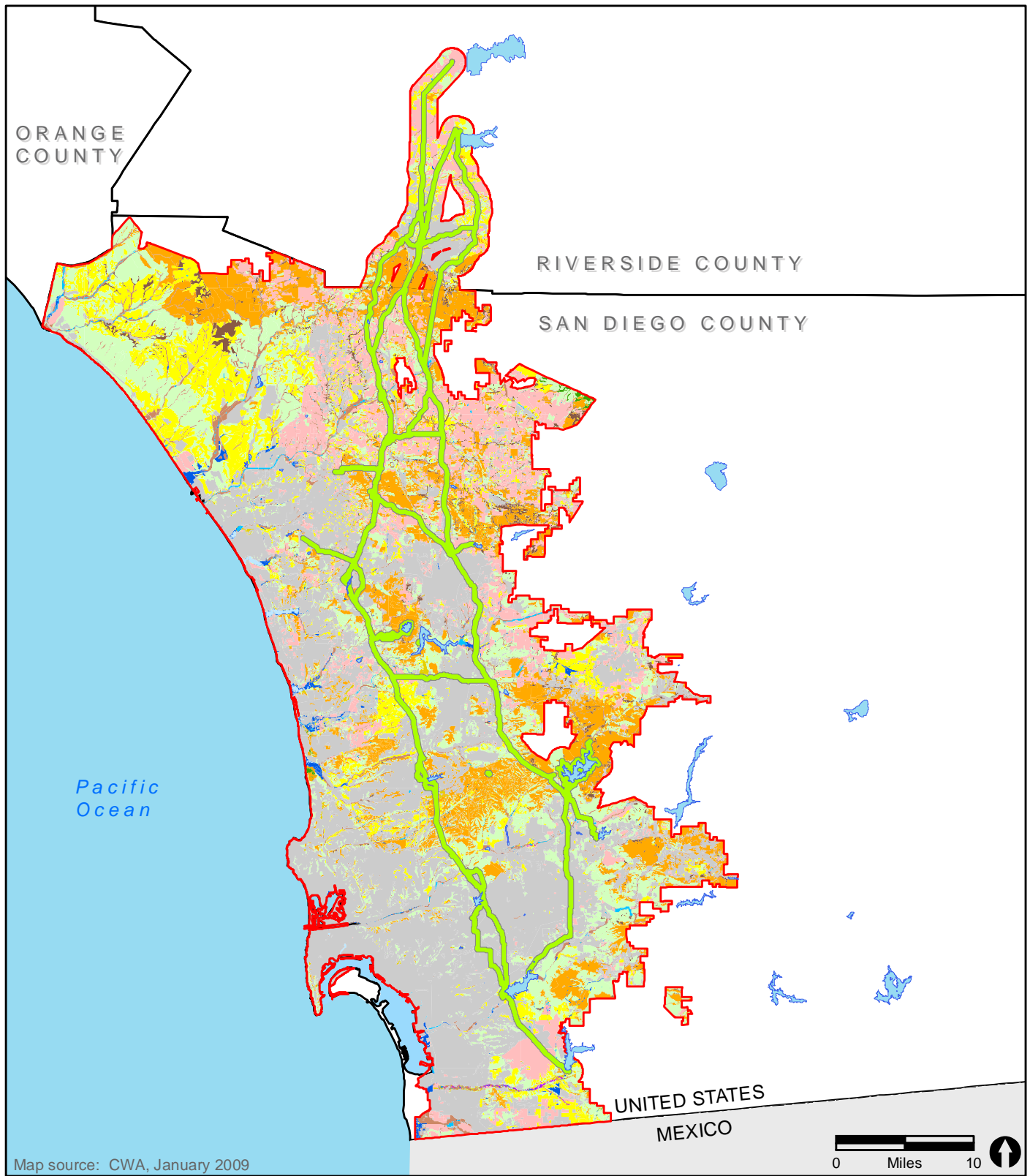
4.2 Vegetation Communities and Habitat Types

Habitat and vegetation communities in the Plan Area reflect the diverse topography and climate of the region. As a result, a large number of habitat and vegetation types that support a host of native plant and wildlife species exist within the Plan Area. The distribution of vegetation communities occurring within the Plan Area is shown in Figure 4-1.

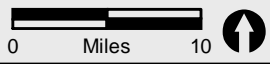
Vegetation communities found within the Plan Area include coastal fringe environments, freshwater wetland, sage scrub, chaparral, grasslands, oak woodlands, high foothill, montane, and vernal pool habitats. Other land types include agricultural and non-native landscapes, as well as developed and urbanized lands. Vegetation community classifications follow Holland (1986) as modified by Oberbauer (2005) and Sawyer and Keeler-Wolf (1995). Floral nomenclature for common plants follows Hickman (1993). Specific definitions for communities follow the North County MHCP Volume II Appendix F (SANDAG 2003) and the MSHCP's Riverside County Integrated Project (RCIP 2003).

Figure 4-1 displays the generalized vegetation communities and land cover types within the Plan Area based on regional vegetation community mapping from SanGIS that was most recently updated in 2007. The acreage of each vegetation or land cover type and subcommunity is shown for both the Plan Area and the PIZ in Table 4-1. Because the majority of vegetation mapping was performed at a landscape level (i.e., large scale), the vegetation subcommunities listed in this table have been further refined in some cases to better represent vegetation communities known to occur in the region. Although there are subcommunities that have not been distinctly mapped within the Plan Area or the PIZ, it is anticipated that site specific surveys in the area of proposed Covered Activities may reveal some of these specific subcommunities.

Table 4-2 provides the terminology used in the Plan in comparison to terminology used in other regional planning documents.



Map source: CWA, January 2009



- | | | | |
|---|--------------------|-------------------------|------------|
| NCCP/HCP Plan Area | Aquatic Marine | Disturbed/Developed | Riparian |
| Probable Impact Zone (PIZ) | Aquatic Freshwater | Grasslands | Sage Scrub |
| Vegetation Communities/
Land Cover Types | Chaparral | Non-Native Vegetation | Wetland |
| Agricultural | Coastal | Oak Woodland and Forest | |
| | Coniferous Forest | Disturbed Riparian | |

FIGURE 4-1

Vegetation Communities/Land Cover Types in the NCCP/HCP Plan Area

**TABLE 4-1
APPROXIMATE AREA OF VEGETATION COMMUNITIES/LAND COVER TYPES (acres)**

Vegetation Community/Land Cover Type and Subcommunities	Approximate Area ¹	
	Plan Area	PIZ
Upland Habitats		
Agricultural	123,240	11,469
General Agriculture	12,348	2,092
Extensive Agriculture (Row Crops, Pastures)	39,055	2,597
Intensive Agriculture (Dairies, Nurseries, Chicken Ranches)	5,189	259
Orchards and Vineyards	66,648	6,521
Chaparral, Coastal	142,204	8,139
Chamise Chaparral (Granitic Chamise Chaparral)	5,425	29
Chaparral ²	36,025	1,664
Ceanothus crassifolius Chaparral	4,231	0
Interior Live Oak Chaparral	0	0
Northern Mixed Chaparral	140	0
Northern Mixed Chaparral (Granitic)	14	0
Northern Mixed Chaparral (Mafic)	1	0
Scrub Oak Chaparral	301	0
Southern Maritime Chaparral	3,025	4
Southern Mixed Chaparral (Granitic)	92,848	6,435
Southern Mixed Chaparral (Mafic)	194	7
Chaparral, Montane/Trans-montane	0	0
Montane Chaparral	0	0
Redshank Chaparral	0	0
Coastal	459	0
Open Beach	301	0
Southern Foredunes	158	0
Coniferous Forest	902	0
Big Cone Spruce- Canyon Oak Forest	721	0
Mixed Coniferous Forest	2	0
Southern Interior Cypress Forest, Tecate Cypress Forest	17	0
Torrey Pine Forest	162	0
Disturbed/Developed	378,251	25,024
Bare Ground	0	0
Disturbed	352,165	1,387
Urban/Developed Land	26,086	23,637
Grasslands	100,579	6,222
Native Grassland (Valley Needle Grassland, Valley and Foothill Grassland)	52,635	2,705
Non-Native Grassland (Grassland)	47,944	3,517
Exotic Landscapes	2,851	215
Eucalyptus/Non-native vegetation	2,851	215
Ornamental	0	0
Oak Woodland and Forest	17,548	775
Black Oak Forest	28	0
Black Oak Woodland	781	33
Coast Live Oak Forest (Dense Coast Live Oak Woodland)	2,246	103
Coast Live Oak Woodland (Open Coast Live Oak Woodland)	9,976	636
Engelmann Oak Forest (Dense Engelmann Oak Woodland)	2,837	2
Engelmann Oak Woodland (Open Engelmann Oak Woodland)	1,391	1
Mixed Oak Woodland (Oak Woodland)	289	0

**TABLE 4-1
APPROXIMATE AREA OF VEGETATION COMMUNITIES/LAND COVER TYPES (acres)**

Vegetation Community/Land Cover Type and Subcommunities	Approximate Area ¹	
	Plan Area	PIZ
Sage Scrub, Coastal	179,708	9,856
Alluvial Fan Scrub	133	0
Cactus Scrub	0	0
Coastal Sage-Chaparral Scrub	15,933	368
Coastal Sage Scrub (Diegan)	160,215	8,534
Coastal Sage Scrub (Inland)	302	500
Flat-topped Buckwheat Scrub	103	0
Maritime Succulent Scrub	1,434	35
Riversidean Alluvial Fan Scrub	172	14
Riversidean Sage Scrub	1,131	405
Southern Coastal Bluff Scrub	285	0
Sage Scrub, Montane/Trans-montane	4	0
Big Sagebrush Scrub (Great Valley)	4	0
Undefined³	1,627	0
Wetland Habitats		
Aquatic Freshwater	8,529	1,638
Non-vegetated Floodplain, Channel, Lakeshore Fringe	2,316	0
Open Freshwater (Freshwater, Open Water, Water)	6,213	1,639
Aquatic Marine	1,365	0
Open Saltwater (Brackish Water, Deep Bay, Estuarine, Intertidal, Shallow Bay, Subtidal)	1,189	0
Saltpan/Mudflats	176	0
Riparian	29,231	1,132
Arrowweed Scrub	0	0
Mule Fat Scrub	830	60
Southern Arroyo Willow Riparian Forest	413	5
Southern Coast Live Oak Riparian Forest	6,023	207
Southern Cottonwood-Willow Riparian Forest	6,079	377
Southern Sycamore Woodland	0	0
Southern Sycamore-Alder Riparian Woodland	3,999	151
Southern Willow Scrub	11,867	332
White Alder Riparian Forest	20	0
Riparian (Disturbed)	457	4
Arundo Scrub	14	0
Tamarisk Scrub	443	4
Wetland	5,351	125
Alkali wetlands (Alkali Seep, Alkali Marsh, Cismontane Alkali Marsh)	921	34
Freshwater Meadow or Seep	148	11
Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland)	1,397	36
Montane Meadow	3	0
Southern Coastal Salt Marsh	1,837	0
Wetland (Disturbed)	769	44
Alkali Vernal Pools	0	0
San Diego Mesa Claypan Vernal Pools	0	0
San Diego Mesa Hardpan Vernal Pools	260	0
Vernal Lake	16	0
Total	992,306	64,599

¹The total area of the Plan Area is estimated to be 992,000 acres. At present, the area of the PIZ is approximately 64,600 acres (approximately six percent of the Plan Area). Due to slight differences in the boundaries for the Plan Area and vegetation data used in the analysis, there is a difference in the acreage presented in this table. As this table represents approximate acres, the area of each community has been rounded to the nearest acre.

²Due to general mapping, portions of the Plan Area are not specifically categorized as a specific subcommunity.

³Due to variances in the coastline for the Plan Area boundary and available regional data, vegetation mapping is not available for approximately 1,627 acres; therefore, these acres are listed as undefined.

**TABLE 4-2
COMPARISON OF VEGETATION COMMUNITIES/LAND COVER TYPE TERMINOLOGY**

Water Authority NCCP/HCP	MSCP	City of San Diego Subarea Plan	MHCP	Western Riverside County MSHCP
Upland Habitats				
Agricultural				
General Agriculture	Agricultural Lands	Agriculture	Agricultural Lands	Agricultural Lands
Extensive Agriculture (Row Crops, Pastures)	Agricultural Lands	Agriculture	Agricultural Lands	Field Croplands
Intensive Agriculture (Dairies, Nurseries, Chicken Ranches)	Agricultural Lands	Agriculture	Agricultural Lands	Dairy and Livestock Feedyards
Orchards and Vineyards	Agricultural Lands	Agriculture	Agricultural Lands	Grove/Orchard
Chaparral, Coastal				
Chamise Chaparral (Granitic Chamise chaparral)	Chaparral	Chamise Chaparral	Chaparral	Chamise Chaparral
Ceanothus crassifolius Chaparral	Chaparral	Mixed Chaparral	Chaparral	Chaparral
Interior Live Oak Chaparral	Chaparral	Mixed Chaparral	Chaparral	Chaparral
Northern Mixed Chaparral	Chaparral	Mixed Chaparral	Chaparral	Chaparral
Northern Mixed Chaparral (Granitic)	Chaparral	Mixed Chaparral	Chaparral	Chaparral
Northern Mixed Chaparral (Mafic)	Mafic Northern Mixed Chaparral	N/A	Chaparral	Chaparral
Scrub Oak Chaparral	Chaparral	Scrub Oak Chaparral	Chaparral	Chaparral
Southern Maritime Chaparral	Southern Maritime Chaparral	Maritime Chaparral	Southern Maritime Chaparral	N/A
Southern Mixed Chaparral	Chaparral	Mixed Chaparral	Chaparral	Chaparral
Southern Mixed Chaparral (Granitic)	Chaparral	Mixed Chaparral	Chaparral	Chaparral
Southern Mixed Chaparral (Mafic)	Mafic Southern Mixed Chaparral	N/A	Chaparral	Chaparral
Chaparral, Montane/Trans-montane				
Montane Chaparral	Chaparral	N/A	Chaparral	Chaparral
Redshank Chaparral	Chaparral	N/A	Chaparral	Red Shank Chaparral
Coastal				
Open Beach	N/A	N/A	Beach	N/A
Southern Foredunes	N/A	Southern Foredunes	Beach	N/A

**TABLE 4-2
COMPARISON OF VEGETATION COMMUNITIES/LAND COVER TYPE TERMINOLOGY
(continued)**

Water Authority NCCP/HCP	MSCP	City of San Diego Subarea Plan	MHCP	Western Riverside County MSHCP
Coniferous Forest				
Big Cone Spruce-Canyon Oak Forest	Closed Cone Coniferous Forest	N/A	N/A	Lower Montane Coniferous Forest
Mixed Coniferous Forest	Closed Cone Coniferous Forest	N/A	N/A	Lower Montane Coniferous Forest
Southern Interior Cypress Forest	Cypress Forest	N/A	N/A	Lower Montane Coniferous Forest
Torrey Pine Forest	Closed Cone Coniferous Forest	Torrey Pines Forest	N/A	Lower Montane Coniferous Forest
Disturbed/Developed				
Bare Ground	Disturbed Lands	Disturbed Land	Disturbed	Residential/Urban/Exotic
Disturbed	Disturbed Lands	Disturbed Land	Disturbed	Residential/Urban/Exotic
Urban/Developed Land	Disturbed Lands	Developed	Disturbed	Residential/Urban/Exotic
Exotic Landscapes				
Eucalyptus/Non-native vegetation	Eucalyptus Woodland	Eucalyptus Woodland	Eucalyptus	Residential/Urban/Exotic
Ornamental	Agriculture/Developed	Developed	Disturbed	Residential/Urban/Exotic
Grasslands				
Native Grassland (Valley Needle Grassland, Valley and Foothill Grassland)	Native Grassland	Native Grassland	Native Grassland	Valley and Foothill Grassland
Non-Native Grassland (Grassland)	Non-native Grassland	Non-Native Grassland	Annual (Non-native) Grassland	Non-native Grassland
Oak Woodland and Forest				
Black Oak Forest	Oak Woodlands	Oak Woodlands	N/A	Black Oak Forest
Black Oak Woodland	Oak Woodlands	Oak Woodlands	N/A	Black Oak Forest
Coast Live Oak Forest (Dense Coast Live Oak Woodland)	Oak Woodlands	Oak Woodlands	Coast Live Oak Woodland	Coast Live Oak Woodland
Coast Live Oak Woodland (Open Coast Live Oak Woodland)	Oak Woodlands	Oak Woodlands	Coast Live Oak Woodland	Coast Live Oak Woodland
Engelmann Oak Forest (Dense Engelmann Oak Woodland)	Oak Woodlands	Oak Woodlands	Engelmann Oak Woodland	Dense Engelmann Oak Woodland
Engelmann Oak Woodland (Open Engelmann Oak Woodland)	Oak Woodlands	Oak Woodlands	Engelmann Oak Woodland	Dense Engelmann Oak Woodland

**TABLE 4-2
COMPARISON OF VEGETATION COMMUNITIES/LAND COVER TYPE TERMINOLOGY
(continued)**

Water Authority NCCP/HCP	MSCP	City of San Diego Subarea Plan	MHCP	Western Riverside County MSHCP
Mixed Oak Woodland (Oak Woodland)	Oak Woodlands	Oak Woodlands	Coast Live Oak Woodland	Oak Woodland
Sage-Scrub, Coastal				
Alluvial Fan Scrub	Coastal Sage Scrub	Coastal Sage Scrub (CSS)	Coastal Sage Scrub	Coastal Scrub
Cactus Scrub	Coastal Sage Scrub	Coastal Sage Scrub (CSS)	Coastal Sage Scrub	Coastal Scrub
Coastal Sage-Chaparral Scrub	Coastal Sage-Chaparral Scrub	CSS/Chaparral	Coastal Sage-Chaparral Scrub	Coastal Scrub
Coastal Sage Scrub (Diegan)	Coastal Sage Scrub	Coastal Sage Scrub (CSS)	Coastal Sage Scrub	Diegan Coastal Sage Scrub
Coastal Sage Scrub (Inland)	Coastal Sage Scrub	Coastal Sage Scrub (CSS)	Coastal Sage Scrub	Coastal Scrub
Flat-topped Buckwheat Scrub	Flat-topped Buckwheat Scrub	Coastal Sage Scrub (CSS)	Coastal Sage Scrub	Coastal Scrub
Maritime Succulent Scrub	Maritime Succulent Scrub	Maritime Succulent Scrub	Maritime Succulent Scrub	N/A
Riversidean Alluvial Fan Scrub	N/A	N/A	N/A	Riversidean Alluvial Fan Scrub
Riversidean Sage Scrub	N/A	N/A	N/A	Riversidean Sage Scrub
Southern Coastal Bluff Scrub	Coastal Bluff Scrub	Coastal Bluff Scrub	Southern Coastal Bluff Scrub	N/A
Sage-Scrub, Montane/Trans-montane				
Big Sagebrush Scrub (Great Valley)	Coastal Sage Scrub	N/A	Coastal Sage Scrub	Big Sagebrush Scrub
Wetland Habitats				
Aquatic, Freshwater				
Non-vegetated Floodplain, Channel, Lakeshore Fringe	Natural Flood Channel	Natural Flood Channel	Flood Channel	N/A
Open Freshwater (Freshwater, Open Water, Water)	Open water	N/A	Fresh Water	Open Water/Reservoir/Pond
Aquatic, Marine				
Open Saltwater (Brackish Water, Deep Bay, Estuarine, Intertidal, Shallow Bay, Subtidal)	Open water	N/A	Estuarine	N/A
Saltpan/Mudflats	Salt Panne	Salt panne	Saltpan/Mudflats	N/A
Riparian				
Arrowweed Scrub	Riparian Scrub	Riparian Scrub	Riparian Scrub	Riparian Scrub
Mule Fat Scrub	Riparian Scrub	Riparian Scrub	Riparian Scrub	Riparian Scrub
Southern Arroyo Willow Riparian Forest	Riparian Forest	Riparian Forest	Riparian Forest	Riparian Forest
Southern Coast Live Oak Riparian Forest	Riparian Forest	Oak Riparian Forest	Riparian Forest	Riparian Forest

**TABLE 4-2
COMPARISON OF VEGETATION COMMUNITIES/LAND COVER TYPE TERMINOLOGY
(continued)**

Water Authority NCCP/HCP	MSCP	City of San Diego Subarea Plan	MHCP	Western Riverside County MSHCP
Southern Cottonwood-Willow Riparian Forest	Riparian Forest	Riparian Forest	Riparian Forest	Southern Cottonwood Willow Riparian Forest
Southern Sycamore Woodland	Riparian Woodland	Riparian Woodland	Riparian Woodland	Riparian Forest
Southern Sycamore-alder Riparian Woodland	Riparian Woodland	Riparian Woodland	Riparian Woodland	Southern Sycamore-alder Riparian Woodland
Southern Willow Scrub	Riparian Scrub	Riparian Scrub	Riparian Scrub	Southern Willow Scrub
White Alder Riparian Forest	Riparian Forest	Riparian Forest	Riparian Forest	Riparian Forest
Riparian (Disturbed)				
Arundo Scrub	Disturbed Lands	Disturbed Wetland	Disturbed Wetland	Arundo/Riparian forest
Tamarisk Scrub	Disturbed Lands	Disturbed Wetland	Disturbed Wetland	Tamarisk Scrub
Wetland				
Alkali wetlands (Alkali Seep, Alkali Marsh, Cismontane Alkali Marsh)	Alkali Marsh	N/A	Alkali Marsh	Cismontane Alkali Marsh
Alkali Vernal Pools	Vernal Pool	Vernal Pool	Vernal Pool	Vernal Pool
Freshwater Meadow or Seep	Wetland	Freshwater Marsh	Freshwater Marsh	Meadow (Montane)
Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland)	Freshwater Marsh	Freshwater Marsh	Freshwater Marsh	Coastal and Valley
Montane Meadow	Wetland	N/A	Freshwater Marsh	Meadow (Montane)
San Diego Mesa Claypan Vernal Pools	Vernal Pool	Vernal Pool	Vernal Pool	Vernal Pool
San Diego Mesa Hardpan Vernal Pools	Vernal Pool	Vernal Pool	Vernal Pool	Vernal Pool
Southern Coastal Salt Marsh	Salt Marsh	Salt Marsh	Coastal Salt Marsh	N/A
Wetland (Disturbed)	Disturbed Wetland	Disturbed Wetland	Disturbed Wetland	N/A
Vernal Lake	N/A	N/A	N/A	Vernal Pool

N/A = Not applicable; Vegetation community/type not described and/or does not occur within plan area of regional conservation plan.

4.2.1 Upland Communities

4.2.1.1 Agricultural

General Agriculture. Areas of unclassified agricultural use. This general category includes agricultural use areas that have been specified as extensive or intensive.

Extensive Agriculture (Row Crops, Pastures). Extensive agriculture includes all agricultural practices which use relatively little labor and resources on relatively large areas of land. Examples of extensive agriculture within the plan area may include: strawberry fields, lettuce farms, tomato farms, and pastures. Pastures fall into the agricultural heading if cultivation practices (e.g., seeding or irrigation) are used periodically to improve land for livestock forage.

Intensive Agriculture (Dairies, Nurseries, Chicken Ranches). Intensive agriculture includes all agricultural practices which use relatively high amounts of labor and resources on relatively small areas of land. This agricultural land type tends to have significant permanent buildings and installations on-site. Examples of intensive agriculture within the plan area may include: dairies, nurseries, cattle feedlots, and other Confined Animal Feeding Operations.

Orchards and Vineyards. Orchards and vineyards are intentional plantings of trees, shrubs, or vines maintained for food production or commercial use. These plantings tend to be perennial, can be artificially irrigated and fertilized, and usually do not involve intense annual soil disturbance. Examples of orchard and vineyard crops include: avocados, grapes, oranges, and apples.

4.2.1.2 Chaparral, Coastal

Chamise Chaparral (Granitic Chamise Chaparral). This low-growing chaparral community is dominated by chamise (*Adenostoma fasciculatum*), with limited shrub diversity and arid understory conditions. It occurs on poorly developed soils which are subject to extreme erosion if exposed by disturbance. Mature stands of chamise chaparral exhibit dense cover with little herbaceous understory or leaf litter.

Ceanothus crassifolius Chaparral. This chaparral community is dominated by hoary-leaf ceanothus (*Ceanothus crassifolius*) and chamise. This community usually occurs below 4,000 feet on xeric sites with shallow, stony soils.

Interior Live Oak Chaparral. This is a tall and dense chaparral community that is dominated by interior live oak (*Quercus wislizenii*), scrub oak (*Quercus berberidifolia*), and other evergreen shrub species. This community occurs on relatively mesic sites in valleys and foothills away from the coast, especially within the lower montane coniferous forest. A dense canopy and leaf litter component limit understory development.

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Northern Mixed Chaparral. This is a dense, near impenetrable community dominated by tall, broad-leafed shrubs. Scrub oak and chamise dominate this community which is often found on dry, rocky slopes. Northern Mixed Chaparral is general restricted to high elevation, north-facing slopes.

Northern Mixed Chaparral (Granitic). This community is characterized by tall, dense chaparral with growth limited to a few shrub species and little or no understory growth on poorly developed soils above substantial granite-derived surface rock. This habitat is generally restricted to higher foothill, montane, and transmontane elevations, and may occupy south-facing slopes of otherwise forested areas.

Northern Mixed Chaparral (Mafic). This community is characterized by tall, dense chaparral with growth limited to a few shrub species and little or no understory growth, occurring on depauperate soils high in magnesium and iron (Mafic soils) above substantial surface rock. This habitat is generally restricted to higher foothill, montane, and transmontane elevations, and may occupy south-facing slopes of otherwise forested areas.

Scrub Oak Chaparral. This tall chaparral community is dominated by scrub oak and associated with large, evergreen shrubs such as *Ceanothus sp.* Scrub Oak Chaparral generally occupies steep north-facing slopes in areas where it is typically interspersed with chamise chaparral.

Southern Maritime Chaparral. This is a low-growing, but sometimes densely canopied chaparral restricted to sandstone soils in areas heavily influenced by a coastal climate. A spectrum of annuals is present due primarily to cooler, moister conditions near the coast. The plant species composition of southern maritime chaparral is similar to southern mixed chaparral. Sensitive plant species characteristic of this community include Del Mar Mesa sand aster (*Corethrogyne filaginifolia* var. *linifolia*), Nuttall's scrub oak (*Quercus dumosa*), summer-holly (*Comarostaphylos diversifolia* ssp. *diversifolia*), wart-stemmed ceanothus (*Ceanothus verrucosus*), and the federally endangered Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*). Southern maritime chaparral is restricted to sandy soils within the coastal fog belt in southern Orange County and in San Diego County.

Southern Mixed Chaparral (Granitic). This is a mid-sized to tall, woody chaparral dominated by chamise (*Adenostoma fasciculatum*) often situated on steep north- and east-facing slopes in soils derived from granite parent material. Drier locales preclude understory species diversity, whereas mesic conditions in the understory support a variety of ferns, subshrubs, herbaceous perennials, bulbs, and annuals. Characteristic species include manzanita (*Arctostaphylos* spp.), blue-colored lilacs (*Ceanothus tomentosus*, *C. leucodermis*), mountain-mahogany (*Cercocarpus minutiflorus*), chamise (*Adenostoma fasciculatum*), mission manzanita (*Xylococcus bicolor*), toyon (*Heteromeles arbutifolia*), holly-leaf cherry (*Prunus ilicifolia*), and fuchsia-flowered

gooseberry (*Ribes speciosum*). This habitat type occurs along the coastal foothills of San Diego County and Baja California, Mexico, typically below 3,000 feet above mean sea level.

Southern Mixed Chaparral (Mafic). Similar to southern mixed chaparral (Granitic), southern mixed chaparral (Mafic) contains mid-sized to tall, woody chaparral dominated by chamise often situated on steep north- and east-facing slopes. These chaparrals, however, are located on depauperate soils high in magnesium and iron (Mafic soils). Although clear floristic distinctions are unclear, southern mixed chaparral (mafic) communities tend to have higher rates of endemism than Granitic derived chaparral.

4.2.1.3 Chaparral, Montane/Trans-montane

Montane Chaparral. Montane chaparral is characterized by dense stands dominated by several shrub species, such as manzanita (*Arctostaphylos sp.*) and lilac/buckbrush (*Ceanothus sp.*). It occurs on poorly developed soils underlain by substantial surface rock. This chaparral is restricted to higher foothill, montane, and transmontane elevations, and occupies south-facing slopes in forested areas.

Redshank Chaparral. Redshank chaparral is a tall-growing chaparral community dominated by redshank (*Adenostoma sparsifolium*). This community is usually found at higher foothill elevations, particularly in transmontane areas. Redshank chaparral occurs along the eastern limits of the Plan Area.

4.2.1.4 Coastal

Open Beach. Open beach habitats are sandy, unvegetated areas along the shoreline between the tideline and southern foredune communities.

Southern Foredunes. This distinctive habitat occurs beyond the high tide line and is composed of dunes with low-lying sandy areas supporting sparse woody shrubs and native annuals such as sand-verbena (*Abronia spp.*), sea-rocket (*Cakile maritima*), beach saltbush (*Atriplex leucophylla*), and coastal saltgrass (*Distichlis spicata*). This habitat type is extremely rare due to intensive recreational activities at beach areas.

4.2.1.5 Coniferous Forest

Big Cone Spruce – Canyon Oak Forest. This forest type is dominated big cone spruce (*Pseudotsuga macrocarpa*) with a shorter, dense sub-canopy of canyon oak (*Quercus chrysolepis*) and a very sparsely vegetated herbaceous layer. This forest type can be found between 1,000 and 8,000 feet above mean sea level (Holland 1986).

Mixed Coniferous Forests. Mixed coniferous forest habitats include Coulter pine forest, ponderosa pine forest, Sierran coniferous forest, mixed oak-coniferous big pine/coulter

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pine, mixed evergreen forest, and Jeffrey pine forest. These montane forests are primarily composed of conifers intermixed with occasional broad-leaved trees, especially oaks. Conifer species include pines (*Pinus coulteri*, *P. ponderosa*, *P. jeffreyi*), white fir (*Abies concolor*), and incense cedar (*Calocedrus decurrens*). The understory is generally sparse and consists of tall-growing shrubs. Elevations range between 3,500 and 8,000 feet above mean sea level.

Southern Interior Cypress Forest, Tecate Cypress Forest. These fire-dependent forests consist of isolated stands of cypress (*Cupressus forbesii* or *C. arizonica* ssp. *stephensonii*), which are relictual elements from a more widespread Pleistocene flora. Forests of cypress are found at elevations between 1,000 and 5,500 feet above mean sea level. Young stands consist of densely packed adolescent trees that gradually give way to a more mature forest of fewer and larger trees. In the southern and better-developed habitats, the understory consists of more loosely associated chaparral and sage scrub species.

Torrey Pine Forest. Torrey pine forest is an open forest of relict Torrey pines (*Pinus torreyana*) and sandstone soils that occur along the coastline where significant fogs and mesic microhabitats are present. Much of this remaining habitat is protected in Torrey Pines State Reserve.

4.2.1.6 Disturbed/Developed

Bare Ground. Bare ground consists of unvegetated, disturbed areas. Areas with bare ground include: graded lands, land with significant topsoil disturbance, lands subject to repeated clearing for fuel management, construction staging areas, off-road vehicle trails, and old home sites.

Disturbed Habitat. Disturbed land is the area within a project site that, at the time a specific project is analyzed under CEQA or the pre-activity assessment is made (if no CEQA is required), the habitat mapping identifies as having less than 20 percent cover (by area or frequency of occurrence as determined during the site assessment) of native plants. The minimum mapping unit used to identify habitat and disturbed polygons will be appropriate for the site. Disturbed land will not require mitigation, except that non-native grasslands and delineated corridors/linkages may have less than 20 percent (or no) native plant species cover and still be treated as habitat that requires mitigation. The Plan relied on a regional vegetation data base for the initial habitat assessment, and as each project is initiated, the Plan's vegetation mapping will be updated for those sites.

Urban/Developed Land. Urban/Developed lands include areas that have been permanently altered for human use. Urban/Developed lands include: parking lots, homes, commercial development, infrastructure, and ornamental landscaping.

4.2.1.7 Grasslands

Native Grassland (Valley Needle Grassland, Valley and Foothill Needle Grassland).

Native grasslands are found on clay substrates and support perennial native bunchgrass species such as needlegrass (*Nassella* spp. and *Achnatherum* spp.), wild rye (*Elymus* spp.), deergrass (*Muhlenbergia* spp.), and sacaton (*Sporobolus* spp.). Native grasslands also support herbaceous perennial, annual, and bulb species such as blue-eyed grass (*Sisyrinchium bellum*), mariposa lily (*Calochortus* spp.), golden star (*Bloomeria* spp.), and clarkia (*Clarkia* spp.). Approximately 10 percent cover of native grasses will delineate native grassland from a non-native grassland. This vegetation type is scattered throughout the foothills, and is generally replaced in the higher mountains by montane meadow grassland species. Stands along the coast tend to cover relatively small areas and have often been heavily impacted by urban development. The majority of perennial grassland occurring in the Plan Area is found at upper elevations.

Non-native Grassland (Grassland). Non-native grassland is typified by a dense-to-open cover of annual and broadleaf, herbaceous grasses. Annual species comprise 50 to 90 percent of the vegetative cover, with most annuals being non-native species (SANDAG 2003). Shrubs and trees may be present, but do not comprise more than 15 percent of the vegetative cover. Non-native grassland indicator species include brome grasses (*Bromus* spp.), wild oats (*Avena* spp.), fescues (*Vulpia* spp.), mustards (*Brassica* spp.), and filarees (*Erodium* spp.). Non-native grasslands became widespread following the 19th century introduction of cattle and sheep herds. This introduced grassland often occupies deep loams and clays. Non-native grassland typically supports habitat for small mammals, reptiles, and raptor foraging. In the Plan Area, most non-native grassland likely developed as a result of past agricultural or urban development-related activities that occurred in native habitats.

4.2.1.8 Exotic Landscapes

Eucalyptus/Non-native Vegetation. Non-native eucalyptus woodlands are dense forests of tall Australian eucalyptus (*Eucalyptus* spp.) trees with allelopathic toxins that tend to exclude understory growth. This introduced woodland vegetation is well developed throughout the urban and coastal plains. Occasionally, other planted woodlands can be found at scattered locations. These woodlands provide foraging and breeding habitat for raptors and other avian species.

Ornamental. Ornamental landscapes include intentionally or actively planted areas usually associated with aesthetic improvement of developments. Ornamental landscapes are distinct from "natural", unplanned non-native areas that are the result of invasion by exotics following disturbance. Ornamental landscapes include: lawns, median plantings, golf courses, landscaped areas, street trees, etc.

4.2.1.9 Oak Woodland and Forest

Black Oak Forest. The black oak forest community is a persistent subclimax vegetation community dominated by black oak (*Quercus kelloggii*). These even-aged, dense stands of black oak occur on mountain slopes, canyon bottoms, and upper foothill slopes (Holland 1986).

Black Oak Woodland. Black oak woodland is dominated by black oak and is found inland from between 2,500 to 7,000 feet. This community usually has a well developed understory and is associated with Ponderosa pine (*Pinus ponderosa*) (Holland 1986).

Coast Live Oak Forest (Dense Coast Live Oak Woodland). Coast live oak forest is very similar to the coast live oak woodland habitat described above except that it is characterized by having a denser, closed canopy. This habitat can be interspersed with madrone (*Arbutus menziesii*) and/or Coulter pine (*Pinus coulteri*). This habitat type is known to occur adjacent to coast live oak woodland in more mesic areas near the coast below 3,000 feet above mean sea level (Holland 1986).

Coast Live Oak Woodland (Open Coast Live Oak Woodland). This evergreen woodland is characterized by a sparse distribution coast live oak (*Quercus agrifolia*) with varying, relatively open understory components. Coast live oak woodlands can support an understory of perennial grasses, wild flowers, shrubs, and vines. Coast live oak woodland ranges from coastal canyons to montane valleys. This woodland habitat is typically found on north-facing slopes and in shaded ravines in drier areas (Holland 1986).

Engelmann Oak Forest (Dense Engelmann Oak Woodland). Engelmann Oak forest is similar to Engelmann Oak Woodland, except for tree density. Engelmann Oak Forests have a denser, more closed canopy than Engelmann Oak woodlands and contain a less dense understory. This habitat type is known to occur adjacent to other oak woodland communities in more mesic areas. (Holland 1986).

Engelmann Oak Woodland (Open Engelmann Oak Woodland). Mature Engelmann oaks (*Quercus engelmannii*), a sensitive tree whose primary range is within San Diego County, are typically found at mid-elevations. These woodlands are dominated by Engelmann oaks, and usually contain some coast live oaks as well. The understory is primarily composed of low-growing grasses and forbs. Much of Engelmann oak woodland habitat has been historically grazed in the plan area. Typically, one or two age classes of oaks are present, rather than a mix of class sizes. Engelmann oak woodland primarily occurs at foothill elevations below 4,000 feet (Holland 1986).

Mixed Oak Woodland (Oak Woodland). These broad-leaved, forest/woodland habitats exhibit a strongly tiered canopy of oaks (*Quercus kelloggii* and *Q. chrysolepis*) and mid-sized trees. A diverse understory of shrubs and herbaceous perennials is typical, often

including substantial amounts of downed logs and thick leaf litter. Occasional conifers may be present in addition to a mosaic of small glades and meadows. These habitats are present at mid- to upper-elevations (1,000 to 8,000 feet above mean sea level), and are uncommon in the foothills.

4.2.1.10 Sage Scrub, Coastal

Alluvial Fan Scrub. This vegetation community forms in washes and alluvial fans. It is characterized by a co-dominance of woody coastal sage scrub, chaparral, riparian plants and annual herbaceous species within a short distance of one another.

Cactus Scrub. Cactus scrub is a subtype of Diegan coastal sage scrub that supports a high density (greater than 60 percent) of prickly pear (*Opuntia littoralis*) (USFS 1997). There is no equivalent Holland (1986) vegetation class. In the Manual of California Vegetation (Sawyer-Keeler-Wolf 1995), the coast prickly-pear series is equivalent to cactus scrub, but this Sawyer Keeler-Wolf classification system does not specifically describe Diegan coastal sage scrub series dominated by coast cholla (*Cylindropuntia proliferata*) which can occur in coastal San Diego and Orange Counties.

Coastal Sage-Chaparral Scrub. This category represents a transitional habitat containing plant species representative of both sage scrub and chaparral vegetation. With respect to shrub height, density, and composition, this habitat more closely resembles sage scrub, as compared to the relatively tall and dense canopy of mixed chaparral.

Coastal Sage Scrub (Diegan). Diegan coastal sage scrub comprises low-growing, aromatic shrubs that are drought-deciduous. Diegan coastal sage scrub is found in coastal areas from Los Angeles County south into Baja California, Mexico. This community typically grows on sites with low moisture availability, steep, xeric slopes, or clay-rich soils that are slow to release stored water (Holland 1986). Typical native scrub species include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), California encelia (*Encelia californica*), lemonadeberry (*Rhus integrifolia*), and laurel sumac (*Malosma laurina*).

Coastal Sage Scrub (Inland) Inland sage scrub occurs within San Diego County at elevations above 1,000 feet above mean sea level.

Flat-topped buckwheat scrub. This scrub community is dominated by flat-topped buckwheat (*Eriogonum fasciculatum*) and is found in interior valleys, 10 to 24 miles from the coast. California sagebrush and laurel sumac can also be associated with this vegetation community.

Maritime Succulent Scrub. Maritime succulent scrub is a low-growing, relatively open vegetation community often dominated by drought-deciduous shrubs with a rich mixture

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of cactus and other succulents. The vegetation is an extension of flora common in northern Baja California, Mexico, but uncommon in the U.S. It is differentiated from coastal sage scrub by the high density of jojoba (*Simmondsia chinensis*) and several cactus species and/or indicator species such as San Diego bur-sage (*Ambrosia chenopodifolia*) and cliff spurge (*Euphorbia misera*). This community intergrades with southern coastal bluff scrub on exposed headlands and bluffs and with coastal sage scrub on better developed, moister soils. It is reduced in the region due to urban development along the coast.

Riversidean Sage Scrub. This form of coastal sage scrub occurs throughout the plains and hills of western Riverside County. The community is characterized by low-stature, aromatic, drought-deciduous shrubs and sub-shrubs. It occurs on excessively drained soils or clay soils. Common shrub species include California sage brush, California buckwheat, and brittlebush (*Encelia farinosa*). The vegetation is typically a fairly open mixture of native shrubs, cacti, and non-native grasses. These species may vary depending on physical characteristics and successional status of the habitat.

Riversidean Alluvial Fan Scrub. Alluvial fan scrub is a Mediterranean-type shrubland restricted to floodplains and the periphery of drainages where deeply bedded, sandy alluvium supports plant species adapted to nutrient poor soils. Drought-deciduous, soft-leaved shrubs typically predominate, but evergreen shrubs, riparian species, and upland annual plants may all be present. Scalebroom (*Lepidospartum squamatum*) is considered an indicator species for this vegetation type. Although alluvial fan scrub is typically an inland vegetation community, tracts of alluvial fan scrub can also be found along the coastal plains. Additionally, alluvial fan scrub is occasionally found in the lower foothill drainages.

Southern Coastal Bluff Scrub. This vegetation community occurs on headlands and uplands that lie immediately behind and usually elevated above the beach dunes. Bluff scrub applies to an open mix of native succulents and low-lying shrubs that are adapted to moisture-laden winds and salt spray. Typical species include saltbush (*Atriplex* spp.), iceplant (*Mesembryanthemum* sp.), dudleya (*Dudleya* spp.), and sea-dahlia (*Coreopsis* spp.). Steady erosion and nearby horticultural plantings have introduced exotic species to these areas. This vegetation is rare due to intense urban development, and remains in only a few protected locations and along precipitous beach cliffs.

4.2.1.11 Sage Scrub, Montane/Trans-montane

Big Sagebrush Scrub. Big sagebrush scrub is an inland shrub community occurring at 4,000 to 9,000 feet. Big Sagebrush scrub is dominated by big sagebrush (*Artemisia tridentata*) and is found on a variety of soils and terrain. Other associated species include: blackbush (*Coleogyne ramosissima*), wingscale (*Atriplex canescens*), and rabbitbrush (*Chrysothamnus nauseosus*).

4.2.2 Wetland Communities

4.2.2.1 Aquatic, Freshwater

Non-vegetated Floodplain, Channel, Lakeshore Fringe. Non-vegetated channels and floodways consist of dry washes, scoured channels, dry river beds, channelized floodways, and unvegetated margins of lakeshore. Plant cover in this habitat is typically absent or greatly reduced due to the severe seasonal water flow, shifting sediments, or a surface layer of bedrock that prevents plant establishment.

Open Freshwater (Freshwater, Open Water, Water). This category consists of inundated areas with no emergent vegetation. Open water areas include reservoirs, lakes, rivers, and ponds. Vegetation, if present, consists of floating aquatic species.

4.2.2.2 Aquatic, Marine

Open Saltwater (Brackish Water, Deep Bay, Estuarine, Intertidal, Shallow Bay, Subtidal) This category consists of marine inundated areas with no emergent vegetation. This category includes bays, estuaries, brackish water, and coastal subtidal areas.

Saltpan/Mudflats. Salt pans and mudflats are unvegetated coastal wetland areas formed by the deposition of sediment and/or salts from tidal inundation. Salt pans and mudflats are typically associated with bays and estuaries.

4.2.2.3 Riparian

Arrowweed scrub. This community is composed of moderate to dense cover of Arrowweed (*Pluchea sericea*) below 2,500 feet above mean sea level. Additionally, *Typha ssp.*, *Scirpus spp.*, *Juncus spp.*, and *Distichlis spicata* may occur sparsely throughout this community. Arrowweed scrub is a disturbance-maintained successional community, which occurs in stream banks, ditches, and washes with gravelly or sandy soil (Holland 1986).

Mule Fat Scrub. Mule fat scrub is a tall, herbaceous riparian scrub strongly dominated by mule fat (*Baccharis salicifolia*). It occurs along drainages with a fairly coarse substrate and a moderately deep water table. Mule fat scrub is developed and maintained by flooding or other disturbances but, in the absence of disturbance, may change, through successional processes to willow-cottonwood or sycamore-dominated riparian forest/woodland. Mule fat scrub typically occurs at elevations below 2,000 feet above mean sea level (Holland 1986).

4.0 Study Area Biology and Land Use

Southern Arroyo Willow Riparian Forest. Southern arroyo willow riparian forest is a riparian vegetation community that is dominated by arroyo willows (*Salix lasiolepis*). This community is typically found along rivers and streams.

Southern Coast Live Oak Riparian Forest. Southern coast live oak riparian forests are open to locally dense evergreen woodlands primarily dominated by coast live oak. The forest understory is typically dominated by herbaceous species and tends to have a minimal shrub understory. Coast live oak woodlands are present bottomlands and outer floodplains along larger streams, on fine grained soils (Holland 1986).

Southern Cottonwood-Willow Forest. Southern cottonwood willow riparian forest is a riparian community dominated by cottonwood and willow trees. The understory typically consists of shrubby willows. This plant community is typically found along rivers and streams, where there is groundwater and frequent overflows (Holland 1986).

Southern Sycamore Woodland. Southern Sycamore Woodlands are sparse riparian communities dominated by California sycamore (*Platanus racemosa*) and coast live oak.

Southern Sycamore-Alder Riparian Woodland. Southern Sycamore-Alder Riparian Woodland is a tall, open canopy, broadleaved, winter-deciduous streamside woodland dominated by western sycamore (*Platanus racemosa*) and often white alder (*Alnus rhombifolia*). This vegetation community typically occurs in very rocky streambeds subject to seasonal high-intensity flooding. The dominance of white alder in these woodlands increases in abundance on more perennial streams, while western sycamore favors more intermittent streams (Holland 1986).

Southern Willow Scrub. Southern willow scrub is a dense riparian community dominated by broad-leaved, winter-deciduous willow trees (*Salix* spp.). This vegetation community is typically found along major drainages but also occurs in smaller drainages. The density of the willows typically prevents a dense understory of smaller plants from growing. The representative species typically grows in loose, sandy, or fine gravelly alluvium deposited near stream channels during flood flows. This community requires repeated flooding to prevent succession to community dominated by sycamores and/or cottonwoods (Holland 1986).

White Alder Riparian Forest. White Alder Riparian Forest can be found along permanent streams from 1,000 to 5,000 feet above mean sea level. This riparian community is dominated by white alder.

4.2.2.4 Riparian (Disturbed)

Arundo Scrub. Arundo scrub is found in disturbed riparian areas and washes. It is characterized by the dominance of *Arundo donax*, a large, bamboo-like plant from Mediterranean Europe and Southern Asia.

Tamarisk Scrub. Tamarisk scrub is a type of riparian scrub dominated by non-native, highly invasive tamarisk (*Tamarix* spp.). This weedy plant community is usually a monoculture of tamarisk that has supplanted native wetland plant species. Tamarisk usually invades following disturbance. This plant community typically occurs in floodplains of drainages or intermittent streams, which are often in areas where high evaporation creates high salinity in the stream.

4.2.2.5 Wetland

Alkali Wetlands (Alkali Seep, Alkali Marsh, Cismontane Alkali Marsh). Alkali wetlands are characterized by saturated soils dominated by emergent, herbaceous monocots. These areas have high salt concentrations due to seasonal evaporation and poor flushing or leaching of the soils. Soils typically become dry, but may support standing water during the wet season. Most habitat areas occur as small, isolated stands in the foothills and lower mountains. Species typical of this habitat include yerba mansa (*Anemopsis californica*), spiny rush (*Juncus acutus*), and San Diego marsh elder (*Iva hayesiana*).

Freshwater Meadow or Seep. Freshwater seeps are localized microhabitats situated in moist or wet soil around springs or seeps, where wetland herbs and herbaceous perennials, especially sedges and grasses, are concentrated. Freshwater seeps are often associated with grasslands or meadows. This habitat differs from freshwater marsh in that it is usually low-growing and is not perennially inundated.

Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland). Freshwater marsh habitat consists of saturated soils that remain wet through much of the year and support stands of perennial, emergent monocots. Uniform stands of bulrushes (*Scirpus* spp.) or cattails (*Typha* spp.) often characterize this habitat. Vegetation is substantially taller than in alkali marshes. Unlike freshwater seeps, freshwater marshes are relatively common at the edges of ponds, creeks, and riverbeds on the coastal plain, as well as into the foothills and mountains.

Montane Meadow. The montane meadow vegetation communities include wet and dry montane meadows and wildflower fields. Montane meadows support mesic fields of herbaceous perennials, bunchgrasses, and sedges which are adapted to a spring/summer growth cycle following heavy winter rainfall and snowmelt. High seasonal or semi-permanent moisture levels and poorly draining soils tend to preclude shrub growth. These meadows are distributed in low-lying fields with a substantial watershed throughout the mountains of the region at elevations between 4,000 and 9,000 feet above mean sea level.

Southern Coastal Salt Marsh. Southern coastal salt marsh and mudflats are coastal lagoon habitats that are characterized by low-energy tidal movement, river inputs, and increased sedimentation. Based on vegetation patterns, salt marshes can be segregated

4.0 Study Area Biology and Land Use

into distinctive zones. Common species such as California cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia virginica*) generally occur in the lower marsh areas subject to moderate tidal inundation closest to the waterline. Annual pickleweed, saltwort (*Batis maritima*), and sea-blite (*Suaeda californica*) generally occur at middle marsh elevations.

Wetland (Disturbed). Disturbed wetland habitat includes those areas which have been previously cleared and/or otherwise disturbed through human activity so that native wetland vegetation has been displaced. If there is a regulatory or legal action on the land to return it to a prior undisturbed condition, then the prior condition will be used to determine the status of the vegetation condition. Disturbed wetlands are characterized by the presence of hydric soils and/or dominated by nonnative or weedy wetland indicator species.

4.2.2.5.1 Vernal Pools

Vernal pool designation may include both road rut vernal pools and naturally formed pools. In San Diego County, natural vernal pools are usually either San Diego mesa hardpan vernal pools or San Diego mesa claypan vernal pools. Within the Plan Area in Riverside County, natural vernal pools may include vernal lakes, such as Skunk Hollow, or alkali vernal pools. A number of federally and/or state-listed plants and animals are restricted to these pool systems, including San Diego mesa mint (*Pogogyne abramsii*), Otay Mesa mint (*Pogogyne nudiuscula*), San Diego button celery (*Eryngium aristulatum* ssp. *parishii*), Riverside fairy shrimp (*Streptocephalus woottoni*), and San Diego fairy shrimp (*Branchinecta sandiegonensis*).

Alkali Vernal Pool. Named after their saline-alkali soils, alkali vernal pools form over a large area in the inland valleys. There is an alkali vernal pool at the Salt Creek vernal pool complex in southwestern Riverside County (RCIP 2003). The size and configuration of alkali vernal pools varies based on annual rainfall and seasonal flood conditions.

San Diego Mesa Claypan Vernal Pool. These pools are similar to hardpan vernal pools except they have basins sealed by a thick veneer of clay. These pools occur on marine terraces on the coastal plain and have finer textured soils than the hardpan pools. They are often associated with mima mound topography. Claypan pools are often found in open fields and grasslands.

San Diego Mesa Hardpan Vernal Pool. This is a very low-growing plant community of herbaceous perennials and annuals that are adapted to seasonal ponding on hardpan iron and silica rich substrates relatively impervious to the downward flow of water. As a result, the rainfall in these coastal basins slowly evaporates over an extended period, allowing a unique assemblage of plants to grow during the interim. San Diego Mesa hardpan vernal pools are primarily found interspersed among open chaparral and sage scrub on the coastal marine terrace deposits of the northern portions of the city of San Diego.

Vernal Lake. Large vernal pools that form in a basin and remain saturated for a longer duration are called vernal lakes. For some vernal lakes, vegetation in deeper portions may resemble freshwater marshes (RCIP 2003). The Skunk Hollow vernal pool is an example of a vernal lake. Located in Riverside County and covered by the MSHCP, Skunk Hollow is an isolated pool which supports several rare and endangered species (USFWS 2007b).

4.3 Sensitive Vegetation Communities

Vegetation communities considered sensitive by the Water Authority are rare or threatened in the region and support sensitive plant and wildlife species, including all wetlands, riparian habitats, waterways, coastal sage scrub, native grasslands, and oak woodlands.

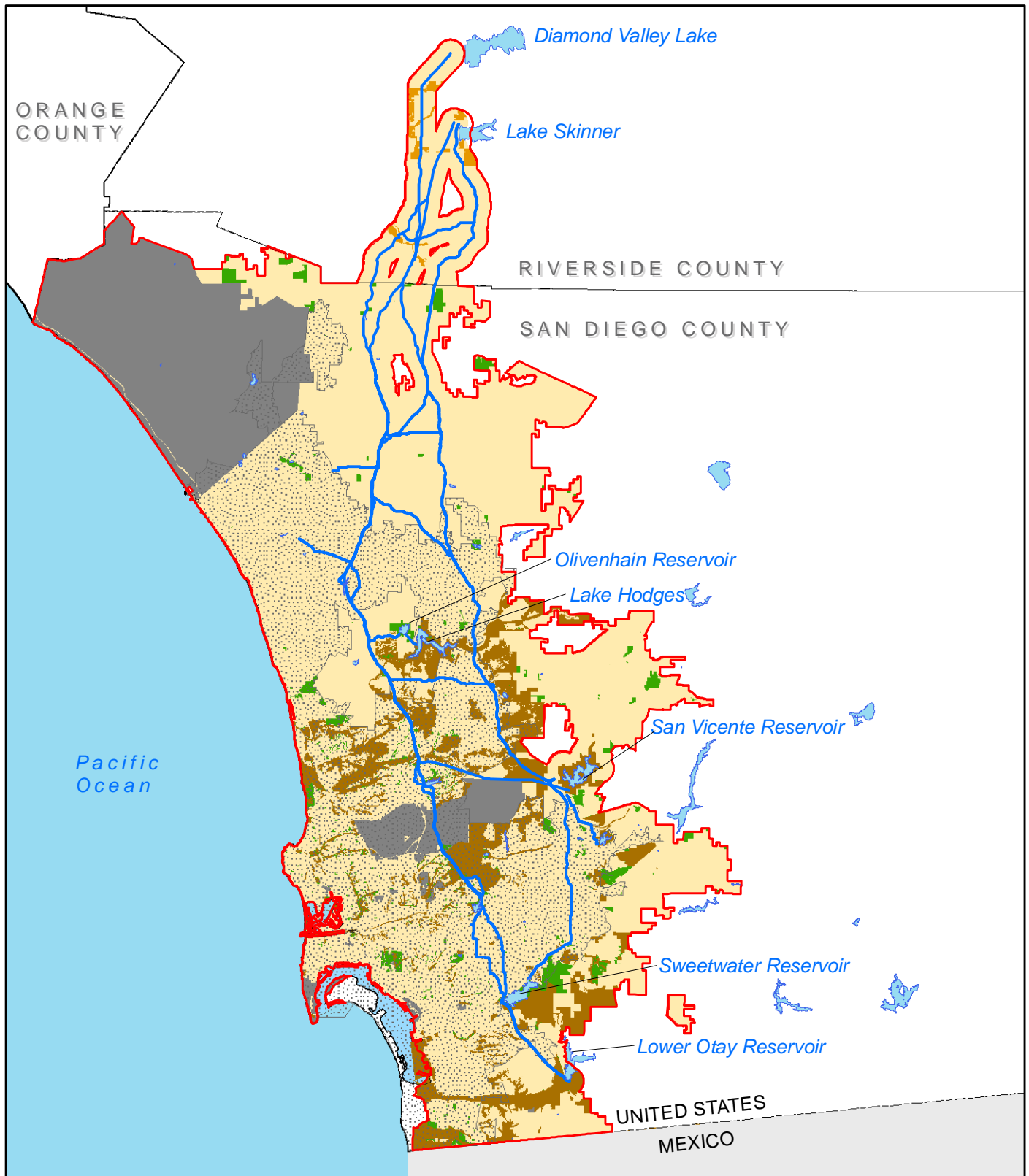
4.4 Land Use

4.4.1 Existing Land Uses

General land uses within the Plan Area include residential development, commercial and business centers, industrial areas, public facilities such as government offices and education facilities, utilities, military installations, parks, agriculture, and open space. Approximately 25 percent of the area consists of parks and recreation areas. Figure 4-2 illustrates the general locations and boundaries of parks and preserve lands, including state and county parks and national parks. Military lands and lands covered by an existing or proposed city or county multiple species and/or habitat conservation plan are displayed on Figure 3-1.

Urban and residential development is more extensive in the lower elevations of the coastal plain of San Diego County and the inland valleys of southwestern Riverside County around Temecula. Residential land uses include single-family and multi-family residential housing, including townhouses and condominiums. Commercial land uses typically consist of business parks, retail shops, restaurants, and local businesses. Industrial areas are usually plant operations, such as manufacturing. Public facilities include government offices, schools, universities, and churches. Utilities include areas for power plants, water treatment plants, electrical substations, and associated easements and rights-of-way. Roads and paved areas are included in the public facilities land use category. Military installation areas include Camp Pendleton, MCAS Miramar, and Fallbrook Naval Weapons Station.

Agricultural uses are predominantly the orchard crops (e.g., avocado and citrus) of northern San Diego County, as well as tree crops and vineyards of foothills and valley












- | | | |
|--|--|--|
|  NCCP/HCP Plan Area |  Military Land | 0 Miles 10  |
|  Existing/Planned Aqueducts and Pipelines |  San Diego County MSCP Preserve Lands | |
|  Urbanized Areas |  Western Riverside County MSHCP Reserve Lands | |
|  Parks and Preserves |  MSHCP Reserve Lands | |

FIGURE 4-2
Land Use in NCCP/HCP Plan Area

fringes of southwestern Riverside County. Agricultural uses (e.g., orchards, pastures, and dairy farms) are being rapidly displaced by residential development within the central portions of the Temecula Valley. Expansive areas of agricultural lands were also found on former ranch lands in southern San Diego County, notably on the Rancho Jamul Ecological Reserve (the former Daley Ranch) and Otay Ranch properties, and along the lowlands of the San Dieguito River Valley. Substantial tracts of this agricultural land are currently proposed for, or are actively being converted to, residential development.

Urban development covers much of the San Diego area, particularly along the coast and around the city of San Diego. However, open space and vacant lands occur in large tracts within the region. These areas are typically along ridges and mountain ranges, and in the east county area of San Diego County. Many parks, offering passive recreation opportunities such as hiking, are located in the undeveloped areas. Other activities associated with this land use include camping, biking, and picnicking.

4.4.2 Preserve Lands

This section discusses lands that have been preserved and managed (conserved) for biological diversity within the Plan Area. Within the Plan Area, these lands include state, county, and city parks, preserves, and ecological study areas, national forests, private and public lands covered by open space or conservation easements, and habitat mitigation banks. Most of the protected lands occur at higher elevations within the Cleveland National Forest, as well as within state parks and recreation areas. These areas are managed for joint use with a priority on protecting sensitive habitats and species, supporting large populations of larger wildlife species, and protecting populations of species requiring chaparral and montane habitats.

Existing conservation areas at lower elevations include the Lake Skinner-Shipley-Domenigoni Preserve complex in Riverside County; county, regional, and state parks; city preserves; and National Wildlife Refuges within coastal wetland complexes. Open space preserves within San Diego County include Blue Sky Ecological Reserve, Goodan Ranch, and Sycamore Canyon in Poway; El Capitan and Oak Oasis in Lakeside; Hellhole Canyon in Valley Center; Los Penasquitos Canyon, Mt. Gower, and Simon Open Space Preserve in Ramona; Otay Valley Regional Park; San Elijo Lagoon in Solana Beach; South Bay Biological Study Area in Imperial Beach; Volcan Mountain in Julian; and Wilderness Gardens in Pala. Day use regional parks include Mission Trails, Tijuana River Valley, Dos Picos, El Monte, Felicita, Flinn Springs, Otay Lakes, Pine Valley, Potrero, San Dieguito, Stelzer, and Sweetwater. National Wildlife Refuges (NWR) in southern San Diego County, including the San Diego NWR (which includes the San Miguel HMA owned by USFWS), the San Diego Bay Sweetwater Marsh NWR, the Tijuana Slough NWR, and the San Diego Bay South Bay NWR.

4.0 Study Area Biology and Land Use

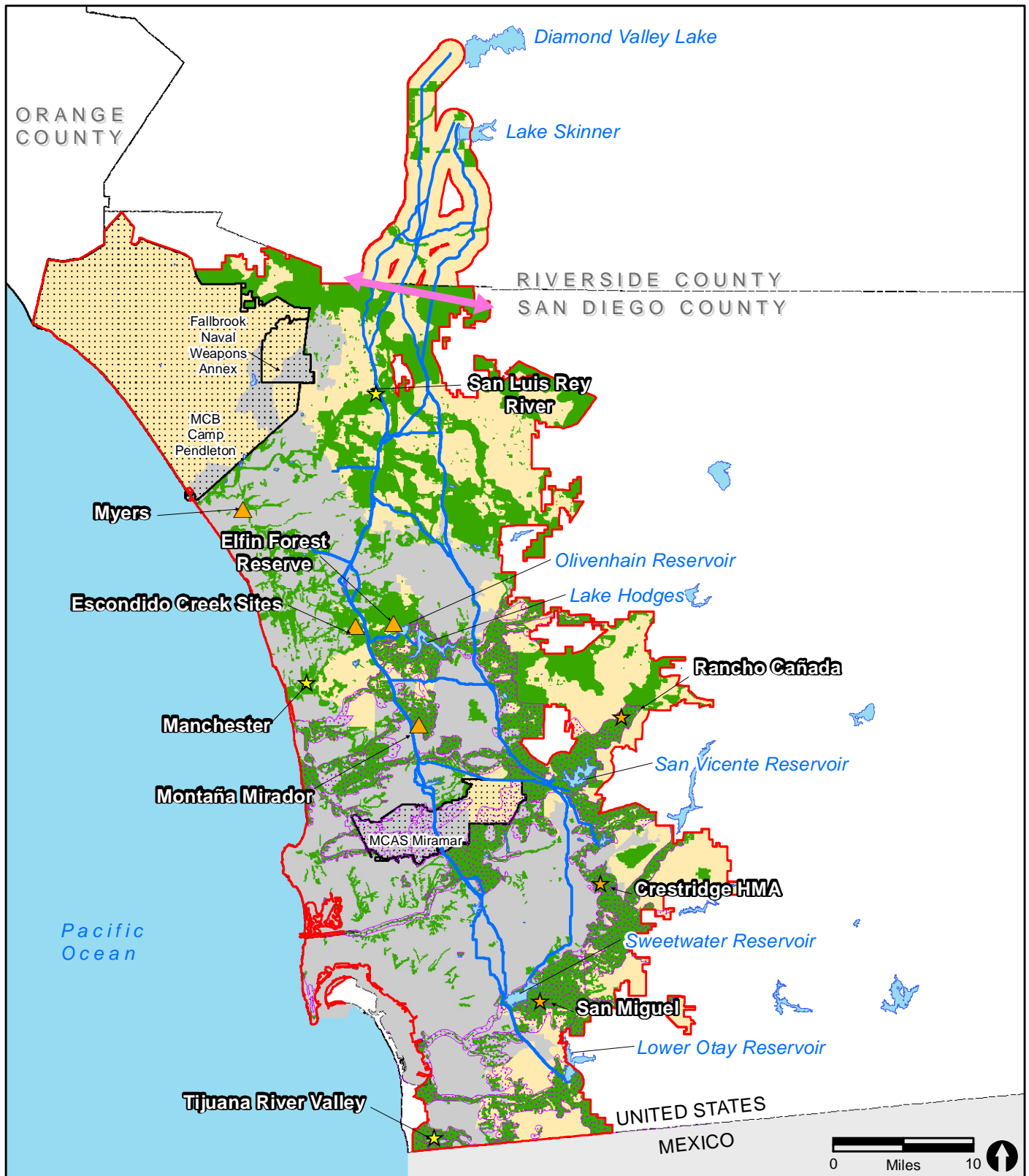
The Water Authority's Plan contributes to regionally significant conserved lands (i.e., Preserve Area) with the Crestridge HMA located near El Cajon; the San Miguel HMA within the San Diego NWR; and the Rancho Cañada HMA, which is part of the larger Monte Vista Ranch south of the community of Ramona in central San Diego County (Figure 4-3). The Water Authority's Plan includes three wetland mitigation sites, including the existing Manchester HMA in the city of Encinitas, the proposed Tijuana River Valley HMA near the border, and the proposed San Luis Rey HMA in northern San Diego County. Finally, the Plan contributes numerous mitigation lands that were previously obtained and transferred to other entities for management (MMAs) as part of the regional conservation reserve system. Each of these HMAs is described in detail in Section 6.0.

4.5 Habitat Linkages and Wildlife Corridors

Wildlife linkages and corridors can function to increase the habitat value of blocks of habitat or to mitigate the effects of habitat fragmentation. Linkages are generally considered to be any connective land between larger blocks of habitat that promotes movement of a variety of species and/or ecosystem processes. These connections can facilitate the movement of larger animals and can serve as "live-in" habitat for smaller species – both of which can improve gene flow among populations. Corridors are generally considered to be linear (often narrow) features that connect larger blocks of habitat and provide for movement, dispersal and migration of wildlife species. The linkage or corridor may not have continuous natural habitat ("stepping stones") or may have very narrow constrictions ("bottlenecks"). The geographic area, time scale, and species of interest will affect the functional level of the linkage or corridor, which can be generally described as regional corridors and local corridors.

The Plan reviewed regional information and reports on core habitat areas and major corridors/linkages within the Plan Area. The Preserve Area and MMAs comprise portions of the core and linkages areas, and the Biologically Significant Resource Areas (BSRA) delineate habitat areas that may be important for maintaining key biological resources (see Figure 4-3). The regional wildlife corridors depicted on Figure 4-3 represent the general locations of habitat connections identified as missing linkages (South Coast Wildlands 2009). As Covered Activities are implemented under this Plan, it will ensure that Covered Activities do not significantly compromise core areas and linkages/corridors and that the guidelines for corridors/linkages are complied with (see Sections 6.4.2.1, 6.4.2.2, and 6.11.3.1).

Regional corridors are important in promoting dispersal of individuals that allow a species to repopulate areas (e.g., following a wildfire or other catastrophic event) and to exchange genetic materials among larger, disjunct populations. Due to the high incidence of habitat fragmentation in coastal southern California, regional wildlife



- NCCP/HCP Plan Area
- Existing/Planned Aqueducts and Pipelines
- Urbanized Areas
- Military Land
- Wetland HMA Sites
- Upland HMA Sites
- Upland MMA Sites
- Biologically Significant Resource Areas*
- MSCP Core Habitat Linkages
- Regional Wildlife Corridors

* Based on available digital data



FIGURE 4-3
 Conceptual Habitat Linkages
 in NCCP/HCP Plan Area

4.0 Study Area Biology and Land Use

corridors have begun to receive significant attention by Wildlife Agencies and conservation groups. The development of regional conservation plans with proposed reserve systems has increased the importance of and attention paid to conserving or establishing/enhancing these features. Despite this attention, substantial uncertainty surrounds the design of and key features for specific linkages and corridors (Beier, Majka and Spencer 2008). The San Diego MSCP adopted a general guideline that a significant corridor should have an average width of 1,000 feet to provide for most larger wildlife species' movement, including some edge buffering. Pinch points less than 1,000 feet may be permissible for relatively short distances, but must have a minimum width of 400 feet for no more than 500 feet linear distance (City of San Diego 1998).

Local corridors often are short, relatively narrow linkages between two or more small, connected patches of habitat, which allows them to function as a larger block of habitat. The larger interconnected block enables viability and promotes population stability through regular genetic interchange, even though each individual habitat patch may be too small for the long-term survival of a wildlife population. The length and width (including any buffering from incompatible land uses/activities) and habitat patchiness within a corridor can greatly affect its effectiveness. The more effective wildlife corridors allow unobstructed movement of the species; however, some local linkage/corridors are comprised of closely-spaced patches of habitat. Limiting activities within and adjacent to local corridors can have a great effect on the suitability of corridors. Depending upon the particular species' needs for a linkage/corridor, utility service corridors, emergency access routes, and recreational trails may function as corridors. This Plan does not define the specific width, patchiness, or other parameters for local corridors.

This Plan has been designed to maximize consistency with and complement other conservation planning efforts, with an emphasis on maintaining and/or expanding habitat linkages and wildlife corridors. Figure 4-3 shows conceptual conservation plan habitat linkages and wildlife corridors in San Diego County. As illustrated in Figure 4-3, the Crestridge HMA, San Miguel HMA, and Rancho Cañada HMA occur within county of San Diego MSCP core habitat linkages. The Tijuana River Valley and San Luis Rey River properties will also be located along key river corridors. In addition, Water Authority rights-of-way may be used as local wildlife linkages and corridors where they occur in native habitats and rural settings. Habitat linkages and wildlife corridors are important to the viability of regional planning efforts. In some instances, the presence of a utility corridor may serve to link habitat patches and ensure the long-term persistence of habitat connections. In other instances, surface features or prolonged construction activities may permanently or temporarily block corridors. As a result, the consideration of habitat linkages in other multiple species planning efforts was integrated into the development of compatibility criteria for Covered Activities occurring within the Plan Area.

5.0 Covered Activities

The Water Authority owns, operates, and maintains pipelines and numerous ancillary facilities along the aqueduct pipeline corridors (Figure 2-1; Table 5-1). Routine maintenance is required to assure a safe and reliable supply of water to its Member Water Agencies whose service areas are generally within western San Diego County. This section discusses the types of Water Authority activities that are covered by this Plan. This Plan addresses only Water Authority projects which are not covered by any other plan or permit. Mitigation for Water Authority Covered Activity impacts pursuant to this Plan will provide species conservation that is complementary to that provided/required by other plans. Additionally, this section provides a basis for the impact assessment of these activities on Covered Species and native habitats.

**TABLE 5-1
OVERVIEW OF EXISTING WATER AUTHORITY FACILITIES**

Facility/Structure	Approximate Number
Flow control facilities (FCF)	120
Aqueduct structures (blow-offs, air vents, etc.)	1,300 plus 12 interconnects and exchange structures
First and Second Aqueduct and other Pipelines	286 miles; 75 service connections
Rights-of-Way	1,900 acres (approx. 1,625 acres held as easement, and 275 acres held as fee owned parcels)
Dam/ Reservoir	1 (24,000 acre-feet capacity)
Flow Regulatory Structure (FRS)	4
Pump Stations	3
Hydroelectric Generating Plants	3
Water Treatment Plants	1

The activities to be covered by this Plan Area are organized into three categories:

1. CIP projects covered for construction and expansion (i.e., Planned or Future Projects that have not already been authorized/permited by Wildlife Agencies);
2. O&M Activities; and
3. Preserve Area management, monitoring, and adaptive management.

The CIP includes Existing Projects (i.e., those projects that have been issued permits by the Wildlife Agencies) as well as Planned and/or Future Projects for which take of Covered Species and loss of habitat are anticipated to occur pursuant to this Plan. This Plan covers the potential take of Covered Species and habitats associated with the construction of Planned and Future Projects, the O&M of those Planned and Future

5.0 Authorized and Covered Activities

Projects constructed pursuant to the Plan, and the O&M of existing CIP projects and Water Authority facilities, where their maintenance, repair, and operation has not already been authorized pursuant to an existing BO (Section 1.1.4).

The Plan includes Future CIP projects for coverage of construction, and associated O&M Activities that are outside the Survey Area but within the Plan Area, if the project conforms to this Plan, as outlined in Sections 6.0 and 8.0.

In addition, where modifications, amendments, clarifications, or other discretionary changes to an Existing Project's individual permit are required and the change to the permit affects a Covered Species, any measures to offset additional impacts to Covered Species will be consistent with this Plan. The Water Authority rights-of-way system spans approximately 1,900 acres within the County, and provides some level of continuity of habitats through limitations placed on the uses which may occur over Water Authority facilities. While lacking certain control over land uses within easements and rights-of-way, the Water Authority will continue its policy to allow compatible joint use of its easements, including the development of natural habitats. The Water Authority cannot require underlying land owners to maintain Covered Species or their habitat on the easements, and third-party activities that impact Covered Species are not covered by this Plan.

This Plan and its associated Permits include O&M Activities that are required to operate and maintain the existing facilities and planned and future CIP projects (Section 5.1) that rely on this Plan for as long as needed. Some existing BOs (BO 1-6-93-F-28, BO 1-6-97-F-13, BO FWS-SD-1373.2, BO 2007-B-14/2007-F-22, and BO 2008B0061-2008F0732) include O&M Activities in the permitted project description, providing a limited amount of take of certain Covered Species for on-going operations and maintenance associated with those previously permitted projects (Section 1.1.4).

Emergency actions that might be required, either by the Water Authority or by public health, safety, homeland security, local law enforcement, or other such entities, cannot be fully anticipated by this Plan. However, where possible, this Plan will define protocols and guidelines for emergency actions to reduce adverse effects on Covered Species and their habitats. A discussion of Emergency Actions is in Section 5.3.

5.1 Capital Improvement Program (CIP) Activities

The Water Authority's CIP, first adopted by the Board in 1989, has been and will continue to be periodically modified and amended, as needed, for the purpose of fulfilling the mission of the Water Authority. The goal of the CIP is to "provide the necessary facilities for a safe, reliable, and operationally flexible water storage, treatment, and

delivery system” (Water Authority 2004a). The facilities necessary to meet this goal include pipelines, pump stations, storage facilities, treatment facilities, flow control facilities, and other equipment related to the aqueduct system.

The CIP includes, but is not limited to, buried pipelines with above ground hydraulic structures and access roads; pump station, flow control, and metering facilities; and water treatment and storage facilities of various sizes. Planned Projects and Existing Projects that may need coverage under this Plan are described in more detail in Appendix C. Construction and/or expansion of Planned and Existing Projects are considered Covered Activities under this Plan. Future Projects that are part of the CIP do not have enough information to allow impacts to Covered Species or habitats to be specifically identified in this Plan, so impacts were projected based on the current trend of facility buildout (see Table 5-3 and Section 5.5.1). Future Projects could involve Covered Activities for existing or new facilities and associated O&M Activities, and any take of Covered Species outside of the Survey Area/PIZ would be approved pursuant to the Minor Amendment process identified in Section 8.0 (with the exception of Major Amendment Species). Standard construction specifications are summarized from the approved Master Plan (Water Authority 2002).

5.1.1 Pipelines

5.1.1.1 New Construction

In order to accommodate the Water Authority’s need to transport water throughout the Plan Area, construction of new pipelines and underground and surface appurtenances is required between existing or new facilities. Construction of new pipelines of any length within the Plan Area and consistent with the Plan, IA, and Permits is a Covered Activity under this Plan.

Whenever possible, facilities will be sited adjacent to or within an approved right-of-way or other publicly owned property. The use of previously disturbed areas will minimize disruptions to native habitat. Generally, facilities will be located adjacent to pipelines or other locations with existing access roads to the site. Therefore, construction of new access roads will not typically be required. Site preparation involves grubbing and brushing of vegetation and grading or excavation, depending on topography. Equipment used for ground clearing and excavation is typical of a construction site. Heavy equipment may be required for excavations and connections to water conveyance systems. Blasting may be required depending on site topography and geology. Construction operations involve pouring concrete footings for tanks, laying pipeline segments and other support equipment (such as control panels), construction of buildings and structures, and fencing the site perimeter. Construction duration would be dependent on the size and type of facility.

5.0 Authorized and Covered Activities

Whenever possible, pipelines are placed in existing improved or future public rights-of-way, such as streets, highways, utility corridors, or other publicly owned lands. Permanent rights-of-way are typically 100 feet wide or greater to allow access for inspection, maintenance, and repairs. Temporary construction for rights-of-way pipeline installation is determined by conditions in the field. Temporary construction staging areas may be leased for material stockpiles and can reach up to two acres in size. Staging areas will generally be located in existing disturbed areas adjacent to roadways. When new pipeline rights of ways are required, right-of-way selection and pipeline construction will be implemented pursuant to Plan Minimization Measures identified in Section 6.4. Pipeline construction in existing rights of way will be implemented pursuant to Plan Minimization Measures; however, the Plan's Narrow Endemic Policy (Section 6.5.1.6) avoidance threshold is not applicable to rights-of-way in existence at the time the IA is executed, because of past use of the rights-of-way and limitations imposed by the pre-existing rights-of-way configuration. However, narrow endemic species populations will be avoided to the extent practicable, and the 80 percent avoidance policy identified in Section 6.5.1.6.1 will be implemented to the extent feasible within pre-existing rights-of-way. Covered Activities that cannot meet the 80 percent avoidance policy due to site and planning constraints will implement a Wildlife Agency-approved biologically equivalent or superior alternative, designed to achieve a no-net-loss of narrow endemic populations, occupied acreage, and/or Covered Species' population status as determined in consultation with the Wildlife Agencies. Mitigation for unavoidable impacts will be designed to minimize adverse effects to species viability and to contribute to the biological objectives of the Plan. Habitat based mitigation consistent with the mitigation ratios in Tables 6-6 and 6-7 and Covered Species specific mitigation consistent with Appendix B will be required to compensate for all impacts. The measures in the Vernal Pool Protection Policy (Section 6.7.3) are applicable in the rights-of-way, regardless on when the right-of-way was acquired.

Pipelines are installed using conventional open trench or tunneling construction. Pipelines are typically constructed of reinforced concrete cylinder pipe, welded steel pipe, polyvinyl chloride, or high-density ethylene. Site preparation and methods for open trench pipeline construction are discussed in detail below.

Where open cut trenching is not feasible, tunneling techniques, such as boring, jacking, microtunneling, or similar methods, are used. Tunneling is used in areas including (but not limited to) major transportation crossings (e.g., interstate and rail corridors), flood control channel crossings, stream crossings, and highly congested utility areas.

Construction corridor width is typically 45 to 65 feet wide, but may need to be wider to accommodate construction on areas that have slopes. Trench installation rates occur at a rate of 200 to 400 feet per day, but are entirely dependent on the actual geologic conditions encountered and topography. All construction activities take place within the rights-of-way or public streets.

Pipeline construction in open lands generally proceeds at a relatively expeditious rate; however, it may be slowed considerably through complex terrain or within areas of exposed hard-rock geology. Pipeline construction may also be slowed by constrained work areas, inclement weather, or as a result of complicated interties or the need to work around existing utilities, structures, or where significant volumes of surface or groundwater complicate construction. Because pipeline construction is fairly rapid, Covered Species impacts associated with construction activity are typically considered to be of short duration and have limited prolonged effects on species in the vicinity. However, if the seasonal timing of work overlaps with periods of breeding, courtship, or other significant behaviors, Covered Species may be more susceptible to impacts than at other periods of the year. Work initiated during these periods may result in reduced recruitment to the population, temporary or permanent site abandonment, and other impacts affecting individual or local population success. Further, prolonged work (several months to a year or more) within a localized area may locally depress the abundance and diversity of Covered Species in the vicinity, as well as introduce exotic plant and animal pest species. The bird breeding seasons are identified in Section 6.4.2.1, and in Appendix B, Avian Breeding Season Policy.

While the Water Authority's aqueducts are primarily based on gravity flow, the system requires a number of ancillary structures to regulate flow, maximize hydraulic efficiency and avoid system damage, and to deliver water to member agencies at acceptable pressures and volumes. Most of these facilities are located immediately on the pipeline alignment and are extremely small (less than 250 square feet). Structures at high elevation points along the right-of-way include air release and vacuum valves. These valves are required to release trapped air that accumulates at high points in the pipeline, and to allow air to enter the pipe to relieve vacuum conditions that develop during certain hydraulic conditions. The regular functioning of these valves produces no noticeable noise or vibration effect outside of the small tower or enclosed structure. At low points in the system are blow-off valves and pumping connections to allow draining of the pipes for interior inspection or repair. These structures are concrete vaults approximately five feet in diameter.

Tunnel portals and shafts differ from pipeline construction because these construction features often are in use over an extended period of construction time. Localized ground disturbance is potentially more severe than with a pipeline because these sites are the staging and temporary storage area for underground construction. Also, construction activities may occur 24 hours a day, and may result in artificial illumination of adjacent habitat areas. Tunnel portals and shafts are unique in that they generally lack substantial surface components once construction is completed. In this respect, tunnel portals and shafts result in long-term conditions which are comparable to those described for cut and cover pipeline projects.

Factors Influencing the Duration and Extent of Construction Impact

The creation of staging areas, grubbing and clearing zones, and the quantity of work area required during pipeline construction would influence the type and duration of impact a project would have on the surrounding habitat. The required work area and the time it takes for a contractor to move through any given area are controlled by many factors, including the following:

- *Trench Depth:* Trench characteristics such as width and depth are dependent on soil characteristics and the cover or depth requirements of the pipe itself. Minimizing the depth of burial reduces the construction area and cost of the pipeline. However, pipe depth must be balanced against the higher incidence of utility interference, greater live loading, flotation concerns, and restriction of future development/land use.
- *Construction Methods:* The method of pipeline construction used by the contractor may be dictated by the amount of construction area available for use. Smaller, more restrictive work zones may increase the cost of the pipeline and the time it takes to install the pipe by requiring the use of special equipment or excavation techniques in order to remain within the construction zone. In addition, constrained work routes also increase the need for staging and contractor storage areas along the routes.
- *Soil Properties:* Soil properties are one factor that may determine which trench cross-section would be excavated. For example, in hard rock areas where blasting is required, very steep-sloped or vertical walls may be used for the trench sidewalls. In sandy or alluvial soils, more shallow side slopes would be required in order to maintain a stable trench excavation.
- *Terrain Steepness:* The steepness of the terrain and the position of the pipe would also affect the type and width of trench excavation.

Additional factors such as stormwater runoff control requirements, presence of groundwater, and equipment and materials storage may also have an impact on the amount of work area needed for pipeline construction.

Construction Operations

Pipe installation operations are typically conducted by three crews varying in number from three to 15 people per crew. The first crew clears the right-of-way, excavates the trench, and removes the resulting material. After excavation is complete, a second crew lays the pipe and constructs the joints. A third crew follows this operation and backfills the pipeline. Work by the second and third crews is typically conducted while the first crew continues excavating for the next pipeline section. Additional manpower and vehicles may be

involved in the trenching operation for hauling bedding material and pipe, or exporting trench spoils in highly constrained areas. Supplemental crews would be necessary to remove unsuitable trenching debris, maintain equipment, and provide inspection/construction administration services. Operations generally commence at 7:00 A.M. and stop at 7:00 P.M. five days per week. At tunnel portals, shafts, and within tunnels, work may continue around the clock.

The maximum length of open trench in undeveloped areas will not normally exceed 4,000 feet per heading. The maximum length of open trench in high traffic volume roads/more urban areas and highway crossings will not normally exceed 500 feet per heading.

The typical, sequential components of pipeline construction are described below.

- *Clearing Operations:* Vegetation would be cleared or crushed and topsoil removed and stockpiled prior to trench excavation. The trench site preparation may take from several days to several weeks depending upon the amount of existing utilities/improvements that need to be removed or relocated. Clearing activities will occur outside of the sensitive upland and riparian avian species nesting season for all CIP projects. Clearing activities may occur during nesting season if an Environmental Surveyor first inspects the impact area and the applicable species-specific buffer areas (Appendix B, Section 7.0), and determines no active nest would be affected by the clearing activity. The Environmental Surveyor will carry out the inspection in conformance with Section 6.4.1.1 and 6.4.1.2.
- *Trench Excavation:* The equipment and methods used during the trench excavation varies with soil conditions, trench depth, terrain, and contractor preference. Under ideal conditions, excavations can be accomplished in one process. If ground conditions are unfavorable, the process may require controlled blasting and the possible use of blast containment mounds or blankets. Common equipment used in the excavation and installation of large diameter pipelines include: backhoes, clamshells, rubber tire or tracked front-end loaders, bulldozers, and draglines. Excavated material is placed along the side of the trench and used later for backfill. It is assumed that most of the excavated trench soil will be used in backfill operations; however, if excavated soil is not suitable for backfilling, it will be trucked off-site or feathered into nearby disturbed or developed right-of-way areas. The total number of truck trips associated with this operation is estimated to be 30-100 per day, depending on the amount of material removed.
- *Pipe Installation:* Pipeline sections may be stored at a staging area and delivered as needed or stored along the pipeline right-of-way when sufficient room is available. Typically, five to ten 40-foot long pipeline sections will be installed per day in open country. Normally, the pipe would be trucked in (from the factory) and stored alongside the trench for installation the following day. A crane, or similar

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equipment, is used to lower the pipe into place. The steel pipe joints are welded and then coated or encased for corrosion protection. The joint construction and pipe delivery schedules typically control the rate of pipe installation.

- *Backfill:* Trench backfill consist of earthen material which meets specified gradation requirements. Imported backfill or suitable on-site material will be used. Material not meeting backfill requirements will be trucked off-site or feathered into nearby disturbed or developed right-of-way areas. Undisturbed and natural areas within the right-of-way will not be used for disposal of trench material.

The size of the pipeline work area is heavily dependent on the localized construction conditions. Pipeline construction contractors will ultimately select appropriate construction techniques to be applied in specific areas within specified construction limits.

Based on prior experience with large pipelines, the Water Authority has prepared estimates for the required work area "footprints," which vary based on differing circumstances. The bottom width of shored and unshored trenches is assumed to be 13 to 15 feet. Sufficient room must be available for at least one vehicle to pass alongside the top of any trench. Average pipeline lay rates, in feet per day, are for those periods when construction is active and do not include delays due to weather or other unanticipated causes.

Excavation, bedding, pipe laying, and backfill operations are normally limited to no more than 4,000 feet of open trench construction in unpaved areas and 1,200 feet in paved areas at any one time. This means that the distance from the excavation heading to final compacted backfill does not normally exceed 4,000 feet. At an average pipe laying operation of approximately 300 feet per day in open terrain, any given area should be completed in ten to twenty days. This schedule does not include construction of pipelines with appurtenances or work delays due to weather.

- Traffic Control: Provisions for limited local access
- Width of Footprint: 80-150 feet
- Length of Footprint: 1,000-4,000 feet
- Average Lay Rate: 200-400 feet per day
- Average Time Open: 10-20 working days

Minor Support Facilities

Appurtenance and manway (access) structures would remain aboveground following construction of the pipeline. These typically would be flat-topped concrete structures approximately 1.5 to three feet in height above the ground surface, and of either cylindrical

or rectangular shape, with dimensions up to eight feet (typically eight-foot diameter). They would be located at all high and low points along the pipeline right-of-way, with additional structures located such that spacing does not exceed 1,500 feet.

Ancillary Facilities

Ancillary facilities such as flow control facilities, pressure control facilities, and pump stations vary in size and typically occupy a permanent footprint of a few hundred to a few thousand square feet. Construction of such facilities is typically completed within a one- to two-acre footprint of disturbance.

Major Ancillary Facilities

Along with the smaller, more regularly distributed structures along the various pipelines, a few much larger hydraulic control structures are necessary. These include Flow Regulatory Structures (FRS) and pressure control structures to maintain delivery pressures. For these structures, the construction footprint may be much more expansive, from two to 20 acres, than for the smaller structures. Similarly, the duration of work, size of construction crews, and level of equipment use would be commensurately higher. Construction methods are similar to open trench pipeline construction, with the exception that initial excavation is for the purpose of preparing the site for a structure's foundation or a concrete slab that will bear the weight of the entire structure and its contents.

Access Roads During Construction

During pipeline construction, new or existing roads are used to provide temporary construction access from public streets to staging areas and the work zone. Preference would be given to utilizing existing roads over developing new roads. Existing roads may include permanent Water Authority access roads along existing pipeline routes, other utility access roads (e.g., SDG&E), and private roads. Where required, new access roads will be selected to avoid or minimize impacts to Covered Species by implementing conservation measures in Appendix B and their habitats by implementing applicable measures in Section 6.0 (e.g., Section 6.4, Plan Minimization Measures, and Section 6.7, Wetland Protection and Mitigation Program). Typical vehicle traffic associated with pipeline construction would consist of the following:

- *Construction Equipment:* Typical equipment includes bulldozers, excavators, loaders, tunneling machines, dump trucks, and other construction equipment. Once delivered, this equipment would tend to remain on-site until work shifts to a new staging area.
- *Work Force Transportation:* In general, a work force of approximately 20 to 40 workers, using their own vehicles, would enter the work zone in the morning and leave in the afternoon. During the work day, personal vehicles are kept to a

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minimum along the construction route.

- *Material Deliveries:* Construction materials would be delivered to the work zone throughout project construction. Material deliveries would consist of periodic deliveries of pipe, rebar, sand, concrete, valves, and other materials. Pipe would be delivered in mostly 40-foot sections. For a 10 mile long pipeline alignment, this would require approximately 1,320 deliveries, or approximately four to five deliveries per work day over a 12-month pipe laying period.
- *Soil Removal:* Any trench and tunnel spoil material that is unusable for backfill, or which cannot be stored on-site due to area restrictions, would be removed by haulers or spread out evenly and feathered into the existing developed or disturbed ground topography on the right-of-way. Where removal is necessary, transport to a staging or disposal area could require 30-100 truck trips per day.
- *Public Roads:* Access to staging areas that are adjacent to public roads would utilize those roads. Access to staging areas not located adjacent to public roads would utilize public roads for as far as practical, and then continue using other access options.
- *Pipeline Right-of-Way:* In all but very steep terrain (longitudinal slopes over 20 percent and cross slopes over 15 percent), the graded pipeline right-of-way would be available for use as construction access for areas of the alignment where use of existing public and private roads is not a practical option.
- *New Roads:* In areas where existing roads are not available and steepness of the right-of-way precludes its use, new roads may need to be graded and easements obtained.

Blasting

Blasting is an operation performed during facility construction to loosen formational rock for excavation or removal from its existing position. Blasting would be accomplished by the controlled discharge of an explosive that has been placed in a hole drilled and prepared especially for this purpose. Typically, drilling holes for a blasting pattern can last from several hours to several days. The drilling time period per blast depends on the number of holes, the depth of the holes, and the effort required to drill through the rock.

The blast itself is generally perceived as a dull thud or rapid series of thuds, rather than a loud explosion. The energy associated with an explosion is the result of the pressure produced by the gases that are formed during the explosion. Construction blasting generates a maximum noise level of approximately 94 decibels (dB) at a distance of 50 feet. Rock drills generate noise levels of approximately 80 to 98 dB at a distance of 50 feet. According to Section 02229 of the Water Authority's General Conditions and

Standard Specifications, blasting would only be permitted Monday through Friday between the hours of 8:00 A.M. and 4:00 P.M. (Appendix D). Blasting outside of those hours for the purpose of maintaining the construction schedule would be allowed with approval in writing by the Water Authority's project engineer and the agency having jurisdiction. Blasting operations would be in conformance with the specifications prepared by the U.S. Bureau of Mines and any required blasting permits. The blasting contractor would be required to limit ground vibration intensities to prevent damage to all existing structures, and in no case would intensities exceed the safety standard of particle velocity recommended by the U.S. Bureau of Mines.

Impacts to Covered Species and their habitats caused by the construction of new pipeline facilities may include the temporary and/or permanent removal of vegetation and floral assemblages, loss of occupied or potential Covered Species habitat, and disruption of dispersal and travel corridors. In addition, potential indirect construction effects from noise, dust, introduction of weedy species, or provisions of new access into previously undisturbed habitats may be factors adversely affecting vegetation communities and Covered Species. In general, the linear nature and limited width of pipeline construction corridors (80 feet to 150 feet), and the limited extent and number of ancillary surface features, minimizes habitat fragmentation or isolation occurring as a result of pipeline construction. While total impact acreage from pipeline construction may be substantial, impacts are typically spread over a long distance, thus resulting in a limited and localized impact.

5.1.1.2 Conversions

Pipeline conversions occur when a treated water service pipeline is converted to an untreated water service pipeline, or vice versa. Construction activities along the existing pipeline would include a reconfiguration and relocation of both valves and piping. Conversions can be either temporary or permanent. Typically, a pipeline and control valves are installed to interconnect two parallel pipelines and the project footprint would be in an area previously disturbed by prior pipeline construction projects. The construction would be open trench construction method described in detail above. However the entire trench length may range from 30 to 100 feet, depending on the proximity of the pipelines to be interconnected. Therefore, the project footprint is relatively minor. Project access would be on existing access roads.

Similar to new pipeline construction, Covered Species may be displaced by the temporary removal of habitat, and indirectly affected by construction related impacts such as noise, fugitive dust, and occasionally night lighting. Construction traffic is adverse if it results in a direct vehicle strike to a Covered Species.

5.1.1.3 Long-Term Replacement/Relining of Pre-stressed Concrete Cylinder Pipes (PCCP)

Relining requires the excavation of several portals to access the pipeline, followed by the insertion of sections of new pipeline within the existing pipeline. This covered activity will re-disturb numerous localized sites along portions of the aqueduct. Depending on location, a relining project may not impact large amounts of native habitat, given that native habitat communities are fragmented throughout the rights-of-way, and there is some limited flexibility in locating portal sites. Pipeline relining projects would include environmental fencing and flagging, clearing and grubbing, dewatering, installation of interior bulkheads, temporary erosion control, excavation, shoring and bracing, cutting and demolishing a segment of the existing PCCP, placing a field-applied cement mortar lining, installing cathodic protection systems, placing reinforcing steel and concrete encasement, backfill, disinfection of piping, hydroseeding, revegetation, and other appurtenant work. Each access portal would consist of a pit that has been excavated over the pipeline, and an opening in the pipeline (typically 40-feet long) that would provide access to the interior of the existing PCCP. On average, each pit would be 60 feet long by 20 feet wide. The sides of the pits would be vertically shored in most locations, and the depth of each pit would vary from 12 to 18 feet deep, depending on the depth to the top of the pipe.

Where replacement of pipeline is required, the damaged pipeline would be removed or a new adjacent pipeline would be installed. This would have similar impacts to those associated with constructing a new pipeline, except that substantial portions of the impact would be restricted to the historically disturbed corridor of the First and/or Second Aqueduct rights-of-way.

The PCCP project contains approximately 82.5 miles of pipeline; to date, approximately 23.5 miles have been relined. Relining disturbances would result from the mandatory portal excavations spaced approximately 2,000 feet apart for liner jacking. Shifting the portal locations slightly along the alignment to avoid high sensitivity resource areas may further reduce impacts to Covered Species and their habitat. The overall PCCP project's goal is to reline, on average, 20,000 linear feet of pipeline a year. Typically, an individual project ranges from 16,000 to 24,000 linear feet of pipeline. The Water Authority anticipates completing the PCCP relining effort in 2027. Direct impacts associated with this project include temporary habitat removal for construction and staging purposes. Direct impacts to gnatcatcher and its habitat were addressed through BO (1-6-93-F-28) issued in 1993 (Section 1.1.4.1). This Biological Opinion does not provide for indirect effect to the species during the breeding season, such as noise, lighting, and increased human intrusion. However, due to water demand and operational constraints, construction for this type of project may extend into the breeding season, where indirect impacts, such as noise, lighting, and increase human intrusion may have a greater effect than at other times of year. If construction activity continues into the gnatcatcher's

breeding season resulting in additional impacts to the species, any conservation measures aimed at minimizing or mitigating the new impacts will be consistent with this Plan.

5.1.2 System Regulatory Storage

A FRS is a large tank that holds water for storage or to control hydrologic functions, and is considered a major ancillary facility to the pipeline system. Depending of the facility's size and site condition (e.g., slope) the impact area could vary from two to 20 acres. The structures can be rectangular or circular in nature, and may store either treated or untreated water depending upon which aqueduct the FRS is supplementing. When possible, the Water Authority's existing and planned FRSs are typically covered facilities completely below or just slightly above ground level. However, due to the engineering hydraulics of the aqueduct system, an FRS may be constructed entirely above ground level. FRSs are commonly constructed of reinforced concrete or steel material, with corrosion protection measures in place. The construction of these facilities is typically localized and generally involves normal daylight work hours. Differing from new pipeline construction described above, these facilities often are constructed over an extended period of time and may include a larger number of differing construction trades. Therefore, localized ground disturbance is more severe than with a pipeline and may be prolonged. The facility may include a small, unstaffed aboveground control building (10 feet to 30 feet on a side, and approximately 10 feet in height) that houses monitoring equipment, access ways, valves, and other appurtenances. The control building would typically be fenced and locked, with external low intensity safety/security lighting, and security surveillance cameras.

During FRS construction, Covered Species may be displaced by the temporary and/or permanent removal of habitat, and indirectly adversely affected by construction related impacts such as noise, fugitive dust, temporary disruption to wildlife movement, and occasionally night lighting. Construction traffic is adverse if it results in a direct vehicle strike to a Covered Species. Safety/security lighting would be directed downward, so that it does not illuminate adjacent habitat areas. Generally, Water Authority staff inspects control structures and FRS sites weekly, using established access roads. To minimize impacts to biological resources and lessen post construction visual affects, the Water Authority has revegetated the tops of buried concrete FRS facilities with grasses and native shrubs that can persist in shallow soils (18 to 24 inches maximum depth). Depending on the pre-impact habitat type, this may result in a habitat type conversion, benefiting one group of Covered Species over another.

5.1.3 Flow Control Structures

Flow Control Structures include facilities and equipment for water flow metering, velocity and pressure reduction, and appurtenant valves. Oftentimes, this equipment is housed

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in a pre-fabricated concrete reinforced building or vault. Vaults may be above, at, or below grade. These pipeline ancillary facilities vary in size and typically occupy a permanent footprint of a few hundred square feet. Construction of such facilities is typically completed within one to two acre footprint of disturbance. The construction methods for these facilities are similar to a FRS, but the disturbance footprint and construction duration may be substantially less. Larger above ground structures (10 feet to 30 feet on a side and approximately 10 feet in height) housing equipment would require fencing and safety/security lighting, and surveillance cameras similar to a control structure at an FRS. For new Flow Control Structures electrical power may need to be brought to the site depending on local availability of ancillary utilities. Expansion in capacity or other upgrades to an existing Flow Control Structure may require an increase in capacity of offsite power lines. If installation of off-site electrical lines is conducted by the Water Authority, its contractors, or by contract with the local utility entity, such lines are considered a project element and will be implemented per the Plan.

During construction, Covered Species may be displaced by the temporary and permanent removal of habitat, and indirectly adversely affected by construction related impacts such as noise, fugitive dust, temporary disruption to wildlife movement, and occasionally night lighting. Construction traffic is adverse if it results in a direct vehicle strike to a Covered Species. Safety/security lighting for permanent aboveground structures would be directed downward, so that it does not illuminate adjacent habitat areas. Generally, Water Authority staff inspects the facilities weekly, using established access roads. Because of the low activity around the ancillary structures, their small size, and their sporadic occurrence along pipeline alignments, long-term biological impacts are typically considered to be limited to direct footprint habitat losses with no substantial secondary effects.

5.1.4 Pump Stations

Pump stations convey water from a lower elevation, or hydraulic head, to a higher elevation or head. The Water Authority's aqueduct operates primarily on gravity flow; however, pumping may be necessary in order to move water due to substantial changes in topography. Pump Stations are also a component of pumped storage hydroelectric generating projects. Typically, pump station equipment consists of pumps, valves, pressure reducing equipment, and meters. The equipment is usually housed in a reinforced concrete building above grade level. Pump station structures can range in size from 1,200 square feet up to 13,000 square feet, depending on capacity and topography. Construction of such facilities is typically completed within a one to five acre footprint of disturbance. Site preparation and construction operation is similar to new pipeline construction method described in Section 5.1.1, but are also similar to FRS facilities because they often are constructed over an extended period of time and include a larger number of differing construction trades. Therefore, localized ground disturbance is

greater than with a pipeline and the construction period in a given area is prolonged. A pump station may require new or upgraded electric lines to be extended to the facility.

During construction, Covered Species may be displaced by the temporary and/or permanent removal of habitat, and indirectly affected by construction related impacts such as noise, fugitive dust, temporary disruption to wildlife movement, and occasionally night lighting. Construction traffic is adverse if it results in a direct vehicle strike to a Covered Species. Safety/security lighting for permanent aboveground structures would be directed downward so that it does not illuminate adjacent habitat areas. Generally, Water Authority staff inspects the facilities weekly, using established access roads.

Expansion of pump station facilities involves the identification of the expansion area, meter modifications, construction of interconnecting pipelines, and the construction of a building addition to house the new equipment. An expanded facility may require an increase in capacity of the off-site electric lines serving the facility. Construction and impacts would be similar to, but less than, those for a new site.

5.1.5 Water Treatment Plants

Water Treatment Plants (WTPs) treat water that is served for potable use that meets all state and federal drinking water standards. WTPs can be used for the treatment of surface water, groundwater, brackish groundwater, recycled water, or seawater. Either conventional processes or membrane technologies can be utilized for the core treatment process, each affecting the type and size of buildings required on-site. Although no new WTPs or expansion of existing WTPs that require coverage under this Plan are currently proposed for construction in the CIP or Master Plan, this Plan is designed to cover construction of new WTPs and expansion of existing WTP facilities when implemented consistent with the Plan. Construction of a new WTP 100 million gallons per day (MGD) capacity facility would require approximately twelve to fifteen acres for the necessary treatment components. Depending on local site conditions, such as slopes and other constraints, more acreage may be necessary for staging and storage of materials, and for constructing utilities and permanent access to a site.

Site preparation and construction operation is similar to new pipeline construction utilizing open trench construction described in Section 5.1.1, with the exception that work activities are fixed at the WTP site until construction is complete. Similar to a pump station, several specialty trades would be involved over an extended construction period, and off-site electrical lines may need to be extended or upgraded to serve a WTP. During construction, Covered Species may be displaced by the temporary and/or permanent removal of habitat, and indirectly adversely affected by construction related impacts such as noise, fugitive dust and, occasionally, night lighting. Due to WTP facility layout, local wildlife movement would not be expected to occur during construction or operation of a WTP. In order to maintain a construction schedule, night lighting may be

necessary during a portion of the construction. Construction traffic is adverse if it results in a direct vehicle strike to a Covered Species. During operations of a WTP, buildings would have exterior safety/security lighting, which would direct downward so that it does not illuminate adjacent habitat areas. The WTP would have permanent staffing at the site to operate and maintain the facility.

5.1.6 Hydroelectric Generating Stations

Water Authority currently operates hydroelectric generating facilities, and may build future hydroelectric generating facilities. Water Authority hydroelectric facilities use either high-pressure water flow in certain pipeline sections, or a pump-storage system that relies on water pressure associated with an elevation difference between two reservoirs to provide the force to turn turbines used to generate electric power.

Typically, high-pressure station equipment consists of generators, water pipelines, valves, pressure reducing/control equipment, electric conduit, lines, control and monitoring equipment; electric transmission lines and interconnect facilities (switch yard) to connect to the electric power grid. The equipment is usually housed in a reinforced concrete building partially below grade level. Hydroelectric station structures can range in size from 1,400 square feet up to 13,000 square feet, depending on capacity and topography. Construction of such facilities is typically completed within a one- to five acre disturbance footprint. Site preparation and construction operation is similar to new pipeline construction method described in Section 5.1.1, but are also similar to FRS facilities because they often are constructed over an extended period of time and include a larger number of differing construction trades. Therefore, localized ground disturbance is greater than with a pipeline and the construction period in a given area is prolonged. A hydroelectric station may require new or upgraded electric lines to be extended to the facility. Because the current pipeline system configuration and operational practices future generating stations sites are not identifiable, and it uncertain that an additional hydroelectric generating facility could be incorporated into the existing pipeline system. However, new pipeline projects, such as Pipeline 6, may be capable of incorporating a hydroelectric generating station's operational parameters into the overall pipeline design parameters, and provide opportunities for a hydroelectric generating station adjacent to the pipeline.

The existing Lake Hodges Pump Storage Project represents another type of hydroelectric generating system. Water is pumped via a pipeline from a lower reservoir (Lake Hodges) to a higher reservoir (Olivenhain Reservoir) during low electric demand periods (night). During peak electric demand periods (day) the water flows via underground pipeline from the higher reservoir to the lower reservoir and turns the electric generators. The Lake Hodges Emergency Storage Pump Station/Lake Hodges-Olivenhain Reservoir Pipeline Project had the necessary elements (sufficient elevation gradient, pumps, storage and conveyance system) to incorporate hydroelectric

generating into the project by modifying the pump house structure and enlarging the switch yard footprint to include two generators and all the internal and external appurtenant infrastructure to maintain and operator the generators.

The construction of future hydroelectric generating stations relying on high pressure in the pipeline system is a Covered Activity when implemented consistent with the Plan. During construction, Covered Species may be displaced by the temporary and/or permanent removal of habitat, and indirectly affected by construction related impacts such as noise, fugitive dust, temporary disruption to wildlife movement, and occasionally night lighting. Construction vehicle traffic could potentially result in a direct strike to a Covered Species. Safety/security lighting for permanent aboveground structures would be directed downward so that it does not illuminate adjacent habitat areas. Generally, Water Authority staff inspects the facilities daily or less frequently, using established access roads.

The construction, permanent footprint, and O&M impacts of a pumping/generating structure and appurtenances impacts to Covered Species and habitats are similar to other described Covered Activities. Therefore, if implemented consistent with the Plan, a pumping/generating project is a Covered Activity. However, a future pump storage project is not a Covered Activity if its implementation specifically requires the construction of a new dam and open storage reservoir, or the expansion of an existing reservoir's surface area. In this case, project permitting would be independent of the Plan, or may be processed as a Major Amendment (Section 8.4). The decision on whether to process a Major Amendment or pursue permits independent of the Plan will be made by the Water Authority based on the individual project conditions.

5.1.7 Access Road Construction, Re-Establishment and Improvements

To the greatest extent feasible, existing maintenance roads within rights-of-way would be used in order to minimize potential impacts associated with new access road construction. In areas where existing roads are not available and steepness of the right-of-way precludes its use, new roads may need to be graded and easements obtained. Certain temporary road improvements would be made to allow passage of construction vehicles for specific projects. When new road construction is required, it will be implemented pursuant to Plan Minimization Measures identified in Section 6.4, particularly Sections 6.4.2.6 (Stormwater Best Management Practices) and 6.4.2.7 (New Access Roads). Following construction, disturbed road sections would be restored to original contours. Some road improvements may be permanent where required by the landowner, land managing agency, or for O&M Activities. Typically, access roads through covered habitats are compacted native soil, but in areas of steep slopes or other site-specific requirements, the road surface is generally paved with concrete. New access roads through drainage channels and streams may be unimproved crossings or

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improved crossings (Arizona crossing or culverts) subject to appropriate state and federal agreements and permits authorizing such activities. Modification to existing and construction of new access roads is a Covered Activity in this Plan.

Road re-establishment may involve abandoning a severely overgrown road and constructing a new access road that will be safer or easier to maintain. Re-establishing roads could include permanent habitat removal at previously disturbed sites, increased access for invasive species, noise, dust and human activity for a limited period of time. When re-establishing access with an altered road alignment, the road segment to be abandoned will be subject to the applicable provisions of the Habitat Restoration Program (Section 6.6), including weed control (Section 6.6.3). If the road segment to be abandoned was previously mitigated off-site, the Water Authority is not responsible to mitigate off-site pursuant to Section 6.5, except when the vegetation impacted by the new road alignment is considered more sensitive (as identified in Table 6-8) than the original impacts associated with the road to be abandoned, or when the vegetation impacts are the same or lesser, but the new road sensitive habitat impacts exceed those of the segment to be abandoned. In the second case, the Water Authority would only be responsible to mitigate the acreage difference between the new alignment minus the area of the abandoned alignment, and if appropriate (e.g., no anticipated future Water Authority impact to the abandoned road segment) may apply on-site restoration (see Section 6.6.1) as mitigation instead of off-site mitigation.

Site preparation and construction operation is similar to open trenching pipeline construction described in Section 5.1.1. Covered species may be permanently or temporarily displaced by new road construction due to the removal of their habitat, and indirectly affected by temporary noise, dust, and human presences.

Permanent roads are to have regular maintenance activities, such as mowing and grading, which will occur annually to properly maintain the road, per Section 5.2.8.

5.1.8 Feasibility Studies and Data Collection

The Water Authority typically conducts feasibility studies for its projects to establish baseline conditions as a precursor to environmental document preparation. Projects requiring feasibility studies include, but are not limited to, CIP projects and groundwater investigations. Typically, these impacts are considered to be temporary unless an actual project is developed. In this case, permanent impacts to Covered Species and sensitive habitats would require mitigation consistent with Section 6.5 and Appendix B of this Plan.

Feasibility study activities may include, but are not limited to:

- Conducting geologic, soil, cultural, and/or biological field surveys;

- Completing test borings and collecting soil samples with hand augers or truck mounted drilling equipment;
- Constructing temporary access roads to test boring sites;
- Testing well construction;
- Testing pumps and aquifers (involves up to 72 hours of continuous generator and pump operation, as well as disposal of water to land surface);
- Constructing and maintaining access roads to monitor and test well sites;
- Conducting periodic visits to monitor or test well sites. Additional activities include well purging or pumping discharge of small volumes of groundwater to land surface, taking water level measurements, and collecting groundwater samples;
- Completing seismic or resistivity land surveys;
- Engineering and/or pre-design analyses; and,
- Land Surveying to establish property and project boundaries.

Field investigations and data collection are Covered Activities in this Plan.

5.1.8.1 Aqueduct Protection Program

The Water Authority's Aqueduct Protection Program (APP) is a covered activity that addresses the structural integrity, maintenance, and protection of the large pipeline facilities of both aqueducts. Its objective is to determine the condition and, if feasible, extend the service lives of these facilities to maintain a safe and reliable water supply to the Member Water Agencies. Data gathered during the internal and external inspections allow the Water Authority to identify, classify, and prioritize reaches of the pipelines that need replacement or relining.

Developed in 1991, the APP is a three-phase program structured as follows:

- Phase 1: development of a database including a corrosion survey, as well as internal and external inspections of pipelines;
- Phase 2: completion of the condition assessment report and rehabilitation design of the subject pipelines; and,
- Phase 3: implementation of preventive maintenance repairs and rehabilitation, which includes pipeline replacements.

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Initial investigative phases of the program do not result in take of species or habitats. Repair activity as a result of APP investigations may result in temporary impacts to habitat, depending on the location and nature of the repair. Current APP relining projects are discussed in Appendix C.

5.1.8.2 Groundwater Storage and Recovery Program Studies

It is anticipated that various groundwater studies may ultimately lead to one or more programs for basin recharge and extraction. Analyses have been conducted on multiple alluvial basins within the county of San Diego to determine storage capacity, extraction potential, and preliminary environmental effects. Several Member Water Agencies currently manage extraction activities, and the Water Authority has conducted groundwater evaluations to assess the feasibility of seasonal and reserved storage in the San Diego Formation Aquifer and the lower San Luis Rey River valley (PSBS 1991a, 1991b).

Local groundwater storage capacity may be used to supplement existing water supplies and offset seasonal or peak-day water demands. A portion of an aquifer can also be reserved for carryover storage that can be utilized during prolonged droughts and when local water supply sources are limited. Before capital and operating expenses for such projects/programs can be determined and projects implemented, some additional field investigations and feasibility studies may need to be conducted in some groundwater basins.

The field investigations and feasibility studies conducted by the Water Authority involve the following activities: data collection, vegetation clearing, and grading and fill activities for access and drilling pads. If monitoring wells are required for a feasibility study, impacts could result from drilling operations, installation and testing of monitoring wells, and closing/abandonment of monitoring wells. For monitoring wells with a larger diameter, there could be a discharge of water. Depending on site conditions and the amount of discharge, this could include water discharged into a sewer system, water discharged into surface water subject to Regional Water Quality Control Board (RWQCB) regulations, or water percolating into the ground. Impacts from surface facilities will be minimized to the maximum extent practicable during the design process.

Temporary alterations to vegetation and hydrology necessary to gain vehicle access to and construct a pad to operate a drilling rig may result in impacts to Covered Species or their habitat. Vehicle (drill-rig) access routes would use existing roads when available. When existing roads are not available, either a vehicle access route would be established by cutting and crushing vegetation, leaving the roots systems and seed bank intact, or a temporary access road would be graded. Depending on the well's diameter and depth, installation typically requires two to 10 days of work, resulting in wildlife avoidance due to increased human presence and noise. During the study period, a well

is periodically monitored and tested, resulting in potential wildlife avoidance when personnel are present. At end of the study period, the well is closed (filled), typically requiring less than one day to two days of work depending on the well's diameter and depth. The well pad and any created access route is then restored per the Plan (Section 6.6). Well closing impacts to Covered Species are similar to installation, as wildlife avoidance is expected due to increased human presence and noise. Field investigations required for determining the feasibility of implementing a groundwater storage and recovery program are Covered Activities in this Plan. Construction and operation of permanent groundwater extraction and injection wells, recharge basins, and associated pipeline systems may be added to this Plan through the Amendment process. Nothing in this Plan prevents a Member Water Agency that also has an approved NCCP/HCP from implementing such a project pursuant to the provisions of their own NCCP/HCP.

5.1.9 Wetland and Riparian Mitigation Site Implementation and Interim Management

The Water Authority anticipates that implementing some Covered Activities will result in unavoidable permanent loss of wetlands. The Wetland Protection and Mitigation Program (Section 6.7) commits the Water Authority to a “no net loss of wetlands” standard. To achieve this standard and provide conservation for Covered Species, the Water Authority has proposed to initially create three wetland habitat management areas as part of the Plan. The Manchester Wetland HMA (Section 6.8.2.3) has already been installed, and has completed its fourth year of interim management and monitoring. Wetland creation and restoration requires professional engineering design expertise to predict and address any change to localized hydrology. Therefore, although not a routine Water Authority construction activity, wetland and riparian creation and restoration activities are included as a subset of CIP Covered Activities. Specifically, the Tijuana River Valley HMA (Section 6.8.2.1) and San Luis Rey River HMA (Section 6.8.2.2) are two wetland habitat management creation areas to be authorized for implementation per the Plan. These two projects are described in Appendix C and Sections 7.1 and 7.2.

Because wetland mitigation projects require the use of earth moving equipment, initial site preparation activities are similar to other CIP Covered Activities discussed above. Earth moving equipment is used to remove soil or structures to achieve the desired elevation and flow gradient needed to sustain the desired wetland and/or riparian communities. During wetland creation project planning, an adjacent non-sensitive habitat area is typically identified as a placement area for the soil that is excavated from the creation area. The excess soil removal area is typically vegetated with a site appropriate upland habitat type. Because local river and stream flows are dependent on the region's variable and relatively short winter rainy season, a temporary irrigation system is typically installed and used to more quickly establish the shrub and tree canopy, rather than to rely only on natural rainfall.

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Tasks associated with wetland creation can be divided into two phases, the first phase covers construction of the project, and the second phase covers interim habitat management activities. Construction phase includes site preparation (delineating limits of work, removal of debris, structures and vegetation), earthwork (grading, and placement of soil), and installation (temporary irrigation system, container plants, cuttings and seeding).

The time required to implement this first phase is dependent on site specific conditions, for an example the Tijuana River Valley HMA is anticipated to require three-months to complete preparation and earthwork tasks, and two months to complete the installation task. Impacts to Covered Species are temporary, and include a temporary reduction in habitat, construction noise and fugitive dust, and increased human presence.

The interim management phase is the period anticipated for the newly installed site to achieve its site-specific success objectives, and is typically a five-year period for riparian habitat types. Management activities include maintenance (routine weeding and invasive species control, replacement of plants and cuttings and re-seeding, as needed), monitoring (qualitative and quantitative vegetation assessments, wildlife observation), and report preparation. Sites generally have more maintenance and monitoring needs during the first few years. As the site matures and approaches its success objectives, the numbers of visits for maintenance and monitoring trips decrease. Impacts to Covered Species are identified as increased human presence.

Once interim management is deemed complete, ongoing wetland HMA management, monitoring and adaptive management would continue as an O&M Activity (Section 5.4).

5.2 O&M Activities

This section describes general O&M Activities associated with various Water Authority existing and/or planned facilities. The Water Authority's maintenance and scheduled repairs include, but are not limited to: re-grading of access roads; fire clearance around surface structures; pipeline inspections; valve and pipeline section replacements; pipeline, tank, and reservoir drainage into natural waterways to allow for interior inspection and work; and cathode/anode renewal. The majority of O&M Activities occur in developed and disturbed areas, or other non-sensitive habitat areas. Table 5-3 provides an impact summary for O&M Activities and vegetation communities over a 55-year period. The following O&M Activities are Covered Activities in this Plan.

5.2.1 Aqueduct Security and Surveillance

Several methods of securing the aqueduct system were evaluated as a result of a Hazards Assessment and Vulnerability Analysis conducted by the Water Authority in

2002. As part of that project, the analysis addressed general security and surveillance issues along the system through the design and installation of security camera systems, security lighting, fencing, alarm systems, and real-time water quality monitoring stations. Security cameras and lighting are associated with structures, and are typically mounted on the actual structure; therefore, routine inspections and maintenance is expected to have no effect on Covered Species. Vegetation is managed on each side of security fencing, as needed, to maintain visibility and the effectiveness of the fence as a barrier. Impacts could include temporary habitat modification or removal at previously disturbed sites, and increased noise and human activity for a limited period of time.

5.2.2 Pipelines and Minor Support Facilities

O&M Activities specific to pipelines include, but are not limited to: (1) weekly visual inspections; (2) mowing within pipeline alignments; (3) access road grading; (4) testing and servicing of valves as needed; (5) yearly walking of pipeline alignment and inspection of the cathodic protection system; (6) draining for internal inspection; (7) replacement of pipeline and pipeline appurtenances, such as air-release valves, vents, and blow-off structures; and (8) pressure testing pipeline, painting pipeline appurtenances, repairing tunnel entrances, and repairing minor leaks in buried pipeline joints or segments as needed. Impacts could include temporary habitat removal at previously disturbed sites, increased noise, light, and human activity for a limited period of time.

5.2.2.1 Repairs

When pipeline repair requires excavation to access the effected infrastructure the types of construction related work activities associated with new pipeline construction and the resulting impacts to Covered Species are generally the same as described in Section 5.1.1. The actual disturbance footprint would be based on the area that needs to be excavated to conduct the repair, together with an adjacent temporary soil storage area, work zone, and staging area. There is a higher probability that all or portions of the repair work would occur within a developed area (e.g. existing access roads) or in disturbed habitat within the existing rights of way, when compared to new pipeline construction. After the repair work is complete the impacted area would be restored per the Plan (Section 6.6).

Many repairs are conducted within the existing pipeline. Access is gained to the pipelines' interior through inline surface structures referred to as manways. Prior to entering the pipeline, the particular pipeline section must be drained (Section 5.2.2.2). Vegetation around manway structures is maintained per Sections 5.2.9 and 5.2.11. Staging is typically conducted within the existing access road, road shoulder, and other disturbed areas within the rights of way. Impacts associated with interior repairs would be limited to increased human presence during the duration of repair (typically ten days

or less from pipeline shutdown to start-up), noise from an air-compressor needed to maintain a safe working environment inside the pipeline, vehicle trips required to transport personnel and deliver supplies.

5.2.2.2 Draindowns

This maintenance activity involves stopping water flow within a pipe and the complete drainage of water from a section of pipeline to allow for an internal inspection. Water is released through the low-lying portions of the pipeline through existing surface structures and into natural and artificial drainages. A valve housed in the draindown structure controls the water's velocity as it exits from an outlet-pipe into a natural drainage or storm water system. Controlling the water velocity prevents scour and subsequent down gradient sedimentation. Draindowns can occur anytime of the year, and are typically performed in a 10-day work period, three to five times per year, at different locations throughout the aqueduct system.

For many riparian associated Covered Species the release of water during any season would be beneficial or neutral. However, for a limited number of riparian Covered Species, out of season water release at a velocity that would dislodge egg masses or larvae would be detrimental. For vernal pool associated Covered Species, the introduction of water out of the normal wet season could be detrimental. The Water Authority has identified one area in the water conveyance system where this could occur, and currently avoids the impact by pumping the discharged water into the neighboring drainage where vernal pool resources are not affected.

There is also the potential of introducing Quagga and Zebra Mussels into perennial surface waters. The Water Authority implements its Quagga and Zebra Mussel Response and Control Action Plan during draindowns to prevent mussel larva, if present in the water, from entering surface waters (see Section 6.7.4).

The Plan includes draindown protection measures in Section 6.4.3.4.

5.2.3 System Regulatory Storage

O&M Activities typically associated with system-wide storage facilities include, but are not limited to: (1) routinely visiting and inspecting the site; (2) performing routine maintenance and cleaning of equipment on-site; and (3) responding to outages or other emergency situations. Impacts are limited to weekly use of access roads by patrol vehicles and the less frequent need to access the structure through existing hatches for maintenance or repair. Impacts could include temporary habitat removal or trimming of vegetation at previously disturbed sites, increased noise, light, and human activity for a limited period of time.

5.2.4 Pump Stations

O&M Activities typically associated with pump stations include, but are not limited to: (1) routine operation checks; (2) routine general pump station cleaning and maintenance; (3) routine maintenance of pump station exteriors; (4) routine testing and replacement of pumps and other equipment during non-emergency periods and verification of operational readiness; (5) annual major maintenance and clean-up; and (6) as-needed service to motor cooling system (emergency pumps), replacement of pump seals, painting pump station and equipment, and disassembling pumps to inspect bearings and impeller (recirculation pumps and emergency pumps). Activities are limited to existing structures and will not appreciably affect native species or habitat. Impacts could include temporary habitat removal at previously disturbed sites, increased noise, light, and human activity for a limited period of time.

5.2.5 Water Treatment Plants

O&M Activities generally associated with WTP facilities include, but are not limited to: (1) visiting and inspecting the site on a routine basis; (2) performing periodic routine maintenance and cleaning of equipment at the site; (3) taking delivery and/or hook-up of disinfection chemicals on an as-needed basis; (4) performing major maintenance or replacement of pumps and other equipment on an as-needed basis; and, (5) responding to outages or other similar situations. Other than the normal operations, activities that could affect Covered Species at a WTP generally are limited to temporary habitat removal at previously disturbed sites, increased noise, light, and human activity at the WTP perimeter for a limited period of time.

5.2.6 Hydroelectric Generating Stations

O&M Activities typically associated with hydroelectric stations include, but are not limited to: (1) routine operation checks; (2) routine general generation station cleaning and maintenance; (3) routine maintenance of station exteriors; (4) routine testing and replacement of generators, electric control systems and other equipment; (5) annual major maintenance and clean-up; and (6) as-needed service to electric generation system. Activities are limited to existing structures and will not appreciably affect Covered Species or habitat. Impacts could include temporary habitat removal at previously disturbed sites, increased noise, light, and human activity for a limited period of time.

5.2.7 Reservoir Drawdown and Refilling

Water levels in a reservoir are expected to fluctuate for a variety of operational reasons. Maximum operational capacity refers to the spillway elevation; however, actual operational elevation is typically several feet below spillway height. Drawdown, the

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controlled lowering of the surface water level, may occur due to seasonal demand, or to conduct maintenance on some reservoir feature. Under normal operational circumstances, routine drawdown results in no discharge of water into waterways; drawdown occurs by controlled inflow relative to outflow, until the desired water level is achieved.

It may be necessary to conduct rapid drawdown of the reservoir through controlled releases to accommodate flood protection from local watershed rainfall. Likewise, it may be necessary to utilize stored water to meet water demands resulting from facility damage elsewhere or prolonged drought. These drawdowns may differ from flood control releases in terms of season of the year, magnitude, frequency, and duration. In addition, the reservoir may be utilized as part of a pumped storage operation, resulting in daily fluctuations in surface elevations as water is pumped and recovered for energy production.

Prolonged emergency conditions and lowered water levels due to other operations could allow riparian vegetation to establish on the reservoir bottom and along the stream channels entering the site. Typically, riparian vegetation is allowed to establish and persist in the empty reservoir bed to provide interim habitat value during drawdown periods provided that no additional mitigation is required for refilling the reservoir to its maximum operational level. These habitats would be lost as the reservoir is refilled. The process of refilling reservoirs is distinguished between natural filling with native run-off, which the Water Authority does not control, and manual filling with imported water, which is regulated by the Water Authority. However, it is important that the full operational capacity of the reservoir be retained for water supply purposes. Manual refilling occurs typically between November 1 and May 31, when excess water is more likely to be available. However, manual refilling could occur whenever water is available for storage.

The primary purpose of the management of the reservoirs is for efficient operation of the San Diego region's water supply system. While there are recognized habitat values and wildlife benefits associated with reservoir features, the primary purpose of the proposed facilities is water storage. As such, significant habitat loss and species take will be mitigated consistent with Section 6.0 and Appendix B of this Plan without the consideration of any compensatory value provided by the reservoir.

Covered Species are not expected to be adversely affected by routine seasonal drawdown, or by maintenance actions on a particular reservoir feature that requires the water surface to be lowered. Generally, the drawdown period does not provide sufficient time for a Covered Species' habitat community to develop.

Prolonged drawdown periods, for example three years or greater, could provide sufficient time for Covered Species' habitat to colonize an exposed reservoir bed. The subsequent refilling of the reservoir would inundate any opportunistic habitat, and any

burrows, dens or nest sites, resulting in the loss of habitat and any eggs and nestlings. The rise in water level is relatively slow (i.e., less than one foot per day), therefore it is expected that adult and juvenile wildlife would evacuate the area in advance of the rising water level. A prolonged drawdown could occur because of the reconstruction or raising of on an existing dam, or from a prolonged disruption (over several seasons) of imported water due to an extended drought in California or the Colorado River Basin, or a catastrophic disruption to the statewide water conveyance system requiring multiple seasons to return to historical water delivery amounts. The Plan includes drawdown protection measures in Section 6.4.3.4.

5.2.8 Access Road Maintenance and Repair

The Water Authority owns and operates facilities that require regular access on established roads. These access roads are typically 12-feet wide with an additional four feet of mow strips on each side and must be maintained and repaired on an annual basis. Access road maintenance includes filling, grading, paving, and spot-repair of areas subject to scouring and erosion. Road repairs are performed as necessary to access facilities, usually following seasonal rains. Impacts could include increased noise, light, dust, and human activity for a limited period of time.

Several areas of access roads are severely overgrown from years of limited maintenance activities. These areas will require more intensive one-time activities for road re-establishment, which include vegetation removal, tree trimming, and grading. Re-establishing roads could include permanent habitat removal at previously disturbed sites, increased access for invasive species, noise, and human activity for a limited period of time.

5.2.8.1 Access Road Grading

Access roads are graded in most areas as conditions require. Grading is done with construction equipment, such as motorgraders and earth-raking attachments. Impacts could include increased noise, dust, and human activity for a limited period of time.

5.2.8.2 Access Road Upgrades and Stream-crossing Improvements

Upgrade activities for access roads may involve stream-crossing improvements (i.e., (Arizona Crossings) and installation of culverts at waterways, erosion control measures, additional grading activities, re-paving, and application of surface materials, such as decomposed granite, gravel, or pavement.

Construction and patrol vehicle access through shallow creeks or streams is allowed year-round. Access roads may cross a variety of shallow waterways ranging from

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perennial and intermittent streams designated on U.S. Geological Survey (USGS) maps to agricultural irrigation ditches. When the integrity of the access road is threatened, some road repair may be necessary. Activities may include, but are not limited to, installation of Arizona Crossings, bank stabilization, and repair of subsidence damage. These activities may be accomplished through the placement of riprap and through the use of earth-moving equipment within the access road area. Crossings would be implemented pursuant to Section 6.7.

Access road maintenance may require the placement of Arizona Crossings where Water Authority roads currently traverse streams, rivers, or drainages. Locations where Arizona Crossings could be required include, but are not limited to:

- San Luis Rey River (First and Second Aqueduct crossings);
- Salt Creek (Second Aqueduct crossings);
- Escondido Creek (Second Aqueduct crossing);
- Sweetwater River (below dam; Second Aqueduct crossing); and,
- Lakeside (La Mesa–Sweetwater Crossing).

Impacts could include permanent or temporary habitat removal at previously disturbed sites, increased noise, dust, light, and human activity for a limited period of time.

5.2.8.3 Culvert Cleaning

Road repair activities could include replacement or cleaning culverts of vegetation, sediment, and debris. Sediment deposited in or around culverts will be removed by hand or through the use of earth-moving equipment. Mechanized equipment would be staged on existing roadbeds and outside of flowing or ponded water, if conditions permit. Impacts could include permanent or temporary habitat removal at previously disturbed sites, increased noise, light, and human activity for a limited period of time.

5.2.9 Mowing

In addition to maintaining the road surface and facilities, adjacent vegetation must be controlled so that it does not expand into the roadway or encroach onto facilities. Mowing and/or trimming of vegetation around facilities is needed to maintain access and comply with fire regulations. In general, the Water Authority clears approximately 15 feet from facilities and four feet on each side of roads, with the exception of urban and developed areas where the Water Authority also clears all vegetation inside fenced areas and up to four feet outside the fences with permission from the landowner. Where pipelines cross rivers and streams, the Water Authority needs to prevent direct and indirect damage to the pipelines from root systems. Mowing is one technique used to

prevent the establishment of trees, large shrubs, and other large woody species. Vegetation management activities generally require a mower, mechanical brusher, a weed-whacker, or hand clipping. Because of the length of the right-of-way and number of facilities, only a portion of the mowing activity occurs in any given year. Mowing reduces or eliminates habitat suitability for many species because of change in native vegetation structure, density, and diversity. However, mowing also provides a successional vegetation edge effect that can be exploited by some species. If a Covered Species cannot move away from a mower, mortality could occur. Other impacts could include increased noise, dust and human activity for a limited period of time.

5.2.10 Protection of Underground Facilities in Waterways

Protection of underground facilities is required wherever facilities cross a waterway within the Plan Area. When scouring threatens a facility, measures to protect the facility and to minimize future erosion must be taken. Maintenance activities to protect underground facilities include grading, addition of fill material to repair erosion damage, repair of adjacent slopes with placement of riprap or concrete, installation of sheet pile, compaction of soil, control of species with invasive root structures, and other activities as necessary. These measures may involve the use of heavy equipment and other machinery. Vegetation generally less than 36 inches tall will be allowed to grow over the underground facilities to reduce erosion by wind and water and stabilize the soil. Impacts could include permanent or temporary habitat removal at previously disturbed sites, increased noise, light, and human activity for a limited period of time.

5.2.11 Fire Protection

A clearing of a minimum 15 feet around facilities and mowing four feet adjacent to roadways is needed for fire protection after construction. The local Fire Marshall typically identifies areas requiring fire maintenance. The Water Authority will also follow the San Diego County Fire Chief's Association (1997 or more recent versions) Wildland/Urban Interface Development Standards. Vegetation and brush that may fuel fire are removed. Vegetation clearing may involve mowing, weed abatement, or removal of dead or dying trees or foliage, or the dead, diseased, or dying limbs of trees or foliage. Approved herbicides will be applied in conformance with applicable federal, state, and local regulations (in a manner that avoids or minimizes harm to native plants or animals) to prevent vegetation from reoccurring, typically after mechanical clearing and outside of the avian breeding season. See Appendix B for avian breeding dates and species specific mitigation measures. Impacts could include permanent or temporary habitat removal at previously disturbed sites, increased noise, and human activity for a limited period of time.

5.2.12 Weed Abatement in the Preserve Area

Weed control may be necessary in the Water Authority's Preserve Area, and during Covered Activity post-construction revegetation efforts. Weed abatement would be used in order to improve the habitat for Covered Species or for fire protection and may involve mechanical or chemical (herbicides) methods. Abatement measures are described in Section 6.0. Impacts could include increased noise and human activity for a limited period of time.

5.2.13 Tree Trimming and Removal

Tree trimming for routine maintenance or entire tree removal can be required to protect facilities and to keep areas around facilities and access roads clear. Tree trimming is done generally with lift trucks and a chipper trailer. In most cases, the crew will have vehicle access. If vehicle access is not available, then hand trimming is done. Tree trimming and removal activities will conform to the measures outlined in Section 6.4.3.7 and Appendix B. Impacts could include increased noise and human activity for a limited period of time.

5.2.14 Pest Control

Use of pesticides (herbicide, insecticide, fungicide, etc.) is a Covered Activity when employed to implement projects, O&M Activities, and reserve management, and performed in conformance with the label requirements and all federal, state, and local regulations. However, take of Covered Species associated with Pesticide use is not covered by the Plan. Pesticides will not be used intentionally on any Covered Species (unless that is a legitimate use to control a pest species that has infected or may affect a Covered Species). Pesticides would only be used when all other control options/Covered Activities were determined not to be feasible and effective.

Facilities require pest control, usually to control problems with non-native rats, mice, and other rodents. Pest control is more common to facilities located adjacent to urbanized areas where food is more plentiful. When necessary, pest control measures will be used in accordance with the written recommendation of a licensed, registered Pest Control Advisor and in conformance with label precautions and federal, state, and local regulations in a manner that avoids or minimizes harm to native plants or animals. Impacts could include increased noise and human activity for a limited period of time.

5.2.15 Urgent Repairs

Urgent repairs are required when a facility or structure is compromised and requires repairs to remain functional. Urgent repairs are those that do not pose an immediate threat to life or property, but are among the top priorities of the Water Authority to ensure

continued service, as they have the potential to jeopardize the integrity of the water treatment, delivery, and storage system. They may also become emergency repairs if not addressed in a timely manner. Construction activities and impacts to Covered Species and habitats for an urgent repair would be similar to constructing the corresponding Covered Activity type described above, i.e., new pipeline construction.

Standard procedures for addressing an urgent repair need are as follows:

- Once an urgent repair situation is discovered and verified, notification of the situation and activities necessary for repair are sent by the O&M staff to the Rights-of-Way and Water Resources Departments (per the Water Authority Urgent Repair Manual). Individual habitat impacts due to Urgent Repairs will be calculated as they occur and documented in accordance with the Plan's monitoring program (see Section 6.0).
- Photographs will be taken to document the existing urgent repair conditions.
- If the facility is located in a natural area (i.e., native or sensitive habitats), an Environmental Surveyor, as determined by the Water Authority and possessing the qualification identified in Section 6.4.1.1, would conduct a survey of the area (discussed in detail in Section 6.0) prior to repair activities if possible.
- The Environmental Surveyor will recommend measures to minimize impacts to the habitat or Covered Species if avoidance is not possible, and will monitor repair activities.
- As required by this Plan or applicable regulations, the Water Authority will notify the Wildlife Agencies, USACE, RWQCB, and other agencies as appropriate.
- After the repair is complete, a follow-up survey will be conducted to quantify actual impacts to Covered Species or habitat affected, and to develop recommendations for on-site revegetation. Temporary impacts will be revegetated per the Plan (Section 6.5.1.4), and any permanent or residual temporary impact will be mitigated per the Plan.
- Urgent repairs, and any resulting revegetation and off-site mitigation will be documented in the annual report.

Urgent repairs will be made as soon as possible. As a result, in considering potential take of Covered Species or their habitat, adjustments for time of day or seasonal constraints may not be possible in the interest of system integrity and reducing the potential risk to public health and safety. An Environmental Surveyor will be consulted for measures to minimize impacts to Covered Species should they be present in the vicinity of the repair.

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Nighttime activities may be necessary in order to expedite the repair work on the system. Due to the urgent nature of these repairs, normal construction activities (i.e. not all minimization or mitigating measures implemented) may take place, resulting in typical daylight levels of construction traffic, dust, and noise during nighttime hours. As identified above, the Wildlife Agencies will be notified and provided information for the implementation of the urgent repair as soon as possible.

The types of impacts to Covered Species associated with Urgent Repairs are the same as identified under the Section 5.1.1 and Sections 5.2.1 through 5.2.7. However, Urgent Repairs differ in one important aspect that is an Urgent Repair may require extended work hours or an extended workweek. Therefore, there is a higher probability that urgent repair work would include construction lighting for night-time work, the work day would be longer, and work week could include Saturday, resulting in longer daily duration that adjacent Covered Species would be subject to potential lighting, noise, fugitive dust and human presence.

5.2.16 Rights-of-Way Activities

Approximately 85 percent of Water Authority rights-of-way land is held as easements, with the remaining 15 percent as fee-owned parcels. Fee-owned lands held by the Water Authority are limited to approximately 80 parcels and make up approximately 275 acres scattered along various alignments. The Water Authority maintains full control of fee-owned parcels and can grant encroachment permits to public and private individuals. Encroachment into fee-owned parcels that support native habitat requires a CEQA determination from the appropriate land use jurisdiction and an encroachment permit from the Water Authority. The Water Authority does not limit activities in easements under private ownership that do not jeopardize facilities or block access. The activities of underlying private landowners where the Water Authority has an easement are not covered under this Plan.

The Water Authority holds exclusive use easements over the majority of its rights-of-way and facility properties. In some situations, the Water Authority holds restricted licenses (e.g., pipelines on MCAS Miramar). The Water Authority's standard easement provisions for private properties, and most public properties, provide extensive rights for any necessary actions related to installation and O&M Activities of Water Authority facilities. The Water Authority easements allow the underlying landowner to undertake any and all surface uses which do not conflict with the rights of the Water Authority.

5.2.16.1 Water Authority Easements/Fee Ownership

An example of a standard grant of easement to the Water Authority is in Appendix E. This Plan is not intended to be used as coverage for activities undertaken by underlying fee owners of land.

Water Authority Use of Easements and Fee Ownership

1. Easements provide the Water Authority the right to engage in activities required to construct, install, repair, relocate, replace, remove, maintain, drain, and inspect facilities, including, but not limited to, pipelines that run through easements. The Water Authority may also construct, repair, and maintain related facilities, including, but not limited to, manholes, vaults, flow control and measuring devices, alarms, erosion control facilities, pumping wells, blow-offs, antennas, cables, and power transmission and communication conduits within these easements.
2. The Water Authority has the right to remove any buildings, structures, and vegetation within the easement, as necessary.
3. The Water Authority will continue to revegetate the aqueduct easements with local native seed mix after each construction event, where adjacent to native habitat and not conflicting with approved O&M activities (see Appendix D).

Activities of Underlying Fee Owner

1. Most Water Authority rights-of-ways are within an existing easement. The activities of underlying fee owners are not covered by this Plan.
2. The underlying fee owner may not increase or decrease the surface elevation of an easement area (by grading or filling), may not drill any wells or plant any trees, and may not construct fences, gates, posts, chains, walls, or other objects that obstruct the easement without written approval from the Water Authority.
3. The underlying fee owner has the ability to use the surface of the easement area in a way that does not interfere or conflict with Water Authority structures and activities. The underlying fee owner must receive an Encroachment Permit from the Water Authority for all uses within the rights-of-way.
4. This Plan does not cover impacts to habitat and species that result from separate agreements between a Water Authority contractor and a private property owner that are not specifically authorized by the Water Authority. The private property owner or contractor is responsible for obtaining any necessary approvals/permits from appropriate jurisdictions, as well as implementing any required mitigation measures.

5.2.16.2 Rights-of-Way Management

Access roads are driven once per week to inspect fencing, pipeline appurtenances, and facilities, as well as potential encroachment to the rights of ways. Maintenance and repair activities that are unlikely to impact habitat or cause take of a Covered Species,

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such as the repair of gates, vent structures, Flow Control Facilities, replacement of surface structures, and lubricating equipment, are conducted year-round.

For dam and reservoir facilities, access roads are patrolled daily to inspect and maintain facilities. Instrumentation at dam sites is monitored monthly or as required to check integrity.

Aqueduct and pipeline inspections are conducted routinely by truck or on foot. Operating personnel check and record rights-of-way conditions, replace missing or damaged pipeline markers and patrol signs, ensure that pipeline markers are clearly visible, perform minor maintenance activities, and record any conditions that may affect pipeline operations. These activities are generally limited to access roads, road shoulders, and other maintained or disturbed areas within the rights-of-way. Impacts to Covered Species could be due to human presence for a limited duration.

5.2.16.3 Land Surveying for Rights-of-Way Expansion

The purpose of rights-of-way expansion projects would be to acquire additional property rights to widen the rights-of-way in order to provide an adequate width to maintain pipelines and protect facilities from conflicting land-use encroachments. Water Authority staff is evaluating the need for additional rights-of-way width for the entire aqueduct system. Fieldwork associated with this Covered Activity is land surveying, which may require off-road hiking, staking and/or installation of boundary markers, and trimming vegetation as needed to establish lines-of-sight. Impacts to Covered Species by this activity could occur due to human presence for a limited duration, or from modifying vegetation to establish a line of sight, or to place temporary boundary stakes or set property corners.

5.2.16.4 Land Surveying for Aqueduct Alignment Corrections

There are locations in the Water Authority system where the legal description for the rights-of-way does not match the actual location of the pipeline. The aqueduct alignment corrections project will correct the known inaccuracies by acquiring the necessary property rights and will identify other locations where the right-of-way and Water Authority facilities do not coincide. Fieldwork associated with this Covered Activity is land surveying, which may require off-road hiking, staking and/or installation of boundary markers, and trimming vegetation as needed to establish lines-of-sight. Impacts to Covered Species by this activity could occur due to human presence for a limited duration, or from trimming vegetation to establish a line of sight, or to place temporary boundary stakes or set property corners.

5.3 Preserve Area Management, Monitoring and Adaptive Management

This Plan establishes practices to manage the Preserve Area (Section 6.11). Unlike most other NCCP/HCP plans, this Plan does not authorize agriculture, general development, mineral extractions or other activities that could affect areas adjacent to or within its Preserve Area or other plans' preserve lands.

Covered Species protection and conservation are primary goals of the Preserve Area, and all management activities, including monitoring, maintenance, and adaptive management, will comply with state and federal endangered species regulations as well as this Plan. The contributions of the Preserve Area to the regional conservation of Covered Species are discussed in detail in Section 6.8. With the exception of the San Miguel HMA, which is managed as a National Wildlife Refuge and in accordance with the conservation banking agreement for this area, Preserve Area management plans will identify and provide detailed descriptions of the land management activities, restrictions and practices that will be undertaken to maintain or enhance Covered Species habitat. Individual Preserve Area Management Plans (PAMP) are subject to Wildlife Agencies review and approval (Section 6.11). The following management activities would be implemented as site specific measures, where applicable, with the intent to result in a net benefit to Covered Species in the Preserve Areas: active and passive habitat restoration, stream stabilization measures, fire management practices, compatible public uses/outreach, fencing, signage, removal of trash and debris, light and noise, feral and domestic animal control, cowbird trapping, invasive exotic species control, and guidelines for species introduction and reintroduction.

The San Miguel HMA is a FWS-approved bank and the purchase price for credits at the bank includes a per-acre fee provided to an endowment dedicated to funding monitoring and management activities for species and habitats within the bank. With the purchase of credits, the Water Authority is entitled to rely on the monitoring and management assurances provided in banking agreement.

The primary goal of the Preserve Area is to protect and conserve Covered Species. Although management and monitoring activities may cause temporary impacts, there will be a net benefit to Covered Species.

5.4 Incidental Take

The ESA defines take as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct." In regards to this Plan, estimates of potential take of Covered Species were based on the definition above and the predicted impacts from Covered Activities, as outlined in this section and

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Appendix C. Take was assumed to result from the disturbance of habitat known or with potential to support the Covered Species. Disturbance was estimated by overlaying rights-of-way, facilities, and known project areas on the potential habitat for the species, as defined by appropriate vegetation communities (see Appendix B).

Based on a review of Covered Activities, this Plan provides a habitat-based impact summary (Table 5-3) of the anticipated permanent impacts from Covered Activities. Estimates of habitat impacts are provided for Planned and Future Projects and O&M Activities. Preserve Area Management impacts to Covered Species are presumed to be temporary, and overall will provide a net benefit to the species; therefore, these impacts are not summarized Table 5-3.

Impacts for Planned Projects (i.e., expected to occur over the next 20 years) that require compensatory mitigation are estimated at 71.4 acres, based on either specific project planning documents, or GIS analysis of a construction footprint. For Future Projects, the estimated impacts were assumed to be similar in scope/extent on a per year basis to the Planned Projects. Future Project impacts for the 35 years after the Planned Project time frame resulted in a multiplier of 1.75 (35 years vs. 20 years). Additionally, a 20 percent “contingency” has been added to the estimated impacts from Future Projects (totaling 149.8 acres) and O&M Activities (totaling 33 acres) to account for uncertainties regarding those impacts. Based on preliminary information regarding a potential realignment of Pipeline 6’s central and southern segments (an Existing Project described in Appendix C, Section 3.1.2), a different set of impacts may occur to an estimated 118.9 acres of vegetation communities that are addressed by this Plan. This Plan includes the alternative Pipeline 6 alignment as a Covered Activity. The level of project detail available for Pipeline 6 precludes separating permanent and temporary impacts, so all impacts to habitat types are treated as permanent (Table 5-3) for the purposes of assessing take under the Plan.

Appendix B summarizes the potential habitat within the Survey Area, PIZ, Preserve Area, and MMAs that may support the Covered Species as well as the reported occurrences of Covered Species in the Survey Area and PIZ (see Table B-1 in Appendix B). For each Covered Species, Appendix B provides an assessment of the potential take by the Planned Projects and the documented or potential conservation provided by the Preserve Area and MMAs. The habitat and occurrence-specific impacts from Future Projects cannot be determined, but the Preserve Area, as noted in Section 6.5.1.1, has substantially more available habitat credits than the projected habitat acreage impacts to many vegetation types from planned and future projects. If the Preserve Area does not contain the appropriate Covered Species habitat or Covered Species, then additional suitable habitat will be added to the Preserve Area, or appropriate credits from existing banks will be obtained (Section 6.5.1.2). Species-specific conditions for coverage required for these impacts are provided in Appendix B.

Take of the Covered Species typically quantified in terms of acres of actual or potential habitat impacted by Covered Activities, is described below. To ensure that incidental take was not underestimated, any displacement of Covered Species was treated as harm and thus considered as take. It was assumed that no direct take of nesting birds, active nests, eggs, or young would occur, except during urgent repairs and in association with the infrequent drawdown and refilling of reservoirs. Plan measures to avoid, minimize, mitigate, and monitor incidental take are presented in Section 6.0.

Water Authority actions within the Plan Area have the potential to contribute both individually and cumulatively to the reduction of native habitats and associated Covered Species' populations. These impacts arise both from construction of new project facilities and regular O&M Activities. The extent of impacts to Covered Species and native habitats varies based on several factors, including the location, duration, and magnitude of the projects. Although impacts may differ, the Water Authority's principal construction activities rarely deviate from projects directly related to water delivery and support facilities.

Because many of the pipelines and minor support facilities parallel each other along north-south trending alignments, there is a substantial amount of overlap between construction impacts associated with new facilities and rights-of-way management activities supporting existing pipelines. Also, in some cases, take for a particular Covered Species is already authorized per an existing BO (e.g., gnatcatcher by BO 1-6-93-F-28). When examining the composition of non-developed habitats present within the existing rights-of-way and within the areas of work under the CIP projects, the distribution of impacts from Future Projects across habitat types is expected to be similar to those for the Planned Projects.

5.4.1 CIP Project Impacts

Estimated impacts from the construction and expansion of CIP projects were drawn from available project-specific assessments, i.e., CEQA documents. Where project-specific information was not available, impact assessments were based on recent construction of similar facilities, regional vegetation, and resource mapping combined with Water Authority rights-of-way information (SANDAG 1997; Water Authority and PSBS 2003b). Actual impact acreage and species impacts caused by CIP projects will be determined during preparation of individual projects' CEQA documents and verified through the Pre-activity Survey program described in Section 6.4.1.2.

A summary of the types of CIP projects (i.e., Covered Activities) that are covered by this Plan are described in Section 5.1, and a summary of Existing and Planned Projects with either planning or Master Plan level of specificity are included in Appendix C. The CIP projects identified in Appendix C result in comparatively minor native habitat impacts (190.3 acres) and are discussed as a group. Section 6.0 and Appendix B provide an

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assessment of the potential take by the Planned Projects and the documented or potential conservation provided by the Preserve Area and MMAs.

The CIP Covered Activities not identified in Appendix C are Future Projects in the CIP. The CIP Covered Activities types described in Section 5.1 maybe be constructed individually, for example a future pipeline project, or implemented together as a more complex project, for example a water treatment plant, together with a pump station and pipeline. As discussed in Section 5.5, take of Covered Species habitat associated with Future Projects is estimated at 149.8 acres. General estimates of impacts resulting from construction of each type of facility are described in Table 5-2. Impacts by habitat types are summarized for Proposed and Future Projects in Table 5-3.

With relatively few exceptions, impacts from existing CIP projects are not included in the take estimate. As discussed in Section 1.1.2.2, existing CIP projects are already permitted for construction and operation, and impacts have been previously accounted for and mitigated accordingly (see Table 1-1 and Appendix C). While the Planned Projects have greater specificity of habitat impacts, habitat impacts are projected for all Planned and Future Projects and associated O&M Activities to programmatically address the project needs of the Water Authority. Recognizing that the CIP is regularly updated and projects are added, deleted, or modified to meet existing and future needs, the final (actual) impacts and the take from each implemented Water Authority project will be confirmed at the conclusion of construction. Projects that are added or modified through the CIP are to be reviewed for conformance with the conditions of this Plan. If found to be compatible, these projects may be considered Covered Activities provided that they are adequately mitigated in accordance with measures outlined in Section 6.0 of this document and the amendment process is properly implemented (see Section 8.0), when applicable. The final impacts due to each Water Authority project will be calculated as they occur and documented in accordance with the reporting and monitoring program requirements in Section 6.0 of this Plan.

5.4.2 O&M Impacts

In prior environmental documents and ESA section 7 consultations, efforts have been made to estimate the maximum extent of annualized O&M impacts that are anticipated to occur within the Water Authority's existing rights-of-way. This Plan acknowledges that most impacts from O&M Activities will occur to disturbed habitat areas that do not support Covered Species. The Plan estimates that approximately 0.5 acre annually of permanent take of Covered Species habitat will occur due to O&M Activities, including Urgent Repairs. As described in Section 5.5, impacts from O&M Activities to Covered Species habitat are estimated to be 33 acres over the 55 year term of the Plan. Sections 6.4 and 6.5 provide measures that the Water Authority will follow to minimize and mitigate impacts that cannot be avoided.

**TABLE 5-2
GENERAL IMPACT ESTIMATES BY FACILITY TYPE**

Facility Type	General Area or Extent of Impact	Basis for Estimate
Cut & Cover Pipelines, Ancillary Structures	80–150-foot width; 100-foot average; approximately 12 acres/mile.	Past project experience. Geology and slope plays significant role in width of impacts.
Tunnel Portals	One to two acres for small tunneling needs (freeways, railroads, short reaches of environmentally constrained lands). Relining portals are typically 0.2 acre. Up to five or more acres for large tunnels where the portal site is also a materials handling facility.	Past project experience and engineering estimates for larger tunnel projects. Material handling and tunnel lining needs play significant roles in portal staging area impacts.
FCF, Meter Vaults, Pump Stations, Pressure Control Facilities (PCF)	Less than one acre and contained in the 100-foot-wide footprint of pipeline construction corridors. Can be as large as two acres on slopes, or in areas with multiple facility components.	Past project experience.
Hydroelectric Generating Facilities	Less than one acre of permanent developed surface; facilities typically installed contiguous to the pipeline right of way. Depending on slopes, site preparation could range from one acre to five acres.	Past project experience
Flow Regulatory Structures (FRS), Diversion Structures, Tank or Vault Water Storage	These facilities can occupy as much as 15 to 20 acres during construction, and are typically restored to a substantially smaller permanent footprint following construction.	Past project experience.
Treatment Plants	Only project-specific estimates should be used. Impacts may range from 10 to 20 acres depending upon the specific treatment process being employed. Expansion of existing facilities may have lesser impacts.	Past project experience and by reviewing member agency treatment facilities.

**TABLE 5-3
IMPACT SUMMARIES FOR COVERED ACTIVITIES (acres)
(EXCLUDING EXISTING PROJECTS)**

Vegetation Community/Land Cover Type and Subcommunities	Estimated Impacts from Pipeline 6 Alternative Alignment ¹	Estimated Impacts from Planned CIP Projects ²	Estimated Impacts from Future CIP ¹ Projects ³	Estimated Impacts from O&M ⁴	Total Impacts Requiring Mitigation
Upland Habitats					
Agricultural	185.0	139.8	293.5	--	--
General Agriculture/Extensive Agriculture (Row Crops, Pastures)/Intensive Agriculture (Dairies, Nurseries, Chicken Ranches)	23.6	99.6	209.1	--	--
Orchards and Vineyards	161.4	40.2	84.4	--	--
Chaparral, Coastal	30.1	16.3	34.3	7.6	88.3
Chamise Chaparral (Granitic Chamise Chaparral)	0.0	0.1	0.1	--	--
Chaparral	0.0	0.0	0.0	--	--
Ceanothus Crassifolius Chaparral	0.0	0.0	0.0	--	--
Interior Live Oak Chaparral	0.0	0.0	0.0	--	--
Northern Mixed Chaparral	0.0	0.0	0.0	--	--
Northern Mixed Chaparral (Granitic)	0.0	0.0	0.0	--	--
Northern Mixed Chaparral (Mafic)	0.0	0.0	0.0	--	--
Scrub Oak Chaparral	0.0	0.0	0.0	--	--
Southern Maritime Chaparral	0.0	0.0	0.0	--	--
Southern Mixed Chaparral	30.1	16.2	34.2	--	--
Southern Mixed Chaparral (Granitic)	0.0	0.0	0.0	--	--
Southern Mixed Chaparral (Mafic)	0.0	0.0	0.0	--	--
Chaparral, Montane/Trans-montane	0.0	0.0	0.0	0.0	0.0
Montane Chaparral	0.0	0.0	0.0	--	--
Redshank Chaparral	0.0	0.0	0.0	--	--
Coastal	0.0	0.0	0.0	0.0	0.0
Open Beach	0.0	0.0	0.0	--	--
Southern Foredunes	0.0	0.0	0.0	--	--
Coniferous Forest	0.0	0.0	0.0	0.0	0.0
Big Cone Spruce-Canyon Oak Forest	0.0	0.0	0.0	--	--
Mixed Coniferous Forest	0.0	0.0	0.0	--	--
Southern Interior Cypress Forest, Tecate Cypress Forest	0.0	0.0	0.0	--	--
Torrey Pine Forest	0.0	0.0	0.0	--	--
Disturbed/Developed	103.2	71.8	150.8	--	--
Bare Ground	0.0	0.0	0.0	--	--
Disturbed	0.0	10.1	21.3	--	--
Urban/Developed Land	103.2	61.7	129.5	--	--
Exotic Landscapes	0.0	0.7	1.4	--	--
Eucalyptus/Non-native vegetation	0.0	0.7	1.4	--	--
Ornamental	0.0	0.0	0.0	--	--
Grasslands	28.3	7.9	16.5	3.6	56.3
Native Grassland (Valley Needle Grassland, Valley, and Foothill Grassland)	0.0	0.0	0.0	--	--
Non-Native Grassland (Grassland)	28.3	7.9	16.5	--	--
Oak Woodland and Forest	11.5	3.9	8.2	1.7	25.3
Black Oak Forest	0.0	0.0	0.0	--	--
Black Oak Woodland	0.0	0.0	0.0	--	--
Coast Live Oak Forest (Dense Coast Live Oak Woodland)	0.0	0.0	0.0	--	--
Coast Live Oak Woodland (Open Coast Live Oak Woodland)	11.5	3.9	8.2	--	--

TABLE 5-3
IMPACT SUMMARIES FOR COVERED ACTIVITIES (acres)
(EXCLUDING EXISTING PROJECTS)
(continued)

Vegetation Community/Land Cover Type and Subcommunities	Estimated Impacts from Pipeline 6 Alternative Alignment ¹	Estimated Impacts from Planned CIP Projects ²	Estimated Impacts from Future CIP ¹ Projects ³	Estimated Impacts from O&M ⁴	Total Impacts Requiring Mitigation
Engelmann Oak Forest (Dense Engelmann Oak Woodland)	0.0	0.0	0.0	--	--
Engelmann Oak Woodland (Open Engelmann Oak Woodland)	0.0	0.0	0.0	--	--
Mixed Oak Woodland (Oak Woodland)	0.0	0.0	0.0	--	--
Sage-Scrub, Coastal	42.2	30.4	63.8	14.1	150.5
Alluvial Fan Scrub	0.0	0.0	0.0	--	--
Cactus Scrub	0.0	0.0	0.0	--	--
Coastal Sage-Chaparral Scrub	0.0	8.6	18.1	--	--
Coastal Sage Scrub (Diegan)	42.2	21.8	45.7	--	--
Coastal Sage Scrub (Inland)	0.0	0.0	0.0	--	--
Flat-topped Buckwheat Scrub	0.0	0.0	0.0	--	--
Maritime Succulent Scrub	0.0	0.0	0.0	--	--
Riversidean Alluvial Fan Scrub	0.0	0.0	0.0	--	--
Riversidean Sage Scrub	0.0	0.0	0.0	--	--
Southern Coastal Bluff Scrub	0.0	0.0	0.0	--	--
Sage-Scrub, Montane/Trans-montane	0.0	0.0	0.0	0.0	0.0
Big Sagebrush Scrub (Great Valley)	0.0	0.0	0.0	--	--
Wetland Habitats					
Aquatic, Freshwater	0.0	0.5	1.0	0.0	1.5
Non-vegetated Floodplain, Channel, Lakeshore Fringe	0.0	0.0	0.0	--	--
Open Freshwater (Freshwater, Open Water, Water)	0.0	0.5	1.0	--	--
Aquatic, Marine	0.0	0.0	0.0	0.0	0.0
Open Saltwater (Brackish Water, Deep Bay, Estuarine, Intertidal, Shallow Bay, Subtidal)	0.0	0.0	0.0	--	--
Saltpan/Mudflats	0.0	0.0	0.0	--	--
Riparian	6.80	11.9	25.0	6.0	49.7
Arrowweed Scrub	0.0	0.0	0.0	--	--
Mule Fat Scrub	1.84	0.1	0.2	--	--
Southern Arroyo Willow Riparian Forest	0.0	0.0	0.0	--	--
Southern Coast Live Oak Riparian Forest	0.0	7.4	15.4	--	--
Southern Cottonwood-Willow Riparian Forest	3.61	0.0	0.0	--	--
Southern Sycamore Woodland	0.0	0.0	0.0	--	--
Southern Sycamore-Alder Riparian Woodland	0.0	1.0	2.2	--	--
Southern Willow Scrub	1.35	3.4	7.2	--	--
White Alder Riparian Forest	0.0	0.0	0.0	--	--
Riparian (Disturbed)	0.0	0.0	0.0	0.0	0.0
Arundo Scrub	0.0	0.0	0.0	--	--
Tamarisk Scrub	0.0	0.0	0.0	--	--
Wetland	0.0	0.5	1.0	0.0	1.5
Alkali Wetlands (Alkali Seep, Alkali Marsh, Cismontane Alkali Marsh)	0.0	0.0	0.0	--	--
Freshwater Meadow or Seep	0.0	0.0	0.0	--	--
Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland)	0.0	0.5	1.0	--	--
Montane Meadow	0.0	0.0	0.0	--	--
Southern Coastal Salt Marsh	0.0	0.0	0.0	--	--
Wetland (Disturbed)	0.0	0.0	0.0	--	--
Alkali Vernal Pools	0.0	0.0	0.0	--	--

**TABLE 5-3
IMPACT SUMMARIES FOR COVERED ACTIVITIES (acres)
(EXCLUDING EXISTING PROJECTS)
(continued)**

Vegetation Community/Land Cover Type and Subcommunities	Estimated Impacts from Pipeline 6 Alternative Alignment ¹	Estimated Impacts from Planned CIP Projects ²	Estimated Impacts from Future CIP ¹ Projects ³	Estimated Impacts from O&M ⁴	Total Impacts Requiring Mitigation
San Diego Mesa Claypan Vernal Pools	0.0	0.0	0.0	--	--
San Diego Mesa Hardpan Vernal Pools	0.0	0.0	0.0	--	--
Vernal Lake	0.0	0.0	0.0	--	--
Subtotal -- Communities/Land Covers not subject to mitigation	288.2	212.3	445.7	N/A	--
Subtotal – Communities subject to mitigation	118.9	71.4	149.8	33.0	373.1
Total	407.1	283.7	595.5	33.0	--

¹ Possible Pipeline 6 alternative alignment impacts to mitigatable vegetation communities addressed by this Plan. Current Pipeline 6 alignment impacts are treated as an Existing Project, are covered under that project's individual permit, and are not addressed by this Plan.

² Permanent impacts to mitigatable vegetation communities from Planned Projects included in the CIP project list, as fully described in Appendix C.

³ Permanent impacts to mitigatable vegetation communities from Future Projects were estimated assuming the same rate of project build-out (on an acres/year basis) in the remaining 35 years of the full Permit term as during the 20-year period of the CIP projects, and increased by 20 percent to account for future project planning uncertainties. Impacts were assigned to the same individual vegetation community types as for the Planned Projects.

⁴ Permanent Impacts to mitigatable vegetation communities from O&M Activities were calculated assuming 0.5 acres/year for the full 55-year Permit term, and increased by 20 percent to account for future project uncertainties.

Disturbance generally occurs at specific locations which are regularly inspected or serviced, such as anode beds or valve structures along existing access roads, mainly within previously cleared and mitigated areas. Individual habitat impacts due to O&M Activities will be calculated as they occur and documented in accordance with the monitoring program in Section 6.0 of this Plan.

Activities related to Rights-of-Way management, expansion, and the aqueduct alignment involve acquiring access rights and property, correcting legal descriptions of properties, establishing agreements, patrolling access roads, and conducting minor repairs. Impact estimates from rights-of-way activities are based on past Water Authority experience with established facilities and completed projects. Rights-of-way activities are included in the two percent calculated for O&M Activities. Actual individual habitat impacts due to rights-of-way activities will be calculated as they occur and documented in accordance with the reporting and monitoring program requirements in Section 6.12 of this Plan.

5.4.3 Preserve Area Management, Monitoring, and Adaptive Management

The Preserve Area identified in the Plan (Section 6.8) totals approximately 1,920 acres, of which 1,220 acres represent the baseline preserve (areas set aside to compensate for previously permitted projects), and approximately 700 acres, including approximately 51 acres of wetland and riparian habitat types still to be installed by the Water Authority (see Sections 6.8.2.1 and 6.8.2.2), are available as compensation to off-site future Covered Activities impacts to Covered Species. Although Preserve Area management activities, including monitoring, research, maintenance, and adaptive management activities provide a net benefit to Covered Species there is potential for direct and indirect take when carrying out those activities. However, no Existing, Planned, or Future CIP projects or O&M Activities are expected to impact the Preserve Area. This plan covers incidental take for management activities conducted within the Preserve Area, but does not cover incidental take associated with MMA (Section 6.9) management, because existing permits already cover the MMAs.

The Preserve Area Manager will assess all proposed management and research activities to insure that their implementation will avoid or minimize direct and indirect impacts to Covered Species. The Preserve Area Manager will assess the qualifications of the staff or contractors conducting the management or research activities to assure they have the qualification for the particular management activity. Most management activities' impacts to Covered Species are anticipated to be temporary (e.g., increased human presence, noise, temporary reduction in vegetation associated with prescribed burns or grazing), and provide a net benefit to the Covered Species. To the extent feasible, all future management activities will incorporate appropriate avoidance measures, such as temporary fencing to protect riparian areas from grazers, prescribed burn protocols, and appropriate use of herbicides and pesticides, into the design of the

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management activity. These impact avoidance measures will minimize the potential for Covered Species impacts. However, some impacts to Covered Species may be unavoidable, particularly in circumstances where a species is difficult to detect.

Implementation of the following measures may avoid or reduce impacts to Covered Species:

- Surveys and monitoring will be performed by a qualified biologist.
- Surveys and monitoring will follow protocols established by the CDFG and USFWS.
- Best management practices (BMPs) will be implemented whenever erosion or sedimentation could result from management activities. Over the term of the Plan, improvements to BMPs may occur, including materials, design, installation/implementation, and monitoring procedures. To take advantage of any such improvements, the Preserve Area manager is to implement current and effective BMPs at the time of the management action. Several public agencies maintain and update BMPs manuals and handbooks, such as the California Department of Transportation, Storm Water Quality Handbooks (March 2003), and the County of San Diego Low Impact Development Handbook Stormwater Management Strategies, January 31, 2007.
- Any habitat impact resulting of the use of heavy equipment will be restored to its original condition.
- Activities that would directly or indirectly affect habitat occupied by Covered Species shall be conducted during the non-breeding season of the species in the project area.
- New facilities will be placed in disturbed habitat whenever possible.
- Temporary staging areas will be revegetated following the completion of construction.
- Hand tools rather than mechanized equipment will be used whenever feasible.

Potential direct and indirect impacts may also result from the public's use allowed in PAMPs. The uses that may result in impacts include: (1) the overuse of trails, open areas, or parking lots; (2) unauthorized use of closed areas; (3) conflicts among users; and (4) accidents involving wildlife (e.g., road kill). These impacts may be avoided or reduced by implementation of the following or similar measures:

- Managing visitation to an appropriate level.
- Preventing unauthorized activities through daily observation of visitor activities.
- Promptly repairing damaged trails, parking areas, etc.
- Installing educational signs and/or display cases to educate and inform the public regarding rules and regulations governing the use of a Preserve Area and access restrictions.
- Regularly monitoring public use effects on existing ecosystems.
- Closing trails where use is determined to have, or potentially have, an adverse effect on sensitive biological and cultural resources.

5.4.4 Assessment of Incidental Take

Of the 992,000-acre Plan Area, a total of 373 acres of Covered Species habitat are estimated to be directly impacted as a result of the Covered Activities identified within this Plan over a 55-year period. Because project information is primarily master planning level detail with projections of future build-out, the incidental take assessment treats all of the impacts as permanent and does not subdivide direct habitat impact acres into permanent and temporary impacts. Therefore, Future and Planned Projects' impacts to covered wildlife species' habitats are potentially overstated because temporary construction staging and storage areas, and construction haul routes will be restored per Section 6.6. Additional impacts will occur to disturbed habitats, agricultural lands, or non-native vegetation communities (e.g., eucalyptus woodlands) that do not require mitigation pursuant to this Plan. Incidental take estimates are summarized in Table 5-3 based on the habitat types within the generalized vegetation communities. To address uncertainty associated with Future Projects and O&M Activities in the later years of Plan, these two covered activity types' take impacts have been increased by twenty percent and summarized in Table 5-3. As discussed above, impacts from construction of CIP projects are calculated as a one-time occurrence, while impacts from O&M Activities are calculated as 0.5 acre-per-year of permanent sensitive habitat impacts. Generally, O&M Activities will occur in the same general areas, such as road shoulders, and around inline structures, such as blow offs and air-release valves, but the same area may not be impacted every year by these activities. Many of these areas are classified as developed or disturbed, or otherwise occur in non-sensitive land covers or vegetation communities that do not require mitigation pursuant to the Plan, and therefore, these impacts are not summarized in the Plan. Covered Activities conducted within the access road is not expected to result direct impact to Covered Species, but there may be indirect temporary impacts to Covered Species such as noise, dust, and increased human presence which may adversely affect a Covered Species behavior during the activity. Due to the varying

levels of project definition and designs, impact acreage estimates vary with respect to source and precision. The estimates of impacts resulting from planned CIP projects are more precise because CIP projects have a specific location. For projects that are sited and have preliminary designs, the Water Authority is able to estimate acres, not only for the generalized vegetation community, but also for specific habitat and landscape types within the Plan Area.

5.5 Emergency Actions and Accidental Discharges and Spills

5.5.1 Emergency Response Actions

Emergency response actions are required when a facility or structure has failed or is about to fail and requires immediate action to minimize or avoid catastrophic failure of all or part of the water treatment, storage, or delivery system. Emergency actions are necessary to mitigate or prevent loss of, or damage to, life, health, property, or essential public services and include, but are not limited to, emergency release of reservoir water in a storm or earthquake event, reservoir or groundwater drawdown during severe drought, repair of broken pipelines, and search and rescue operations on Water Authority lands. Suggested protocols to reduce impacts to sensitive resources would be immediately available to emergency crews. These may include signage, maps, or fact sheets that clearly indicate preferred access routes, communications protocols, and areas to be avoided, if possible, during emergency operations.

The Water Authority General Manager declares emergency situations requiring immediate repairs. Immediate repairs may be required as a result of natural disaster or other damage to facilities. Immediate repairs may also be required to prevent the imminent failure of a facility. Conditions in this category are those that immediately threaten the integrity of the aqueduct and water distribution system, which includes, but are not limited to, landslides, surface fault ruptures, erosion, major subsidence, or other man-induced or natural disasters.

In an emergency situation, the Water Authority will immediately conduct the necessary activities to alleviate the situation. Typically, biological assessments cannot be conducted prior to the repair activity. If the facility is in a natural area, the Environmental Surveyor, as described in Section 6.4.1.1, will conduct an assessment during the event, if possible, or after the event is complete. Once the emergency situation is stabilized, incidental take of Covered Species or habitat affected will be assessed and recommendations for revegetation activities proposed. If resulting impacts are permanent, Preserve Area credit deductions or other mitigation acceptable to the Wildlife Agencies will be made. All appropriate parties and agencies will be notified as soon as

possible regarding any emergency actions and repairs, but no later than required by any applicable regulations governing such notifications.

For dam facilities, emergency actions could result in a need to clear vegetation around abutments, install additional drainage features, inject additional grouting into bedrock foundations to reduce seepage, fill cracks in the dam, stabilize abutments, rapidly drain the reservoir, or restore flow to a reservoir following a shut down.

Nighttime activities may be necessary in order to expedite the repair work on the system. Due to the emergency nature of these repairs, typical levels (i.e. no avoidance or mitigating measures implemented) of construction-related traffic, dust, artificial lighting, and noise during nighttime hours may result.

Emergency actions will be treated as an authorized use that is compatible with the species conservation goals and conservation objectives outlined in the Conservation Analysis (Appendix B). Local, State, and federal law enforcement entities will be allowed access to areas as necessary to enforce the law. Medical, rescue, fire fighting operations, and other emergency service providers will be allowed access to carry out operations necessary for the health, safety, and welfare of the public. Local law enforcement agencies and other entities, such as the National Guard or U.S. Department of Homeland Security, operating on Water Authority lands are subject to existing State and federal laws. The Water Authority will not create additional permit requirements for these entities beyond those of existing State and federal laws. However, this Plan does not cover actions conducted by law enforcement agencies or emergency responders, if their actions require compliance with either ESA or CESA.

5.5.2 Responses to Accidental Discharges and Spills

During the construction or O&M periods, a discharge of treated or untreated water may occur due to rapid changes in hydraulic conditions or unforeseen flow changes. In addition, an accidental spill of a substance or chemical used for the treatment of water or disinfection of the aqueduct may occur within regular O&M Activities. Immediate response to any spill or discharge would be prudent and necessary, without a biological assessment prior to the cleanup activity. If the affected facility is in a natural area, the Environmental Surveyor will conduct an assessment during the remediation activities if possible, or after the cleanup is complete. After the activity is complete, incidental take of Covered Species or affected habitat will be assessed, and recommendations for revegetation activities and mitigation credit deductions, if necessary, will be made. All appropriate parties and agencies will be notified as required by any governing statute appurtenant to a specific discharge or accidental spills. The Water Authority will report discharges and accidental spills in the annual report, and sooner where there are impacts to Covered Species.

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The Water Authority will protect Covered Species and their habitats by meeting the Plan's goals and objectives (Section 6.1) and implementing habitat conservation measures contained in this section and as described for individual Covered Species in the Conservation Analysis (Appendix B). The Covered Species (Section 6.2) were selected because of the potential for Covered Activities (Section 5.0) to impact those species and their habitats. Based on the commitments in this Plan, sufficient conservation will be implemented (Section 6.3) to justify the incidental take authorizations (exemptions) for listed Covered Species and any Covered Species that is subsequently listed (with the exception of three species, vernal pool fairy shrimp, Orcutt grass, and Munz's onion, which require a Major Amendment). The Plan describes minimization (Section 6.4) and mitigation (Sections 6.5 through 6.7) measures; the Preserve Area (Section 6.8); previously conserved and managed mitigation areas (Section 6.9); the process to augment the Preserve Area (Section 6.10); and Preserve management (Section 6.11) and monitoring and adaptive management (Section 6.12) that comprise the essential conservation measures.

In addition to the designated Preserve Area and MMAs, where conservation actions would not adversely affect its mission, the Water Authority agrees to maintain its fee-owned rights-of-way as native habitat where they occur in and around its facilities. The Water Authority will retain and manage its fee-owned rights-of-way habitat to supplement adjoining preserve lands that are part of, or provide connections to, other conservation plan lands. To the extent that fee-owned rights-of-way can serve two purposes (i.e., function for Water Authority facilities and connect fragmented habitat areas) or may contribute to the habitat carrying capacity of other preserve lands managed as a part of other conservation plans, the Water Authority-owned rights-of-way and easements would provide building blocks for the creation of wildlife corridors, similar to SDG&E utility corridors. No conservation easements are proposed over Water Authority rights-of-way. If the Wildlife Agencies desire to utilize such lands to link habitats or be preserves, the Water Authority will work to achieve these shared goals as long as such joint uses do not impede the Water Authority's ability to maintain facilities and fulfill the Water Authority's mission.

The Water Authority will compensate for impacts to Covered Species and loss of their habitat by deducting credits from its upland and wetland HMAs established for this use, either previous to or as a requirement of this Plan. The use of mitigation credits (acres) for permanent impacts will require the permanent withdrawal of credits. Where on-site habitat enhancement and restoration are expected to mitigate temporary impacts, the Water Authority will ensure sufficient credits remain in one or more HMAs to provide off-site mitigation should the enhancement or restoration not meet the performance criteria.

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Through the implementation of conservation measures identified in this section, the Water Authority will minimize and mitigate impacts to Covered Species. The Water Authority's Plan includes 63 Covered Species. Of the Covered Species, 18 are considered narrow endemics. Three species are considered Major Amendment Species because they are known to primarily occur in the Plan's Major Amendment Area in Riverside County.

6.1 Conservation Plan Strategy, Goals and Objectives

6.1.1 Conservation Strategy

This Plan adheres to the intent and expectations of the state's NCCPA (as amended) and federal HCP process, as described in Section 1.5.1. The Water Authority is not a general land use agency, has a general set of projects and activities that traverse many other agencies' conservation plan reserves, and has assembled its conservation plan primarily by providing additional habitat lands to complement those reserves, rather than creating a "stand-alone" preserve system. The Plan's central conservation strategy relies on previous contributions of regionally-significant habitat lands (baseline conservation that benefited many of the conserved habitats and Covered Species), full compensation for all new impacts to conserved habitats and any incidental take of Covered Species, a significant additional habitat land contribution (above the anticipated required compensation for future impacts), and funding to ensure monitoring and management of the preserve lands.

After reviewing the Water Authority's draft Plan, the Independent Science Advisors Report (Attachment B-2 of Appendix B) stated that this Plan represents a unique case because the projects are mostly linear and the mitigation areas were for the most part already established. For those reasons, the advisors stated that there was no clear opportunity to review whether the Plan adequately addressed (all of) the NCCP tenets of reserve design. However, they recommended that the preserve lands be evaluated for their contribution to the regional conservation strategies of the other conservation plans, connectivity to other protected areas, and support of Covered Species. The conservation contributions of the Preserve Area and MMAs are described in Sections 6.8 and 6.9, respectively.

6.1.2 Goals and Objectives

6.1.2.1 Goal 1

Ensure habitat and species diversity through the identification and protection of lands in Preserve Areas for the benefit of Covered Species.

- Objective 1.1: Preserve Area managers will ensure that the approximately 1,920 acres of Preserve Area lands are conserved and managed consistent with the needs of the Covered Species known or expected to occur on those lands. The 1,147 acres of MMA lands provide additional habitat (baseline conservation) value to Covered Species but are not part of the Preserve Area.
- Objective 1.2: Water Authority will ensure the conservation of specified acreages of suitable vegetation communities as described in Sections 6.8 and 6.9 to support the Covered Species known or expected to occur in the Preserve Area and MMAs.
- Objective 1.3: Identify/document the conserved habitats and Covered Species that are proposed to be created/supported on each proposed Preserve Area property (creation will occur primarily in wetland HMAs).

6.1.2.2 Goal 2

Provide and implement conservation measures that meet the environmental needs of the Covered Species, based on the best available scientific information.

- Objective 2.1: Preserve Area managers will document that the conserved habitats are adequate to contribute to support populations of the Covered Species known or expected to occur within each Preserve Area property.
- Objective 2.2: Water Authority and Preserve Area managers will document that the Preserve Area's credits are sufficient to mitigate the types and acres of habitats and Covered Species anticipated to be impacted by the Plan; or, that appropriate additional credits or habitats will be provided by the Plan.
- Objective 2.3: Preserve Area managers will document that each Preserve Area property (and the Water Authority for its properties, if appropriate) provides for movement and interchange of Covered Species.

6.1.2.3 Goal 3

Identify and implement environmentally sensitive methods for planning, construction, and O&M (Covered Activities) that minimize project impacts and ensure that activities

6.0 Conservation Plan

within the Preserve Area are compatible with the habitats and species conservation and ecological functions.

- Objective 3.1: Water Authority will document that the Covered Activities specify procedures and practices to minimize impacts to conserved habitats and Covered Species that may occur within the project areas.
- Objective 3.2: Preserve Area managers will document that management plans developed for each Preserve Area property specifies procedures and practices to minimize impacts to conserved habitats and Covered Species.

6.1.2.4 Goal 4

Provide and implement an adaptive management program with measurable objectives for vegetation types and Covered Species, where appropriate.

- Objective 4.1: Water Authority will document that each Preserve Area has, or specifies an appropriate timeline to produce, a management plan with an adaptive management element. Adaptive management measures will complement (and generally be consistent with) those in other conservation plans within the Plan Area.
- Objective 4.2: Water Authority will document that delegated preserve managers are implementing the management plans/adaptive management programs and that adequate funding is available to carry out management functions.

6.1.2.5 Goal 5

Provide and implement a monitoring and reporting process.

- Objective 5.1: Water Authority will prepare an annual report summarizing impacts/mitigation, conservation, and management/monitoring occurring under the Plan.
- Objective 5.2: Preserve Area managers will document that each Preserve Area property has, or provides an appropriate timeline to produce, an annual monitoring and reporting plan.
- Objective 5.3: Water Authority will document that each annual reporting plan provides the required information and is submitted to the appropriate agencies in a timely manner.

6.2 Covered Species

Covered Species are those plant and animal species, listed or unlisted, that are considered adequately conserved and managed by actions outlined in this Plan, and for which impacts will be avoided or minimized and mitigated, such that impacts to these species and loss of their habitat can occur pursuant to the Plan and IA. Under the state NCCPA standards, the Plan must assure that the Covered Species are conserved and managed. As such, coverage for each species will require a determination of conservation as defined in the NCCPA (Fish and Game Code, Section 2805). Pursuant to federal ESA standards, species can be covered when there is a potential for impact, provided Plan implementation will contribute to a net benefit to the species' overall viability throughout the region by increasing protection of habitat and beneficial management.

For species Covered by the Plan, impacts will be avoided, minimized, and mitigated; Plan implementation will support the species' viability in the Plan Area; and, for listed species, Plan implementation will contribute to their recovery. The Water Authority will be authorized for incidental take of these species and loss of their habitat (including losses that do not adversely modify designated critical habitat) resulting from implementation of Covered Activities, provided the Plan is implemented as described in this document and the IA. The standards for mitigation and protection afforded to the non-listed Covered Species in this Plan are equivalent to those afforded to the listed Covered Species.

6.2.1 Covered Species

Species that are identified as covered by this Plan that are not listed as threatened or endangered at the time the IA is signed, but that are listed in the future, will be covered by the permits without the need for a Plan amendment. Table 6-1 is a summary list of the Covered Species. These include:

- Twenty-six plant species;
- Five invertebrate species;
- Two amphibian species;
- Nine reptile species;
- Thirteen bird species; and
- Eight mammal species.

The Plan Area covers a wide range of habitats and spans portions of the ranges for numerous plants and animals. To determine which species within the Plan Area

**TABLE 6-1
COVERED SPECIES SUMMARY LIST**

Scientific Name	Common Name
Plants	
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint
<i>Adolphia californica</i>	California adolphia
<i>Ambrosia pumila</i>	San Diego ambrosia
<i>Baccharis vanessae</i>	Encinitas baccharis
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea
<i>Brodiaea orcuttii</i>	Orcutt's brodiaea
<i>Calochortus dunnii</i>	Dunn's mariposa lily
<i>Ceanothus cyaneus</i>	Lakeside ceanothus
<i>Centromadia parryi</i> ssp. <i>Australis</i>	Southern tarplant
<i>Centromadia pungens</i> ssp. <i>Laevis</i>	Smooth tarplant
<i>Deinandra conjugens</i>	Otay tarplant
<i>Dudleya variegata</i>	Variegated dudleya
<i>Dudleya viscida</i>	Sticky-leaved dudleya
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery
<i>Ferocactus viridescens</i>	San Diego barrel cactus
<i>Iva hayesiana</i>	San Diego marsh-elder
<i>Monardella hypoleuca</i> ssp. <i>Lanata</i>	Felt-leaved monardella
<i>Monardella viminea</i>	Willow monardella
<i>Muilla clevelandii</i>	San Diego goldenstar
<i>Navarretia fossalis</i>	Spreading navarretia
<i>Nolina cismontana</i>	Chaparral nolina
<i>Pogogyne abramsii</i>	San Diego mesa mint
<i>Pogogyne nudiuscula</i>	Otay Mesa mint
<i>Quercus dumosa</i>	Nuttall's scrub oak
<i>Salvia munzii</i>	Munz's sage
<i>Tetracoccus dioicus</i>	Parry's tetracoccus
Invertebrates	
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly
<i>Euphyes vestris harbisoni</i>	Harbison's Dun skipper
<i>Lycaena hermes</i>	Hermes copper butterfly
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp
Amphibians	
<i>Anaxyrus (=Bufo) californicus</i>	Arroyo toad
<i>Spea hammondi</i>	Western spadefoot toad
Reptiles	
<i>Actinemys marmorata pallida</i>	Southern Pacific (Southwestern) pond turtle
<i>Aspidoscelis hyperythra beldingi</i>	Belding's orange-throated whiptail
<i>Aspidoscelis tigris stejnegeri</i>	Coastal (western) whiptail
<i>Coleonyx variegates abbottii</i>	San Diego banded gecko
<i>Crotalus ruber</i>	(Northern) red diamond rattlesnake

**TABLE 6-1
COVERED SPECIES SUMMARY LIST
(continued)**

Scientific Name	Common Name
<i>Diadophis punctatus similis</i>	San Diego ring-neck snake
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink
<i>Lichanura trivirgata roseofusca</i>	Coastal rosy boa
<i>Phrynosoma coronatum blainvillii</i>	Coast (San Diego horned) lizard
Birds	
<i>Agelaius tricolor</i>	Tricolored blackbird
<i>Aimophila ruficeps canescens</i>	Southern California rufous-crowned sparrow
<i>Ammodramus savannarum</i>	Grasshopper sparrow
<i>Amphispiza belli belli</i>	Bell's sage sparrow
<i>Athene cunicularia hypugaea</i>	Western burrowing owl
<i>Campylorhynchus brunneicapillus sandiegensis</i>	San Diego cactus wren
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher
<i>Eremophila alpestris californica</i>	California horned lark
<i>Dendroica petechia brewsteri</i>	Yellow warbler
<i>Icteria virens</i>	Yellow-breasted chat
<i>Lanius ludovicianus</i>	Loggerhead shrike
<i>Polioptila californica californica</i>	Coastal California gnatcatcher
<i>Vireo belli pusillus</i>	Least Bell's vireo
Mammals	
<i>Chaetodipus californicus femoralis</i>	Dulzura pocket mouse
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat
<i>Felis concolor</i>	Mountain lion
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit
<i>Neotoma lepida intermedia</i>	San Diego woodrat
<i>Onychomys torridus ramona</i>	Southern grasshopper mouse
<i>Perognathus longimembris brevinasus</i>	Los Angeles pocket mouse

6.0 Conservation Plan

warranted consideration for coverage under the Plan, information such as distribution, status, and degree of existing protection of the species on Water Authority HMAs, MMAs, and rights-of-way was evaluated to determine the potential that a Covered Activity (including Planned and Future Projects) could impact a species. The process to determine the list of Covered Species is discussed further in Section 1.2, Species Coverage, of Appendix B. Based on current listing and sensitivity information, habitat distribution data, and proposed and existing conservation/management conditions, a total of 26 plant species and 37 animal species are known to occur or have potential to occur within the Plan Area and are proposed for coverage under this Plan. Appendix B includes descriptions of each species, their habitat requirements, management commitments, and applicable policies for each Covered Species. Three of these species, Orcutt grass, vernal pool fairy shrimp, and Munz's onion, are Major Amendment Species, and coverage would be processed under a Major Amendment for the Riverside County portion of the Plan Area.

Species included are federally and/or state-listed as rare, threatened, endangered, or are likely candidates for future listing as rare, threatened, or endangered based on present population declines, diminishing habitat, or existing levels of sensitivity. Assessments of the sensitivity of species are based primarily on the following documents: California Native Plant Society (CNPS; 2001), State of California (2000, 2006a, 2006b, 2007a, 2007b), and USFWS (2006). Floral nomenclature for common plants follows Hickman (1993) as updated by the Jepson Online Interchange (Jepson Flora Project 2008). Zoological nomenclature is in accordance with the following: birds—the American Ornithologists' Union Checklist (1998 and supplements); fish—University of Texas (2006) and State of California (2000); butterflies—Mattoni (1990) and Opler and Wright (1999); mammals—Hall (1981) and Baker et al. (2003); and amphibians and reptiles—Crother (2001) and Crother et al. (2003). Where noted, the common names of some species may not be consistent with accepted nomenclature in order to remain consistent with other MSCP documents from the region. A description of the data sources and methods related to Covered Species is provided as an introduction to the Conservation Analysis (see Section 1.1, Selection Criteria of Appendix B).

6.2.2 General Conditions for Covered Species Not Documented in Preserve Areas

Most Covered Species are known to occur or have potential to occur within the Survey Area and are present in the Preserve Area. The conservation and mitigation commitments for many of the Covered Species will be provided by the use of habitat credits available in the Preserve Area properties, which support key vegetation communities and a number of the Covered Species. However, not all of the Covered Species are known to occur within the Preserve Area. For a Covered Species whose presence has not been documented in the Preserve Area, coverage will require demonstration that one or more of the following conditions is met, as well as

implementation of both general and species-specific conditions that have been identified for Covered Species (see Section 2.1 and the Conditions for Coverage for each Covered Species in Appendix B). In addition to these conditions, the Water Authority shall demonstrate that a Covered Activity will avoid, minimize, or mitigate impacts to the species (by meeting the species-specific criteria and one or more of the following conditions) at the time that a Covered Activity is proposed to be implemented. The Water Authority will select which of the following conditions are appropriate on a species-by-species basis in consultation with the Wildlife Agencies. No impacts may occur to the species in question unless the Wildlife Agencies have concurred in writing the selection of the conditions to be applied.

1. Demonstrate that adequate suitable habitat already exists (either occupied or not) within Preserve Area to justify coverage. Such habitat must be biologically viable to support the species.
2. Acquire additional habitat with known species' occurrences or the potential to support the species with suitable occupiable habitat. Suitable habitat should have enhancement or restoration potential and should be biologically viable for the species' persistence. Such habitat must be added to the Plan's Preserve Area and managed and monitored in perpetuity consistent with this Plan.
3. Restore and/or enhance habitat within the Plan Area's existing mitigation lands within the Preserve Area, where appropriate. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
4. Contribute funds to other regional conservation efforts or species-specific management programs.
5. Implement a biologically superior conservation alternative for the species at appropriate locations within the Plan Area.
6. Propagate species for reintroduction and/or introduction into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.
7. Salvage and relocate species into suitable, occupiable habitat in accordance with a Wildlife Agency-approved restoration and monitoring program.
8. Purchase mitigation bank credits within established mitigation banks that support and provide active management for the species.

6.2.3 Plant Species

Table 6-2 lists the covered plant species, along with a summary of the species' status. The sensitive plant list includes state and federal status, as well as sensitivity according to CNPS (2001). Plant species that have special conservation and avoidance requirements under this Plan because they are narrow endemic and/or vernal pool species are listed in Table 6-3. Species-specific avoidance, minimization, and compensation measures for covered plant species are outlined in Appendix B.

Designated and/or proposed critical habitat, as defined by USFWS for the following listed covered plant species, is mapped within the Plan Area: San Diego thornmint, Otay tarplant, spreading navarettia, San Diego ambrosia, willowy monardella, and thread-leaved brodiaea. Although there is designated critical habitat for Munz's onion – a Major Amendment Species – none occurs within the Plan Area or PIZ. The potential impacts to and conservation of these Covered Species' critical habitat is discussed in the species accounts in Appendix B. In addition, Orcutt grass is found predominantly within the Major Amendment Area in Riverside County. Because of this, it is a Major Amendment Species. Take of these two species would occur through a Major Amendment that is approved for a project that affects these species.

6.2.4 Wildlife Species

Table 6-4 lists the covered wildlife species, including a summary of the species status. The sensitive wildlife list includes state and federal status according to USFWS (USFWS 2006a) and CDFG (State of California 2000, 2006a, 2006b, 2007a, and 2007b). Animal species that have special conservation and avoidance requirements under this Plan because they are narrow endemic and/or vernal pool species are listed in Table 6-3. Species-specific avoidance, minimization, and compensation measures for covered wildlife species are outlined in Appendix B.

Designated and/or proposed critical habitat, as defined by USFWS, for the following listed covered wildlife species, is mapped within the Plan Area: San Diego fairy shrimp, Riverside fairy shrimp, quino checkerspot butterfly, arroyo toad (re-proposed only), coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher. The potential for Water Authority projects to impact one or more designated or proposed critical habitat areas is discussed in the Covered Species' accounts in Appendix B. Impacts to and conservation of Covered Species critical habitat is discussed in the species accounts (see Appendix B). Although there is critical habitat for the vernal pool fairy shrimp, there is no critical habitat within the Plan Area.

In addition, because vernal pool fairy shrimp is found predominantly within the Major Amendment Area, this species is a Major Amendment Species. Take of this species

**TABLE 6-2
COVERED PLANT SPECIES**

Scientific Name	Common Name	Federal/State Status	CNPS List	Plan Policies	Occurrence		
					Survey Area	PIZ	Preserve Area**
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint	CE/FT/CH	1B	NE	K	K	P
<i>Adolphia californica</i>	California adolphia	-/-	2	--	K	K	K
<i>Ambrosia pumila</i>	San Diego ambrosia	-/FE/CH	1B	NE	K	K	NP
<i>Baccharis vanessae</i>	Encinitas baccharis	CE/FT	1B	NE	K	K	NK
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea	CE/FT/CH	1B	NE, VP	K	K	NP
<i>Brodiaea orcuttii</i>	Orcutt's brodiaea	-/-	1B	--	K	K	NP
<i>Calochortus dunnii</i>	Dunn's mariposa lily	CR/-	1B	NE	K	N	P
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	-/-	1B	NE	K	K	K
<i>Centromadia parryi</i> ssp. <i>australis</i>	Southern tarplant	-/-	1B	--	K	N	N
<i>Centromadia pungens</i> ssp. <i>laevis</i>	Smooth tarplant	-/-	1B	--	K	K	N
<i>Deinandra conjugens</i>	Otay tarplant	CE/FT/CH	1B	NE	K	K	K
<i>Dudleya variegata</i>	Variegated dudleya	-/-	1B	NE	K	K	K
<i>Dudleya viscida</i>	Sticky-leaved dudleya	-/-	1B	--	K	K	N
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery	CE/FE	1B	NE, VP	K	K	N
<i>Ferocactus viridescens</i>	San Diego barrel cactus	-/-	2	--	K	K	K
<i>Iva hayesiana</i>	San Diego marsh-elder	-/-	2	--	K	K	K
<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved monardella	-/-	1B	NE	K	K	N
<i>Monardella viminea</i>	Willow monardella	CE/FE/CH	1B	NE	K	K	N
<i>Muilla clevelandii</i>	San Diego goldenstar	-/-	1B	--	K	K	K
<i>Navarretia fossalis</i>	Spreading navarretia	-/FT/CH	1B	NE, VP	K	K	N
<i>Nolina cismontana</i>	Chaparral nolina	-/-	1B	--	K	K	N

**TABLE 6-2
COVERED PLANT SPECIES (continued)**

Scientific Name	Common Name	Federal/State Status	CNPS List	Plan Policies	Occurrence		
					Survey Area	PIZ	Preserve Area**
<i>Pogogyne abramsii</i>	San Diego mesa mint	CE/FE	1B	NE, VP	K	K	N
<i>Pogogyne nudiuscula</i>	Otay Mesa mint	CE/FE	1B	NE, VP	K	N	N
<i>Quercus dumosa</i>	Nuttall's scrub oak	-/-	1B	--	K	K	N
<i>Salvia munzii</i>	Munz's sage	-/-	2	--	K	P	K
<i>Tetracoccus dioicus</i>	Parry's tetracoccus	-/-	1B	--	K	K	P

California Native Plant Society (CNPS) Lists

- 1B = Species rare, threatened, or endangered in California and elsewhere.
 2 = Species rare, threatened, or endangered in California, but more common elsewhere.
 3 = Species for which more information is needed (a review list).
 4 = A watch list of species of limited distribution.

Federal and State Listed Plants

- FE = Federally listed, endangered
 FT = Federally listed, threatened
 FC = Federal Candidate for listing
 CH = Critical Habitat
 CE = State listed, endangered
 CT = State listed, threatened
 CR = State listed, rare

Plan Policies

- NE = Narrow Endemic Policy
 VP = Vernal Pool Protection Policy

Occurrence

- K = Known to occur
 N = Not known to occur
 P = Potential to occur

‡ Covered Species not subject to take.

** Refer to species-specific Conservation Analysis in Appendix B for details on potential habitat locations in Survey Area, PIZ, and Preserve Area.

TABLE 6-3
SPECIES COVERED BY THE NARROW ENDEMIC POLICY AND/OR VERNAL POOL POLICY

Scientific Name	Common Name	Narrow Endemic Policy	Vernal Pool Protection Policy
Plants			
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint	*	
<i>Allium munzii</i>	Munz's onion [†]	*	
<i>Ambrosia pumila</i>	San Diego ambrosia	*	
<i>Baccharis vanessae</i>	Encinitas baccharis	*	
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea	*	*
<i>Calochortus dunnii</i>	Dunn's mariposa lily	*	
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	*	
<i>Deinandra conjugens</i>	Otay Tarplant	*	
<i>Dudleya variegata</i>	Variiegated dudleya	*	
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery	*	*
<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved monardella	*	
<i>Monardella linioides</i> ssp. <i>viminea</i>	Willowy monardella	*	
<i>Navarretia fossalis</i>	Spreading navarretia	*	*
<i>Orcuttia californica</i>	California Orcutt grass [†]	*	*
<i>Pogogyne abramsii</i>	San Diego mesa mint	*	*
<i>Pogogyne nudiuscula</i>	Otay mesa mint	*	*
Wildlife			
<i>Branchinecta lynchi</i>	Vernal Pool fairy shrimp [†]		*
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp	*	*
<i>Campylorhynchus brunneicapillus sandiegonensis</i>	San Diego cactus wren	*	
<i>Euphyes vestris harbisoni</i>	Harbison's dun skipper	*	
<i>Spea hammondi</i>	Western spadefoot toad		*
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp	*	*

SOURCE: City of San Diego 1997, RCIP 2003

[†]Major Amendment Species

**TABLE 6-4
COVERED WILDLIFE SPECIES**

Scientific Name	Common Name	Federal/State Status	Plan Policies	Occurrence		
				Survey Area	PIZ	Preserve Area**
Invertebrates						
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	FT, CH	VP	K	N	N
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp	FE, CH	NE, VP	K	K	P
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	FE, CH	--	K	K	K
<i>Euphyes vestris harbisoni</i>	Harbison's dun skipper	*	NE	P	P	P
<i>Lycaena hermes</i>	Hermes copper butterfly	*	--	K	P	K
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp	FE, CH	NE, VP	K	N	N
Amphibians						
<i>Anaxyrus (= Bufo) californicus</i>	Arroyo toad	FE, CSC, CH	--	K	K	K
<i>Spea hammondi</i>	Western spadefoot toad	CSC	VP	K	K	K
Reptiles						
<i>Actinemys marmorata pallida</i>	Southern Pacific (southwestern) pond turtle	CSC	--	K	K	P
<i>Aspidoscelis hyperythra beldingi</i>	Belding's orange-throated whiptail	CSC	--	K	K	K
<i>Aspidoscelis tigris stejnegeri</i>	Coastal (western) whiptail	*	--	K	K	K
<i>Coleonyx variegatus abbottii</i>	San Diego banded gecko	*	--	P	N	P
<i>Crotalus ruber ruber</i>	(Northern) red-diamond rattlesnake	CSC	--	K	K	K
<i>Diadophis punctatus similis</i>	San Diego ring-neck snake	*	--	K	K	K
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink	CSC	--	K	P	K
<i>Lichanura trivirgata roseofusca</i>	Coastal rosy boa	*	--	K	N	K
<i>Phrynosoma coronatum blainvillii</i>	Coast (San Diego) horned lizard	CSC, *	--	K	K	K
Birds						
<i>Agelaius tricolor</i>	Tricolored blackbird	CSC	--	K	N	K

**TABLE 6-4
COVERED WILDLIFE SPECIES
(continued)**

Scientific Name	Common Name	Federal/State Status	Plan Policies	Occurrence		
				Survey Area	PIZ	Preserve Area**
<i>Aimophila ruficeps canescens</i>	Southern California rufous-crowned sparrow	*	--	K	K	K
<i>Ammodramus savannarum</i>	Grasshopper sparrow	CSC	--	P	N	K
<i>Amphispiza belli belli</i>	Bell's sage sparrow	*	--	K	K	K
<i>Athene cunicularia hypugaea</i>	Western burrowing owl	CSC	--	K	K	N
<i>Campylorhynchus brunneicapillus sandiegensis</i>	San Diego cactus wren	CSC, *	NE	K	K	K
<i>Dendroica petechia brewsteri</i>	Yellow warbler	CSC	--	K	P	K
<i>Empidonax traillii eximius</i>	Southwestern willow flycatcher	FE, CE, CH	--	K	P	N
<i>Eremophila alpestris californica</i>	California horned lark	CSC	--	K	P	K
<i>Icteria virens</i>	Yellow-breasted chat	CSC	--	K	K	K
<i>Lanius ludovicianus</i>	Loggerhead shrike	CSC	--	P	N	K
<i>Polioptila californica californica</i>	Coastal California gnatcatcher	FT, CH, CSC	--	K	K	K
<i>Vireo bellii pusillus</i>	Least Bell's vireo	FE, CE, CH	--	K	K	P
Mammals						
<i>Chaetodipus californicus femoralis</i>	Dulzura (California) pocket mouse	CSC	--	K	K	K
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse	CSC	--	K	K	K
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat	FE, CT	--	K	K	N
<i>Felis concolor</i>	Mountain lion	*	--	P	P	K
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit	CSC	--	K	K	K
<i>Neotoma lepida intermedia</i>	San Diego desert woodrat	CSC	--	K	K	K
<i>Onychomys torridus ramona</i>	Southern grasshopper mouse	CSC	--	P	N	P

**TABLE 6-4
COVERED WILDLIFE SPECIES (continued)**

Scientific Name	Common Name	Federal/State Status	Plan Policies	Occurrence		
				Survey Area	PIZ	Preserve Area**
<i>Perognathus longimembris brevinasus</i>	Los Angeles pocket mouse	CSC	--	K	K	N

Listed/Proposed

FE = Federally listed, endangered
 FT = Federally listed, threatened
 CH = Critical Habitat
 CE = State-listed, endangered
 CT = State-listed, threatened

Other

CFP = California Fully Protected Species. No take of individuals is permitted.
 CSC = CDFG Species of Special Concern
 * = Taxa listed with an asterisk fall into one or more of the following categories:

- Taxa considered under Section 15380(d) of CEQA guidelines.
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range
- Population(s) in California that may be peripheral to the major portion of a taxon's range, but which are threatened with extirpation within California.
- Taxa closely associated with a habitat that is declining in California. (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands).

Plan Policies

NE = Narrow Endemic Policy
 VP = Vernal Pool Protection Policy

Occurrence

K = Known to occur
 N = Not known to occur
 P = Potential to occur

Major Amendment Species

** Refer to species-specific Conservation Analysis in Appendix B for details on potential habitat locations in Survey Area, PIZ, and Preserve Area.

would occur through a Major Amendment that is approved for a project that affects this species.

6.2.5 Species Not Currently Covered Under the Plan

Listed species not covered by this Plan will continue to be regulated under the ESA and CESA. Take of listed species can be authorized separately from this Plan under section 7 or section 10 of the ESA, and take exceptions under Section 2081 of the Fish and Game Code. Impacts to species not covered under this Plan can also be addressed through the Plan and Permit Amendment process described in Section 8.0. Adding species to the Covered Species list may involve additional mitigation including reprioritized management practices or habitat acquisition.

For the non-listed species occurring within the Plan Area that are not covered under this Plan, available information suggests that many are unlikely candidates for future listing by either state or federal agencies and were given lower priority for potential coverage in this Plan. Other species occur only within portions of the Plan Area that are not anticipated to be affected by Water Authority project work. Based on the available information on the biological and potential listing status of these species and their distributions relative to planned and future Covered Activities, these species are not addressed or covered by this Plan.

This Plan provides an initial analysis of 26 species in addition to the Covered Species (see Appendix B). Based on that analysis, the Water Authority determined that it would not seek coverage for those species. However, if additional information becomes available to warrant the Water Authority seeking coverage for one or more of these species, such as a species subsequently being proposed for listing, this Plan provides the basis for supplementing the species' assessment and conditions for coverage that would be augmented as part of an amendment to add the species to the Covered Species list (see Section 8.0).

6.3 Plan Implementation

This Plan requires that Covered Activities demonstrate compliance with the implementation commitments, in particular measures to avoid, minimize, and mitigate impacts. In addition, the Preserve Area properties will be managed and monitored to demonstrate that suitable conditions are maintained on those lands to support Covered Species. Avoidance and minimization of effects on Covered Species and their habitats will be implemented through a process to verify that construction and O&M Activities (Covered Activities) adhere to a set of protection measures. These measures address planning, construction, and maintenance phases. In addition, the Plan contains policies for protecting wetlands/vernal pools, narrow endemic species, and breeding birds.

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Unavoidable impacts will be mitigated by compliance with a set of habitat-based compensation criteria that reflect the biological significance of the impact and mitigation sites, as well as by meeting species-specific conditions. Finally, lands that are preserved for conserving Covered Species will be managed and monitored pursuant to guidelines specified in this Plan.

A verification process to ensure conformance with the Plan commitments will be prepared when a Covered Activity is proposed. The process will be overseen by Water Authority personnel who supervise the Plan. Key items to be discussed in the conformance verification are the following, which are described in detail in subsequent sections of this section and summarized below:

1. New construction or O&M Activities (Covered Activities) that has the potential to impact habitats that may support Covered Species will be required to assess the potential impacts and propose avoidance, minimization, and mitigation measures.
2. A Pre-activity Survey Form (PSF) will be completed for each Covered Activity that has the potential to impact habitat that may support Covered Species.
3. The PSF (and any associated CEQA document) will identify whether the Covered Activity is within a Biologically Significant Resource Area (BSRA) and why (or why not) the project site qualifies as a BSRA (see Section 6.5.1.4.1).
4. The proposed mitigation measures will comply with the BSRA determination and apply the appropriate mitigation ratios as specified in the Plan.
5. The Covered Activity will comply with this Plan's breeding bird season avoidance restrictions and narrow endemic species conservation and vernal pool policies.
6. All personnel involved in the on-site project implementation will be required to participate in a pre-construction training program to understand the avoidance, minimization, and mitigation obligations on the project.
7. The mitigation/conservation is consistent with the species-specific requirements in Appendix B to this Plan.
8. Any off-site mitigation is secured by obtaining credits from the approved HMAs, from approved conservation or mitigation banks within the Plan Area, by acquiring additional suitable habitat for the Covered Species and adding that habitat to the Preserve Area, or by providing a biologically superior alternative mitigation with the concurrence of the Wildlife Agencies.

6.4 Plan Minimization Measures

The measures listed below represent appropriate, environmentally-sound approaches to Water Authority construction, O&M Activities, and rights-of-way activities that will be implemented through this Plan to reduce effects to Covered Species and their habitats. These standard minimization measures will be applied to all activities covered by this Plan, as described below. The appropriate measures for an individual project will be identified and documented by an Environmental Surveyor. The Water Authority will provide oversight of all Environmental Surveyor activities and incorporate appropriate measures into the Covered Activities to ensure compliance with the Plan's requirements.

6.4.1 Environmental and Water Authority Personnel

The Water Authority will assign staff to administer and report on the Plan's implementation. In addition, all Water Authority personnel (and construction contractors) will be trained to ensure that the Plan commitments are adhered to as Covered Projects are planned and implemented. An Environmental Surveyor (which may be a Water Authority staff or a consultant) will oversee pre-project evaluations/needs of Covered Activities and work with the project engineer and contractors to ensure implementation compliance of Covered Activities with Plan commitments.

6.4.1.1 Environmental Surveyor

The Environmental Surveyor may be one or more firms or individuals retained by the Water Authority, or qualified Water Authority staff. An individual who is designated to function as an Environmental Surveyor is responsible for pre-activity surveys and determining the appropriate minimization measures (e.g., flagging sensitive zones and habitats) prior to the commencement of construction or O&M Activities. An Environmental Surveyor will have a B.S. or B.A. degree in wildlife management, ecology, zoology, botany, biology, or a similar degree, at least two years of field experience in southern California, knowledge of any sensitive species or habitats that may be impacted, and, if undertaking surveys that could result in take of any federally or state-listed species, will possess appropriate section 10(a)(1)(A) recovery permits or state permits/memoranda to conduct such surveys. Qualifications and selection of an Environmental Surveyor for any given individual project will be approved by the Water Authority. More than one Environmental Surveyor may work on any particular project at any given time. The Environmental Surveyor will be responsible for, but not be limited to, the following activities:

1. If the Environmental Surveyor discovers that the Water Authority is out of compliance with the permits associated with this Plan, he/she will report the non-compliance to the Water Authority within one working day and to the Wildlife

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Agencies within five working days so that the Water Authority and Wildlife Agencies can determine how to put the Plan back into compliance.

2. Before any clearing and/or construction activities are performed in habitat areas that may support Covered Species, the Environmental Surveyor will review the site, identify any sensitive plant and animal species, and identify requirements pursuant to the Plan for impact avoidance and minimization. A standard PSF will be prepared for each project and submitted to the Water Authority for review and tracking purposes. The PSF is described in Section 6.4.1.2 below, and a copy of the form is included as Appendix F.
3. The Environmental Surveyor will determine the extent of potential Covered Species habitat and will flag the sensitive resources to be avoided. If a Covered Species is present, the Environmental Surveyor will refer to Appendix B for species-specific conservation measures. In the case of unavoidable impacts to a Covered Species, the Environmental Surveyor will determine the extent of impact, the appropriate mitigation measures, and recommend to the project engineer additional measures to minimize impacts in accordance with Appendix B.
4. The Environmental Surveyor will work with the project engineer to identify and mark areas appropriate for staging and temporary equipment storage, placement of heavy machinery, as well as vehicle turn around and access, that will result in the least amount of impact to sensitive vegetation and/or Covered Species. The Environmental Surveyor will verify that all areas specified on the plans to be avoided are marked with flagging in the field prior to construction start.
5. The Environmental Surveyor will attend pre-construction meetings for projects in sensitive areas. The Environmental Surveyor will provide brief presentations to field staff, as needed, to familiarize field personnel with the natural resources to be protected and avoid on project sites and outline environmental expectations. The Environmental Surveyor will also be available to answer questions and address any last-minute construction changes.
6. The Environmental Surveyor will be present during clearing, topsoil salvage, and construction activities located within sensitive habitat. The frequency and duration of required monitoring will be specified in the PSF that is completed by the Environmental Surveyor and submitted to the Water Authority on a project-by-project basis prior to the start of construction.
7. The Environmental Surveyor will advise the construction manager during construction to ensure compliance with all avoidance, minimization, and mitigation measures (see Section 6.5 for mitigation measures).

8. The Environmental Surveyor will conduct (and document) monitoring as required by the PSF. At the completion of the Covered Activity, the Environmental Surveyor will prepare a brief report to verify compliance with the avoidance and minimization recommendations in the PSF. This report will include documentation that the flagged areas were avoided and that minimization measures were properly implemented. The Environmental Surveyor will be responsible for the identification and monitoring of any Covered Species that are found on the project site prior to and during construction activities. Monitoring activities will be in accordance with the species-specific measures (see Appendix B).
9. If any previously unidentified Covered Species or otherwise sensitive species, nests, dens, or burrows are located on a project site during construction activities, the Environmental Surveyor will provide guidance, through the construction manager, as to how best to minimize or avoid impacting the resource(s).
10. The Environmental Surveyor will be on-call (via phone) to respond within 24 hours for potential emergency deployment to assess and monitor potentially critical biological issues.
11. If the Environmental Surveyor determines that the Covered Activity is out of compliance with the requirements of the Plan, the Environmental Surveyor will report it to the Water Authority. The Water Authority will be responsible for bringing the project back into compliance and determine the appropriate remedial action, if necessary, through coordination with the Wildlife Agencies.
12. The Environmental Surveyor or construction manager will be responsible for ensuring the removal of all habitat flagging from the construction site at completion of work.
13. If included in the PSF, the Environmental Surveyor will direct the relocation of Covered Species that can be moved from harm's way in coordination with the species-specific Conditions of Coverage in Appendix B (in non-emergency situations) with notification to the Wildlife Agencies.

6.4.1.2 Pre-Activity Survey Form (PSF)

To ensure all Water Authority Covered Activities comply with the Plan, an Environmental Surveyor must survey the project area for sensitive biological resources within 30 days prior to initiation of ground disturbing activities for new construction and O&M and complete a PSF (Appendix F). PSFs are the Plan's primary tool and documentation for Covered Activities that have statutory or categorical exemption from CEQA. For Covered Activities not exempt from CEQA, a Mitigation, Monitoring and Reporting Plan

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(MMRP) is required to be prepared (California Code of Regulations, Title 14, Chapter 3, Section 15097). Project design features (e.g., Water Authority “General Conditions and Standard Specifications, 2005”), CEQA mitigation measures, and Permit conditions will be compiled into a single plan to track all project activities/requirements. PSFs do not replace or substitute for a required MMRP. The PSF prepared for a Covered Activity that does not require an MMRP will include the following information and timing considerations:

1. The PSF will include avoidance, minimization, and mitigation requirements based on the general measures outlined in this section and the species-specific conditions in Appendix B. USFWS biological survey protocols performed by qualified and appropriately authorized personnel will be conducted where appropriate and required.
2. The PSF will be reviewed by designated Water Authority staff. The Water Authority will summarize information in the required annual monitoring report, a copy of which will be sent to the Wildlife Agencies in accordance with annual reporting requirements (see Section 6.12).
3. The pre-activity survey is valid for 30 days unless the project is scheduled to begin during the avian breeding season, in which case the nesting bird clearance must be conducted within five days of project implementation (Section 6.4.2.1). If ground disturbance activities have not commenced within 30 days after the survey is completed, the Environmental Surveyor will conduct a verification survey to confirm that biological conditions have not significantly changed that would alter the specified avoidance, minimization and mitigation commitments prior to construction.
4. As soon as the pre-activity survey is completed and the PSF approved, the Water Authority’s project may proceed during this 30-day period (subject to the conditions in #3 above) as long as it is in compliance with this Plan, and the terms and conditions outlined in the associated state and federal Permits and IA.

When a PSF is prepared for a project that has an MMRP, the PSF will be used to compare the biological baseline presented in the CEQA document with the pre-construction biological condition. The Environmental Surveyor will confirm the location of sensitive biological resources and that the MMRP addresses current conditions. If a significant change has occurred, the PSF will address:

1. A description of the significant change compared to the CEQA document’s biological conditions.

2. Identify whether the MMRP requirements would achieve compliance with the Plan's commitments and if not, what measures must be added to the MMRP to ensure compliance.

The designated Water Authority staff will review the PSF and any recommended measures to ensure Plan compliance. The Water Authority will summarize information in the required annual report, which will be provided to the Wildlife Agencies (Section 6.12).

6.4.1.3 Field Personnel Education Training

Field personnel working within sensitive habitat areas, including both Water Authority employees and contractors, will participate in an education training program at the start of each project. The program will be conducted on-site by an Environmental Surveyor under the direction of the Water Authority. The training will include: an overview of Covered Species identification and the legal protections afforded to each species; a brief discussion of their biology; habitat requirements; status under ESA and CESA; conservation measures being taken by the project for the protection of the Covered Species and their habitats under this Plan; and penalties for non-compliance.

The training program will also educate field personnel in the identification of invasive species that may be removed, as well as desirable seeded and planted species, to ensure that native species are not affected by invasive species control. A fact sheet conveying this information will also be available to all personnel working in the project area. The Water Authority, either directly or through the services of the Environmental Surveyor, will be responsible for the education and training for new field personnel coming on-site after the start of a project.

6.4.1.4 Field Personnel (and Contractor) Responsibilities

1. Contractors or other project personnel will not collect plants or wildlife, unless specifically authorized and directed by the Environmental Surveyor. Only qualified and appropriately authorized personnel will handle or collect plants or wildlife as required by species-specific measures (see Appendix B).
2. Field personnel will not intentionally harm or harass wildlife or damage nests, burrows, rock outcrops, or other habitat components.
3. Drivers on unpaved roads in native habitats will not exceed a speed of 20 miles per hour in order to avoid injury to animals and minimize dust generation.
4. Impacts to adjacent native vegetation that would be significantly affected by excessive fugitive dust will be avoided and minimized through watering of access roads (except in areas with vernal pools) or other appropriate measures, such as

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reducing the number or speed of vehicles or adding inert materials that reduce dust. Projects with the potential for excessive dust generation include those that involve more than occasional use of roads in dust-prone soils (i.e., more than three to five vehicle roundtrips per day) or require multiple vehicles to transport heavy equipment and supplies.

5. Vehicles will not park in areas where catalytic converters may ignite vegetation. Construction vehicles will be equipped with shovels and fire extinguishers in order to reduce the risk of wildfires.
6. Littering will be strictly prohibited. All trash will be deposited in secured, closed containers or hauled out daily by field personnel.
7. No pets will be allowed on any construction site.
8. No firearms or other weapons will be allowed on any construction site except as carried by governmental law enforcement, or as authorized in writing by Water Authority staff.
9. Field personnel will be prohibited from pushing or dumping soil and brush into sensitive habitats.
10. All vehicles, tools, and machinery will be restricted to access roads, approved staging areas, or within designated construction zones.
11. If any field personnel identify a previously unnoticed Covered Species on a construction site, work activities will cease in order to immediately notify the Water Authority's construction manager, project engineer, and the Environmental Surveyor. In conjunction with Water Authority environmental staff, the Environmental Surveyor will determine what actions would be taken to avoid or minimize impacts to the species according to the species-specific conditions outlined in Appendix B.
12. Field personnel will notify the project engineer/environmental staff of any sick, injured, or dead wildlife found on site.
13. Parking or driving underneath oak trees, except in established traffic areas, will not be allowed in order to protect root structures.

6.4.2 Protection Measures during Project Development and Construction

This section outlines the avoidance and minimization protocols for project development and construction activities. All field personnel will adhere to all the following measures for any covered construction activities. Project-specific minimization and mitigation

measures will be outlined within the CEQA document prepared for the project as well as the PSF.

6.4.2.1 Planning and Coordination

1. When sensitive biological resources or approved preserves are affected by a new project, the Water Authority will coordinate with the Wildlife Agencies during the early phase of project planning. This coordination is designed to identify any specific concerns and potential alternatives, and to collect information regarding potential Covered Activities that may affect Water Authority planning and decision making. This coordination will occur prior to, or as part of, the issuance of public notices pursuant to CEQA.
2. The Water Authority will design facility and alignment alternatives to achieve desired resource goals at the beginning of the planning process. This maximizes opportunities to avoid and/or minimize biological impacts associated with project development.
3. The Water Authority will incorporate design features that minimize impacts to Covered Species from night lighting, noise, and vehicle speed. Examples of these measures could include, but are not limited to: provision of animal passage over or around trenches, erection of exclusion or noise barriers for some species, directed lighting away from adjacent habitat areas, and rescue of animals in the work area (by a permitted biologist if a listed species is involved).
4. When crossing through a sensitive habitat or an established preserve, the most direct, least damaging, feasible alignment will be used to minimize disturbance in these areas.
5. To protect all covered avian species, vegetation clearing will be performed generally outside of the nesting and breeding seasons of bird species to comply with the requirements of the MBTA, BEPA, and Fish and Game Code Section 3513, or specific state or federal permits, unless otherwise specified in Appendix B. Breeding season dates may be modified to reflect the species known or expected to occur on the specific site. The following general breeding season dates shall be used: January 15 to July 31 for raptor species; March 15 to September 15 for riparian species; and February 15 to August 15 for upland species. For least Bell's vireo, noise levels at the nest will be restricted to less than 60 dB(A) $L_{eq(1)}$ or the ambient noise level plus three decibels (perceptible change threshold), whichever is greater. Conditions imposed to authorize clearing work during the nesting and breeding season will include, but are not limited to, pre-construction surveys to document absence of nesting birds, buffers around active nests (as identified for a Covered Species in Appendix B or determined by the Environmental Surveyor if no specific buffer is specified), and

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construction beginning prior to nesting/breeding season and continuing into that period (see Section 2.3 of Appendix B for Avian Breeding Season Policy).

Construction that starts prior to the breeding season and continues uninterrupted and at the same intensity into the breeding season will minimize potential for birds to move into areas adjacent to construction areas. If birds move into areas adjacent to construction areas during construction, it is expected that the project's indirect construction activities will not substantially affect those individuals. However, in such circumstances, the Environmental Surveyor will monitor and document continued nesting activity; if the Environmental Surveyor determines that nesting is being negatively affected and may cause nesting abandonment/failure, additional protection measures will be implemented and the Water Authority will summarize the results in the annual report. A breeding season survey may begin up to 10 days prior to the planned disturbance, and at least one survey will be completed within five days of planned disturbance (minimum of one survey is required within five days of impacts). If relevant to the site, other species' breeding season conditions will be included. The PSF prepared by the Environmental Surveyor would include all appropriate conditions. When Covered Activities must occur during the breeding season, or at such time or manner as may affect nesting birds, the Water Authority will consult with the Wildlife Agencies to review any issues prior to project initiation.

6. Narrow endemic species are species that are considered to have highly restrictive habitat requirements, localized soil requirements, other ecological factors, and limited but important populations within the Plan Area (see Table 6-3 and Appendix B). A substantial decrease in these populations or loss of their habitat may jeopardize the continued existence or recovery of that species within the Plan Area. The size of the population and extent of occupied habitat that could be impacted will be determined by the Environmental Surveyor.

Narrow endemic species' populations will be avoided to the maximum extent feasible. Unavoidable impacts to a narrow endemic population and occupied acreage will be minimized to the maximum extent practicable, and associated mitigation will be designed to meet a minimum 1:1 conservation ratio (e.g., by restoring/creating/expanding suitable habitat or reintroducing the species into unoccupied, suitable habitat) within the Preserve Area or other Wildlife Agency-approved mitigation sites. For new projects, the conservation objective will be to avoid at least 80 percent of the population. To the extent feasible, the Water Authority will attempt to achieve this level of conservation on existing Water Authority rights-of-way (including easements and fee-owned parcels). The rights-of-way have been previously impacted by construction activities and continue to be impacted by O&M Activities. Pre-activity surveys will be used to identify the location of narrow endemic populations to ensure that they are

avoided and protected. Mitigation will be designed to minimize adverse effects to species viability and to contribute to the biological objectives of the Plan.

6.4.2.2 Facility Siting

To the extent feasible:

- Facilities will be sited to avoid permanent disruption of wildlife movement corridors or habitat linkages;
- Facilities will be sited adjacent to and within an approved rights-of-way or other publicly-owned property;
- Project footprints for Facilities, including all temporary construction related areas (e.g., staging areas), will be restricted to existing developed or disturbed habitats;
- Facilities will be located to use existing access roads to limit the need for new access roads;
- Facilities will be set back from riparian corridors a minimum of 100 feet from the edge of riparian vegetation to avoid any adverse direct or indirect impacts to these areas.

6.4.2.3 Pipeline Siting

To the extent feasible, pipelines and minor support facilities (e.g., blow-off valves and valve vaults) will be placed in existing or future public rights-of-way, including streets, highways, utility corridors, or other publicly owned properties, to minimize impacts to native habitat.

6.4.2.4 Existing Pipeline Relining

1. Where habitat for Covered Species occurs, pre-activity surveys and appropriate USFWS protocol surveys (for listed species for which protocols have been written) will be conducted in accordance with species-specific measures outlined in Appendix B.
2. Portals will be located within disturbed or developed areas, and away from habitat occupied by Covered Species to the extent feasible.
3. Project construction will be initiated outside the Covered Species breeding seasons (as explained in Section 6.4.2.1), including vegetation removal or other habitat modifications. If construction must occur during the breeding season (e.g., due to water system operational constraints, amount of pipeline to be

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relined, and pipeline condition), a pre-construction nesting survey will be conducted to assess the potential for direct impacts to nests/breeding sites and/or indirect noise effects. Conditions that may be imposed on the activity are described in Section 6.4.2.1 and in the species-specific Conditions for Coverage (see Appendix B).

4. If Covered Activities need to occur during the breeding season, an Environmental Surveyor will evaluate the need for noise walls or other feasible noise reduction measures to reduce construction noise levels. The PSF will specify the appropriate noise minimization requirements. For least Bell's vireo nesting sites, noise levels at the nest will be restricted to less than 60 dB(A) $L_{eq(1)}$ or the ambient noise level plus three decibels (perceptible change threshold), whichever is greater. If noise cannot be kept below 60 dB(A) $L_{eq(1)}$, construction will cease until nests have fledged or failed (as determined by the Environmental Surveyor).
5. The PSF will specify the appropriate sound minimization techniques, possibly including activity setbacks/buffers, temporary noise barriers, limited hours of work, etc.

6.4.2.5 Design and Construction Controls

1. Projects will be designed to avoid and minimize impacts to biological resources, to the extent feasible.
2. Construction and operation activities will be designed and implemented to avoid and minimize new disturbance, erosion on manufactured and other slopes, and off-site degradation from sedimentation.
3. Storage and staging areas will be located in disturbed areas or within the least biologically sensitive areas established by the Environmental Surveyor. No filling, excavating, trenching, or stockpiling of materials will be permitted outside of the approved construction footprint, unless the area to be used is already disturbed and does not support habitat for Covered Species.
4. Construction footprints will be delineated in the construction documents. In addition, if the construction footprint is located within or near sensitive habitat, the project footprint will be fenced or continuously flagged with streamers or a boundary rope barrier to ensure that habitat is not removed beyond the limits of work. These barriers will be established prior to any grading, grubbing, or clearing, and will be monitored by the Environmental Surveyor.
5. Projects will be refined, where possible, during the engineering and construction phases to further avoid and minimize impacts to Covered Species or their

habitat through seasonal timing of work, minor realignments, and narrowing of construction limits.

6. Clearing and grubbing will be performed within the construction areas only as necessary for safe vehicle movement and construction activities.

6.4.2.6 Stormwater Best Management Practices

Prior to the start of ground disturbing activities, the Water Authority or their consultants will prepare a Storm Water Pollution Prevention Plan (SWPPP) to reduce or eliminate pollutants during and after construction. The most current and applicable Best Management Practices (BMPs) will be implemented at all construction sites in or adjacent to native habitat in accordance with the approved Water Authority's General Conditions and Standard Specifications manual, including, but not limited to, Sections 02140 Dewatering, 02270 Temporary Erosion Control, and 02940 Revegetation. In addition to the approved manual, BMPs listed in the most recent National Pollutant Discharge Elimination System (NPDES) General Permit and the BMP Fact Sheet located in State Water Resources Control Board (SWRCB) General Permit for Small Linear Underground/Overhead Projects will apply. The fact sheet is attached as an Appendix G and the SWRCB or RWQCB will be contacted for the latest requirements.

In addition to the above resources, which are used during the preparation of a site-specific SWPPP for each project, typical design features identified in a site-specific SWPPP may include, but are not limited to:

1. Identification all pollutant sources, including sources of sediment that may affect the quality of storm water discharges associated with construction activity (e.g., storm water discharges from the construction site); non-storm water discharges; structural and/or treatment control BMPs that are to be implemented in accordance with a time schedule to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction; and a maintenance schedule for permanent or post-construction BMPs that will, to the maximum extent possible, reduce or eliminate pollutants after construction is completed.
2. Implementation of a detailed, site-specific BMP to prevent hazardous materials impacts to water quality will be included in the project SWPPP.
3. Conformance by the grading/construction contractor with all applicable NPDES General Groundwater Extraction and Waste Discharge Permit criteria prior to disposal of extracted ground water.

All SWPPP prepared for Water Authority activities will conform to the latest RWQCB requirements.

6.4.2.7 New Access Roads

1. New access roads will be sited in previously disturbed areas, or in the least biologically sensitive areas that require the least amount of construction grading, whenever feasible in order to avoid and minimize impacts to Covered Species.
2. New access roads will be constructed outside of the avian or other Covered Species' breeding seasons, to the extent feasible. In the event construction is unavoidable during the breeding seasons, the Environmental Surveyor will determine the presence or absence of nesting or breeding Covered Species, and the appropriate protection and minimization recommendations will be followed (as identified in Appendix B).
3. New access roads will be constructed to avoid or minimize impacts to streambeds, rivers, or other waterways, to the extent feasible. In addition, construction will comply with applicable CDFG, USACE, and RWQCB regulations and policies independent of the requirements of this Plan (see also Section 6.6). This Plan does provide for a streamlining process to address the CDFG requirements (see Section 6.7.2).

6.4.2.8 Clean-up

Refuse and trash will be regularly removed from activity sites and disposed of in a lawful manner. Timing of refuse and trash removal will be determined by the Environmental Surveyor and comply with the Water Authority's Standard Specifications (Section 01560-Temporary Controls) that require debris to be removed as work is completed. Petroleum products, including gasoline, diesel, and hydraulic fluid, will be used during construction in accordance with all federal, state, and local laws, regulations, and permitting requirements. In the event that hazardous materials are encountered or generated during construction, contractors certified by the responsible regulatory agency will conduct all recovery operations and dispose of hazardous waste in accordance with existing regulations and required permits. As required, petroleum products, trash, and other materials will be taken to a disposal facility authorized to accept such materials.

6.4.3 Protection Measures during Operations and Maintenance (O&M) Activities

Some O&M Activities (described below) have the potential to impact sensitive habitats and Covered Species. These activities will be conducted in a manner that avoids and/or minimizes impacts to sensitive resources, primarily by staying within the limits of existing disturbance. If the O&M Activity will require impacts beyond the existing limits of disturbance, the activity will be located away from sensitive resources and ground disturbance will be minimized. The Water Authority and Environmental Surveyor will include in the PSF the relevant protective measures (based on the conditions described

in the subsections below), which Operation and Maintenance staff or contractors will follow. A PSF will be prepared for all activities that have the potential to impact Covered Species or their habitat, especially projects that involve new disturbance, occur within/adjacent to a known Covered Species location, or occur during the breeding season in habitat that supports a Covered Species.

6.4.3.1 Weeding and Mowing

1. Weeding and mowing activities for fuel management generally require a mower, mechanical brusher, weed-whacker, or hand clipping. Mowing is typically conducted from September 1 to January 31, which is mostly outside of the avian breeding season. If weeding and mowing activities must occur during the avian breeding season, at least one pre-construction nesting survey will be conducted by the Environmental Surveyor no more than five days prior to clearing activities to determine potential impacts to nesting birds. If weeding and mowing must occur in such a time or manner as may affect nesting birds, the Water Authority shall consult with the Wildlife Agencies to review any issues prior to project initiation.
2. Isolated facilities surrounded by high fuel volume and that are located in sensitive habitat will be selectively hand cleared or weed-whacked to avoid impacts to sensitive habitats or Covered Species, consistent with the San Diego County Fire Chief's Association (1997 or more recent versions) Wildland/Urban Interface Development Standards.
3. Herbicides used to control vegetation will be applied per applicable federal, state, and local regulations and label directions/restrictions (see Section 5.5).
4. Herbicide use as part of O&M Activities within areas of native vegetation will be applied to avoid non-target exposure.
5. Power spray application of herbicides will not be used within 50 feet of any covered plant species population. Hand application may be performed in these areas.

6.4.3.2 Clearing and Grubbing

To the extent feasible, crushing or mowing of vegetation will be substituted for clearing or grubbing activities. Crushed vegetation is more likely to return to its natural state faster and more completely than cleared vegetation. Crushing may also reduce the need to reseed some areas.

6.4.3.3 Fire Protection

1. Fuel management around existing facilities will be conducted in accordance with local fire department requirements, consistent with the San Diego County Fire Chief's Association (1997 or more recent versions) Wildland/Urban Interface Development Standards. The minimum distance required to adequately protect structures against fires will be determined by local regulations/guidelines and refined during project design and marked prior to any vegetation clearing. To the extent feasible, fuel management will be scheduled occur outside the avian breeding season.
2. The Environmental Surveyor will monitor clearing in areas with native vegetation and Covered Species to ensure compliance with the avian breeding season policy and specific Covered Species Conditions of Coverage.
3. Fuel management will occur around surface facilities to maintain a mowed strip between surface structures and upright vegetation, or as required by order of local fire departments. To the extent feasible, the Water Authority will maintain a 15-foot radius mowed area around all line structures. In locations where this is not feasible, the Water Authority will work with the landowner to clear a safe working area for the crews on at least three sides of the structure. The mowed strip will allow a valve service truck to circle the structure. The mowed strip will also provide a safe and designated work area for field personnel.
4. Fuel management around facilities for fire protection will not be conducted during the avian nesting season (see Section 6.4.2.1). The Environmental Surveyor will conduct at least one pre-activity survey no more than five days prior to the initiation of clearing activities to ensure that the habitat contains no active nests, burrows, or dens of Covered Species. If active nests, burrows or other evidence of breeding are discovered, then the Environmental Surveyor shall notify the Water Authority environmental staff, who will notify the Wildlife Agencies so that an acceptable avoidance/minimization plan can be developed.

6.4.3.4 Drains and Drawdowns

1. Individual pipeline segments and associated facilities will typically be drained for routine internal inspection during low water demand periods, generally during the winter months. Water released from structures located at low points along the rights-of-way flows into adjacent natural or channelized drainages at rates engineered to avoid or minimize downstream erosion. In such areas, energy dissipating structures, rock riprap, or temporary erosion control measures will be installed to minimize habitat damage. Dechlorination occurs as necessary, based on testing, to current RWQCB discharge standards.

2. When water levels in surface reservoirs are lowered, the Water Authority may make an effort to control or manage vegetation growing within the reservoir or, at a minimum, clear vegetation that could be suitable for nesting outside of the avian breeding season (Section 6.4.2.1). Vegetation growing on the reservoir bottom may be allowed to remain and provide interim habitat value as long as no mitigation is required when reservoir is refilled. Vegetation that is occupied by active, nesting birds will not be removed or inundated by the artificial filling of the reservoir during the nesting season, except as described in Section 5.2.7 of the Plan.
3. Prior to conducting draindowns that release into streams or drainages reported to support arroyo toads (*Anaxyrus californicus*) and where breeding conditions have been identified down stream of the discharge point, surveys will be conducted during the arroyo toad breeding season (March 15 to July 31). If draindowns must occur in such a time or manner as may affect active breeding habitat, the Water Authority shall consult with the Wildlife Agencies to develop discharge flow and volume rates appropriate to the area.

6.4.3.5 Stream Crossing

1. Where required, the Water Authority will coordinate stream crossing maintenance with the CDFG, RWQCB, and USACE.
2. Where facilities cross streambeds and require maintenance and repair, water may be temporarily diverted around the construction area as long as natural drainage patterns are restored. All diversions will be planned (appropriate permits obtained, if necessary) and implemented in accordance with applicable regulations. Erosion control during construction, in the form of intermittent check dams and culverts, will be implemented to prevent alteration to natural drainage patterns and prevent siltation.

6.4.3.6 Erosion Control

1. Field personnel will conduct all construction, repair, and maintenance activities in a manner that will minimize erosion; avoid adverse impacts to adjacent sensitive habitats; and conform to the Water Authority's "General Conditions and Standard Specifications," Section 02270 for Temporary Erosion Control and Section 02940 for Revegetation.
2. The Environmental Surveyor will prepare a restoration plan that includes an appropriate native seed mix based on surrounding native vegetation and maintenance and monitoring schedules, prior to seeding in areas where erosion control is necessary.

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3. Supplemental planting of particular species of concern may be considered in areas where expansion of existing colonies is desired. However, care will be taken to avoid habitat conversion and impacts to extant native vegetation.
4. Construction areas located adjacent to native habitat may be reseeded with a mostly low-growing mix of non-dominant native erosion control species similar in composition to the surrounding vegetation. In construction areas surrounded by non-native landscaping, non-invasive, non-native cover crop species may be added to the native hydroseed mix. Exceptions to use non-native, non-invasive species may be made by the Environmental Surveyor in disturbed areas that have been landscaped with non-native species, or elsewhere with concurrence from the Wildlife Agencies.
5. Clean, weed-free straw mulch will be applied on all slopes that are at a 2:1 ratio (every two feet of horizontal change, there is a vertical change of one foot) or steeper promptly after seeding operations are complete. The straw will be applied at a rate of 4,000 pounds per acre, and then rolled into the surface with straw roller equipment where feasible. The straw will be rolled into the soil to a sufficient depth to tie down the surface soils. All straw mulch used adjacent to native habitats shall be weed-free.
6. Silt fences, sedimentation ponds, sand bag dikes, stabilized construction entrances, and any other erosion control measures will be installed by field personnel and checked by the Environmental Surveyor to prevent sediment from entering any adjacent lakes, streams, ponds, vernal pools, or drainages.
7. Erosion and sedimentation control measures will remain in place until the work site is prepared for permanent drainage and erosion control measures. While removing temporary erosion and sediment control measures, care will be taken to avoid damage to permanent drainage, erosion control, and restoration areas.

6.4.3.7 Tree Trimming and Removal

1. Tree trimming will be conducted to the extent necessary to conduct work. Tree removal will be avoided to the maximum extent practicable.
2. Tree removal or tree trimming during the general avian nesting season (see Section 6.4.2.1) may occur only after a survey (conducted within five days of the planned trimming) has determined that no active nests are present. If active bird nests are present, the tree with the nest may not be removed or trimmed until the nest fails or nestlings have fledged. In addition, the nest will be encompassed by an avoidance buffer consistent with Section 2.4 of Appendix B. The buffer will remain in place until the nestlings fledge or the nest fails. Removal of native

trees, such as coast live oaks, will be reviewed by the Water Authority on a case-by-case basis.

3. Any cuts or other tree damage as a result of trimming or construction will be appropriately treated, if necessary, to minimize damage to tree health.

6.4.3.8 Vehicle Operation

Vehicles will be kept on access roads to the maximum extent possible. A 20 miles per hour speed limit will be observed on unimproved dirt access roads to limit death or injury of wildlife species that may be present on the roadway and minimize dust generation. Vehicles must be turned around in established or designated areas only.

6.4.3.9 Cut and Fill Slopes

Maintenance of cut and fill slopes will consist primarily of erosion control. In situations where revegetation would improve the success of erosion control, planting or seeding with a locally native hydroseed mix may occur on slopes adjacent to native habitats. Exceptions to use non-native, non-invasive species may be made by the Environmental Surveyor in disturbed areas that have been landscaped with non-native species, or elsewhere with concurrence from the Wildlife Agencies.

6.4.3.10 Urgent Repairs

The majority of urgent repairs are performed during scheduled shutdown and inspection periods. An Environmental Surveyor will identify sensitive resource issues, as appropriate. All repairs qualifying as urgent will be conducted in accordance with this Plan, the Water Authority Urgent Repair Manual (Water Authority, September 2007), and the Integrated Contingency Plan (Water Authority September 2008), respectively.

6.4.3.11 Maintenance of Access Roads

Maintenance of access roads within rights-of-way will be designed to avoid or minimize disturbance and protect off-site areas from indirect effects (e.g., soil erosion and sedimentation). Routine maintenance of general rights-of-way typically includes visual inspections and minor servicing of existing valves/facilities. Routine patrol and inspection activities of the Water Authority do not result in impacts to habitat, as patrols utilize existing roadways. The following measures will be implemented to avoid and minimize impacts to Covered Species and their habitats:

1. Erosion will be minimized on access roads and other locations primarily with water bars (i.e., mounds of soil shaped to direct flow and prevent erosion).

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2. Access road erosion repair will be accomplished through grading, addition of fill, and compacting as needed. In each case of repair, the total area of disturbance will be minimized by careful access and use of appropriately sized equipment. Repairs will be done in accordance with construction protocols. Consideration will be given to the source of the erosion problem. Road filling material will not be obtained from the sides of the road in sensitive habitat.
3. Access road maintenance will not expand the existing roadbed. The standard road parameters for Water Authority access roads include an approximate 12-foot road bed (one-way access only) with an additional four-foot mow strip on each shoulder (i.e., a 20-foot-wide corridor) to reduce the potential for fires ignited by vehicles. Care will be taken to utilize equipment that is appropriately sized for project needs. Schedule and resource constraints do not allow the Water Authority to mow 100 percent of the line roads every year. Grading and mowing the roads and line structures for shutdowns will be a priority for the Water Authority.
4. Road maintenance will be on a yearly basis to prevent new road ruts from becoming occupied by Covered Species (e.g., fairy shrimp). Where vernal pools and road ruts are present within access roads, vehicles will avoid these areas during the wet season. If wet season impacts are unavoidable, options such as temporary covers or spans will be placed over the resource to avoid damaging habitat or impacting sensitive species (e.g., crushing fairy shrimp or spreading individuals to other non-natural areas) where feasible (Section 6.7.3 describes vernal pool protection measures).

6.5 Plan Mitigation Measures

The Water Authority's Covered Activities serve a public need (providing a safe and reliable water supply) and are considered compatible uses when implemented by the Water Authority in conformance with this Plan, even within existing preserves. However, as described in Section 6.4, the Water Authority will make all feasible efforts to avoid or minimize impacts from Covered Activities to Covered Species and their conserved habitats (vegetation communities). If impacts cannot be avoided, then identified impacts to those species and habitats covered will be minimized and mitigated in accordance with the requirements in this Plan. All permanent impacts will be mitigated by deducting appropriate habitat acres (credits) from the Water Authority's upland and wetland HMAs, by obtaining credits from other banks within the Plan Area, or by acquiring and protecting additional qualifying habitat within the Plan Area that contributes to the Water Authority's Preserve Area or another participating agency's preserve/reserve lands.

6.5.1 Habitat-based Mitigation

This Plan's biological mitigation approach is habitat-based. All of the vegetation communities/land covers (habitat types) known to occur within the Plan Area are grouped into tiers (Section 6.5.1.3 and Table 6-5) that are deemed to have similar ecological values, based on rarity, Covered Species diversity, environmental sensitivity, etc. Impacts to habitats caused by Covered Activities will be mitigated with the same or biologically-equivalent habitat. Wetland habitats are separated from upland habitats because of the qualitative and regulatory differences attributed to wetlands. Mitigation ratios reflect the different relative ecological values among the tiers, as well as the location of the impact and mitigation sites (Section 6.5.1.3 and Tables 6-6 for uplands and 6-7 for wetlands).

The Plan will ensure that impacts from Covered Activities are fully compensated by providing the required acres of appropriate mitigation credits from the HMAs, by augmenting the Preserve Area (and qualifying mitigation acres) through acquisition of additional Preserve Area land within the Plan Area (and preparation of a minor amendment for this activity, as described in Section 8.0), or by acquiring credits in other approved conservation/wetland banks within the Plan Area (after notifying the Wildlife Agencies of the intent to use this option). Before implementation of each Covered Activity, the Water Authority will demonstrate that the Plan has those habitat (credit) acres available, or how the required compensating habitat will be obtained. Impact acres and mitigation acres will be tracked to confirm that they are in "rough step" and that conservation commitments are being met; this information will be summarized in the annual report on Plan activities.

Appendix B summarizes the potential habitat within the Survey Area, PIZ, and HMAs that may support the Covered Species, as well as the reported occurrences of Covered Species in the Survey Area and PIZ (see Table B-1 in Appendix B). For each Covered Species, Appendix B provides an assessment of the potential take by the Planned Projects and the documented or potential conservation provided by the HMAs and MMAs. The habitat and occurrence-specific impacts from Future Projects cannot be determined, but the HMAs, as noted in Section 6.5.1.1, have available or proposed habitat credits to address most of the projected habitat acreage impacts from planned and future projects. If the HMAs do not contain the appropriate Covered Species habitat or Covered Species, then additional suitable habitat will be added to the Preserve Area (Section 6.5.1.2).

6.5.1.1 Stay Ahead Commitment

As part of its conservation strategy and commitments, the Water Authority has acquired and manages (or assured/will assure the management of) approximately 3,067 acres of regionally significant habitat that supports Covered Species (1,920 acres in the HMAs

**TABLE 6-5
VEGETATION COMMUNITIES/LAND COVER TYPES TIER LEVELS**

Vegetation Tier	Vegetation Community/Land Cover Type	Subcommunities
<u>Upland Habitats</u>		
I	Chaparral I	Northern Mixed Chaparral (Mafic) Southern Maritime Chaparral Southern Mixed Chaparral (Mafic)
	Coastal	Open Beach Southern Foredunes
	Coniferous Forest I	Southern Interior Cypress Forest Torrey Pine Forest
	Grasslands I	Native Grassland (Valley and Foothill Needle Grassland)
	Oak Woodland and Forest	Black Oak Forest Black Oak Woodland Coast Live Oak Forest Coast Live Oak Woodland Engelmann Oak Forest (Dense Engelmann Oak Woodland) Engelmann Oak Woodland (Open Engelmann Oak Woodland) Mixed Oak Woodland
	Coastal Sage-Scrub I	Alluvial Fan Scrub Cactus Scrub Maritime Succulent Scrub Riversidean Alluvial Fan Scrub Southern Coastal Bluff Scrub
II	Coniferous Forest II	Big Cone Spruce- Canyon Oak Forest Mixed Coniferous Forest
	Coastal Sage-Scrub II	Coastal Sage-Chaparral Scrub Coastal Sage Scrub (Diegan) Coastal Sage Scrub (Inland) Flat-topped Buckwheat Scrub Riversidean Sage Scrub Big Sagebrush Scrub (Great Valley)
	Sage-Scrub, Montane/Trans-montane	
III	Chaparral III	Ceanothus crassifolius Chaparral Chamise Chaparral (Granitic Chamise chaparral) Interior Live Oak Chaparral Northern Mixed Chaparral Northern Mixed Chaparral (Granitic) Scrub Oak Chaparral Southern Mixed Chaparral Southern Mixed Chaparral (Granitic) Montane Chaparral
	Chaparral, Montane/Trans-montane	
	Grasslands III	Redshank Chaparral Non-Native Grassland
IV	Agricultural	General Agriculture Extensive Agriculture (Row Crops, Pastures)

**TABLE 6-5
VEGETATION COMMUNITIES/LAND COVER TYPES TIER LEVELS (Cont.)**

Vegetation Tier	Vegetation Community/Land Cover Type	Subcommunities
	Disturbed/Developed	Intensive Agriculture (Dairies, Nurseries, Chicken Ranches) Orchards and Vineyards Bare Ground Disturbed
	Exotic Landscapes	Urban/Developed Land Eucalyptus/Non-native woodland Ornamental
<u>Wetland Habitats</u>		
I	Aquatic, Marine I Riparian I	Saltpan/Mudflats Southern Arroyo Willow Riparian Forest Southern Coast Live Oak Riparian Forest Southern Cottonwood-Willow Riparian Forest Southern Sycamore Woodland Southern Sycamore-alder Riparian Woodland White Alder Riparian Forest
	Wetland I	Alkali wetlands (Alkali Seep, Alkali Marsh, Cismontane Alkali Marsh) Alkali Vernal Pools Montane Meadow San Diego Mesa Claypan Vernal Pools San Diego Mesa Hardpan Vernal Pools Southern Coastal Salt Marsh Vernal Lake
II	Aquatic, Freshwater II Aquatic, Marine II Riparian II	Open Freshwater (Freshwater, Open Water, Water) Open Saltwater (Bays, Estuarine, Subtidal) Arrowweed Scrub Mule Fat Scrub Southern Willow Scrub
	Wetland II	Freshwater Meadow or Seep Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland)
III	Aquatic, Freshwater III Riparian III	Non-vegetated Floodplain or Channel Arundo Scrub Tamarisk Scrub
	Wetland III	Wetland (Disturbed)

**TABLE 6-6
UPLAND HABITAT MITIGATION RATIOS**

Mitigation Site	Impacted Land Classification	
	Meets criteria for Biologically Significant Resource Area	Does not meet criteria for Biologically Significant Resource Area
Tier I		
Meets criteria for Biologically Significant Resource Area	2:1	1:1
Does not meet criteria for Biologically Significant Resource Area	3:1	2:1
Tier II		
Meets criteria for Biologically Significant Resource Area	1.5:1	1:1
Does not meet criteria for Biologically Significant Resource Area	2:1	1.5:1
Tier III		
Meets criteria for Biologically Significant Resource Area	1:1	0.5:1
Does not meet criteria for Biologically Significant Resource Area	1.5:1	1:1
Tier IV	No mitigation required	No mitigation required

**TABLE 6-7
WETLAND HABITAT MITIGATION RATIOS**

Mitigation Site	Impacted Land Classification	
	Meets criteria for Biologically Significant Resource Area	Does not meet criteria for Biologically Significant Resource Area
Tier I		
Meets criteria for Biologically Significant Resource Area	2.5:1	2:1
Does not meet criteria for Biologically Significant Resource Area	4:1	3:1
Tier II		
Meets criteria for Biologically Significant Resource Area	2:1	1.5:1
Does not meet criteria for Biologically Significant Resource Area	3:1	2:1
Tier III		
Meets criteria for Biologically Significant Resource Area	1.5:1	1:1
Does not meet criteria for Biologically Significant Resource Area	2:1	1.5:1

and 1,147 acres in the MMAs). Some of these lands were acquired for previous Water Authority projects, and others have been acquired specifically to address planned and future projects. So, unlike most NCCP/HCPs, the Water Authority Plan has already assembled and will ensure the management of a Preserve Area system well in advance of the occurrence of impacts. A number of the HMAs include habitat acreage credits in excess of current and foreseeable mitigation needs.

As shown in Table 6-8, the Water Authority Preserve Area includes approximately 704 acres of upland and wetland habitat credits, exceeding the estimated approximately 373 acres of impacts from Covered Projects and Activities (consisting of 71.4 and 182.8 acres from Planned and Future Projects and O&M Activities, respectively, and 118.9 acres if the Pipeline 6 Existing Project alignment is modified). Assuming an average 2:1 mitigation ratio for projects/activities (e.g., roughly 746 mitigation acres), the currently available/proposed credits in the HMAs are nearly sufficient to meet the Plan's mitigation needs for Pipeline 6 and Planned Projects and nearly sufficient to meet the projected needs over the 55-year term of the Plan. Future Projects and Covered Activities will require the use of these credits, and the amounts and types of credits will be specified and updated in the annual reports. Therefore, the Water Authority's Plan is and will continue to stay ahead of its anticipated mitigation needs.

6.5.1.2 Rough (Step) Proportionality Commitment

The Water Authority, pursuant to the NCCPA and federal requirements, must ensure that implementation of conservation and mitigation measures, on a plan basis, is roughly proportional in time and extent to the impacts on Covered Species (and their habitats). The Water Authority commits to implement this obligation by using the following approach, and as further explained in subsequent subsections. Each Covered Activity will be assessed for its potential impacts to vegetation communities (habitats) and Covered Species. As described in Table 6-5, each affected vegetation community will be assigned to a "tier" denoting its relative sensitivity. Tables 6-6 and 6-7 identify the mitigation ratios required to effectively mitigate impacts to each tier. Furthermore, mitigation must occur within the same vegetation type or, where justified on a biological basis, with a higher value or comparable vegetation type. As Covered Activities occur that require habitat mitigation, the mitigation process assures that conservation and loss of each vegetation community remains in rough step. As noted above, the Water Authority has already assembled an initial Preserve Area, so the only rough step issue arises from assuring that mitigation obligations are met. As described in Section 6.12, Plan Monitoring and Adaptive Management, the Plan requires reporting of all impacts and mitigation/credit use. The reporting would use the CDFG "Habitrak" or a GIS-based approach to track and report impacts and mitigation.

The Water Authority, pursuant to the NCCPA and federal requirements, must ensure that implementation of conservation and mitigation measures, on a plan basis, is roughly proportional in time and extent to the impacts on Covered Species (and their habitats).

**TABLE 6-8
SUMMARY OF IMPACTS TO MITIGATED VEGETATION/LAND COVER TYPES
AND HMA MITIGATION ACRES**

Vegetation Tier	Vegetation Community/Land Cover Type	Estimated Project Impacts from Pipeline 6 Alternate Alignment ¹	Estimated Planned Projects Impacts (acres) ²	Estimated Future Projects and O&M Impacts (acres) ³	Existing/Proposed HMA Mitigation Credits (acres)
<u>Upland Habitats</u>					
I	Chaparral I	--	--	--	--
	Coastal	--	--	--	--
	Coniferous Forest I	--	--	--	--
	Grasslands I	--	--	--	8.3
	Oak Woodland and Forest	11.5	3.9	9.9	7.6
	Coastal Sage-Scrub I	--	--	--	--
II	Coniferous Forest II	--	--	--	--
	Coastal Sage-Scrub II	42.2	30.4	77.9	518.2
III	Sage-Scrub, Montane/Trans-montane	--	--	--	--
	Chaparral III	30.1	16.3	41.9	122.7
	Chaparral, Montane/Trans-montane	--	--	--	--
	Grasslands III	28.3	7.9	20.1	--
	Subtotal – mitigated habitats	112.1	58.5	149.8	656.8
<u>Wetland Habitats</u>					
I	Aquatic, Marine I	--	--	--	--
	Riparian I	3.6	8.4	21.6	25.5
	Wetland I	--	--	--	--
II	Aquatic, Freshwater II	--	0.5	1.2	--
	Aquatic, Marine II	--	--	--	--
	Riparian II	3.2	3.5	8.8	19.8
	Wetland II	--	0.5	1.2	1.3
III	Aquatic, Freshwater III	--	--	--	1.0
	Riparian (Disturbed)	--	--	--	--
	Subtotal – mitigated habitats	6.8	12.9	33.0	47.6
	Total	118.9	71.4	182.8	704.4

¹ Estimated permanent and temporary impacts from potential alignment change to Pipeline 6, an Existing Project.

² Estimated permanent and temporary impacts from Planned CIP Projects

³ Estimated impacts to individual vegetation communities from Future Projects and O&M Activities projected from Planned Projects' impacts.

The Water Authority commits to implement this obligation by using the following approach, and as further explained in subsequent subsections. Each Covered Activity will be assessed for its potential impacts to vegetation communities (habitats) and Covered Species. As described in Table 6-5, each affected vegetation community will be assigned to a “tier” denoting its relative sensitivity. Tables 6-6 and 6-7 identify the mitigation ratios required to effectively mitigate impacts to each tier. Furthermore, mitigation must occur within the same vegetation type or, where justified on a biological basis, with a higher value or comparable vegetation type. As Covered Activities occur that require habitat mitigation, the mitigation process assures that conservation and loss of each vegetation community remains in rough step. As noted above, the Water Authority has already assembled an initial Preserve Area, which includes unused mitigation credits in the HMAs, so the only rough step issue arises from assuring that mitigation obligations are met. As described in Section 6.12, Plan Monitoring and Adaptive Management, the Plan requires reporting of all impacts and mitigation/credit use. The reporting would use the CDFG “Habitrak” or a GIS-based approach to track and report impacts and mitigation.

The Water Authority commits to assure that during the 55-year Permit term period, the available upland or wetland habitat credits will be sufficient to satisfy the projected mitigation obligation requirements for the next two years, based on the estimated impacts from Covered Activities for that period.

If the available credits would be reduced to below that estimated credit/acres need, the Water Authority would either obtain credits from an independent, approved conservation/wetland bank, acquire additional habitat acreage to add to the Preserve Area to meet that commitment, or provide a biologically superior alternative that is acceptable to the wildlife agencies. This information would be updated and reported annually. Credits from the appropriate HMA or HMAs will be secured (withdrawn from the credit ledger) to mitigate the projected obligations. If temporary impacts are to be restored on-site, the Water Authority will ensure sufficient credits remain in one or more HMA’s until the performance criteria are met; any unmet obligation will require permanent withdrawal or purchase of the necessary credits from an existing bank. For certain vegetation communities, such as Coastal Sage Scrub II and Chaparral III, the HMAs appear to have sufficient credits to meet the projected need during the 55-year Permit term. If the HMAs cannot provide the expected credit acres, then the Water Authority would identify which option it would implement and provide a commitment to obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations.

6.5.1.3 Tiering

As described in Section 4.2, the Plan Area supports a wide range of upland and wetland vegetation communities and land cover types. The vegetation and land cover categories

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and tiers into which vegetation communities are assigned are comparable to those used in other conservation plans within San Diego County (see Tables 4-2 and 6-5). Generally, impacts to a vegetation community will be mitigated by conserving additional acreage in the same vegetation community. This is most important for those vegetation communities that represent limited geographical extent, unique geology and soils, or are specifically associated with one or more Covered Species.

Alternative Habitat Mitigation. In the event that there is no in-kind HMA habitat credit available for mitigation of impacts, the Water Authority may obtain habitat credits from conservation banks within the Plan Area or acquire additional appropriate habitat lands to add to the Preserve Area. Alternatively, the Water Authority may submit a proposal to the Wildlife Agencies for a biologically equivalent or superior mitigation approach (“alternative mitigation approach”) that may include substituting other vegetation communities. Any deviation from the vegetation types/habitats and ratios in Tables 6-6 and 6-7 would require case-by-case Wildlife Agencies approval. The following information must be included in the alternative mitigation approach proposal:

1. Definition of the project area.
2. A written description of the project.
3. A written description of biological information available for the project site, including the results of all focused surveys for Covered Species.
4. Written finding of infeasibility of mitigating in accordance with the mitigation requirements, including Tables 6-6 and 6-7.
5. Quantification of impacts to Covered Species associated with the project, including direct and indirect effects.
6. A written description of project design features that reduce indirect effects, such as edge treatments and landscaping, minimization, and/or compensation through restoration or enhancement.
7. Description of measures proposed to compensate for identified impacts in a manner that demonstrates that the proposed design, including compensation, would result in a long-term benefits to the Preserve Area for the species of concern that is functionally equivalent to or better than what would occur by conforming to the standard mitigation approach. The equivalency analysis will be based on the particular requirements of the species of concern.
8. A summary conclusion, including implementation findings to verify conformance with the Plan’s objectives (Section 6.1.2).

6.5.1.4 Mitigation Ratios and Geographic Considerations

To calculate the final mitigation ratio, the project activity must identify the vegetation community/habitat tier as well as the impact and mitigation site locations. Geographic considerations that may affect the final mitigation obligation include: the activity (impact) is within a biologically significant resource area (see below), the mitigation is within a biologically significant resource area, and whether the activity is within an existing right-of-way (Section 6.5.1.4.3). Whether the impact is permanent or temporary also affects the mitigation obligation (Section 6.5.1.4.2).

6.5.1.4.1 Biologically Significant Resource Area

Habitat areas do not support equivalent biological resources. Some habitat areas support rare vegetation types and species; support greater species diversity; are part of core areas of habitat; or function as key linkages or corridors for species. These types of habitat areas are generally the focus for conservation by this Plan and other conservation plans. This Plan uses the term “Biologically Significant Resource Area”, or BSRA, to include the following types of habitat areas within the Plan Area:

- an upland or wetland HMA (e.g., all Water Authority-committed lands in this Plan);
- areas that have been designated in approved (or in-approval stage) conservation plans as biological resource core areas, pre-approved mitigation areas, focused planning areas, corridors/linkages or equivalent designated/defined terms. The approval stage includes jurisdictions/entities formally committed to preparing a conservation plan that have produced a draft, publicly-released map of priority areas for conservation and areas proposed for development.

Existing rights-of-way are excluded from the BSRA because they have and continue to be impacted by O&M Activities. Based on the above conditions, each project will identify the impact area and mitigation area and determine whether the sites are within BSRA. That determination will affect the final mitigation ratio requirement.

6.5.1.4.2 Permanent and Temporary Impacts

Permanent Impacts. Permanent impacts result from Covered Activities that cause the removal of habitat (e.g., sensitive vegetation community or Covered Species) that cannot be mitigated on-site through revegetation and other restoration efforts. Mitigation for permanent impacts requires the acquisition of credits at a Water Authority upland or wetland HMA, other Wildlife Agency-approved bank, or through the acquisition/protection of a qualifying habitat area that augments the Plan’s Preserve Areas or reserves in another approved conservation plan, at the ratios specified in this Plan (Tables 6-6 and 6-7).

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If the mitigation ratio is greater than 1:1, the Water Authority may choose to provide the portion of the mitigation that is over the 1:1 component by restoring disturbed lands within this Plan's Preserve Areas or other protected habitat areas if those areas have no required restoration requirement imposed by this Plan or another plan, and no other legal/regulatory obligation or other requirement for habitat enhancement and/or restoration. If the Water Authority determines, based on project monitoring and performance criteria, that enhancement or restoration efforts are not likely to be successful, equivalent credits of the appropriate habitat type will be deducted from the appropriate Water Authority HMA or purchased from an existing bank. Project monitoring methods and performance criteria will be developed in consultation with the Wildlife Agencies, who will also review and provide concurrence that the criteria have been met or are not likely to be met. See Section 6.6 for a discussion of restoration approaches and specifics.

Temporary Impacts. Temporary impacts to sensitive (mitigation-requiring) vegetation communities are impacts resulting from Covered Activities that do not disturb or remove vegetation root stock or that can be mitigated on-site through revegetation and other restoration efforts. Revegetation and restoration of temporary impacts will occur on-site in the area of initial disturbance. Effective implementation and monitoring of the mitigation and invasive species control ensures that habitat and plant species are reestablished or recover to the original condition or a biologically superior condition. See Section 6.5 for a discussion of restoration approaches and specifics.

The Water Authority identifies two types of temporary impacts: (1) the impacts are considered to be a one-time disturbance, or (2) the impacts are considered to be repeated (known or expected to occur more frequently than the time period in which the restored area is scheduled to return to fully-restored status) within the duration of the Plan's permit. The Water Authority will use different approaches when dealing with these two types of temporary impacts, as described below.

For projects or portions of projects with one-time temporary impacts, restoration and revegetation of the impacted area will be implemented at a 1:1 ratio. The specific habitat enhancement (restoration and revegetation) measures will be selected to address site-specific needs. Performance (success) criteria will be defined for each project and will generally conform to the Water Authority's revegetation guidelines (Section 02940 in the General Conditions and Standard Specifications, 2005 edition, Appendix D). Success criteria will be reviewed and concurred with by the Wildlife Agencies before restoration projects may commence. Restoration measures will be developed to restore the site's previous biological resources and minimize establishment of invasive nonnative plant species. Habitat enhancement and restoration activities will occur under the supervision and direction of an Environmental Surveyor who has experience developing and implementing native restoration plans in southern California. Within a project site, any disturbed areas that do not require regular maintenance or future disturbance, whether

inside or outside of preserves, will be improved either through enhancement, restoration, or a combination of the two. No off-site mitigation will be required for one-time temporary impacts unless the restoration is determined unsuccessful by the Wildlife Agencies. The Water Authority must receive concurrence from the Wildlife Agencies that each restoration effort is successful, as discussed in Section 6.6.

For project or portions of projects for which the Water Authority believes there will be a need for repeated temporary impacts to an area, the Water Authority will treat the initial disturbance as permanent and mitigate off-site at the appropriate mitigation ratio prior to initiating work at the site. Mitigation for initial disturbance will be performed off-site using the same approach as described above for permanent impacts (e.g., using credit from a Water Authority HMA or other Wildlife Agency-approved bank, acquiring/protecting habitat that augments the Plan's Preserve Areas or other reserve lands). Also, the disturbed area would be reseeded with a native seed mixture appropriate to the site. No performance criteria will be associated with the restoration efforts in this case. Subsequent disturbances in the same area would only require that the affected area be revegetated to its original condition, and no additional off-site mitigation would be required.

The Water Authority will be responsible for ensuring that the temporary disturbance areas are properly reseeded/revegetated. During the construction warranty period (varies with projects, but is generally 24 months), the project contractor(s) will be responsible for reseeding/revegetating. The Water Authority, through the requirements of this Plan and using the Environmental Surveyor, will ensure that these areas will be monitored and managed for a three-to-five year period, based on the site-specific performance conditions.

If the restoration has not met the restoration plan's success criteria within two years of reseeding, the Water Authority may initiate a second round of reseeding efforts to meet the mitigation requirements. The Water Authority may install container plants and irrigation to aid revegetation efforts. This decision would be based on weather, site conditions, and the value of the habitat in the area. If success criteria have not been met during the restoration process, and the Water Authority determines that subsequent effort will not achieve the success standards, the Water Authority will consider impacts to be permanent and mitigate off-site at one of the HMAs or a Wildlife-Agency approved bank.

Restoration techniques utilized by the Water Authority are described in more detail in Section 6.6 below. For activities affecting riparian/wetland areas, enhancement and mitigation measures are outlined in the Wetlands Protection and Mitigation Program (see Section 6.7). Habitat restoration guidelines are set forth in Section 02940 of the Water Authority General Conditions and Standard Specifications, which were updated in 2005 (see Appendix D). Updates to the guidelines (e.g., site-specific seed mixes) will be submitted for Wildlife Agency review and comment as part of the annual reporting

process. Additional project-specific design features and mitigation measures implemented through the environmental process would be reviewed during the CEQA process. If other revegetation techniques not presented in this Plan are considered, they will be submitted to the Wildlife Agencies for concurrence.

6.5.1.4.3 Existing Rights-of Ways and Facilities

Water Authority rights-of-ways and facilities which were in place before a preserve, reserve, or BSRA designation was applied to the area, will be treated as being outside of those designations. Impacts to habitats by Covered Activities within these areas will be treated as “outside” a BSRA. In these instances, Covered Activities within existing ROWs are considered to have “pre-existing” status, and the preserve, reserve or other resource overlay/designation should have factored the pre-existing status into the areas’ expected conservation values. Similar to the approaches noted above, temporary impacts to sensitive habitat areas within rights-of-way will be revegetated on-site and any new, permanent impacts to sensitive habitats will be mitigated off-site. An existing right-of-way or facility within property that is proposed as a conservation or mitigation bank would not be included as part of the bank’s potential mitigation credit acreage because that portion of the property could not be assured of supporting appropriate habitat over the long-term. For the same reasoning, impacts to vegetation communities within those existing rights-of-way/facilities will be treated as “outside” of a biologically significant resource area even if it is physically within the resource area’s boundaries. The Covered Activities will comply with the preserve adjacency guidelines described in Section 6.11 of this Plan.

6.5.1.5 Mitigation Tables

Separate mitigation ratio tables for impacts by Covered Activities are provided for upland and wetland vegetation communities (Tables 6-6 and 6-7). The mitigation ratios reflect the impacted vegetation community’s tier and the biological status of the impact and mitigation sites. All permanent impacts will adhere to these ratios, but as noted in Section 6.5.1.3, this Plan allows the Water Authority to consider proposing alternative biological mitigation to meet the requirement; or, to fulfill part of the mitigation, using restoration after at least a 1:1 replacement has been identified (see Section 6.5.1.4.2). As described previously, temporary impacts that are determined to be permanent will be mitigated off-site, and all subsequent disturbance at that location will be mitigated solely by on-site restoration. Temporary impacts that are not determined to be permanent may be mitigated by restoring or revegetating the impact site at a 1:1 ratio.

The Plan has estimated habitat impacts from planned Covered Activities (Section 5.0) and the identified existing/proposed mitigation credits in the upland and wetland HMAs (Table 6-8). Because the specific locations of planned Covered Activities will only be known when the projects are ready for implementation, these estimated impacts may

change. The determination of whether a Covered Activity is within a BSRA (and assignment of the final mitigation ratios) will be made once the location of the activity is finalized. However, as shown in Table 6-8, the Plan has or proposes to create sufficient acres of habitat credits to address most of the estimated impacts from planned Covered Activities over the 55-year Permit term. Several habitats – coastal sage scrub, chaparral and certain wetland/riparian types – have more credits than are expected to be needed to meet Plan obligations.

6.5.1.6 Narrow Endemic Policy

Narrow endemic species are species that are considered to have highly restrictive habitat requirements, localized soil requirements, or other ecological factors. Narrow endemic species may have limited but important populations within the Plan Area, such that substantial loss of these populations or their habitat would jeopardize the continued existence or recovery of that species within the Plan Area. A population is based upon the number of individuals present for perennial species and contiguously occupied habitat acreage for annual species and bulb or corm species. The extent of the population will be defined by the Environmental Surveyor.

Unavoidable impacts to a narrow endemic population and occupied acreage will be minimized to the maximum extent practicable, and associated mitigation will be designed to meet a minimum 1:1 conservation ratio (e.g., by restoring/creating/expanding suitable habitat or reintroducing the species into unoccupied, suitable habitat) within the Preserve Area or other Wildlife Agency-approved mitigation sites.

The Narrow Endemic Policy applies to those species identified in Table 6-3 of the Plan as narrow endemic species. Species listed in Table 6-3 of the Plan are included due to their rarity and limited distribution within the Plan Area; some may not be considered a narrow endemic species from a purely ecological standpoint. The policy will apply to all portions of the Plan Area, regardless of preserve status.

6.5.1.6.1 Narrow Endemic Mitigation Measures

1. Narrow endemic species populations will always be avoided to the maximum extent practicable.
2. For new projects, an 80 percent avoidance policy will apply, excluding existing Water Authority rights-of-way (including easements and fee-owned parcels). For plant species, 80 percent of the species' mapped distribution area will be avoided; for animal species, 80 percent of the occupied habitat and suitable habitat will be avoided. Covered Projects that cannot meet the 80 percent avoidance policy due to additional site and planning constraints will implement a Wildlife Agency-approved biologically equivalent or superior alternative.

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3. Pre-activity surveys will be used to identify the location of narrow endemic populations to ensure that they are avoided and protected in accordance with this policy (see Appendix F of the Plan).
4. Mitigation for unavoidable impacts will be designed to minimize adverse effects to species viability and to contribute to the biological objectives of the Plan.

6.5.1.7 Critical Habitat

Covered Activities may affect proposed and designated critical habitat that has been identified for 14 of the Covered Species and vernal pool fairy shrimp, which is a Major Amendment Species. Of the Planned Projects, only the wetland creation projects at Tijuana River Valley HMA and the San Luis Rey River Valley HMA would impact critical habitat. However, areas of critical habitat at the Tijuana River Valley HMA and the San Luis Rey River Valley HMA include disturbed habitat and former agricultural lands, and restoration is expected to improve the areas of critical habitat. All other proposed locations of the Planned Projects are not expected to impact critical habitat for any Covered Species.

Implementation of the Covered Activities will attempt to avoid and minimize impacts to all critical habitat, but this may not always be possible. When impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. If permanent impacts cannot be avoided, then the Water Authority will first attempt to mitigate with credits in the HMAs that have critical habitat or acquire other lands that are designated as critical habitat. Only if no critical habitat is available from the Preserve Area or as an acquisition of new habitat lands, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies.

6.6 Habitat Restoration Program

As described in Section 6.5, habitat restoration may occur as a partial mitigation response to address permanent impacts, recurring temporary impacts (in conjunction with providing off-site qualifying habitat), and one-time temporary impacts. Where the restoration is providing partial mitigation for permanent impacts and mitigating one-time temporary impacts, the restoration effort will emulate surrounding vegetation characteristics. As described below, restoration of recurring-impact sites will ensure that the restored site does not revert to a disturbed or invasive, non-native species-dominated condition. Restoration site performance criteria and monitoring methods will be developed in consultation and concurred with by the Wildlife Agencies.

6.6.1 Restoration Areas Not Subject to Future Disturbance

Restoration is the reestablishment of natural/native species and processes. Active restoration expedites natural regeneration through the use of planting, seeding, transplanting, and salvaging techniques. To maintain the genetic integrity of sensitive sites, the source of seeds and plant material may be important and necessitate that propagules be harvested from sources close to the restoration site.

Under Water Authority supervision, a qualified restoration specialist (e.g., Environmental Surveyor) will prepare and submit to the Wildlife Agencies for their review and concurrence a restoration plan for each restoration project exceeding one-quarter acre and all wetland/vernal pool restoration sites. The plans will include the following components:

- An assessment of existing physical factors, including topography, slope, aspect, drainage, elevation, hydrologic regime, soils, and climate.
- An assessment of existing biological conditions, applicable management practices, and sources of potential disturbance.
- Collection of reference data from adjacent or nearby representative habitat as a planning guide and for use in developing success criteria for the subsequent monitoring of the restoration site.
- Specification of seed and plant palette, source locations, topsoil and plant salvaging techniques, and restoration design (including site preparation) and schedule.
- When identified as necessary in the restoration plan, plants will be propagated in containers from locally-collected seed or cuttings, particularly for sites with species that do not readily germinate from seed mixes or for some rare species.
- If propagated plants are specified, container plant production can begin as locally collected seed or cuttings become available. Container plants should be inoculated with mycorrhizae (mutualistic fungi) by using native soil that contains the fungi and other microorganisms.
- Exotic plant control and removal program.
- Specification of irrigation needs, as necessary.
- A maintenance program that generally includes irrigation (as necessary), weed control and removal, debris removal, replanting, reseeding, pest control, erosion control, and site protection. The maintenance program will typically last for a period of three to five years, depending upon the extent and the type of habitat to

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be restored, the achievement of success criteria, and other project specific conditions. The Water Authority's experience has been that upland habitats can be self-sustaining after three years of maintenance, and wetland habitats within five years of maintenance.

- A monitoring program that will evaluate the growth and success of the restoration site against specified success criteria (e.g., area to be restored, percent plant cover, plant species' percentages or relative frequency/abundance, species survivorship). The monitoring program may include qualitative and quantitative evaluations depending upon the extent of the restoration site. With the exception of vernal pool restoration projects, small restoration efforts typically may only require qualitative evaluations; however, this determination will be made based on site-specific conditions. A monitoring schedule will be specified that will last throughout the length of the maintenance program. The monitoring program will include the preparation of status reports documenting the findings of the monitoring evaluations. These reports will be submitted to the Wildlife Agencies on an annual basis, or more regularly, if required in the restoration plan. Should the monitoring evaluations reveal that the restoration effort does not meet the specified success criteria, recommended remedial measures will be included in the report.
- Success criteria will be developed that specifies goals and measurable objectives to be achieved for each stage of the restoration effort. Depending upon the type of habitat to be restored, success criteria may include goals for plant survival, vegetation cover, species diversity, plant density, and plant height. A set of success criteria will be specified for each year of the maintenance and monitoring period for each objective. At a minimum, these criteria will identify the desired dominant native species and percent native species' cover (monthly, quarterly and/or annually, as appropriate for the project). Monitoring will be for up to a five-year period unless the final performance criteria are met sooner and the Water Authority and Wildlife Agencies agree that the monitoring can be ended prior to the specified final monitoring date.
- Complex restoration plans will include adaptive management measures (see Section 6.6.2 below) to be implemented if the final success criteria are not completely met at the end of the maintenance and monitoring program. Under this circumstance, the Water Authority, in conjunction with the Wildlife Agencies, shall review and may nonetheless approve the restoration project or may decide that the maintenance and monitoring period shall be extended until success criteria are achieved, or alternatively, mitigation credits may be deducted from the Water Authority's HMAs.

The Wildlife Agencies will make their best efforts to provide their concurrence or objection within 60 days of submittal. If objection is provided, the Wildlife Agencies will

provide a detailed description of the restoration plan deficiencies and recommendations to make the plan acceptable.

Upon completion of the maintenance and monitoring period, the Water Authority will present justification to the Wildlife Agencies for whether the project does or does not meet stated success criteria. The Wildlife Agencies must then provide concurrence within 60 days that the project is a success or meet with the Water Authority to determine appropriate remediation measures that will adequately offset impacts.

6.6.2 Restoration Areas Potentially Subject to Future Disturbance

Restoration for temporarily impacted areas subject to future, repeat disturbance will conform to the following protocols for seeding/planting, weed control, erosion control, species relocation, and soil and plant salvage. For individual restoration/enhancement areas larger than five acres, a restoration plan (described in previous Section 6.6.1) will be required and must be approved by the Wildlife Agencies, who will make their best efforts to review and provide concurrence (or objection, with recommendations to make the plan acceptable) to the Water Authority within 60 days of receipt of the plan, or the plan will be considered acceptable.

6.6.2.1 Seeding/Planting

1. Seeding will generally be performed within 30 days after topsoil replacement (see Section 6.6.4), but each project will specify the topsoil replacement timing to correspond with the appropriate season for application. The seed mix to be used will consist of local native vegetation species that are suitable for restoration as dictated by the terrain, soils, and surrounding native habitat. As conditions allow, native plant species that are a typical component of the pre-existing or surrounding vegetation community will be used in the seed mix. If justified and feasible, plant materials will be derived from local seed and/or cutting sources to maintain genetic integrity. Species lists and sources and quantities of seeds to be applied will be based on local conditions, as determined by the Water Authority. The Wildlife Agencies will be notified of seeding efforts within the regular annual reports (see Section 6.12).
2. Hydroseeding will consist of a slurry mix of native seed, soil stabilizer (100 pounds per acre), fiber mulch (2,000 pounds per acre), water, and other additives to be hydraulically sprayed on the ground as specified in the PSF or restoration plan. The slurry (but not the seed mix) may be altered by the project engineer to meet any site-specific needs. After application, this will allow absorption of moisture and rainfall to percolate to the underlying soil.

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3. Hand-seeding may be used to spread seed by hand and rake it into the topsoil.
4. Drill-seeding may be used in restoration efforts to reduce soil disturbance.
5. Established preserves within the Plan Area will be reseeded only with appropriate native species for the site and surrounding area.
6. Areas requiring erosion control will be reseeded with an erosion control native seed mix as determined in Section 02940 of the Water Authority standards (see Appendix G). Such seed mixes may include a selection of native grasses, low-growing forbs, and shrubs, consistent with the surrounding area and the ultimate disposition of the reseeded site.
7. Hydroseeded areas will be periodically inspected by the Environmental Surveyor. Inspections generally will be conducted on a quarterly basis but could be more or less frequent depending on site specific conditions. Areas failing to show acceptable germination and growth of native species, as determined by the Environmental Surveyor, will be scheduled for reseeded. Acceptability will be determined by uniformity of germination and native plant growth. Any supplemental seeding should take place from September through November, prior to winter rains. The need for supplemental seeding will be evaluated upon whether seedling establishment provides a reasonable expectation that it will develop into self-sustaining native habitat over time with consideration for annual rainfall and other underlying abiotic factors (e.g., slope, aspect, soils).
8. Areas of approximately 4,360 square feet (0.1 acre) or larger that have not achieved 20-percent cover of native plants at the end of the first summer following seeding may require reseeded. Factors such as overall percent cover, health, and vigor will be considered in determination of satisfactory establishment. If supplemental seeding is required, seed mixes may be altered upon direction of the Water Authority to achieve more successful germination based on habitat conditions; however, seed mixes must contain only native species. Exceptions to use non-native, non-invasive species may be made by the Environmental Surveyor in disturbed areas that have been landscaped with non-native species, or elsewhere with concurrence from the Wildlife Areas.

6.6.3 Weed Control

1. Weeds will be controlled in all areas planted and/or seeded throughout the plant establishment and maintenance period. Weed eradication will be performed within 10 days prior to initiating seeding and planting operations.
2. All planted areas will be weeded prior to the weeds reaching 12 inches in height and/or before ripening of seed, unless otherwise directed by the Environmental Surveyor. Weed control methods may include herbicide application, hand

weeding, or mechanical removal as approved for the site by the Environmental Surveyor. Herbicides will be applied in conformance with all applicable laws and regulations.

3. All high-rated invasive weeds on the most current California Invasive Plant Council (Cal-IPC) list (Appendix H) will be prioritized and targeted for control at restoration sites, although additional weeds may be controlled based on recommendations by the Environmental Surveyor.

6.6.4 Soil and Plant Salvage

As a means of enhancing revegetation success, the Water Authority will salvage soil, seed, and plant material on a project-by-project basis, where appropriate and feasible. Project review and CEQA analysis will identify appropriate salvage opportunities. Mitigation measures and conditions of project approval will specify the soils, seed, and plant material to be salvaged, identify the procedures for salvage, and specify locations and time frames for use of material, as appropriate.

1. Where feasible, the project will reuse topsoil that supported native plant species for revegetation and restoration purposes.
2. Where feasible, the project will collect representative cactus joints and/or other rooted materials within impact areas for subsequent planting in restoration sites or areas that will not be impacted.
3. During construction in areas of native habitat, topsoil consisting of the top four to six inches of earthen material will be salvaged and stockpiled separately from other excavated materials. Topsoil piles will be stored within a fenced or a flagged and posted enclosure. These piles will be kept relatively weed free without the use of a pre-emergent herbicide. Weeds will be removed and disposed of off-site before weeds produce mature seed heads. Prior to topsoil salvage, existing native vegetation will be salvaged, removed and mulched, or crushed into the topsoil. If mulched, vegetative material will be no larger than six inches long by one inch wide. Mulched native vegetation may be incorporated and stored with salvaged topsoil at the discretion of the Water Authority. If stockpiles are projected to remain for more than one year, then the Water Authority will provide a maintenance plan.
4. Once construction has been completed, the stockpiled topsoil/mulched plant material will be applied in a layer over all portions of the construction corridor that previously contained native habitat. Both the topsoil and the mulched material contain native propagules beneficial to the growth of native plant species. Additionally, the mulch will reduce erosion potential for the area. This method is

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suited for temporary roads and staging areas (once ripped), as well as for other areas of prior intensive activities.

5. Topsoil compaction during placement will be avoided. The topsoil will be tilled prior to seeding to increase water infiltration and root growth. Disking or ripping to a depth of 12 inches will also reduce topsoil slippage on steep slopes. Tilling after initial seed germination may promote weed growth and will only be utilized when an influx of pest species would not adversely damage or diminish adjacent native plant populations as determined by the Environmental Surveyor.
6. When available and determined acceptable by the Environmental Surveyor, salvaged species may be used in restoration areas to allow the introduction of mature and diversely-aged plants that have developed root systems with symbiotic fungal associations. Plant salvage will begin at least one month prior to clearing and grubbing of the site to allow sufficient salvage time. Salvageable individual plants will be removed from the ground using hand tools or mechanized equipment to remove the root ball and surrounding soil. Plants will then be transplanted and stored in soil per standard horticultural practices for native species until the restoration areas are prepared for planting (e.g., cool season weather arrives or water is available) and until all signs of transplant shock have subsided. When possible, individuals will be removed from a designated grading area and replanted without delay in a prepared revegetation site.

6.7 Wetland Protection and Mitigation Program

The Wetland Protection and Mitigation Program (Wetland Program) will protect and achieve no-net-loss of wetlands. The Wetland Program requires the evaluation of wetland avoidance options and specification of minimization measures prior to compensatory mitigation. The Wetland Program will ensure adequate mitigation based upon habitat type (see Table 6-7) to address federal or state regulatory obligations. If the wetland mitigation creation/restoration site is already fully functional prior to impacts, then a ratio of 1:1 may be substituted by the Water Authority for those specified in Table 6-7. A functional wetland mitigation site means that the site meets performance criteria established in the approved wetland mitigation site plan. Using credits/acres from a fully functional wetland mitigation site avoids the temporal loss associated with creating wetlands concurrent with incurring the wetland impacts and meet the no-net loss requirement for wetlands. To offset unavoidable impacts to wetlands, thereby achieving an overall no-net-loss of wetland functions and values, compensatory mitigation will be provided within the wetland HMAs or, if not yet installed, a site approved by the Wildlife Agencies, and USACE (if warranted).

Wetlands and jurisdictional waters are regulated at the state and/or federal level. Activities that may impact jurisdictional wetlands and/or waters of the U.S. will continue to be regulated under Sections 401 and 404 of the Clean Water Act by the SWRCB and USACE. Under Sections 1600–1616 of the Fish and Game Code, CDFG regulates activities that would alter streams, rivers, or lakes. CDFG jurisdiction includes adjacent riparian habitats affected by watercourse alterations. The California Coastal Commission regulates activities occurring within the coastal zone under the California Coastal Act. The RWQCB regulates activities involving waters of the state and all waters of the U.S., as mandated by both the federal Clean Water Act and the California Porter-Cologne Water Quality Control Act.

The Wetland Program will be implemented within the Plan Area through individual project review and the associated CEQA process. Where development projects are proposed in or near wetlands, the Water Authority, pursuant to the CEQA review, must show that impacts to waters and wetland habitats have been avoided and minimized to the greatest extent feasible. For unavoidable permanent impacts to wetland habitat types, the Water Authority will compensate in accordance with the ratios identified in Table 6-7 to achieve the no-net loss standards. For USFWS section 7 consultations with the USACE and CDFG 1600 agreements, the USFWS and CDFG mitigation requirements for impacts to wetlands/Covered Species from Covered Activities to the maximum extent appropriate will be consistent with the commitments in this Plan. The Water Authority has developed or contemplates developing wetland mitigation HMAs at three wetland creation sites: Tijuana River Valley, San Luis Rey River, and Manchester. Also, San Miguel HMA has three acres of dry marsh/riparian scrub habitat and one acre of freshwater pond (see Section 6.8 below). The Manchester HMA has established created wetland habitat and retains un-allocated wetland mitigation credits. The Tijuana River Valley and San Luis Rey River HMAs are proposed for future construction (i.e., rehabilitation to wetland conditions), and wetland habitat credits are expected to be available to the Water Authority to mitigate any future wetland impacts.

6.7.1 Avoidance and Minimization within Existing Wetland Preserve Areas and Water Authority Easements

The avoidance and minimization measures described in Section 6.3 apply to all Covered Activities, but the Water Authority will also implement specific measures to retain wetlands in designated preserve, reserve and fee/easement areas within the Plan Area. Impacts to waters and wetlands mainly occur when the Water Authority conducts activities on linear facilities that pass through wetlands. Avoidance and minimization of impacts to wetlands within designated preserve/reserve areas will be assured through the implementation of measures outlined in Sections 6.4 and 6.5. Uses within easements inside a wetland preserve area are generally limited to O&M Activities at

existing facilities. All projects are subject to specific siting criteria which will direct facilities away from sensitive resources, such as wetland habitats, to the extent feasible.

6.7.2 Compliance with Fish and Game Code Sections 1602 and 1603(a)

This section identifies streamlined procedures for CDFG and the Water Authority to process Covered Activities that are subject to Fish and Game Code Sections 1602 and 1603(a).

The purpose of code Sections 1600-1616 is to protect and conserve fish and wildlife resources that could be substantially adversely affected by a substantial diversion or obstruction of natural flow of, or substantial change or use of material from the bed, bank, or channel of any river, stream, or lake. When implementing the code sections, CDFG enters into a legally binding Lake or Streambed Alteration Agreement (LSAA) with the entity proposing the alteration, which typically includes conditions of work to avoid and minimize substantial adverse impacts to regulated resources, and compensatory mitigation for unavoidable temporary and permanent impacts to fish and wildlife resources.

Section 1602(a)(1) requires the entity to submit to CDFG written notification regarding the proposed activity, in the manner prescribed by CDFG. Item 12 of the CDFG Notification of Lake or Streambed Alteration form requires the applicant to identify measures to protect fish, wildlife, and plant resources under three categories: a) describe the techniques that will be used to prevent sediment from entering watercourses during and after construction; b) describe project avoidance and/or minimization measures to protect fish, wildlife, and plant resources; and c) describe any project mitigation and/or compensation measures to protect fish, wildlife, and plant resources.

This Plan provides information responsive to item 12. The Plan adequately addresses item 12(a) in that it identifies requirements and references applicable Water Authority General Conditions and Standard Specifications that will be used to prevent sediment from entering watercourses during construction and after construction by implementing stormwater BMPs (Section 6.4.2.6) and a Habitat Restoration Program (Section 6.6). The Plan meets the requirement of items 12(b) and 12(c) by its inclusion of required avoidance and minimization of wetlands (Section 6.7.1) and minimization measures (Section 6.4); compensatory mitigation (Section 6.5) with specific habitat mitigation ratios (Tables 6-6 and 6-7); general biological conservation policies, including general Conditions of Coverage, avian breeding season restrictions, and biological buffers (Appendix B, Section 2.0); and species-specific management measures for covered plants (Appendix B, Section 3.0) and covered wildlife (Appendix B, Sections 4.0 through 8.0). By implementing the Plan sections listed above and the lake, stream, and river

work conditions listed in Appendix I, and by entering into a binding IA together with a standardized LSAA, described below, the Plan fulfills the purpose of a project specific LSAA for Covered Activities' impacts to covered habitat types, Covered Species, and other general fish, wildlife, and plant resources associated with the lakes, streams, and rivers. Covered Activities relying on this section will be identified in the annual report, and will include the applicable CDFG tracking number, identify the wetland vegetation communities and unvegetated channels impacted, including acreages and whether the impact is permanent or temporary, the wetland HMA utilized to offsite impacts together with the type and amount of credits debited, as well as restoration monitoring reporting for any temporary wetland impacts, and all other applicable reporting requirements identified in the Plan.

Code Section 1602 (Notification/Application)

To streamline completing the Notification of Lake or Streambed Alteration prepared for Covered Activities during the term of the IA, CDFG will consider the "Measures to Protect Fish, Wildlife and Plant Resources" fields complete when the information in the fields refers the reviewer to "San Diego County Water Authority NCCP/HCP sections 6.4.2 and 6.4.3." Also, CDFG will not require the entire Plan or the relevant Plan sections, the IA, or the associated Permits to be submitted with the Notification in order to consider it complete, since they will already be on file.

During the term of the IA, CDFG and the Water Authority may negotiate a written notification format other than as currently prescribed by CDFG if it is determined to be mutually beneficial to both CDFG and Water Authority.

Code Section 1603 (Agreement)

During the term of the IA, when a Covered Activity substantially adversely affects Covered Species or covered habitat types, the Plan and IA shall serve as the framework for the agreement identified in Fish and Game Code Section 1603(a), including the compensatory mitigation ratios in Tables 6-6 and 6-7, and Wetlands HMAs as off-site wetland mitigation areas.

If CDFG determines the Plan adequately protects (and, if necessary, adequately mitigates identified impacts to) existing fish and wildlife resources associated with the Covered Activity, CDFG will provide the Water Authority a standardized draft LSAA for the Covered Activity described in the notification no later than 30 days after deeming the notification complete. A standardized LSAA would contain those elements common to all LSAA's (e.g. unique notification number, recitals, term and effective date, language regarding extension, amendment, suspension and revocation, liability, and enforcement of the agreement, and concurrence), project location and description, amount and type of habitat impacted and amount, and type of mitigation (e.g. number of credits deducted from wetland HMA). Mitigation ratios will be taken from Tables 6-6 and 6-7. The LSAA

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will also incorporate, by reference, the protective measures contained in the Plan and Appendix I. Any measures proposed by CDFG in additions to those in the Plan and Appendix I will be subject to negotiation and the arbitration process pursuant to code Section 1603. As identified above, the annual report will include relevant information so that a Covered Activity is in compliance with the Plan and Abbreviated LSSA.

If CDFG finds that the Plan and IA does not provide adequate conservation and protection for existing fish and wildlife resources associated with the Covered Activity, and a project specific LSAA is necessary, CDFG will provide in writing a specific and detailed description of the affected resources and the information upon which its determination of substantial adverse effect is based no later than 30 days after deeming the notification complete. For example, a specific agreement may be prepared if the implementation of a Covered Activity has the potential to cause a substantial adverse impact to a non-covered but CDFG-recognized sensitive aquatic species where the CDFG finds, after considering the Plan, including the Covered Species Conservation Measures (Appendix B) that would be applied to the Covered Activity, that additional minimization and mitigation measures are necessary to ensure impacts to the non-covered sensitive species are less than significant.

During the Plan term, the habitat mitigation ratios identified in Section 6.5.1 and Tables 6-6 and 6-7 will be applied, and the wetland HMAs identified in the Plan will be the utilized to mitigate unavoidable permanent and temporal impacts to wetlands resources caused by Covered Activities implemented consistent with the Plan and IA, and that are subject to Fish and Game Code Sections 1600-1616. In addition, Covered Species general and specific conservation policies identified in Appendix B will apply to fish, wildlife, and plant resources avoidance, minimization, and mitigation measures for Covered Activities subject to Fish and Game Code Section 1600-1616.

Nothing in this Plan alters Fish and Game Code Section 1610. In those circumstances where Fish and Game Code Sections 1600-1616 do not apply, it shall continue not to apply. This section does not apply to projects or activities not covered by the Plan.

6.7.3 Vernal Pool Protection Policy

Vernal pools are naturally occurring seasonal wetlands, such as San Diego mesa hardpan vernal pools, San Diego mesa claypan vernal pools, vernal lakes, and alkali vernal pools, but also include road ruts (see Acronyms and Definitions). Vernal pools are supported by their surrounding watersheds, which comprise the adjacent lands whose runoff supports the seasonal water supplied to the pools. For some vernal pools, the watershed is clearly delineated by topographical features, but others do not have distinct watershed (topographical) boundary. If a vernal pool may be impacted by Covered Activities, a qualified Environmental Surveyor will establish the boundaries of the vernal pool and its watershed based on the best available survey and delineation methods.

This Plan anticipates that no permanent impacts to vernal pool complexes will occur under this Plan, which will ensure no net loss of vernal pool habitat. Temporary impacts or unavoidable permanent impacts will be mitigated in-kind, in accordance with Table 6-7 and the vernal pool policy measures below, in consultation with the Wildlife Agencies. If Covered Species are found to be present within the vernal pools, additional avoidance and minimization measures for Covered Species will be employed (see Appendix B).

As described in Section 5.1.1, jacking and boring are acceptable and proven techniques when open cut trenching is not desirable or feasible for pipeline construction. The Water Authority has used this method to avoid sensitive vernal pool resources and plant species on past projects, such as Second Aqueduct, Pipeline 5-E1. This construction method would be the preferred construction alternative for projects that may potentially impact vernal pool resources within the Plan Area. A site specific assessment of the hardpan or claypan conditions for the vernal pool will be conducted and a 100-foot or greater buffer will be established to ensure the hydrologic conditions of the watershed are not disturbed by jack and boring construction.

6.7.3.1 Vernal Pool Mitigation Measures

1. Identify watershed boundaries and hydrological characteristics for all vernal pools in the project area and ensure that project design features and mitigation measures protect the functionality of the watershed.
2. For unavoidable temporary impacts by a Covered Activity to vernal pools and watersheds, restore hydrological conditions and vegetation at the impacted location as directed by a restoration (including maintenance and monitoring) plan. The restoration plan will be prepared by a qualified Environmental Surveyor and address all vernal pool and watershed issues (a wetland-equivalent to the upland site restoration plans described in Section 6.6).
3. Post-construction weed control measures shall be implemented for a minimum of two years around the affected vernal pools to control non-native species and account for delayed non-native response due to disturbance.
4. In the event a ponded road rut occupied by a Covered Species may be affected by a Covered Activity, the Environmental Surveyor, project engineer, and construction manager will develop a plan to avoid the individual road ruts to the maximum extent feasible. In the event that avoidance is not possible, the Environmental Surveyor will provide recommendations for minimization and mitigation in accordance with this section, Appendix B, and the following measures implemented in accordance with a Wildlife Agency-concurred restoration plan:

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- a. Attempt to schedule activities that impact ponded road ruts by scheduling project activities outside the ponding period (e.g., when wetted soils are more liable to rut formation) to avoid excessive disturbance of substrate.
- b. Prior to disturbance of any road rut(s) containing Covered Species, the topsoil containing inoculum will be removed, packed, and stored until the contours of the ponded road rut can be replaced on-site. If possible, the ponded road ruts(s) will be re-contoured outside of road boundaries to prevent impacts from future activities.
- c. The inoculum will be re-spread in re-contoured ruts in accordance with the restoration plan.
- d. Each restoration plan will include success criteria that must be met within timeframes set in the plan. The project cannot be considered completed until the Water Authority receives concurrence by the Wildlife Agencies.

6.7.4 Quagga and Zebra Mussel Response and Control Action Plan

The Water Authority is participating in efforts to control the spread of quagga and zebra mussels within San Diego County. Together with CDFG, Member Water Agencies, and others, the Water Authority developed and released the San Diego Regional *Dreissena* Mussel Response and Control Plan, dated June 25, 2008. The Response and Control Plan is intended as a reference guide for Member Water Agencies and others considering available response and control options within a given system or body of water. The Water Authority supports all guidelines as published in the Response and Control Plan and has further evaluated and defined measures applicable to its infrastructure and operating characteristics in the preparations of a San Diego County Water Authority Quagga and Zebra Mussel Response and Control Action Plan

The Quagga and Zebra Mussel Response and Control Action Plan details management commitments of the Water Authority, and the action items are intended to meet the requirements of California State Assembly Bill 1683 (amendment to Fish and Game Code 2301) and other related state and federal regulations. The action plan will be reviewed annually, updated as required, and the Water Authority's implementation of quagga and zebra mussel responses will conform with the commitments of this Plan.

The Water Authority implements its Quagga and Zebra Mussel Response and Control Action Plan during draindowns (Section 5.2.2.1) to prevent mussel larva, if present in the water, from entering surface waters.

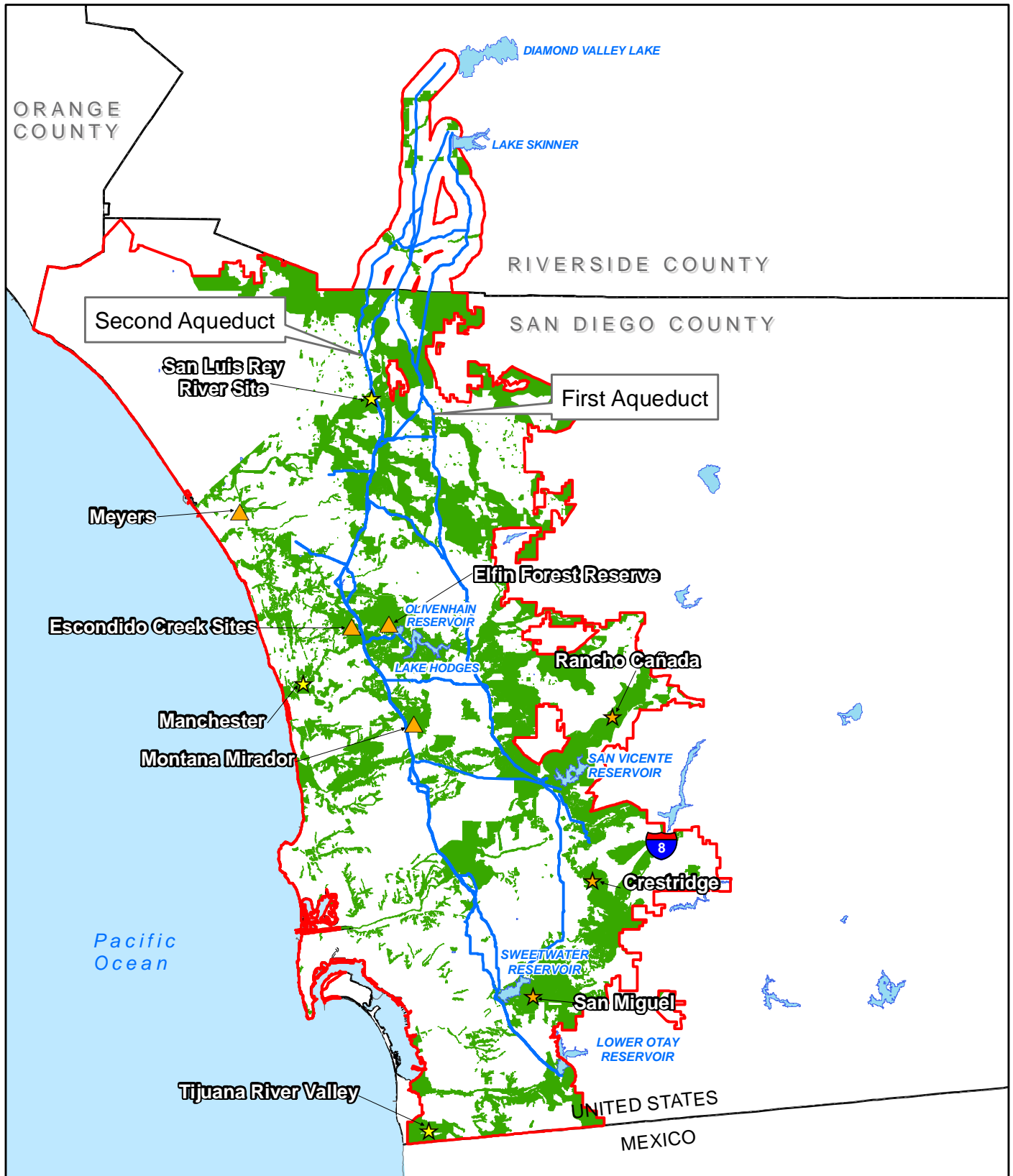
6.8 Preserve Area

Implementation of this Plan will contribute to the regional conservation of important habitat areas and Covered Species at the Water Authority's Preserve Area (the HMAs) and previously conserved properties (MMAs) within the Plan Area (Figure 6-1). The conservation approach will implement the goals and objectives identified in Section 6.1.

The overall conservation strategy for covered plant species focuses on establishing and ensuring the permanent management of a regionally significant Preserve Area that supports Covered Species by avoiding, minimizing and mitigating impacts to Covered Species and sensitive habitats at HMAs within the Plan Area. The Water Authority also will avoid, to the extent feasible, critical locations for Covered Species such as occupied habitat, distinctive clay soils in unoccupied habitat that may allow for population re-establishment, and adjacent native habitat that supports pollinators. Species-specific Conditions of Coverage will be implemented as necessary to enhance or protect habitat quality and increase population size. These may include mitigation measures such as enhancing declining populations, restoring damaged habitat, and establishing seed banks (see Appendix B).

The conservation strategy for covered wildlife focuses on establishing a regionally significant Preserve Area that supports Covered Species and potentially occupiable habitat. These sites are within BSRAs and often adjacent to, or managed as part of, other regionally significant conserved habitat areas. Avoidance and minimization of occupied habitat within rights-of-ways will also occur when feasible. Maintenance of existing habitats within rights-of-way and minimization of and mitigation for impacts within rights-of-way habitat will help maintain linkages between habitat blocks that consist of upland and riparian vegetation types suitable for breeding, foraging, and dispersal of covered wildlife species. As described in Appendix B, other measures will include, but are not limited to, avoidance and minimization of impacts to small seasonal ponds and vernal pools; avoidance and protection of riparian areas and lakes; retention of Covered Species nesting habitat adjacent to aquatic habitat; minimization of the width of linear impacts within substantial patches of oak woodland and riparian forest for nesting and foraging raptors; and maintenance of grasslands, pastures, and agricultural edge habitats within the Plan Area for raptor species.

The Plan's Preserve Area provides native habitat occupied by Covered Species, and the remaining upland and wetland habitat acres/credits in the Preserve Area provides/will provide appropriate habitat to compensate for unavoidable impacts from Covered Activities. Currently, the Water Authority has three upland HMAs: Crestridge HMA, San Miguel HMA, and Rancho Cañada HMA (also known as the Rancho Cañada de San Vicente y Mesa del Padre Barona). The Water Authority is also pursuing wetland habitat credit at two wetland creation sites, Tijuana River Valley HMA in the city of San Diego, and San Luis Rey River HMA within the unincorporated county, and has established the



- NCCP/HCP Plan Area
- ~ Existing/Planned Aqueducts and Pipelines
- Biologically Significant Resource Areas
- ★ Wetland HMA Sites
- ★ Upland HMA Sites
- ▲ Upland MMA Sites



FIGURE 6-1
Water Authority Preserve Area and
MMAs with Biologically Significant Resource Areas

Manchester HMA adjacent to Lux Creek in the city of Encinitas. In addition, the Water Authority previously acquired and transferred ownership/management of several properties (MMAs) as upland mitigation sites for the ESP that provide regional conservation value as well as satisfying species-specific mitigation requirements.

The locations of the Preserve Area properties in the Plan Area are shown in Figure 6-1. The recent acquisition of the Rancho Cañada HMA by the Water Authority provides unique conservation contributions: (1) Approximately 275 acres of sensitive habitats beyond the specific mitigation requirements were acquired and will provide regional conservation benefits for Covered Species, and will not be used to directly mitigate for impacts to Covered Species (see Table 6-11). The Rancho Cañada HMA is being conserved and managed with Water Authority funds; (2) This habitat purchase “frees-up” other agencies’ and organizations’ acquisition funds to acquire other properties in the Ramona area; (3) The Rancho Cañada HMA provides watershed protection for San Vicente Reservoir; and (4) The purchase by the Water Authority removed lands being actively marketed from probable future development. The Water Authority’s acquisition of the Rancho Cañada HMA also helped expedite CDFG’s acquisition of The Nature Conservancy (TNC) adjacent Monte Vista property (4,050 acres), completed in October 2008.

6.8.1 Upland Habitat Mitigation Areas

The sensitive habitats and documented/expected Covered Species at the three primary upland HMAs are described below (see Figure 6-1). Because this regional conservation plan covers a large and varied area, and the distributions of the Covered Species vary within the Plan Area, not all of the Covered Species are present at each preserve area property. However, the locations of the preserve lands throughout San Diego County support a diversity of conserved vegetation and Covered Species, and together they contain many of the diverse habitats and Covered Species that are expected to be impacted by the Covered Activities. As described in Section 8.3.2, Acquisition of Habitat Mitigation Credits or Preserve Area, additional habitat lands that support Covered Species may be acquired to provide/augment conservation for certain species, if needed, to address impacts from Covered Activities.

The HMA habitat acreages available for mitigating impacts from Covered Activities by the Water Authority’s use will be quantified as credits. Rancho Cañada HMA is limited to providing mitigation credits solely towards the CSP, with unallocated habitat acres providing general regional conservation benefits. Credits will be deducted from the appropriate upland HMA at the ratios established in Table 6-6, or as agreed upon by the Water Authority and Wildlife Agencies. The formal mitigation banking agreement for San Miguel HMA and the mitigation credit ledger sheets for San Miguel HMA and Crestridge HMA are included in Appendix J.

6.8.1.1 Crestridge HMA

Crestridge HMA provides as-needed pre-approved mitigation lands for CIP project impacts. The multiple-parcel site is located south of Interstate 8 (I-8) at the eastern edge of the city of El Cajon in San Diego County. Crestridge HMA is owned by CDFG, which it manages together with the adjacent Crestridge Ecological Reserve.

The Crestridge Ecological Reserve, including the Water Authority portion (i.e., Crestridge HMA), is managed under an existing draft management plan prepared by the Conservation Biology Institute in 2002. The management plan is currently being revised and updated by the Conservation Biology Institute under contract to CDFG, and should be completed and finalized in 2009. The management plan will be written to comply with MSCP guidelines for preserve management and includes an adaptive management component. The Crestridge HMA will be managed together with the larger ecological reserve pursuant to the final habitat management plan.

Diegan coastal sage scrub habitat comprises approximately 90 percent of the site, with southern mixed chaparral comprising approximately nine percent. The Diegan coastal sage scrub habitat is of high quality, and the southern mixed chaparral has connectivity to larger expanses of chaparral northeast of the site. Disturbed areas account for one percent of the site (PSBS 1994). Numerous sensitive plant species are known to occur within the scrub and chaparral habitats on-site. The large expanses of high-quality scrub and chaparral habitats also provide habitat for many sensitive wildlife species.

Table 6-9 provides details on the use and status of the mitigation credits as of December 31, 2008. Approximately 17.91 acres of coastal sage scrub credits and 24.8 acres of southern mixed chaparral credits are currently available within the Crestridge HMA. All off the available credits at Crestridge HMA are committed for use by Covered Activities. The Water Authority also reserves the rights to enter an agreement with the Wildlife Agencies to add 2.6 acres of additional coastal sage scrub credits based on habitat restoration work on-site.

**TABLE 6-9
SUMMARY OF CRESTRIDGE HMA MITIGATION CREDITS (acres)**

Bank/Conservation Area	Initial Credits	Deductions	Available Credits
Coastal Sage Scrub	233.65	215.74	17.91
Chaparral	24.80	0	24.80
Disturbed Land	2.60	0	2.60 [†]
Total Credits	261.05	215.74	45.31

[†] Proposed for restoration and credit (not presently available).

Lakeside ceanothus (*Ceanothus cyaneus*), covered plant species, is known to occur within Crestridge HMA. Covered amphibian and reptile species detected within or adjacent to the site include western spadefoot, Coronado skink (*Eumeces skiltonianus*

interparietalis), San Diego horned lizard, Belding's orange-throated whiptail, and northern red-diamond rattlesnake (*Crotalus ruber ruber*). Covered avian species detected within or adjacent to the site include coastal California gnatcatcher, southern California rufous-crowned sparrow, and Bell's sage sparrow. Covered mammal species detected within or adjacent to the site include mountain lion (*Felis concolor*) and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). Other Covered Species, such as coastal (western) whiptail (*Aspidoscelis tigris multiscutatus*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), and Dulzura California pocket mouse (*Chaetodipus californicus femoralis*), also have potential or are expected to occur within the site. For additional information on known Covered Species occurrences or potential for occurrence on Crestridge HMA, refer to the species-specific conservation analyses in Appendix B.

6.8.1.2 San Miguel HMA

The 1,186-acre San Miguel HMA is an existing conservation bank that is part of the larger 1,852-acre San Miguel Ranch conserved land, located in Chula Vista near Mother Miguel and San Miguel Mountains. The conservation bank is part of the San Diego National Wildlife Refuge Complex (Refuge) and is managed in accordance with the conservation banking agreement (see Appendix J). Credit use has been pre-determined by banking agreements established for the property in 1999, and assumed by the Water Authority (see Appendix J). Of the 1,186 credits at the San Miguel HMA, 600.94 credits currently are available for sale to private parties and public agencies with the concurrence of the Wildlife Agencies, or are reserved for Covered Activities as described by this Plan. The Water Authority initially acquired 820.85 credits of the San Miguel HMA in 2003 in anticipation of mitigation requirements under this Plan. The purchase price for credits at the bank includes a per-acre fee provided to an endowment dedicated to funding monitoring and management activities for species and habitats within the bank. With the purchase of credits, the Water Authority is entitled to rely on the monitoring and management assurances provided in the banking agreement.

The bank supports a number of upland habitats that provide very high habitat value for sensitive species. In addition to high quality coastal sage scrub, the site supports chamise and mixed chaparral, native grasslands, riparian scrub, freshwater marsh, and seasonal ponds. Diegan coastal sage scrub habitat comprises approximately 85 percent of the parcel. Non-native grassland, native grassland, southern mixed chaparral, chamise chaparral, and freshwater marsh comprise the remaining 15 percent. Several stock ponds and ephemeral drainages are also present (Merkel and Associates 1997).

The site supports a rich species biodiversity, including a number of sensitive Covered Species. Numerous sensitive bird, reptile, and mammal species are known to occur on the HMA lands. San Miguel Ranch supports a very high diversity of plant and wildlife species, which may be attributed to the large amount of undeveloped land within and

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adjacent to the site, highly variable topography, relatively low disturbance, and connectivity to the Otay Lakes, Sweetwater Reservoir, Sweetwater River, and Mother Miguel and San Miguel Mountains. Several wildlife corridors have been identified on-site that facilitate wildlife movement between areas of the San Miguel and Jamul mountains, as well as the wetlands surrounding the Sweetwater Reservoir and Sweetwater River corridors (Merkel and Associates 1997).

Table 6-10 provides a summary of the initial and available credits at the San Miguel HMA as of December 31, 2008. The deductions do not include 26 acres of Diegan Coastal Sage Scrub that have been reserved, but not used, to address Pipeline 6 impacts.

**TABLE 6-10
SUMMARY OF SAN MIGUEL HMA MITIGATION CREDITS (acres)**

Bank/Conservation Area	Initial Credits	Deductions	Available Credits
Diegan Coastal Sage Scrub	1,034.00	543.21	490.79
Southern Mixed Chaparral and Chamise Chaparral	132.00	34.10	97.90
Perennial Grasslands	16.00	7.75 ¹	8.25
Marsh/Riparian Scrub	3.00	0	3.00
Seasonal Stock Pond	1.00	0	1.00
		585.06	600.94
Total Acres	1,186.00		

¹ 7.70-ac Otay tarplant.

Prior to the October 2007 Harris Fire, habitats within the San Miguel HMA and adjoining San Miguel Ranch have been documented to support a number of covered plant species, including San Diego barrel cactus (*Ferocactus viridescens*), California adolphia (*Adolphia californica*), Munz's sage (*Salvia munzii*), Otay tarplant (*Hemizonia conjugens*), and San Diego marsh elder, occurring in common or abundant numbers. Other covered plant species observed include variegated dudleya (*Dudleya variegata*) and San Diego golden star (*Muilla clevelandii*).

Covered wildlife species are also well represented on-site including high numbers of western spadefoot toad and moderate numbers of San Diego horned lizard, Belding's orange-throated whiptail, and coastal western whiptail. Additional covered reptile and mammal species known to occur on-site include northern red-diamond rattlesnake, and coastal rosy boa (*Lichanura trivirgata roseofusca*), San Diego black-tailed jackrabbit, and mountain lion. In addition, an abundance of small mammal species provides adequate prey for predators, such as raptors, snakes, coyotes (*Canis latrans*), and bobcats (*Felis rufus*).

Over 120 avian species are known to occur on-site, utilizing the upland habitats for breeding, foraging, or wintering. Covered Species present include coastal California gnatcatcher, San Diego cactus wren, southern California rufous-crowned sparrow, Bell's sage sparrow, and grasshopper sparrow.

6.8.1.3 Rancho Cañada HMA

Rancho Cañada HMA, in conjunction with adjacent lands owned by CDFG, San Diego County Parks and Recreation, and Bureau of Land Management (BLM), is an important core habitat conservation area. The property is situated between the coastal mesas and the mountains of the Peninsular Ranges in west-central San Diego County and is part of a proposed network of open-space under the MSCP. County of San Diego Parks and Recreation lands (Ramona Serena) lie adjacent to the northern and northwestern boundaries, and CDFG's adjacent lands (Monte Vista Ranch) lie adjacent to the boundary from the northeastern side to the southwestern corner.

The property is also part of an identified wildlife corridor between larger non-contiguous areas of open space to the southwest that are managed by MCAS Miramar, CDFG, city of San Diego, and county of San Diego, and lands to the northeast that are managed by county of San Diego, BLM, and Cleveland National Forest (TNC 2006). San Vicente Creek is the dominant and central feature of the property, and the property contains the creek channel, floodplain, and a portion of the hills to the northwest of the creek, which provide for local movement of wildlife. Continued acquisitions by other MSCP participants will further secure the movement of key wildlife species (e.g., migrating birds, coyote, bobcat, mule deer [*Odocoileus hemionus*], and mountain lion) through this significant regional linkage.

The property has exceptional plant and wildlife habitat value due to the presence of San Vicente Creek and the diverse mosaic of vegetation communities, including non-native grassland, Diegan coastal sage scrub, chaparral, oak woodland, riparian forest, wetland, and intermittent stream habitats.

The Water Authority purchased this 390-acre property to provide a significant, important habitat contribution by the Plan. Part of the property (115.04 acres) has been allocated to mitigate biological impacts associated with the CSP. However, approximately 275 acres of sensitive vegetation communities that support Covered Species will be committed to the Preserve Area as an "additional contribution to conservation" by the Water Authority, and may not be used as credit for mitigating Plan impacts. To put this contribution in perspective, the additional habitat acreage is approximately 70 percent of the Plan's total anticipated impact acreage (373 acres) over the life of the Plan. The Water Authority has entered into an agreement with DFG that the 275 acres will be committed as conserved and managed habitat to the Plan (by DFG), in perpetuity, concurrent with Plan and Permit issuance. The agreement also includes a reserved right

by the Water Authority to use all remaining acres (except disturbed lands) as credits to mitigate other Covered Activities if this Plan is not approved. This provision was included because the CSP is anticipated to commence construction before the Plan and IA are finalized. Mitigation credits are summarized in Table 6-11.

**TABLE 6-11
SUMMARY OF RANCHO CAÑADA MITIGATION CREDITS (acres)**

Bank/Conservation Area	Initial Acres	CSP Deductions	Contributed Conservation Acres
Coast Live Oak Woodland	29.60	16.97	12.63
Coastal Sage/Chaparral Scrub	80.56	--	80.56
Diegan Coastal Sage Scrub	81.82	--	81.82
Fresh Water Marsh	4.07	4.07	0
Southern Coast Live Oak Riparian Forest/Southern Cottonwood- Willow Riparian Forest	34.70	17.86	16.84
Southern Mixed Chaparral	83.74	76.14	7.60
Urban/Disturbed	8.27	--	8.27
Non Native Annual and Foothill Grassland	67.25	--	67.25
Total Credits (approximate)	390.01	115.04	274.97

CDFG took ownership of Rancho Cañada HMA in December 2007 and has not yet drafted a management plan for the site. The land purchase agreement between CDFG and the Water Authority (signed September 24, 2007) provides for a long-term endowment fund transfer to CDFG once the Water Authority Plan is approved and permitted. Those funds will initiate development of an adaptive management plan for Rancho Cañada HMA. The anticipated timeline for completion of the adaptive management plan is two years to collect baseline biological data (2008-2009) and two years to draft, finalize, and circulate the plan (completion estimated by 2011-2012). However, the Water Authority annually provides funds to CDFG to perform interim management until such time as the long-term endowment funds are made available.

Suitable conditions are present to support San Diego thorn-mint (*Acanthomintha ilicifolia*), a Covered Species, and the baseline biological surveys will confirm its status. A number of wildlife Covered Species are known, or reported, to occur on the property, including arroyo toad, San Diego horned lizard, Coronado skink, Belding's orange-throated whiptail, southern California rufous-crowned sparrow, and yellow warbler (*Dendroica petechia*). In addition, the following covered wildlife species have potential to occur within or adjacent to Rancho Cañada HMA: (northern) red-diamond rattlesnake, Southern Pacific (southwestern) pond turtle (*Clemmys marmorata pallida*), least Bell's vireo, San Diego desert woodrat (*Neotoma lepida intermedia*), and mountain lion (TNC 2006, K. Miner 2009). For additional information on known Covered Species occurrences or potential for occurrence on Rancho Cañada refer to the species-specific conservation analyses in Appendix B.

6.8.2 Wetland Habitat Mitigation Areas

The Water Authority is in the process of planning and/or creating three wetland HMAs to satisfy mitigation requirements for Existing and Planned Projects. These include the Tijuana River Valley and San Luis Rey River HMAs and the existing Manchester HMA (see Figure 6-1). Because the first two sites do not currently support viable wetland habitat, restoration and/or creation will be required to establish suitable wetland conditions. The Water Authority intends to be the exclusive user of any created credits, but reserves the right to pursue formal mitigation banking agreements for these locations. Covered Species that would benefit from these sites include, but are not limited to, arroyo toad, least Bell's vireo, yellow warbler, southwestern willow flycatcher, and yellow-breast chat (*Icteria virens auricollis*).

6.8.2.1 Tijuana River Valley HMA

The approximately 40-acre Tijuana River Valley HMA is a wetland creation project currently in the design phase, with construction expected to commence in 2011. The final Environmental Impact Report for the Water Authority's Tijuana River Valley Wetlands Mitigation Project, dated December 2008, provides project specific information, including identified impacts and mitigation measures. In summary, the Water Authority will create approximately 40 acres of wetland habitat made up of approximately 80 percent southern willow scrub, 10 percent mulefat scrub, 5 percent freshwater marsh, and 5 percent cottonwood willow woodland. The site is currently a relatively flat area of agricultural fields and does not support native habitat. Approximately 19 acres of created habitat will be allocated to mitigate impacts for CSP and ESP. Although located within a flood plain, a berm and constructed basin separate the northern portion of the site from the Tijuana River (Water Authority and Dudek 2007). The project requires removing the berms that separate the project site from the Tijuana River, constructing new berms to contain storm flow to the project site, grading to achieve the desired hydraulic gradient, installing a temporary irrigation system, and planting native wetland vegetation. To implement the project, approximately 3.41 acres of disturbed southern willow scrub, 0.023 acre of mulefat scrub, 0.3 acres of open channel, and 0.071 acre open water will be temporary impacted due to site grading. Approximately 0.003 acre of southern willow scrub, 0.082 acre of mulefat scrub, and 0.029 acre of open water will be permanently impacted by the project.

The wetland creation would result in permanent direct impacts to 30.40 acres and temporary direct impact to 3.44 acres of land designated as critical habitat for least Bell's vireo. Of this area, only 3.41 acres support "primary constituent elements" for the species. The affected 3.41 acres of disturbed southern willow scrub is considered occupied by the species. This wetland creation project is proposed as a Covered Activity. Approximately 23.25 acres of created habitat is identified as project specific mitigation for ESP, CSP, and construction associated with creation of this wetland HMA,

leaving approximately 16.75 acres of wetland habitat as future mitigation credits. The 3.44 acres of least Bell's vireo critical habitat to be impacted by this wetland restoration project will be replaced with higher quality least Bell's vireo habitat in the same location so that ultimately, the amount of critical habitat suitable for least Bell's vireos will not change. Table 6-12 identifies the proposed habitat creation.

**TABLE 6-12
SUMMARY OF TIJUANA RIVER VALLEY HMA MITIGATION CREDITS (acres)**

Habitat Type	Created Habitat Acres Proposed	Acres	
		reserved for Mitigation	Unallocated Acres
Freshwater Marsh	2.00	0.75	1.25
Cottonwood Willow Riparian Forest	2.00	0.21	1.79
Southern Willow Scrub	32.00	21.68	10.72
Mulefat Scrub	4.00	1.01	2.99
Total	40.00	23.25	16.75

6.8.2.2 San Luis Rey River HMA

The Water Authority proposes to create approximately 33 acres of riparian/wetland habitats along the San Luis Rey River. The San Luis Rey HMA is currently in the early planning process, and detailed habitat information on the existing conditions is not currently available. The San Luis Rey wetland creation project is expected to begin construction in 2015. Table 6-13 identifies the proposed habitat creation.

**TABLE 6-13
SUMMARY OF SAN LUIS REY HMA MITIGATION CREDITS (acres)**

Habitat Type	Acres Proposed
Riparian Coast Live Oak Woodland	7.60
Sycamore Riparian Woodland	17.77
Cottonwood Willow Riparian Forest	4.24
Cottonwood Willow Riparian Forest	1.77 (enhancement)
Mulefat Scrub	1.36
Total	32.98 (wetland/riparian)

6.8.2.3 Manchester HMA

The Manchester HMA on Lux Canyon Creek in the city of Encinitas is approximately 9.83 acres. The wetland mitigation project site originally consisted of disturbed non-wetlands habitat adjacent to Lux Canyon Creek. A final EIR was approved in July 2003, and construction occurred between October 2004 and March 2005. The design planned for the creation of 7.74 acres of riparian scrub and herbaceous wetlands, and 2.0 acres of upland revegetation. Monitoring conducted in April 2008 showed wetland container

plant survival was approximately 90 percent, native cover was 77.73 percent, and exotic non-native cover was less than 5 percent. Therefore, the performance of the site exceeded all of the year-three success standards. The uplands revegetated areas are also performing well with an average cover of approximately 70 percent. During 2002 through 2004, gnatcatcher was observed in the project area. During post-construction site visits, gnatcatcher has been heard calling in the upland habitat west and north of the site. Other wildlife detected during vegetation monitoring (based on scat and tracks) include mule deer, brush rabbit, coyote (*Canis latrans*), raccoon (*Procyon lotor*), and numerous bird species (Water Authority 2008). The year three monitoring report indicated that 50 native plant species were established on-site, with dominant species such as southwestern spiny rush (*Juncus acutus* ssp. *leopardii*), evening primrose (*Oenothera elata* ssp. *hookeri*), broad-leaf cattail (*Typha latifolia*), western ragweed (*Ambrosia psilostachya*), and arroyo willow (*Salix lasiolepis*) (Water Authority 2008). Continued plant and strata (i.e., understory and overstory) development will provide greater food, cover, and nesting resources in the future. The wetland creation and upland revegetation areas are expected to provide future suitable habitat for least Bell's vireo and gnatcatcher, respectively. Table 6-14 identifies the actual habitat creation.

**TABLE 6-14
SUMMARY OF MANCHESTER HMA MITIGATION CREDITS (acres)**

Habitat Type	Acres (Existing)	Acres debited for Mitigation	Unallocated Acres
Riparian (Mulefat and Willow)	7.83	6.1	1.73
Scrub/Herbaceous wetlands			

6.9 Managed Mitigation Areas

The upland mitigation lands described below are significant contributions to regional San Diego conservation planning efforts (see Figure 6-1), which the Water Authority obtained and conveyed to other NCCP/HCP participants as part of the ESP mitigation. Although the Water Authority cannot use these lands as mitigation for Covered Activities and they are not part of the Plan's Preserve Area, the lands contribute to the baseline of regional preserve lands and conservation of Covered Species by protecting contiguous blocks of suitable habitat on which Covered Species are known to occur or have the potential to occur. These lands were acquired by the Water Authority after extensive consultations with the Wildlife Agencies and local jurisdictions as a commitment to contribute properties (habitat lands) within core areas and linkages to augment regional conservation efforts by local cities and the county of San Diego. The cities (i.e., city of Oceanside and city of San Diego) and the county of San Diego agreed to manage these conservation lands as parts of their conservation reserves in perpetuity as one of the conditions of the Water Authority's funding of the acquisitions. This Plan will cover

impacts to Covered Species from management and monitoring activities on these properties, if not already covered by other approved conservation plans.

6.9.1 Myers Property

The 35-acre Myers Property Habitat Management Plan (HMP) area is located within and owned and managed by the city of Oceanside. The HMP area is located in the south-central portion of the city of Oceanside and serves as part of the last remaining western/coastal wildlife corridor link between northern Carlsbad and Camp Pendleton. Loma Alta Creek and one of its tributaries are located just outside the northern and western boundaries, respectively, of the HMP area (EDAW 2004).

The HMP area is dominated by two native vegetation communities, Diegan coastal sage scrub, and southern willow scrub (EDAW 2004). The coastal sage scrub and riparian habitat of the HMP area can support a large number of sensitive plant and animal species. Covered plant species that have been identified as having the potential to occur within the site include thread-leaved brodiaea, San Diego thornmint, and San Diego ambrosia (*Ambrosia pumila*) (EDAW 2004). One covered wildlife species, coastal California gnatcatcher, has been observed within the site, and the following covered wildlife species are likely to occur: least Bell's vireo, San Diego horned lizard, and northern red diamond rattlesnake (EDAW 2004). In addition, this site includes 21 acres of very high quality, core gnatcatcher habitat (Water Authority 2004c).

6.9.2 Montaña Mirador Property

The 538-acre Montaña Mirador Preserve Site is located within the southern portion of the 1,314-acre Black Mountain Open Space Park in the community of Rancho Los Peñasquitos, city of San Diego. The Black Mountain Open Space Park is owned and managed by the city of San Diego. A 325-acre portion of the Montaña Mirador parcel was purchased by the Water Authority for the city of San Diego and dedicated as open space, and the remaining 213 acres were purchased through a Wildlife Conservation Board grant for inclusion in the Black Mountain Open Space Park (City of San Diego 2004).

The Montaña Mirador Preserve Site is situated on the south-facing slope of Black Mountain Peak and supports two native vegetation communities, Diegan coastal sage scrub and coastal sage-chaparral scrub (City of San Diego 2004). The coastal sage scrub and coastal sage-chaparral scrub habitats support many sensitive plant and wildlife species. Covered plant species known within or adjacent to the site include California adolphia, variegated dudleya, and San Diego barrel cactus. Covered wildlife species known within the site include coastal California gnatcatcher, southern California rufous-crowned sparrow, orange-throated whiptail, and San Diego horned lizard. In

addition, approximately 185 acres of the sage scrub/sage-chaparral scrub habitats are coastal California gnatcatcher core habitat (City of San Diego 2004).

6.9.3 Escondido Creek Uplands

The Escondido Creek Uplands located in the vicinity of Escondido Creek in the northern part of San Diego County are made up of two properties: the 24-acre Meyerhoff property and 13-acre Rohan property. They are owned and managed by the county of San Diego. The Meyerhoff property contains 17 acres of very high quality native habitat, with 16 acres of coastal sage scrub. The Rohan property is comprised entirely of very high quality coastal sage scrub habitat (Water Authority 2004c).

The entire 16 acres of coastal sage scrub within the Meyerhoff property and the entire 13-acre Rohan property are considered to be core habitat for the coastal California gnatcatcher.

6.9.4 Elfin Forest Reserve

The Water Authority owns the 750-acre Elfin Forest Reserve located in San Marcos (Olivenhain Municipal Water District 2008). Olivenhain Municipal Water District, with funding provided by the Water Authority, operates and manages the property. Portions of the Elfin Forest Reserve encompass the area immediately surrounding the Olivenhain Reservoir.

The Elfin Forest Reserve supports southern coast live oak riparian forest, coast live oak woodland, coastal sage scrub and chaparral habitat. One covered plant species, Encinitas baccharis, is known to occur on the property, and species with potential to occur include Orcutt's brodiaea (*Brodiaea orcuttii*) and felt-leaved monardella (*Monardella hypoleuca* ssp. *lanata*).

Covered wildlife species known to occur include western spadefoot toad, Belding's orange throated whiptail, coastal (western) whiptail, coastal rosy boa, San Diego ring-neck snake (*Diadophis punctatus similes*), San Diego horned lizard, loggerhead shrike (*Lanius ludovicianus*), Bell's sage sparrow, and coastal California gnatcatcher. Covered species with the potential to occur include San Diego banded gecko (*Coleonyx variegatus abbotti*), northern red diamond rattlesnake, Coronado skink, southern California rufous-crowned sparrow, San Diego black-tailed jackrabbit, and northwestern San Diego pocket mouse (Ogden 1995).

6.10 Additional Mitigation Lands

Although this Plan provides the anticipated and required conservation (and management) to address the projected impacts from Covered Activities, the Water Authority may acquire additional habitat lands within the Plan Area to address mitigation needs for Future Projects, if necessary. Prior to committing to acquire additional mitigation lands, the Water Authority will submit the proposed acquisition as a minor amendment to the Plan to the Wildlife Agencies for their written concurrence (See Section 8.3). These lands would meet one or more of the following criteria:

- Make a significant contribution to regional natural open space design and benefit Covered Species and sensitive resources;
- Provide breeding, sheltering, and foraging habitat for Covered Species that will be impacted and for which impacts need to be mitigated;
- Provide comparable habitat values to those habitats impacted;
- Provide a key ecological function for adjacent areas of sensitive habitat; and
- Ensure long-term viability of the site as a sensitive resource preserve.

After establishment of a new mitigation area, the Water Authority may transfer ownership or arrange for an entity to permanently manage it. The Water Authority will retain all unused mitigation credits and will provide a one-time endowment to establish an annuity for land management purposes, if necessary. The amount of the endowment will be established by agreement with the receiving management entity, both of which will be developed in concurrence with the Wildlife Agencies. The specific terms of land transfer will be made a part of individual HMA land transfer agreement or conservation banking agreement entered into by the Water Authority and the Wildlife Agencies.

A PAMP would be developed in coordination and concurrence with the Wildlife Agencies for any additional lands acquired for mitigation credit purposes. The PAMP may include constructing necessary fences, gating appropriate access roads, blocking inappropriate access to the site, performing necessary repairs and clean-up of debris, conducting site patrols, removal of invasive weed species, periodic Covered Species surveys, and assessment of habitat quality. Any draft PAMP prepared for new lands must be submitted to the Wildlife Agencies for review and concurrence before it can be finalized (see Section 6.11).

6.11 Preserve Management and Adjacency Guidelines

This Plan establishes practices to manage the Preserve Area and avoid and minimize, and mitigate when necessary, impacts to preserve areas within the Plan Area. Unlike most other conservation plans, this Plan does not authorize major public recreational uses, agriculture, general development, mineral extractions, or other activities that could affect areas adjacent to or within its Preserve Areas or other plans' preserved areas. Funding to implement the identified actions will be derived from the existing management budgets or from endowments established for each preserve area.

Because the Water Authority has written agreements that transferred (and funded, if part of the transfer agreement) management and monitoring of these lands to other entities, those activities will be implemented by the Wildlife Agencies and other entities as the land managers. This Plan expects that the land managers will prepare a PAMP (with an adaptive management component) consistent with the requirements of this Plan, if a PAMP has not already been prepared, within two years of permit issuance (for existing Preserve Area properties, unless otherwise noted in Section 6.7), or within two years of acquisition and approval of new Preserve Areas or approvals of new habitat mitigation sites (e.g., wetland HMA/mitigation banks). PAMPs will be updated, if necessary, every five years. For the San Miguel HMA, the management plan will be prepared in accordance with the conservation banking agreement (see Appendix J).

In addition, the Water Authority and Preserve Area managers will review any existing PAMP to determine if additional management and monitoring efforts are required to meet the requirements of this Plan. If additional efforts are required, then the Preserve Area manager will revise the PAMP and the Water Authority and Preserve Area managers will determine the additional costs that will be provided to the Preserve Area endowment fund within one year of permit issuance. The PAMPs will identify and provide detailed descriptions of the land management actions, restrictions, and practices that will be undertaken to maintain effective habitat for the Covered Species. The guidelines below provide the framework that Preserve Area managers will use when preparing the management plans. In addition, Preserve Area managers will provide information to non-participant, adjacent landowners to avoid/minimize conflicts with preserve commitments. All draft and revised PAMPs must be submitted to the Wildlife Agencies for review and concurrence by the appropriate compliance staff. Concurrence (or non-concurrence with recommended changes) will be provided within 60 days of receiving the documents. If no comments are received, the plan will be considered acceptable.

6.11.1 Fire Management

1. Prepare site-specific fire management plans. Include local fire department contacts and guidelines for pre-fire prevention activities, fire suppression, and post-fire restoration.
2. Include sufficient setbacks to allow for fuel management zones to be established outside of conserved habitat areas (up to 100 feet from structures and 30 feet from roads) for new projects and facilities.
3. When available, fuel management zones should take advantage of existing roads and disturbed or developed habitats, thus avoiding sensitive habitats.
4. Establish fuel management zones pursuant to the Wildland/Urban Interface Development Standards (San Diego County Fire Chief's Association, revised 1997). If necessary, exceptions to avoid impacts to sensitive species and habitats will be identified by the preserve managers and concurrence sought from the local fire authority.
5. Clearing of vegetation shall be conducted outside of the avian breeding season (as described in Section 6.4.2.1 in this Plan) unless a pre-construction nesting survey (at least one survey to be conducted by a qualified Environmental Surveyor no more than five days prior to clearing activities) determines that no nesting birds will be impacted by clearing activities. If clearing must occur in such a time or manner as may affect nesting birds, the Preserve Area manager shall consult with the Wildlife Agencies to review any issues prior to the initiation of activities.
6. Impacts to narrow endemic plant populations will be avoided during firebreak maintenance operations. However, if high fuel load levels develop in a given year, mowing would have to occur in order to meet firebreak requirements.
7. If clearing must occur in such a time or manner as may adversely affect sensitive resources, the preserve manager will consult with the Wildlife Agencies and fire agency to minimize impacts prior to project initiation.
8. All post-fire actions, such as restoration, invasive species removal, erosion control, or trail stabilization, will be planned in consultation with the Wildlife Agencies prior to project initiation.

6.11.2 Public Use

1. Maintain effective access control through fencing and signage, regular enforcement patrols, and penalties.

2. Develop an educational/outreach program to inform the public and adjacent landowners about allowable uses and activities in and around the preserve. The program may include distributing brochures in surrounding neighborhoods, working with home owners associations in the vicinity, developing an informational website, installing educational kiosks, providing outdoor experiences, etc.
3. Encourage scientific research within the Preserve Area by allowing access to researchers and students. Scientific research projects are subject to approval by the Preserve Area manager, who shall informally discuss the merits of the proposed work with the Wildlife Agencies.
4. Coordinate with special interest groups and Wildlife Agencies to encourage volunteer opportunities, such as trash pick up and weed removal, that support the goals of this Plan.

6.11.3 Fencing

1. Eliminate unnecessary fencing from interior habitat areas that may impede the movement of native wildlife
2. Maintain or install fencing when necessary to:
 - a. limit road kills;
 - b. direct wildlife through wildlife movement corridors, including under-crossings
 - c. discourage off-trail use that may cause habitat degradation;
 - d. to control grazing;
 - e. protect erosion control or revegetation efforts;
 - f. protect native vegetation during construction;
 - g. protect particularly sensitive resources (e.g., vernal pools, small populations of sensitive plants, etc.); and
 - h. provide public safety or security.
3. Select fencing that best accomplishes access control with minimal wildlife interference. Fencing to control human use of an area will generally be a minimum of five to six feet high. Fences within or at the boundary of the conserved habitat will consist of three- or five-strand barbed wire, which does not

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significantly impede wildlife movement. Welded-wire, tall wooden fences, or stone walls are all potentially suitable at the perimeter of human use areas to restrict human and domestic pets from the Preserve Area. Fences that function to minimize road kills will be 10 feet tall in areas where mule deer are known or have the potential to occur. Six-foot fences should be sufficient in areas that do not support mule deer.

4. Maintain fence lines in a way that minimizes impacts to sensitive species and habitats.

6.11.4 Signage

1. Provide educational brochures, interpretive centers, and signs to educate the public about the preserve conservation goals, biological/physical resources, and appropriate uses on and adjacent to the preserve.
2. Install signage for access control and education at the periphery of conserved habitat that are open to human access. Post signs to prohibit firearms, unleashed pets, and all pets in highly sensitive areas.
3. Limit the use of signs to attract attention to sensitive species, since such designation may invite disturbance of their habitat.
4. Use temporary signs to indicate habitat restoration or erosion control areas.
5. Use barriers and informational signs to discourage shortcuts.

6.11.5 Removal of Trash and Debris

1. Loose trash and debris will be removed on an as-found or reported basis. Trash and debris can be an attractant and a hazard for wildlife and may support non-native ant species (e.g., Argentine ants).
2. Wildlife-proof trash receptacles will be located in or near all areas of public access. Public use areas will be patrolled to pick up any loose trash and debris, and the trash receptacles will be emptied regularly, based on the amount of use.

6.11.6 Lighting and Noise

1. Eliminate lighting in or adjacent to conserved habitat except where essential for roadway use, facility use, safety, or security purposes.

2. Use low-pressure sodium illumination sources. Do not use low voltage outdoor or trail lighting, spotlights, or bug lights. Shield light sources adjacent to conserved habitat so that the lighting is focused downward.
3. Incorporate a 100-foot buffer zone between the edges of lighted areas and conserved habitat. Fuel management zones that may be required could be considered part of the buffer zone. Buffer zone width could vary with lighting intensity, lighting type, use of shields, and topography.
4. Public access shall not be allowed during nighttime hours in the conserved habitat to eliminate the need for additional lighting in parking lots and other facilities.
5. Address potential indirect effects of noise at the nest location of least Bell's vireo by keeping noise levels at or below 60 dB(A) $L_{eq(1)}$ or an increase of three decibels above ambient noise levels, whichever is greater, during the breeding season. For other avian species, follow guidance for the Covered Species (Appendix B). Avoid the use of noise-generating equipment and noise-generating public activities.
6. Prepare and disseminate informational materials to adjacent neighbors and users of conserved habitat areas to educate the public on the importance of minimizing edge effects such as nighttime lighting and noise.

6.11.7 Feral and Domestic Animal Control

1. Document evidence of feral or domestic animal activity in Preserve Areas.
2. If a problem exists, establish a feral animal removal program for conserved habitat or refer the problem to the local animal control agency.
3. Prohibit Preserve Area management personnel from housing or allowing domestic pets in or near conserved habitat.
4. Fence areas between conserved habitat and adjacent housing to keep pets out of Preserve Areas, to the degree feasible.

6.11.8 Cowbird Trapping

1. Document and monitor the extent of cowbird parasitism on Covered Species nests in conserved habitat and near equestrian use areas where feed is given and stored, such as stables, feed lots, staging corrals, and equestrian trails.

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2. If necessary, establish a cowbird-trapping program to increase nesting success of Covered Species affected by cowbird parasitism.
3. Adaptively implement cowbird trapping as necessary in response to observed and/or documented parasitism. Place traps in select locations that maximize cowbird captures and reduce cowbird parasitism pressures. Traps shall be checked daily to minimize effects to non-target species during all periods of trap operation.

6.11.9 Invasive Exotic Species Control

1. Prioritize areas for exotic species control based on aggressiveness of invasive species and degree of threat to the native vegetation. The Preserve Area manager will monitor those species of high priority for eradication as determined by the *California Invasive Plant Inventory* (Cal-IPC 2006). Species with a Cal-IPC rating of “high” will be a priority for eradication, with the objective to control and remove it as soon as possible after discovery. Examples of high priority plant species include giant reed (*Arundo donax*), salt cedar (*Tamarix spp.*), castor bean (*Ricinus communis*), fennel (*Foeniculum vulgare*), tree tobacco (*Nicotiana glauca*), artichoke (*Cynara cardunculus*), and pampas grass (*Cortaderia spp.*). “Moderate” or “Limited” rated species may be allowed at low population levels following initial eradication efforts.
2. Where feasible, use an integrated pest management (IPM) approach to eradicate undesirable species; i.e., use the least biologically intrusive control methods, at the most appropriate period of the growth cycle, to achieve the desired goals.
3. Consider both mechanical and chemical methods of control. Only herbicides compatible with biological goals and consistent with reservoir management goals will be used. Licensed pest control advisors qualified under the Department of Pesticide Regulations will be used to make specific pest control recommendations.
4. Dispose of all exotic plant materials that are removed from Preserve Areas at a landfill or on-site at a secure, designated location to avoid the spread of non-native plant species through seeds or propagules. Exotic vegetation shall be chipped and staged in a designated mulch site. All exotic plant materials will be covered during transport and the compost pile will be periodically spot-treated with herbicide to kill any resprouting plants. Exotic plant material will be removed off-site to a green waste recycling facility, or otherwise legally disposed of, as necessary.
5. Revegetate invasive plant and exotic weed removal areas with native species appropriate to biological goals for the area and/or adjacent native habitat.

6. Control the spread of invasive ant species by following the guidelines below:
 - a. Ensure that all ornamental landscaping and native habitat restoration materials do not contain invasive ant or other species by inspecting all container stock before it enters Preserve Areas.
 - b. Control landscaping irrigation adjacent to Preserve Areas to avoid any overflow, which may attract non-native ants by increasing soil moisture.
 - c. Empty trash receptacles located along trails and/or associated with edges of the Preserve Area on a regular basis, as determined by the manager's monitoring of actual needs.

7. Manage exotic aquatic predators such as nonnative turtles, fish, bullfrogs, and crayfish by following the guidelines below:
 - a. Monitor and control exotic aquatic predators when in conflict with native species.
 - b. Coordinate with Wildlife Agencies to implement exotic animal trapping and eradication activities when necessary. Methods may include trapping, netting, electro fishing, or hand captures. Chemical control in aquatic areas is generally not compatible within drinking water reservoirs.

6.11.10 Guidelines for Species Introduction and Reintroduction

Some Covered Species may be appropriate for introduction or reintroduction to a Preserve Area as part of a mitigation project or as part of a recovery effort for listed and/or sensitive species. Species reintroduction may be appropriate where extirpations have occurred. Where suitable habitat conditions exist but no historic record of species occurrence is known, species introduction may also be considered provided the suitable habitat is available. Species introduction and/or reintroduction will be implemented after concurrence with the Wildlife Agencies and under the following conditions:

- Will occur within designated preserve lands (with concurrence of preserve manager);
- Will not damage the genetic integrity of neighboring species and/or populations;
- Preceded by a thorough investigation of the cause for the absence, decline, or extirpation of a species at a particular site, with appropriate remedies applied;
- Will not adversely alter existing ecology;
- Implemented under an adaptive management strategy;

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- Performed through consultation and concurrence by the Wildlife Agencies;
- Will not interfere with projects, actions or O&M Activities (Covered Activities) permitted by this Plan; and
- Subsequent incidental take of introduced individuals/populations by Covered Activities would conform to the requirements of the Plan.

6.12 Plan Monitoring and Adaptive Management

Monitoring and adaptive management of the HMAs will be implemented to ensure that the Water Authority is in compliance with Plan requirements (MMAs are managed with similar requirements by other entities in accordance with their own conservation plans), to measure the effectiveness of conservation actions, and to provide additional information that will help direct or redirect conservation actions to benefit the Covered Species. The progress on and status of all Preserve Area properties and management/monitoring plans will be reported in the Plan's annual report summary. Interim monitoring and management will be consistent with Sections 6.12.1 through 6.12.3. Adaptive management, a key component in conservation plans, provides a strategy to deal with the changes and variability of natural systems. This Plan requires that an individual PAMP for each of the HMAs include an adaptive management component. The adaptive management strategy used must be consistent with the guidelines described in Section 6.12.3. For the San Miguel HMA, which is managed as a National Wildlife Refuge and in accordance with the conservation banking agreement for this area, the purchase price for credits at the bank includes a per-acre fee provided to an endowment dedicated to funding monitoring and management activities for species and habitats within the bank. With the purchase of credits, the Water Authority is entitled to rely on the monitoring and management assurances provided in the banking agreement.

6.12.1 Monitoring and Reporting

Monitoring. To confirm that the anticipated impacts to Covered Species and their habitat are not exceeded, and the mitigation elements of this Plan are implemented, the Water Authority will implement a program to monitor projects and maintenance activities, conduct field personnel education training, and report annually to the Wildlife Agencies. Managers of the HMAs will provide information to the Water Authority for incorporation into the annual report. The Wildlife Agencies will review the annual monitoring report to confirm compliance with the terms of the permits and effectiveness of management of the Preserve Areas. An annual meeting will be held, potentially in conjunction with an annual public meeting for other conservation plans within the Plan Area.

There are three components to a monitoring program: Compliance Monitoring, Effectiveness Monitoring, and Validation Monitoring (see Section 6.12.2).

Compliance Monitoring will track Covered Activities' impacts, mitigation measures (including stay ahead and rough step commitments), and conditions of coverage to document that the habitat conservation strategies are being implemented in accordance with Permit conditions. The report would include documenting the types, amounts, and locations of impacts, the offsetting mitigation, and the significant conditions of coverage undertaken during the reporting period. Compliance Monitoring provides a record of activities implemented to address conservation strategies or components. This information allows the Wildlife Agencies to track Plan implementation, and the Water Authority expects that the land managing entities, in coordination with the Water Authority and Wildlife Agencies, will use this information to modify and improve monitoring and reporting methods.

Effectiveness Monitoring will evaluate the success of management activities to address specific habitat and Covered Species objectives in the Preserve Areas during the reporting period. Each Preserve Area's PAMP is/will be written to address the individual property's habitat conditions and Covered Species. The results of these annual monitoring efforts will be used by preserve managers to determine if the Conditions of Coverage are sufficient for conserving and managing the resources and if modifications or new management (and monitoring) efforts are warranted. Adaptive management recommendations will be provided, as necessary, to improve the effectiveness of the Plan.

Validation Monitoring will be used to help preserve managers (and the Wildlife Agencies) verify if the Plan's assumed causal linkages between management actions and predicted results or expected future conditions outlined in the conservation analysis are supported.

Reporting. Annual reporting will verify:

- Habitat losses and take of Covered Species by Covered Activities allowed under the Permits issued for this Plan are not exceeded;
- Avoidance and minimization measures are implemented in accordance with this Plan;
- Off-site and on-site mitigation measures are completed in accordance with this Plan;
- Consistent and complete documentation of all actions is provided pursuant to the Plan; and
- Provision of a consolidated record of any Plan, Permits, or IA amendments.

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Annual reporting will involve report submittal to the Wildlife Agencies by January 31 of each calendar year (or other date as agreed upon by the Water Authority and Wildlife Agencies). A public meeting on the report will be held within 60 days of the report submittal or in conjunction with the MSCP or MHCP annual meetings. The report will include:

- The incremental and aggregate habitat losses and incidental take of Covered Species (estimated or documented) that occurred under the Plan, based on pre- and post-construction surveys of new project work and an accounting of maintenance impacts (rough step/proportionality accounting), including:
 - Acres of impact to each habitat type by project;
 - Whether the habitat was permanently lost, or temporarily degraded and/or restored;
 - List and quantification of Covered Species potentially or known to be affected;
- The HMA credits/acres (used and remaining) in a ledger-type accounting format by habitat types, and any conservation/mitigation bank augmentations;
- Confirmation that specified treatments including, but not limited, to weed control and habitat restoration or enhancement, resulted in expected habitat characteristics;
- Documentation of field personnel training conducted at the start of each project;
- Analysis/discussion of any Changed Circumstance addressed;
- Analysis/discussion of any Unforeseen Circumstance identified and/or addressed;
- Description and location of Covered Activities (aggregated for each reporting year for O&M Activities);
- Date or period during which Covered Activities occurred and expected completion dates (if not within the reporting year);
- A description of approved, funded CIP projects and their anticipated impacts for the subsequent two years;
- A detailed account of funding used during the reporting year and funding committed for the following year;
- Any project review actions made to determine Plan consistency;

- Any revisions/amendments to the Plan, Permits, or IA;
- Issues that needed adaptive management;
- Discuss all three types of monitoring activities;
- Identify challenges and constraints to implementing the Plan;
- Summarize the status of PAMP development for each of the HMAs;
- Report on compliance with pre-existing BOs (the requirements of which are incorporated herein by reference);
- Preserve management tasks completed or in progress; and
- Evaluation of Covered Species management.

The Water Authority is obligated to submit an annual report covering similar requirements under BO 1-6-93-F-28, as well as under other BOs. This Plan's reporting program, along with that to be implemented under the BOs, will be submitted concurrently, either as a single document or with the BOs as supplemental reports.

All PSF activities will be summarized in the annual report, and individual PSFs will be made available for review by the Wildlife Agencies upon request.

6.12.2 Guidelines for Biological (Effectiveness/Validation) Monitoring

The biological monitoring goals and accompanying guidelines presented in this section will help Preserve Area managers determine if the conservation targets in the Preserve Areas are being met, management strategies are having the desired effect, and underlying biological assumptions are supported by field-tested data.

- Track the distribution and condition of natural communities and habitats throughout the Preserve Area.
- Regularly monitor Covered Species and other sensitive species to determine abundance, and distribution over time.
- Conduct effectiveness and validation monitoring.
- Identify and monitor threats to habitat condition, including introduction or spread of invasive species and other edge effects.
- Monitor the effects of public use.

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Biological monitoring will serve to measure the effectiveness of the overall conservation approach, support informed adaptive management decisions, assist in defining and modifying biological goals, and provide the Wildlife Agencies with information to conduct range-wide assessments of baseline conditions and species status (USFWS 2000). To ensure proper implementation of the Plan, the Water Authority also will be responsible for habitat tracking and reporting and coordination of an annual meeting with the Wildlife Agencies and public. The Preserve Area managers will be responsible for Preserve Area monitoring and management.

It is important to prioritize the components of monitoring in a way that can be efficiently conducted within a reasonable budget and schedule. The following framework guidelines have been developed to assist the Preserve Area managers in prioritizing monitoring tasks. Biological monitoring goals specific to each HMA will be incorporated into the respective monitoring plans and adaptive management components (Section 6.12.3) as appropriate.

1. Conduct annual qualitative surveys to identify the major threats to conserved habitat and Covered Species, impacts from public use, management needs, and issues requiring focused research.
2. Coordinate regularly with Wildlife Agencies, preserve managers in other NCCP areas (e.g., MSCP and MHCP monitoring meetings) and other relevant efforts about monitoring issues to ensure that the most current, established protocols are being used and monitoring data are compatible with regional monitoring efforts.
3. Conduct compliance monitoring using a simple management action tracking system (e.g., a spreadsheet or similar table to track planned actions and phases of implementation).
4. Conduct effectiveness monitoring (the frequency of which will be identified in the individual Preserve Area monitoring and adaptive management plans):
 - a. For all conserved habitat types (including vernal pools) evaluate the effectiveness of habitat conservation as measured by the condition of the habitat over time. Identify a set of habitat indicators such as the extent of nonnative species invasion, diversity of habitat structure, hydrology, or presence of key indicator species.
 - b. Conduct focused species monitoring for high priority species (state or federally listed, narrow endemic, or wetland obligate species) to monitor the effectiveness of the conservation actions (e.g., habitat set aside or specific habitat enhancement actions) over time. As conservation actions and conditions of coverage are shown to be effective for sensitive

habitats and Covered Species, effectiveness monitoring priorities can be shifted to more precisely evaluate other species and habitats.

- c. Conduct presence-absence and/or relative abundance surveys for less sensitive species and wildlife corridor use.
5. Monitor the success of restoration projects annually for at least three to five years or until the habitat is considered to be self-sustaining and meets all success criteria. All restoration projects should include a restoration monitoring plan that describes specific success criteria.
 6. Conduct validation monitoring prior to conducting any major conservation or management activity to test the underlying biological assumptions.
 - d. Review the scientific literature and consult with species and habitat experts.
 - e. Identify the presumed causal mechanism(s) linking cause and effect and develop the research design to test the linkage relationships. Ensure that the research testing will not significantly affect a conserved vegetation community or Covered Species (if biological manipulation is involved, limit the geographic extent of the test and number of any Covered Species involved).

6.12.3 Adaptive Management Strategy and Framework Guidelines

While the Water Authority believes that the conservation in this Plan will be effective to conserve Covered Species and their habitats, it is anticipated that conditions within the Plan Area, the status of habitats, and the overall conditions of individual species may change over time. In addition, it is expected that as the monitoring data and management activities are evaluated, additional and different management/conservation measures will be identified and implemented by the Preserve Area managers during the term of the Permits. In the event that changes to management/conservation measures are warranted for the long-term protection and conservation of Covered Species or their habitats, the Water Authority, with the cooperation of the Wildlife Agencies and other land managers who are responsible for management and monitoring of the Preserve Areas, supports adaptive management.

As described in Section 6.11, existing PAMPs will be revised as appropriate to address (adaptive) management and monitoring relevant to the Covered Species, if not already addressed in those plans. All new PAMPs will be developed to address management and monitoring relevant to the Covered Species. The Water Authority will provide funding to the Preserve Area endowments to support those activities.

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As described in Sections 8.5.1 and 8.5.2, if the extent of changes to the condition of the resources is substantial, the processes for addressing Changed Circumstances and Unforeseen Circumstances may be initiated by the Water Authority and Preserve Area managers.

Section 2805 (a) of the Fish and Game Code defines adaptive management as the use of the results of new information gathered through the monitoring program and from other sources to adjust management strategies and practices to assist in providing for the conservation of Covered Species.

The USFWS and the National Oceanic and Atmospheric Administration (NOAA) “five-point policy” provides a general definition of adaptive management as an integrated method for addressing uncertainty in natural resource management that incorporates a structured process for learning by doing.

Adaptive management provides the framework and methods for developing and evaluating alternative strategies for meeting measurable biological goals and objectives, and, when warranted, modifying management actions in accordance with new findings or insights. It serves as the basis for incorporating flexibility in the long-term planning and management of species and their habitats. In the case of this Plan, adaptive management may be required as new, reliable scientific information on Covered Species becomes available after the Plan is approved. Because the management responsibility for the Preserve Areas falls to the Wildlife Agencies and other management entities, any adaptive management deemed necessary within a Preserve Area property shall be initiated and carried out by the individual Preserve Area managers.

Biological monitoring and management are mandatory elements of all NCCPs and HCPs, and interdependent components of any adaptive management program. The framework guidelines below will be used by Preserve Area managers as the basis for developing new or modify existing management actions for each of the Preserve Areas. The guidelines below focus on the protection and improvement of habitat and the Covered Species, as well as avoiding or minimizing the primary threats to the Preserve Areas. Habitat/adaptive management-related guidelines are presented in order to ensure that adaptive management is a component of the conservation strategy for the Covered Species. Adaptive management components of the management/monitoring plans that are developed for each Preserve Area property will outline specific goals, measurable objectives, timelines, and thresholds/triggers for initiating actions to benefit habitats and Covered Species.

Actions that are undertaken to implement adaptive management will be those that are expected to maintain or improve habitat conditions that will benefit the Covered Species. The actions will developed and monitored to ensure maintenance and/or improved habitat quality or Covered Species populations and with the intent of providing a net benefit to the Covered Species.

The adaptive management/monitoring approach for each Preserve Area will follow the guidance in Atkinson, et al. (2004) *Designing Monitoring Programs in an Adaptive Management Context for Regional Multiple Species Conservation Plans*. The basic approach involves:

- Identify specific goals and objectives;
- Identify the scope of the monitoring program;
- Compile information relevant to the monitoring program;
- Strategically divide the system and prioritize the monitoring elements;
- Develop simple management-oriented conceptual models;
- Identify monitoring approaches (what, where, how to monitor) and critical uncertainties;
- Determine the strategy for implementing monitoring;
- Develop data collection, analysis, reporting and quality assurance processes; and
- Complete the adaptive management feedback loop for use by managers.

To the extent practicable, PAMP approaches developed under this Plan will complement and utilize existing and developing approaches from the MSCP and MHCP efforts.

6.12.3.1 Adaptive Management Guidelines – Goals and Objectives

The adaptive management program goals and objectives developed for the Plan's Preserve Areas will address, as appropriate, landscape features/processes, vegetation communities/assemblages, and Covered Species supported on those lands. This Plan establishes a Preserve Area to be managed by several different management entities and located within several other, larger habitat reserve systems. The Preserve Area will be affected by many of the same landscape-level issues (e.g., fire, hydrology, habitat connectivity, edge effects, non-native species) and support many of the same natural community assemblages and species, so the goals and objectives will be similar among the upland preserves and among the wetland preserves. These goals and objectives also would be expected to complement those developed by other plans for their reserve areas.

Each of the Preserve Area properties will have its particular specific adaptive management needs, concerns and opportunities. However, the following list identifies

the basic elements from which individual Preserve Area managers would select to develop their adaptive management plans (adapted from the Southern Orange County Draft NCCP, 2006):

1. Fire

Goal: Manage fire to maintain a healthy ecosystem in the Plan Area such that the Preserve Area supports a mosaic of multi-aged stands of upland habitats.

Objectives:

- Develop fire management plans for the Preserve Area;
- Identify appropriate temporal and spatial scales/patterns for fires that will support/enhance conserved vegetation communities and Covered Species;
- Develop prescribed fire management standards for woodlands, shrublands (coastal sage scrub and chaparral), and grasslands focused on increasing abundance and diversity of native plants and promoting structure and composition favored by focal wildlife species;
- Quantify the effects of varying fire regimes on selected wildlife species; and
- Develop fuel management standards (within and adjacent to the Preserve Area) to reduce the risk of unplanned fire events.

2. Hydrology

Goal: Maintain natural hydrologic process to the extent possible to preserve natural ecosystem structure and function. Successfully addressing many of these processes will involve solutions by adjacent landowners/jurisdictions.

Objectives:

- Identify and address potential effects of future (adjacent/upstream) land use changes on hydrology;
- Minimize alterations of the timing of peak flows in watersheds/creeks;
- Maintain and/or restore stream banks/beds and floodplains;
- Identify/monitor water quality problems and protect/manage water quality using in-stream and watershed habitat improvements; and
- Measure soil moisture status and trends (in conjunction with habitat and species status monitoring).

3. Habitat Connectivity

Goal: Maximize the value of habitat linkages and wildlife corridors connecting Preserve Area properties to larger blocks of habitat in the Plan Area.

Objectives:

- Identify key habitat linkages and wildlife corridors;
- Determine key functions as “live-in” and/or dispersal habitat;
- Monitor the use of key identified habitat linkages and wildlife corridors by key Covered Species;
- Identify and measure stressors on wildlife such as lighting, noise, public use at key linkages and corridors; and
- Identify and implement feasible remedial actions to improve the function of the habitat linkage/wildlife corridor to an acceptable level.

4. Edge Effects and Encroachment

Goal: Control human-caused effects along the Preserve Area wildland/urban interface.

Objectives:

- Identify, monitor and control invasion of the Preserve Area by exotic plants and animals;
- Minimize establishment/continued presence of potential edge impacts such as lighting, noise, non-natural stream flow and soil moisture increases, pollutants and pesticides; and
- Protect sensitive resource areas from unauthorized public access and associated impacts such as vehicles (motorized vehicles and mountain bikes), encampments and disturbance and collection of native species.

5. Conserved Vegetation Communities

Goal: Maintain the persistence of a native-dominated mosaic of vegetation communities and seral stages in the Preserve Area.

Objectives:

- Maintain the acres of conserved vegetation communities (by tiers or individual subtypes) and associated species/assemblages, while allowing natural

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fluctuations/seral stage development of communities and fluctuations in species populations in response to natural events (e.g., flood, fire, precipitation);

- Maintain the ability of the Preserve Area to support sustainable populations of Covered Species;
- Maintain and, where feasible, enhance long-term net habitat value in order to mitigate for proposed impacts and to further recovery of listed Covered Species;
- Restore or enhance the quality of degraded vegetation communities and other habitat types; and
- Use restoration to increase long-term net habitat value in the Preserve Area.

6. Covered Species

Goal: Maintain conditions that will allow for normal evolutionary processes and genetic integrity and exchange through management of a functional Preserve Area, including functioning vegetation communities, habitat linkages and wildlife corridors. Manage habitat and populations of Covered Species ensure that they persist and in doing so, provide for recovery of Covered Species within the Plan Area.

Objectives:

- Identify, as appropriate, key indicator (biodiversity, umbrella, early warning) species/species assemblages for prioritizing monitoring;
- Maintain populations of selected Covered Species within acceptable/historical levels; and
- Implement appropriate management actions in response to environmental stressors and management issues, as necessary, to stabilize or enhance populations of Covered Species.

7.0 Funding of the Plan

This Plan will be funded through existing financial management policies and procedures as described in the Water Authority's "Adopted Operating and Capital Improvement Program Multi-Year Budget." Implementation of this Plan shall be funded as a capital cost under the CIP Mitigation Program approved by the Water Authority Board in September 1992 or within individually approved CIP project budgets, and/or the annual operating budget of its Water Resources Department. The Water Authority estimates its long-term financial needs based on the CIP, and has adopted a two-year budget cycle to address short-term funding and expenditures.

The Water Authority will fully fund the implementation of this Plan, except as follows:

- The Water Authority is not responsible for funding for USFWS and CDFG agency review and monitoring of plan implementation. Such functions are part of the agencies' statutory and regulatory responsibilities; and,
- The Water Authority is not responsible for costs associated with management and monitoring of HMAs subsequent to establishing the endowment or equivalent funding mechanism. However, where previously provided endowment funds are not sufficient to fully implement the requirements specified in this Plan, the Water Authority will coordinate with Preserve Area managers to identify any funding deficiencies and provide the additional funds necessary to fully comply with the management and monitoring requirements of this Plan.

While not expected to occur, should the Water Authority's costs to implement, monitor, and report on the Plan's measures exceed the budgeted amount, Water Authority staff would secure the required additional funding through one of the following methods: 1) utilize individual project's reserve funds; 2) transfer funds within program budgets; and/or 3) request budget augmentation from the Board, as necessary.

Changing task level budgets within a project or moving funds within a program require approval from an authorized supervisor or manager. Transferring funds between CIP projects or increasing the project budget requires approval from the Water Authority Board. The Water Authority Board, in approving this Plan, commits to provide the funding necessary to implement the Water Authority's obligations under the Plan.

7.1 Financial Capacity of the Water Authority to Fund the Plan

The Water Authority is a special district established in 1944 under the County Water Authority Act by the California State Legislature. The Water Authority is able to raise necessary revenues to fund its operations through a number of sources including, but not limited to, water sales, bonds sales, connection charge on new water meter connections, and water standby availability charges. Revenues from fees for new connections help fund the CIP program to meet future demand. Multiple revenue sources, in conjunction with adequate reserves, impart a substantial degree of financial stability to the Water Authority. The considerable number of consumers served by the Water Authority's Member Water Agencies is essentially a stable and reliable source of revenue, which enhances financial stability. For eight consecutive years, the Water Authority has been awarded the Certificate of Achievement in Financial Reporting from the Government Finance Officers Association for its Annual Comprehensive Financial Reports, which provide detailed accounting of all revenues and expenditures.

In June 2009, the Water Authority Board adopted its multi-year budget for Fiscal Years 2009-2010 and 2010-2011 (Fiscal Year [FY] 2010 and FY 2011). The adopted Operating and Capital Improvement Program Multi-Year Budgets for FY 2010 and FY 2011 are available from the Water Authority. The largest sources of revenues (90 percent of all revenues) derive from water sales and net bond fund withdraws; over 90 percent of the expenditures are for water purchases and treatment, CIP and debt service (Tables 7-1 and 7-2).

**TABLE 7-1
COMPOSITION OF REVENUES**

Revenue Type	Percent
Water Sales	58.3
Net (Bond) Fund Withdraws	30.6
Property Taxes/In Lieu Charges	1.3
Infrastructure Access Charges	2.8
Investment Income	1.6
Water Standby Availability Charges	1.3
Hydroelectric Revenues	0.2
Contributions in Aid of CIP	1.3
Capacity Charge	0.7
Other Income	1.9

**TABLE 7-2
COMPOSITION OF EXPENSES**

Expense	Percent
Water Purchases and Treatment	46.2
CIP	33.6
Debt Service	12.6
Operating Departments	5.5
Equipment Replacement	0.2
Other Expenses	1.9

The FY 2010 and FY 2011 multi-year budget appropriates \$1.65 billion, of which the CIP allocations are \$258.6 million and \$297.1 million, respectively (\$555.7 million total), toward the full CIP improvements budget of \$3.77 billion.

To date, the Water Authority has expended more than \$1.6 billion toward the completion of its CIP improvements. The CIP Mitigation Program, funded since 1992, has an approved budget of \$23.8 million, with \$9.15 million remaining in this assured funding source that can be used to complete the Plan, develop wetland creation plans, acquire land, and develop long-term USACE, and CDFG wetland permits. The Mitigation Program is supplemented by the inclusion of mitigation funds in each individual CIP project's overall budget. For example, the ESP and CSP budgets carry additional environmental mitigation funds to address the needs of these specific projects. In addition, program or project budgets would be augmented to purchase mitigation lands or establish endowments if required. In the event that previously allocated funds are insufficient to meet the mitigation obligations, the Water Authority management can request the Water Authority Board to direct CIP Program funding to augment individual project budgets to cover additional costs and to cover unanticipated costs to implement commitments of this Plan. Overall, the Water Authority maintains a diverse revenue base and consistently evaluates existing and potential revenue sources to ensure that funding of all Water Authority projects, including the implementation of this Plan, are adequate.

The Water Authority is in the midst of the largest CIP in its history. With a \$3.77 billion budget and a two-year appropriation of \$619 million (FY 2007/08 and FY 2008/09), the CIP is one of the largest among California urban water agencies. Its 49 projects represent a substantial investment in regional supply diversification and system reliability. Adapting to the CIP lifecycle requires regular reassessment of organizational resources. As completed projects are brought online, they increase the scope and complexity of system operations. In the future, as the program approaches buildout, there will be a decreased demand for CIP-related resources and increased O&M-funding needs. The principal challenge is managing this dynamic while at the same time containing costs, achieving long-term strategic goals, and responding effectively to external threats and opportunities. The most recent Comprehensive Annual Financial Report (FY 2007-2008) has been approved and is available on the Water Authority

website. For more detailed fiscal information on past or current fiscal performance, the full text of Annual Financial Reports is available on the Water Authority's website.

7.2 Funding for Plan Elements

Funding for the acquisition of preserve (mitigation) lands and management and monitoring of those preserve lands has been largely provided or allocated already by the Water Authority (Table 7-3). This situation is in contrast to most NCCP/HCP plans, which rely on future funding for the majority of their acquisitions and management/monitoring. Additional habitat or mitigation credits may be required to meet the mitigation requirements for Covered Activities if the HMAs do not have the appropriate habitat. Similarly, for those HMAs that have not been fully established (i.e., Tijuana River and San Luis Rey River wetlands), and if this Plan requires additional management and monitoring on certain HMAs to address Covered Species, the Water Authority will provide the necessary funding through existing financial management policies and procedures as described in the Water Authority's Adopted Operating and Capital Improvement Program Multi-Year Budget.

7.2.1 Mitigation Acquisition Funding

As part of the Plan, the Water Authority has established HMAs (described in Sections 1.1.4 and 6.8) that will serve as the primary sites for mitigating habitat and Covered Species impacts. All of the HMAs are, or are expected to be, managed by government entities pursuant to written agreements between the Water Authority and those entities. The Wildlife Agencies are the Preserve Managers of the upland HMAs and have prepared or will prepare the Preserve Area Management Plans for those lands.

The Crestridge HMA has been established and existing credits are being used to mitigate CIP projects. Remaining credits at Crestridge HMA are expected to be utilized for Planned Projects prior to the same credit type being debited from the San Miguel HMA.

The Wildlife Agency- approved San Miguel Conservation Bank (HMA) was acquired by the Water Authority in 2003 to satisfy mitigation needs for existing, planned and future CIP projects and O&M Activities pursuant to requirements of this Plan. It is managed by the USFWS as part of the San Diego National Wildlife Refuge Complex and is an important component of the MSCP regional preserve system.

In 2007, the Water Authority funded the acquisition of the Rancho Cañada HMA for use as partial mitigation for the CSP and as a contribution to regional conservation under this Plan. CDFG has agreed to manage the property (with Water Authority funding), and

**TABLE 7-3
FUNDING OF THE NCCP/HCP PROGRAM**

Component	Fund Source	Funding Status	Acquisition or Endowment (and annual expenditure)
Mitigation Site Acquisition or Credit Purchase			
<u>Upland HMAs</u>			
Crestridge	CIP	Acquired	\$2.3M
Rancho Canada	CIP	Acquired	\$5.8M
San Miguel	CIP	Acquired	\$2.5M
Upland Bank Credits	CIP	Allocated	\$9.15M*
<u>Wetland HMAs</u>			
Manchester	CIP	Acquired**	N/A
Tijuana River	CIP	Acquired**	N/A
San Luis Rey River	CIP	Acquired	\$1.9M
Wetland Bank Credits	CIP	Allocated	\$9.15M*
Mitigation Site Management and Monitoring			
<u>Upland HMAs</u>			
Crestridge	CIP	Provided	\$264,981 (\$7,950/yr.)***
Rancho Canada	CIP	Provided	\$419,689 (\$18,887/yr.)****
San Miguel	CIP	Provided	\$218,870 (\$6,566/yr.)***
<u>Wetland HMAs</u>			
Manchester	CIP	Approved	\$40,000 (\$1,200/yr)***
Tijuana River	CIP	Approved	\$200,000 (\$6,000/yr.)***
San Luis Rey River	CIP	Allocated	TBD*
Water Authority Program Management	CIP	Allocated	\$70,000/yr.

* For Planned Projects through FY 2011; other Planned and Future Covered Activities will be allocated funds from the remaining \$2.17 billion CIP Budget.

** County of San Diego has granted the Water Authority in perpetuity use of the property as a wetland mitigation bank site.

*** Assumes 3 percent per year net return

**** PAR assumed 4.5 percent per year net return.

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prepare a management plan within two years of permit issuance, in conformance with this Plan. The potential to use “excess” habitat acres above those required to mitigate the CSP as mitigation credits will not be sought by the Water Authority unless specific, additional habitat and Covered Species-benefiting enhancements are made to the property and agreed to by the Wildlife Agencies.

This Plan has already established three wetland HMA sites. Wetland mitigation credits are available at the Manchester HMA, where the county of San Diego is the underlying fee landowner. Under an existing long-term funding agreement between the county of San Diego and the Water Authority, which is subject to the Wildlife Agencies’ approval, the county of San Diego Department of Parks and Recreation will be the long-term manager. Additional wetland credits will be available at the Tijuana River Valley HMA and San Luis Rey River HMA following on-site wetland habitat creation and restoration, finalization of Wildlife Agencies’ approved habitat management plans, and providing the long-term funding for these wetland creation sites.

The Water Authority currently uses a ledger accounting system to annually document the assignment of mitigation credits from the Crestridge HMA and San Miguel HMA. A template for the ledger system for each new HMA will be included as an appendix to the first annual report following the addition of a new HMA to the Plan.

The addition of new HMAs to the Preserve Area will be addressed on an as-needed basis, and are not anticipated to require amendments to the Permits or IA if within the Plan Area. However, additional mitigation lands would be addressed in consultation and concurrence with the Wildlife Agencies (see Section 6.10) and included as part of the information supplied in the annual monitoring reports. As noted in Section 7.1, as individual projects are implemented, each project will include funding to satisfy its required mitigation. If the current or committed HMAs can not provide the mitigation required by this Plan, then the project-specific budget will fund the acquisition of additional suitable habitat, which will be added to the Preserve Area. Alternatively, the Water Authority may purchase appropriate credits from an existing Wildlife Agencies-approved mitigation bank.

7.2.2 Non-Acquisition Program Funding

7.2.2.1 Program Administration (Management, Monitoring and Reporting)

The Water Resources Department is responsible for ensuring that the Water Authority meets its commitments under this Plan and will coordinate Plan-related activities among other departments, such as Engineering, Water Resources, Rights-of-Way, and O&M. Administrative costs associated with the Plan’s program compliance and required reporting (as outlined in Section 6.5 and 6.12) will be funded through the Water

Resources Department annual operating budget or through the CIP Mitigation Program budget. Based on the CIP and projected Future Projects and Activities, the Water Resources Department estimates 420 hours to administer the Plan, at a cost of \$30,000 per year (2009 dollars). Water Authority NCCP/HCP staff activities associated with developing the annual administrative cost estimate include reviewing individual project documents to ensure Plan commitments are met, overseeing the Environmental Surveyor, coordinating with Preserve Area managers, and preparing the annual report. Environmental Surveyor work to support O&M Covered Activities, described in Sections 5.2, 5.3, and 6.3.1, is estimated at an additional 420 hours (\$40,000 per year in 2009 dollars). Among the Environmental Surveyor duties to ensure Covered Activity compliance with this Plan are preparation of the Pre-Activity Survey form, conducting Water Authority field staff and contractor education training, and coordinating project activities with the construction site manager. Each covered project will fund specific mitigation and monitoring requirements from its CIP budget allocation, which is separate from the funding specified above.

7.2.2.2 Habitat Management Endowments

For any new mitigation lands or HMAs that are acquired, the Water Authority will enter into an agreement with a land manager, acceptable to the Wildlife Agencies, to develop a HMA budget for management and monitoring and a Management Plan. The long-term management costs necessary to fund the transfer of ownership and/or management responsibility will be provided by the Water Authority's Mitigation Program budget and/or applicable CIP project-specific budgets. The long-term management costs will be determined with a Property Analysis Record (PAR) or comparable process, developed in consultation and concurrence with the Wildlife Agencies for each new HMA. The endowment value will be specified in the land transfer or conservation easement agreement and will be sufficient to fully fund the habitat management plan activities for the acquired property. The Water Authority will establish an endowment account in which interest goes toward required management funds and reinvestment as principal. This account will be designed to keep pace with inflation. The Water Authority and Wildlife Agencies must provide concurrence/approval of all endowments and entities that hold an endowment, which could include, but are not limited to, the CDFG, California Wildlife Foundation, and National Fish and Wildlife Foundation.

For existing HMAs, as stated at the beginning of this section, the Water Authority and Wildlife Agencies (and appropriate Preserve Area manager) will review existing management plans and, if additional management actions and monitoring are required to meet the Plan requirements for the Covered Species, the management plan will be revised and the Water Authority will provide additional funds from the CIP budget for those activities. Revisions to these plans will be made and additions to the associated endowments will be provided within one year of NCCP/HCP permit issuance.

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The existing endowments for HMAs are summarized below.

Crestridge HMA

The 261-acre Crestridge HMA is managed by CDFG as part of the larger Crestridge Ecological Reserve, a significant component of the larger MSCP reserve system. Management funds are held in a non-wasting State of California trust account, referred to as Special Deposit Funds (FASB #MT0126-00; Tracking No. 2835-1995-043-0005), and by California Wildlife Foundation endowment fund pursuant to an agreement between CDFG and the California Wildlife Foundation. Special Deposit funds are held in the state treasury, and their uses are governed by Section 16370 of the California Government Code. The California Wildlife Foundation endowment fund is the primary account for the Crestridge Ecological Reserve, was fully-funded as of June 30, 2008 (\$2,764,998), had earned \$388,089 in interest, and had an available balance of \$191,298 (2008 dollars). The State of California trust account was established on March 29, 1996, as the primary account for the Crestridge HMA portion, had a principal balance of \$264,981 as of August 8, 2008, had a total earned interest of \$158,538, and an available balance of \$43,451 (K. Miner, CDFG, per. comm. 2008). The endowment funding for the Crestridge HMA was based on meeting the requirements of BO #1-6-93-F-28, which primarily addresses California gnatcatcher mitigation, and the Crestridge Ecological Reserve is managed to address MSCP commitments. CDFG activities include patrol/enforcement, trash removal, fuel management, and similar actions associated with managing a preserve property. Biological surveys are conducted to comply with the MSCP on the larger Crestridge ER. The CDFG is currently revising its management plan for the properties. The revised management plan will include any required additional management and monitoring to address this Plan's Covered Species. Based on those requirements, and if additional funds are required to meet the Plan's commitments, the Water Authority will provide additional funding from its CIP budget.

Rancho Cañada HMA

Rancho Cañada HMA is an approximately 390-acre property owned and managed by CDFG. Per the 2007 agreement between the Water Authority and CDFG, the Water Authority provided the acquisition funding and an interim management fund to CDFG to cover management costs until the Plan's NCCP/HCP Permits are issued and the IA executed. On March 16, 2008, CDFG established a State of California trust account for Rancho Cañada HMA (FASB #MT0126-00; Tracking No. 2003-1210-120-000) with the initial deposit of \$18,886, which will be replenished annually until the land transfer and management agreement is finalized and fully funded as part of this Plan. Within seven days of Plan Permit issuance and execution of IA, currently-agreed to long-term management funds will be provided to CDFG to cover "start-up" costs (\$28,829) and the long-term endowment needs (\$419,689), with accrued interest, based on a PAR prepared in August 2007. The management and monitoring activities, and endowment funding, were based on the Plan's anticipated species list and management/monitoring

commitments. The long-term management (and monitoring) plan will be prepared within two years of permit issuance, and the funding commitment will be updated and augmented, if necessary, based on changes required to comply with the final NCCP/HCP Plan.

CDFG will maintain all the funds in a segregated account (non-wasting for the long-term endowment) solely for implementation of Plan-required activities at Rancho Cañada, including but not limited to biological surveys and reporting, non-native animal and plant control, repair/replacement of signs, gates, fences, and road maintenance. Rancho Cañada will be managed by CDFG as part of the larger 4,400-acre Monte Vista Ranch ecological reserve. CDFG will prepare a single management plan for the combined properties; however, additional Rancho Cañada HMA management and monitoring requirements will be specified. The cost to prepare that document was included in the endowment funds already provided by the Water Authority.

San Miguel HMA

The 1,186-acre San Miguel HMA is being managed as part of the larger San Diego National Wildlife Refuge (Refuge). The HMA is also a Wildlife Agency-approved conservation bank (Appendix J), and its management is funded by proceeds from credit sales. The vegetation communities and species on this property are a significant component of the larger MSCP reserve system. The approved bank has a \$500/acre endowment fee payable at the time of each credit sale. In 2003, the Water Authority acquired all rights to, including all remaining available credits associated with, the conservation bank. The National Fish and Wildlife Foundation holds the San Miguel HMA's management account for the Refuge, as a sub-account to the San Diego National Wildlife Refuge Fund (Fund Number 1998-0238-000; Sub Account: San Miguel 1998-0238-002). Per the National Fish and Wildlife Foundation's State of Financial Activity for the period through September 30, 2007, there was \$218,870.31 in the account, or approximately 31 percent funded. The Water Authority made its endowment payment for CSP in November 2009, bringing the management fund account to approximately 49 percent funded. As credits are used/sold in the future to compensate for impacts by Covered Activities, the Water Authority will provide the credit fee to the management account pursuant to the conservation bank document. Complete funding will be assured when all the credits are used or sold. As specified in the conservation banking agreement, the USFWS is preparing a long-term management plan for the property, consistent with the National Wildlife Refuge System Administration Act of 1966, Refuge Recreation Act of 1962, and Executive Order 12996. As part of the management plan preparation, the USFWS and Water Authority will determine if an augmentation to the property's existing management funds by the Water Authority is needed to meet the Plan's commitments that exceed current management commitments pursuant to the conservation banking agreement.

Manchester Wetland HMA

The eight-acre Manchester HMA wetland mitigation site was established on county of San Diego property per a cooperative agreement between the county of San Diego and the Water Authority. In 2005, the Water Authority constructed an approximate 7.7 acres of wetland habitat that is expected to meet specified success criteria by 2010. Until the site has reached its success criteria, the Water Authority manages and maintains the property. Once the site is verified as successful by the appropriate regulatory agencies, the county of San Diego will assume permanent management and monitoring of the property. In December 2008, the Water Authority Board, pursuant to collaboration with the county, approved the Water Authority to negotiate a management agreement with the county and provides for the establishment of endowment account for up to \$325,000 to manage the Manchester HMA and Tijuana River Valley HMA wetlands. Under that agreement, the Water Authority will allocate \$40,000 (\$5,000/acre) to fund an endowment for permanent management/monitoring of the site. In developing the endowment amounts for wetland sites, county staff evaluated a SANDAG review of management costs for a large number of preserve lands in San Diego County. That review indicated that costs vary widely (the average cost was \$150 per acre and ranged from less than \$20 to over \$500 per acre). The funding level that a \$40,000 endowment would yield is approximately \$1,200/year (\$150/acre) at an assumed endowment return of 3 percent. The endowment amount reflects county staff's assessment of costs to manage the site, based on the Plan's wetland/riparian species' commitments. The long-term management and monitoring plan will be prepared by the county and developed in consultation and concurrence with the Water Authority and Wildlife Agencies. Of the up to \$325,000 allocated to Manchester and Tijuana River Valley sites, up to \$85,000 will be held in reserve by the Water Authority for addressing Changed Circumstances at this site and Tijuana River Valley.

Tijuana River Valley HMA

The 40-acre Tijuana River Valley HMA is a proposed wetland mitigation site on county of San Diego property. The Water Authority, Wildlife Agencies, county of San Diego and regulatory authorities currently are designing the created wetlands and approval to construct the wetland creation project is expected in 2010. In December 2008, the Water Authority Board, pursuant to collaboration with the county, approved the Water Authority to negotiate a management agreement with the county and provides for the establishment of endowment account for up to \$325,000 to manage the Manchester HMA and Tijuana River Valley HMA wetlands. Under that agreement, the Water Authority will allocate \$200,000 (\$5,000/acre) to fund an endowment for permanent management/monitoring of the site. An endowment funding level of \$200,000 would yield approximately \$6,000/year or \$150/acre at an assumed endowment return of 3 percent; the endowment level reflects county staff's assessment of costs to manage the site, based on the Plan's wetland/riparian species' commitments. The long-term

management and monitoring plan will be prepared by the county and developed in consultation and concurrence with the Water Authority and Wildlife Agencies. As noted above, of the up to \$325,000 allocated to Manchester and Tijuana River Valley sites, up to \$85,000 will be held in reserve by the Water Authority for addressing Changed Circumstances for these sites.

San Luis Rey HMA

The 33-acre San Luis Rey HMA currently is a proposed wetland/riparian mitigation site, possibly with an upland component. The property is owned by the Water Authority, which is evaluating its suitability and other potential wetland mitigation site in the San Luis Rey River watershed with the county of San Diego. The Water Authority will develop a creation/restoration plan and develop a management plan and endowment estimate when a final decision is made to construct wetlands on this site. All planning, design, review approval, construction, management plan preparation, and management/monitoring costs will be funded by the Water Authority, in consultation and concurrence with the Wildlife Agencies, before credits will be sold. Management is expected to be turned over to the county of San Diego Parks and Recreation Department or other entity after the site's success criteria are met.

7.2.2.3 Compliance and Reporting

As described in Section 6.8, the Preserve Area managers have committed or will commit to manage, monitor and report on the Preserve Area/Covered Species' status, including biological surveys, analysis, reporting and planned responses (i.e., adaptive management actions) that will be identified in those reports on behalf of the Water Authority. As noted in Sections 7.0 and 7.2.1, these management entities have entered or will enter into agreements wherein those entities will ensure that this Plan's commitments are met, which may require additional funding provided by the Water Authority if the original endowments are not sufficient to meet the Plan's commitments. The Water Authority may elect to implement certain mitigation measures that would require additional funding beyond that provided to manage the HMAs. For example, where biologically justified, a project may propose to translocate or reintroduce a Covered Species into an HMA. Unless this type of action had been included in the initial endowment calculation for the HMA, the Water Authority would provide additional funding to cover these additional costs. Any project compliance for mitigation activities not within the HMAs, such as on-site restoration, would be funded as a condition of approval of the project and its mitigation.

7.2.2.4 Changed Circumstances

The Water Authority has provided funding or committed to provide adequate funding to the Preserve Area (HMA) management entities to manage the Preserve Area, including

7.0 Funding of the Plan

implementing routine management, monitoring, and reporting activities as well as adaptive management activities. Responses to Changed Circumstances are described in Section 8.5.1, and are defined as changes affecting the species or geographic area covered in a HCP that can be reasonably anticipated by plan proponents and the Wildlife Agencies. The Plan's management programs will be prepared by the Preserve Area management entities to address relevant Changed Circumstances and identify re-prioritized or remedial measures required to be implemented to address those conditions. Preserve Area managers and the Water Authority, in consultation with the Wildlife Agencies, will implement necessary planned responses to Changed Circumstances. The Water Authority will provide the required funds as a separate account for Changed Circumstances. The costs to address Changed Circumstances will be evaluated by the Preserve Area Managers and Water Authority, in consultation and concurrence with the Wildlife Agencies, during the reviews/updates of the Preserve Area Management Plans (see previous discussions for each HMA). In areas outside the HMAs in which the Water Authority has committed to maintain habitat (e.g., restore temporary impact sites within rights-of-way), the Water Authority would fund remedial measures out of its CIP project budget (if provided) or its Operational Reserve Budget.

8.0 Amending the Plan and Addressing Changed and Unforeseen Circumstances

Changes to this Plan are expected to be required during the 55-year permit period. The Plan addresses potential impacts to Covered Species and their habitat that are associated with Covered Activities, including but not limited to facility construction, O&M Activities, expansion and acquisition of new rights-of-way, and management of Preserve Areas. The Master Plan identifies Existing and Planned Projects necessary to meet projected water demands through the year 2030. It is anticipated that modifications to Existing Projects and/or Planned Projects (including expansion of the Water Authority's CIP) will occur that require amending the Plan. Changed Circumstances (Section 8.5.1) are changes affecting the species or geographic area covered in a HCP that can be reasonably anticipated by plan proponents and the federal wildlife agencies. The Plan's adaptive management programs will be prepared by the Preserve Area management entities to address changed circumstances and identify remedial measures for which they are responsible. Unforeseen Circumstances (see Section 8.5.2) may occur that would require the Wildlife Agencies and Water Authority to confer and determine what Plan changes or additional actions may be necessary to address those unanticipated conditions. To accommodate these potential changes, the following sections outline and provide details for amending this Plan and addressing Changed and Unforeseen Circumstances.

Expected modifications to the Plan range from clerical (non-substantive) changes with no effect on the Plan commitments (conditions of coverage) to amendments that constitute minor or major changes to the Plan's commitments/conditions of coverage. Clerical changes may address corrections to the text and maps, updates to species' and vegetation communities' information, or revisions to adaptive management procedures. More substantive changes that could initiate amendments include, but are not limited to, adding Water Authority activities not currently covered by this Plan, increasing the level of authorized take of Covered Species, extending Plan coverage to newly listed species or designated critical habitat, expanding the geographic region of Plan coverage, moving species currently not proposed for coverage to the Covered Species list, and approving Future Projects/O&M within the Major Amendment Area portion of Riverside County.

Changes and amendments would be documented in addenda to this Plan. Any accompanying documents necessary to satisfy requirements under ESA and the NCCPA, also will be prepared. Plan amendments may require additional environmental analysis under CEQA, NEPA, or both. All Minor and Major Amendments require consultation with and concurrence by the Wildlife Agencies. In addition, Major Amendments will require amendments to the Plan's Permits.

8.0 Procedures for Plan Amendments and Changed or Unforeseen Circumstances

The Water Authority and the Wildlife Agencies agree that the adoption, modification, and amendment of Water Authority Planning Documents identified in Section 1.1.2, consisting of a Master Plan, CIP, or Financing Plan, are matters within the sole discretion of the Water Authority and shall not require the approval of the Wildlife Agencies. However, the Parties acknowledge that changes to those documents, if they affect this Plan's commitments/obligations, may require amendments to this Plan, the IA or Permits to maintain the Permits' Covered Activities and Covered Species.

8.1 Processing Plan Changes

The information necessary to document proposed changes to the Plan will be presented to the Wildlife Agencies in the form of an addendum to the Plan. The addendum will state the need for the change, the proposed change, and based on the type of change, specific information and findings to justify the change(s). While the addendum will be prepared as a separate document, the addendum may also be incorporated as an element of any required CEQA or NEPA document circulated for public review and comment for the proposed action. Three types of changes to the plan may occur: clerical or administrative changes; minor plan amendments; or major plan amendments as described below in Sections 8.2, 8.3, and 8.4.

An annual report on the Plan's implementation will document all plan changes and amendments for the previous calendar year, and include the supporting addenda.

Most changes to the Plan are expected to be Minor Amendments, although some Major Amendments may be required.

8.2 Clerical and Administrative Changes to the Plan

Clerical and administrative edits and updates to the Plan, such as clerical changes (typographical corrections and minor editing that do not affect conservation commitments), vegetation mapping and species occurrence updates, and adaptive management changes made pursuant to monitoring results and discussions with the Wildlife Agencies, are not amendments.

These non-substantive changes to the NCCP/HCP may be made by the Water Authority on its own initiative or in response to a written request submitted by a Wildlife Agency and will not require any amendment to the NCCP/HCP, Permits, or Implementing Agreement. All proposed clerical or administrative changes shall be circulated in writing among the parties by the party proposing the change. If no party objects to the proposed clerical or administrative change within 30 days of receipt, the change shall be deemed accepted. If a party objects to a proposed clerical or administrative change, the

proposing party may elect to propose the change as a minor or major amendment to the Plan. Each annual Report shall include a summary of all clerical and administrative changes made to the NCCP/HCP during the preceding calendar year.

8.3 Minor Amendments

The Plan may, under certain circumstances, be modified without amending its associated IA or Permits, provided such amendments are minor in nature, the effects on the Covered Species involved and the levels of take resulting from the amendment are not greater than those described in this Plan and provided for by the Permits, and the action is otherwise consistent with the Plan, IA, and associated Permits. Minor Amendments shall not alter the terms of the section 10(a)(1)(B) permit and/or NCCPA permit.

Examples of actions that may require Minor Amendments to the Plan include, but are not limited to: acquisition of additional habitat mitigation credits or preserve lands within the Plan Area; and Future Projects or activities not currently identified in this document that are consistent with the criteria identified in Table 8-1, fall within the definition of Covered Activities, and would not increase the level of take allowed under the Permits. If either Wildlife Agency objects to use of the minor amendment process to incorporate a change to the Plan, the proposed change shall be processed as a Major Amendment. However, even if Future Projects or activities are consistent with Table 8-1, the Water Authority must receive concurrence from the Wildlife Agencies that the proposed Plan amendment will be minor in nature and not trigger a major amendment.

General criteria for determining the applicability of the Minor Amendment process are shown below. Activities that meet the criteria will be processed as a Minor Amendment and be reported in the Water Authority's annual report. These criteria are designed to ensure that the proposed change will not result in new or different impacts to the environment that are in excess of those analyzed in connection with the original Plan, or levels of take or impacts to the Covered Species that are different from or greater than those analyzed in connection with the original Plan and Permits. These criteria are not exclusive.

**TABLE 8-1
MINOR AMENDMENT DETERMINATION CRITERIA**

1. The activity requiring coverage must be partially or completely funded, implemented, or managed by the Water Authority as demonstrated through approvals by the Board of Directors.
2. The activity requiring coverage must fall within the definition of Covered Activities outlined in Section 5.0, and the cumulative effects of such activity when added to the effects of other Covered Activities may not exceed those analyzed in the original Plan.
3. The activity requiring coverage involves impacts to species that are covered under this Plan; take of listed species not covered by this Plan will not be addressed with a Minor Amendment.
4. The activity will occur in the Plan Area.
5. The activity requiring coverage will meet conditions presented in Section 6.0 to assure that the activity and will not require a jeopardy analysis because it: <ul style="list-style-type: none">a. Would not appreciably reduce the likelihood of a species' survival and recovery in the wild;b. Would not jeopardize the continued existence of a species or appreciably diminish the value of critical habitat for both the survival and recovery of a listed species; and,c. Measures taken to avoid, minimize, and mitigate impacts shall not provide reduced levels of benefit to the conservation of species from that proposed in this Plan.
6. The Plan provides adequate mitigation credits to offset impacts. Alternatively, suitable additional habitat will be contributed to the Preserve Area or other approved reserve lands or appropriate credits from other mitigation banks within the Plan Area will be purchased.
7. The activity requiring coverage, including design and mitigation measures, do not permanently hinder other conservation programs, preserves, or corridors, and general species' distribution.

The Water Authority will submit in writing to the Wildlife Agencies a description of the proposed Minor Amendment in the form of an addendum with the following subject items addressed:

- (a) An explanation why the Minor Amendment is necessary or desirable;
- (b) An explanation of why the Water Authority believes the effects of the proposal are not significantly different from those described in the original Plan and would not result in greater impacts to the environment, including the Covered

8.0 Procedures for Plan Amendments and Changed or Unforeseen Circumstances

Species and their habitats, or levels of take beyond those analyzed in connection with the Plan and the Permits;

- (c) A description of how the proposed change will be consistent with the goals, policies, and guidelines of this Plan, the IA, and the Permits;
- (d) An explanation of how approval of the proposed Minor Amendment:
 - 1. Maintains or improves the amount, configuration, and/or quality of conserved habitats;
 - 2. Maintains or increases the conservation of Covered Species;
 - 3. Maintains or improves habitat connectivity, wildlife movement corridor function, management efficiency, and/or protection of biological resources; and
- (e) An analysis of the environmental impacts of the proposed change.

Either the Water Authority or either of the Wildlife Agencies may propose a Minor Amendment to the NCCP/HCP Plan by providing a written submission to the other Parties in accordance with Section 8.3 of the Plan. The other Parties will use their reasonable efforts to respond to proposed Minor Amendments within sixty (60) days of receipt of such submission by either approving or denying the Minor Amendment or by notifying the proposing party that the proposed Minor Amendment must be processed as a Permit Amendment in accordance with Section 8.4 of this NCCP/HCP. Proposed Minor Amendments will become effective upon the other Parties' written approval. The Wildlife Agencies will not approve Minor Amendments to the Plan if they determine that such Minor Amendments would result in operations under the Plan that are different from those analyzed in connection with the original Plan, or may result in adverse effects on the environment that are new or significantly different from those analyzed in connection with the original Plan or may result in additional take that was not analyzed in connection with the original Plan.

In order to maximize cost effectiveness and minimize potential environmental impacts of water distribution, treatment, and storage projects throughout the region, the Water Authority may enter into legally binding agreements with one or more Member Water Agencies to: (1) build, on a reimbursement basis, a facility for shared use, or (2) allow the Water Authority to contribute funds to expand a Member Water Agency's facility so that the Water Authority can use the expanded capacity. The Water Authority may propose a minor plan amendment to cover either circumstance and expedite the project's completion to directly benefit the Water Authority's mission. Water Authority participation in these types of cooperative projects will require a written agreement between the Water Authority and the Member Water Agency that identifies the roles and

obligations of each party. The agreement would require Board approval to add the project to the CIP. For the purposes of this Plan, all such cooperative projects will be considered Water Authority projects. Implementation of the project will require compliance with the Plan's conservation commitments. The Wildlife Agencies will approve or disapprove use of the Minor Amendment process for the purposes identified in this paragraph in accordance with the requirements outlined in Section 8.3 of this NCCP/HCP.

8.3.1 Acquisition of Habitat Mitigation Credits or Additional Preserve Area

The addition of mitigation credits to the Plan's wetland and upland HMAs and acquisition of an additional Preserve Area within the Plan Area that may be used to mitigate impacts from Covered Activities are anticipated to be processed as a Minor Amendment. The actions could involve augmenting available mitigation habitat credits, adding to the Preserve Area or other approved preserve lands, or providing funds for additional preserve/reserve area acquisitions and/or management that supplement existing conservation requirements. Additional mitigation land acquisitions shall take into consideration the following factors:

- The distribution of Water Authority Covered Species on the lands proposed to be added to the Preserve Area;
- The level of conservation efforts for and threats to the habitats proposed to be added;
- The regional conservation benefits which may be accomplished through specific land acquisitions or strategic preservation efforts; and
- The anticipated mitigation needs for foreseeable future projects.

The Wildlife Agencies will use their reasonable efforts to approve or disapprove any addition to the Preserve Area or acquisition of credits needed by the Water Authority beyond the credits existing at the time of Permit issuance concurrent with the Water Authority's approval of the project requiring those acres or credits; this presumes the Water Authority has provided timely submittal of an adequate proposed Minor Amendment request covering the Preserve Area addition or acquisition of credits to the Wildlife Agencies. Prior to initiating any impacts to species or habitats that are proposed to be impacted through a Minor Amendment approved under this paragraph, the Water Authority will secure the mitigation by obtaining fee title to the property (executing a sales agreement and depositing funds into an escrow account), providing a letter of security in a mutually agreed-to amount to the CDFG or USFWS, or acquiring appropriate credits (and providing a sales receipt) from an approved conservation or mitigation bank within the Plan Area. When additional Preserve Area lands are to be

acquired, an agreement with a qualified land management entity that specifies management obligations and funding consistent with this Plan's commitments will be included as part of the property acquisition agreement and submitted to the Wildlife Agencies as part of the proposed Minor Amendment.

The Water Authority anticipates that the addition of mitigation credits and acquisition of additional Preserve Area within the Plan Area will not result in additional take and trigger a need to amend the permits. The Water Authority and Wildlife Agencies acknowledge that time is of the essence when negotiating real property acquisitions, and will use reasonable efforts to process their reviews of such acquisitions to provide their approval or rejection as quickly as practicable based on their respective staffing and work priorities.

8.3.2 Future Projects and Conditionally Covered Activities

The Water Authority anticipates that Future Projects proposed for locations outside the Survey Area/PIZ that fall within the definition of Covered Activities may be processed as Minor Amendments. Potential impacts from these Future Projects are anticipated to be within the Plan's authorized take (e.g., Table 6-8) and meet the criteria in Table 8-1. Such projects are referred to as "conditionally covered activities" and will require Wildlife Agency approval pursuant to the Minor Amendment process to proceed. If the project activity does not meet the criteria in Table 8-1 and/or either Wildlife Agency determines that the project does not qualify for approval pursuant to the Minor Amendment process, it will be processed as a Major Amendment. Documentation of Plan compliance will be provided in a written addendum and in the CEQA/NEPA documents, if required, prepared for the proposed project. Wildlife Agency review and approval will follow the process outlined in Section 8.3.

Pipeline 6 is an Existing Project with a certified EIR that has fulfilled its mitigation requirements and obtained its endangered species permits. However, the Water Authority has analyzed and may approve an alternative alignment with impacts different from those of the approved project. This Plan includes those alternative alignments in its analysis of potential impacts, and approval of one of the alternative alignments, including potentially the Pipeline 6 alignment within Riverside County, is anticipated to be processed as a conditionally covered activity under the Minor Amendment process. All other activities proposed by the Water Authority within Riverside County will be processed as Major Amendments to the Plan (see Section 8.4).

The Water Authority will provide the Wildlife Agencies a copy of the addendum supporting the appropriateness of a Minor Amendment, either incorporated as a discussion topic into a CEQA or CEQA/NEPA document, or a stand-alone addendum for review. The Wildlife Agencies acknowledge that time is of the essence and will use their

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reasonable efforts to provide their concurrence or non-concurrence within 60 days. If a CEQA document also is required, then the Wildlife Agencies will coordinate both CEQA comments and minor amendment concurrence within the CEQA response period. The Water Authority will be provided with specific, detailed written reasons for a finding of non-concurrence, including specific recommendations on how concurrence can be achieved.

8.3.3 Minor Changes to Covered Activities

The Water Authority's standard procedures for conducting construction and O&M Activities (Covered Activities) are detailed in Appendix D (General Conditions and Standard Specifications, 2005 edition). Changes to those conditions and specifications may be made in response to new equipment, materials, and procedures that improve the efficiency and effectiveness of the Water Authority's activities. Pre-activity surveys for Covered Activities within rights-of-way and other Water Authority-controlled lands may identify new methods or practices that could further minimize impacts to habitat and/or Covered Species status. Minor changes will result in the same or higher conservation level for the Covered Species and will not increase the incidental take. If changes to the conditions and specifications are proposed that potentially have an effect on the conservation commitments for the Covered Species, the changes will be processed as a Minor or Major Amendment, depending on the extent of the changes.

8.3.4 Adaptive Management Changes

Management and monitoring within the Preserve Areas may identify new practices that can improve habitat conditions and/or Covered Species' status. Changes to management (and monitoring) practices will be proposed and discussed in the annual report. Because these changes would be expected to enhance habitat conditions and/or Covered Species' status, the Water Authority anticipates that they will be processed as administrative changes to Plan in accordance with Section 8.2. Changes to the list of invasive plant species maintained by the Cal-IPC, or an equivalent organization or agency, are expected to occur over time. Changes to the list will be reported in the annual report. The addition or deletion of species on that list are not anticipated to result in a significant change to this Plan and are expected to be processed as administrative changes under Section 8.2. If changes to that list are expected to affect management/monitoring activities on the Preserve Area that would decrease the conservation commitments for Covered Species, those changes will be processed as a Minor or Major Amendment, depending on the extent of the changes.

8.4 Major Amendments

Major Amendments to the Plan will be required if a proposed action would include but not be limited to:

- increase take of a Covered Species;
- add a Covered Species;
- modify/expand the Plan Area to include vegetation communities and listed species not already included in the Plan;
- add or substantially modify a Covered Activity that could reduce conservation commitments in the Plan; and/or
- add a Future Project or O&M as a Covered Activity within the Major Amendment Area portion of Riverside County.

Major Amendments to the Plan will require detailed analyses of the anticipated effects of the proposed action on conserved habitats and Covered Species, on sensitive habitats and species not addressed in the Plan, and on the additional conservation to be provided through the Major Amendment process. Major Amendments will be processed as Permit Amendments in accordance with all applicable federal and state statutory and regulatory requirements, including NEPA and CEQA. The Wildlife Agencies will provide technical assistance to the Water Authority during the amendment process.

Upon receipt of a complete application from the Water Authority for a permit amendment, the proposed permit amendment would be processed in accordance with all applicable federal and state statutory and regulatory requirements. All Major Amendments to the Plan will be memorialized through an addendum to the plan and a Permit Amendment and will be documented in the annual report.

From time to time, additional lands may be annexed by the Water Authority to the Plan Area to incorporate lands which will receive imported water service (Water Authority's Service Area). Annexation, in and of itself, does not necessarily require the Water Authority to undertake any activities that may result in take, since it only serves to rectify the Water Authority Service Area boundary with that of its Member Water Agencies. Any changes to the Plan Area to include additional lands, for purposes of extending incidental take to Covered Activities on those lands or for purposes of adding lands to the Preserve Area, would require Plan and Permit amendment and NEPA/CEQA compliance. In addition, the Water Authority shall provide the Wildlife Agencies with a Boundary Modification Report (BMR) that includes the following:

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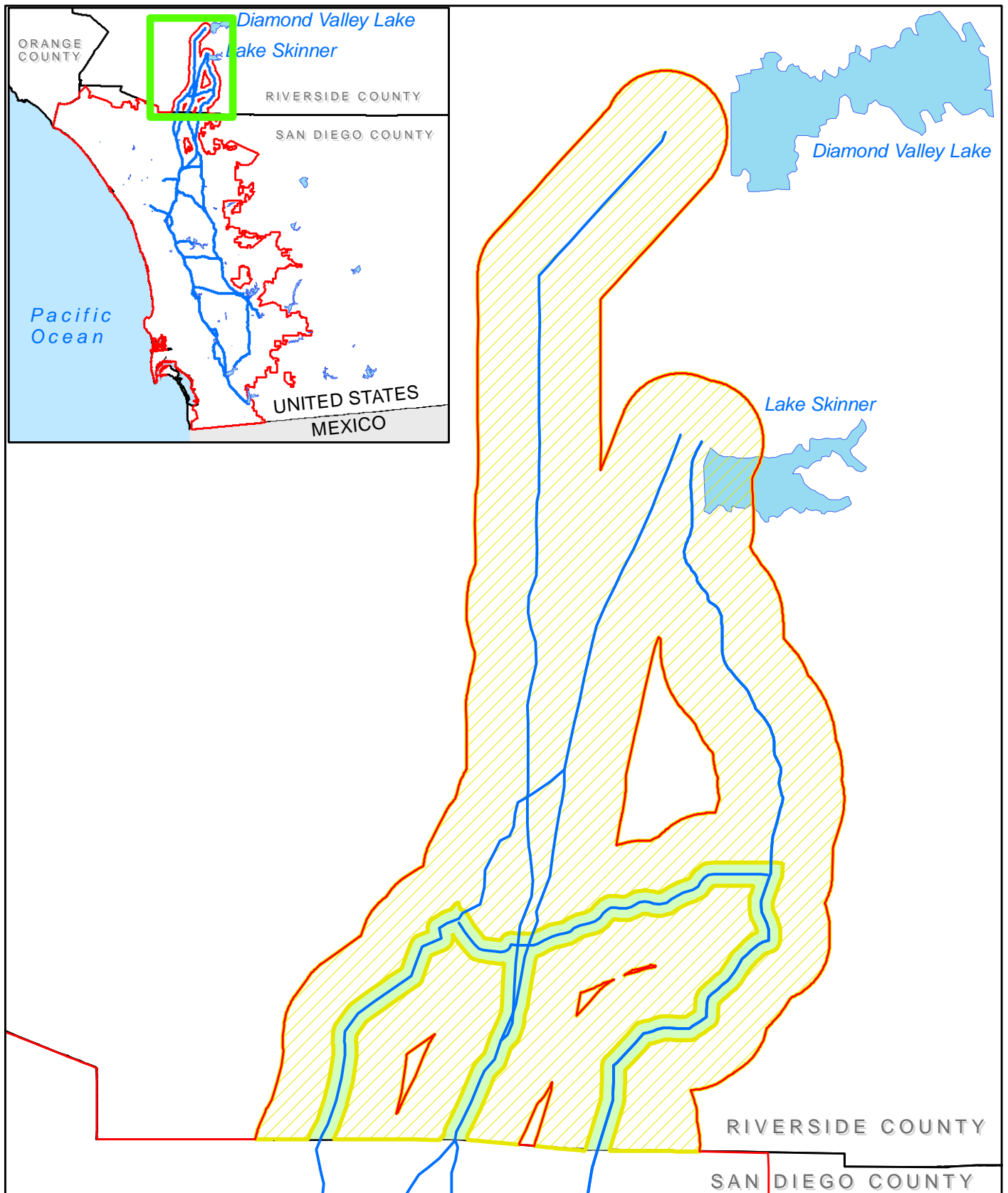
- A general biological survey of the land to be added, a vegetation map of the region, and an assessment of the potential for Covered Species to occur in the region;
- An analysis of sensitive species not covered by the Plan and known or with the potential to occur in the land (impacts to any listed, non-Covered Species would require a separate permit or Major Amendment for take);
- A description of the anticipated Water Authority activities, and a determination of potential effects of the activities on Covered Species and their habitats; and
- An analysis of compatibility with any existing local conservation plans that already cover the region.

The Water Authority would provide the BMR, in the form of a Major Amendment/Plan Amendment request, to the Wildlife Agencies for their review and concurrence. If the Major Amendment/Plan Amendment satisfies the conditions of the Plan, the Wildlife Agencies will make their reasonable efforts to process the permit amendments within 60 days or as soon as possible based on their respective staffing and work priorities. The Water Authority will be provided with specific, detailed written reasons for a finding of non-concurrence, including specific recommendations on how concurrence can be achieved.

Future Projects and O&M Activities in Riverside County could not be analyzed and permitted at the time of the implementation of the NCCP/HCP; therefore, Riverside County has been designated as “Major Amendment Area.” This area is displayed on Figure 8-1. Coverage for activities that result in take of a Covered Species within the Major Amendment Area, apart from the Pipeline 6 alignment impacts within the associated PIZ, which have been included as Covered Activities in the Plan, will be processed as Major Amendments.

8.5 Changed and Unforeseen Circumstances

Natural habitats are inherently subject to fluctuations, and many vegetation communities in southern California are adapted to cyclical events such as wildfires, floods, droughts and species’ population eruptions. Many of these fluctuations will be monitored and addressed through the adaptive management plans developed for the Preserve Area. However, some events or the scale of events may exceed the level of change that can be expected to be addressed through adaptive management responses. Changes greater than those which will be addressed through adaptive management are defined as “Changed Circumstances” and “Unforeseen Circumstances.”



- NCCP/HCP Plan Area
- ~ Existing/Planned Aqueducts and Pipelines
- Major Amendment Area
- Pipeline 6 Excluded Alignments



FIGURE 8-1
Location of Major Amendment Area

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Changed Circumstances refer to changes in circumstances affecting a species or geographic area that can reasonably be anticipated by the Water Authority and the Wildlife Agencies, and that can be planned for in the Plan (e.g., fires or other habitat-altering events that can reasonably be expected to occur and for which contingency actions can be planned to address adverse effects on Covered Species). Unforeseen Circumstances means changes in circumstances affecting a species or geographic area that could not reasonably have been anticipated by the Water Authority and the Wildlife Agencies at the time of the Plan's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Changed and Unforeseen Circumstances are further defined and discussed below in Sections 8.5.1 and 8.5.2 as they specifically apply to this Plan.

8.5.1 Changed Circumstances

Changed Circumstances are defined (50 CFR Section 17.3) as those events that may affect a species or geographic area covered by this Plan that can reasonably be foreseen by the Water Authority and the Wildlife Agencies during planning and development of the Plan. Changed Circumstances for this Plan include the following reasonably foreseeable events: flood; fire; extended period of reduced precipitation; invasion by exotic species or disease; toxic spills, vandalism, and other illegal human activity; and listing of non-Covered Species. The effects of climate change as they relate to Changed Circumstances are discussed under each applicable category below. Natural events, such as flood, fire, drought, invasive species, and disease that could initiate Changed Circumstance under this Plan would most likely be of regional concern for some or all of the other conservation plans within this Plan Area, and responses would likely be implemented in coordination with other HCP permittees. The Water Authority's responses would be implemented to complement responses by other permittees.

The following outline describes how the Water Authority will generally address Changed Circumstances should they occur:

- Notification of the Wildlife Agencies by the Water Authority in writing and within 30 days that a Changed Circumstance has occurred.
- Preparation of an appropriate assessment to determine severity of an event and its impacts. Water Authority staffs (Operations and Maintenance, Right-of-way (property) Management, and Water Resources) will work together to determine the extent of impacts on Water Authority-controlled properties. If a Preserve Area is reported by the land manager to have sustained a Changed Circumstance, the Water Resources staff will work with the land manager to verify and determine the extent of impacts.

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- The appropriate land managing entity (Water Authority, Preserve Area land manager, etc.) will prepare a draft remediation plan, timeline, and cost estimate and determine if environmental compliance (CEQA/NEPA) is required. The preparers will make reasonable efforts to provide the draft remediation plan to the Wildlife Agencies and may initiate responses within 60 days of the determination of Changed Circumstance. The Wildlife Agencies will use their reasonable efforts to provide their concurrence or non-concurrence within 60 days from receipt of the draft plan, including any specific recommendations to modify the plan.
- The approved (concurrence by the Wildlife Agencies) remediation plan will be used by the management entity to implement the identified adaptive management activities, and if necessary to re-allocate funds. All required environmental compliance will be completed before actions are implemented; if an emergency response is required then the management entity will follow-up with all required post-action documentation. A summary report will be prepared by the management entity on the Changed Circumstance event/condition, actions implemented, results of the actions, and any recommendations for future activities. The management entity will make a reasonable effort to submit a post-response summary to the Wildlife Agencies within 60 days of completion of the response.
- The Water Authority and Preserve Area land managers will plan and implement the responses to Changed Circumstances in coordination with the Wildlife Agencies.
- Identify administrative, management, and monitoring actions that the Water Authority and Preserve Area land manager could implement to reduce future recurrences of the Changed Circumstance.

Events that meet the Changed Circumstance threshold will be addressed through monitoring and the steps identified below in Sections 8.5.1.1 through 8.5.1.6. This will ensure that the Water Authority has guidelines for responding to and reporting on Changed Circumstances.

8.5.1.1 Flooding

Definition. A Changed Circumstance flood event will be defined for a particular flood plain or river valley as a flood greater than the 50-year flood level and less than the 100-year flood level, as defined by the Federal Emergency Management Agency (FEMA) and causing permanent impacts to one or more conserved vegetation communities within the Preserve Area. The determination of permanent loss will be made by the management entity and based on whether the manager concludes that the area cannot be restored within five years of the event. FEMA has developed flood zone

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maps that designate flood hazard areas. A 100-year flood area identifies the elevations that have a one percent chance of being inundated by flood in a given year (FEMA 2006). These designations may not be applicable to or present within all Preserve Areas or any right-of-way/facility habitat areas for which the Water Authority and Preserve Area managers have made a commitment to manage for the benefit of Covered Species. Flood events that exceed the local area's flood protection level will require the Water Authority or Preserve Area land manager to determine if a response to the Changed Circumstance is required and within the capability to accomplish, and if so, to address the situation.

Risk Assessment. The Water Authority expects streams, rivers, and floodplains within the Plan Area to flood periodically and to recover naturally from a flood event. Climate change may affect the periodicity and severity of flooding in the future. Predicting the potential for future flooding events, particularly in southern California, is difficult because of its inherent highly variable and localized weather (particularly rainfall). Due to the difficulty in making predictions, the effects of climate change on flooding events cannot be reasonably predicted with the best available scientific information currently available. The severity of a flood event above the design flood stage will increase the likelihood of impacts to conserved habitat.

Flooding within the wetlands HMAs is generally considered a periodic and desirable event. Flooding can result in establishment of new primary and secondary channels and abandonment of other channels. It may also result in redistribution of wetland and riparian communities within the floodplain and multiple age classes of vegetation patches within the flood plain. The primary stressor associated with flooding is the potential for substantial and adverse colonization by non-native invasive plant species after a significant flood event which is addressed in Section 8.5.1.4.

Preventive Measures and Responses. The Preserve Area manager will use reasonable efforts to prepare and submit to the Water Authority and Wildlife Agencies a flood response plan and may initiate responses within 60 days of determining that a flooding Changed Circumstance has occurred. Based on that report and discussions with the Water Authority and Wildlife Agencies, the manager will implement and maintain responses in addition to standard practices for flood protection as required to meet FEMA or local zoning requirements. The possible responses to Changed Circumstances for flooding include but are not limited to:

- Recontour the area to minimize future erosion risks;
- Install erosion control structures;
- If determined appropriate by the land manager, allow the site to restore passively (primarily wetlands); and

- Actively revegetate the site with appropriate plant species.

8.5.1.2 Fire

Definition. A Changed Circumstance fire event will be defined as one that exceeds the ability of the land management entity's standard staff/equipment to control and occurs over the same area(s) more frequently than the expected recovery interval for the affected vegetation communities. Exceeding the ability of the land management entity means that the available fire management resources (as described/listed in the land management plan) cannot contain/control the fire and additional fire fighting resources are required to control and contain the fire. The effects of fire frequency on vegetation types may vary by proximity to the coast, elevation and aspect, time of year, and other factors. For this Plan, repeated frequencies triggering Changed Circumstances for fire in the major upland vegetation types are defined as: occurring more frequently than a 50-year interval for chaparral, more frequently than a 20-year interval for coastal sage, and more frequently than a five-year interval for grasslands.

Risk Assessment. Fires can result from natural sources such as lightning strikes, as well from human activities (e.g., campfires, trash/brush burning, vandalism, arson). Many vegetation communities in southern California have evolved with, or even depend on, natural fire events to maintain conditions favorable to their persistence. Montane (coniferous) and chaparral communities generally have evolved and adapted to longer intervals between natural fires than sage scrub and grassland communities. Too frequent fire intervals can lead to disruption of natural regeneration cycles, including loss of mature (reproducing age) native plants and seed beds, which cause shifts to more fire-tolerant native vegetation communities or the expansion of non-native, invasive species that can greatly disrupt the natural habitats. Preserve lands (and any rights-of-way/facilities managed for Covered Species) that are part of larger natural landscapes/reserve systems may be less likely to experience human-caused fire events. Areas that are adjacent to the urban fringe are potentially more likely to experience human-caused fire events.

Recent reviews of literature on wildfire effects on southern California shrublands suggest that there are no definitive fire frequency intervals that characterize the "natural" fire frequency interval (Diffendorfer, et al, 2008; Farm and Home Advisor's Office, UC Cooperative Extension, San Diego County 2007; Keeley 1995; San Diego Wildfire Education Project 2009; The Chaparral Institute 2009). These reviews strongly suggest that the frequency/interval of fires are more important than the severity and size of fires in determining long-term community health and resilience. There appears to be a general acknowledgement that fires in sage scrub and chaparral that are more frequent than 30 to 50 years are likely to cause a loss of typical dominant species and conversion to mixed vegetation communities with higher components of non-native species. Sage scrub vegetation appears to tolerance more frequent fires than chaparral vegetation, but

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fires that are more frequent than two-10 years in sage scrub and 10-30 years in chaparral have shown extirpation of many native species and conversion to non-native dominated communities.

Climate change may exacerbate the size and intensity of fires in the future. Climate change models indicate that southern California may show appreciable warming, which combined with little change in precipitation (as noted above), could increase fire events above the historical condition. However, as with the risk assessment for flooding, it is difficult to predict the specific effects from climate change. Recent (2003 and 2007) wildfire events in San Diego affected the three main upland Preserve Area properties (San Miguel HMA, Crestridge HMA, and Rancho Cañada HMA).

After many natural fire events, vegetation communities would be expected to recover naturally. However, dry conditions and excessive fuel build-up may result in fire damage that requires remedial actions, particularly to minimize erosion and non-native invasive species. The potential increase of non-native, invasive species that may replace/displace native vegetation is discussed below (see Section 8.5.1.4).

Preventive Measures and Responses. The Preserve Area manager will use reasonable efforts to prepare and submit to the Water Authority and Wildlife Agencies a fire response plan and may initiate responses within 60 days of determining that a wildfire Changed Circumstance has occurred. Based on that report and discussions with the Water Authority and Wildlife Agencies, the manager will implement and maintain responses in addition to standard preserve fire protection practices. The Water Authority's standard operating practices and procedures would help avoid/minimize fire starts by Water Authority Covered Activities. Also, the Water Authority regularly maintains fire clearance around its facilities and does not encourage public access on its right-of-way roads. Preserve Areas managed by other entities have or will develop fire management elements in their Preserve Management Plans. If a Changed Circumstance fire event occurs within a Preserve Area or right-of-way/facility area that is managed for Covered Species, a qualified individual (e.g., Environmental Surveyor) will assess the area to determine specific actions to be implemented. Possible responses to a Changed Circumstance fire may involve:

- Revisions to standard fire prevention procedures by the land management entities on Preserve Areas and the Water Authority on its rights-of-way and easements;
- Collaboration with local fire agencies to assess and revise specific fire-related practices within Preserve Areas (fire breaks, vegetation management, etc.);
- Revisions to Preserve Area management plans regarding public access, use, and fire information;

- Installation of temporary erosion control features;
- Increased invasive (particularly fire-facilitating) species control and native plant reseeding or planting;
- Revisions to vegetation monitoring in potential fire-prone areas and post-fire areas.

8.5.1.3 Extended Periods of Reduced Precipitation

Definition. A Changed Circumstance due to reduced precipitation is an event that involves two consecutive years of annual precipitation that is less than 5.73 inches (one standard deviation below the average annual precipitation for the Lindberg Field historical record data, 1801-2008).

Risk Assessment. Annual rainfall is variable and not controlled by human activity. Drought cycles are cyclical and a natural event in southern California to which the vegetation communities and species have adapted. Extended periods of reduced precipitation (more than two consecutive years) may cause natural communities to sustain significant decreases in plant cover and diversity and subsequently to losses of animal species. Covered Species may be at greater risk than other species if their habitat needs or population numbers are already compromised.

Climate change will affect precipitation, but the changes to southern California may not be as substantial as other areas. As described in the previous sections, climate models are not accurate for localized areas. The effects of climate change on reduced precipitation in the Plan Area cannot be definitively predicted based on current best available scientific information.

Preventive Measures and Responses. The Water Authority and Preserve Area managers have no control over the duration or severity of reduced precipitation. The Preserve Area manager will use reasonable efforts to prepare and submit to the Water Authority and Wildlife Agencies a drought response plan and may initiate responses within 60 days of determining that an extended period of reduced precipitation Changed Circumstance has occurred. Based on that report and discussions with the Water Authority and Wildlife Agencies, the manager will implement and maintain responses in addition to standard preserve management practices. Possible actions that may be taken in response to reduced precipitation include:

- Revisions to standards and practices for establishing revegetation sites to maximize planting survival during periods of reduced water availability;
- Collaboration with other conservation area managers to assess regional habitat and Covered Species conditions;

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- Implement vegetation reduction (e.g., biomass thinning of non-sensitive/non-covered species, particularly non-native species) to conserve available water;
- Provide limited, temporary irrigation to highly vulnerable areas in the Preserve, subject to water availability;
- Revisions to the methods for monitoring of vegetation conditions and Covered Species' status to identify areas/species that may require additional management.

8.5.1.4 Invasive Non-native (Exotic) Species or Diseases

Definition. A Changed Circumstance event due to the presence of an invasive, non-native species is the introduction of an invasive species within a preserve that has either: (a) not previously been known in the Plan Area and has been noxious elsewhere; or (b) is a particularly noxious variety of a non-native species that is resistant to typical control measures. The Plan does not monitor for diseases, but a disease Changed Circumstance event is when a federal, state, or local agency declares a disease condition that could threaten the status of a Covered Species.

Risk Assessment. Invasive non-native species are those that are not indigenous to the Plan Area and have the potential to increase in numbers and/or coverage such that they threaten the continued viability of conserved habitats and/or Covered Species. Many invasive, non-native species presently occur within Preserve Areas and on rights-of-way/facilities in the Plan Area and pose little threat to Covered Species. Often, these species reach temporary, but problematic, levels after some disturbance such as drought, excessive precipitation or fire; or, as a result of importation by humans.

Climate change could alter habitat conditions and favor some invasive, non-native species and diseases over native species. As noted previously, the effects of climate change on habitat conditions in the Plan Area cannot be definitively predicted based on current best available scientific information. However, based on monitoring data and information from other conservation managers and specialists, the Water Authority or Preserve Area manager will determine if a response is required.

Preventive Measures and Responses. The land management entity's Preserve Area management plans will address invasive species monitoring and control. The Preserve Area manager will use reasonable efforts to prepare and submit to the Water Authority and Wildlife Agencies an invasive species/disease response plan and may initiate responses within 60 days of determining that Changed Circumstance has occurred. Based on that report and discussions with the Water Authority and Wildlife Agencies, the manager will implement and maintain responses in addition to standard preserve invasive species/disease control practices. If a Changed Circumstance event for invasive species or disease is determined by the land manager to have occurred in a

Preserve Area, the land manager will have a qualified individual (e.g. biologist or pest control specialist) assess the condition to determine specific actions that are appropriate to be implemented. Possible responses to a Changed Circumstance invasive species or disease may involve:

- Increased removal and monitoring of the problem species or location;
- Revision to specific elements of the management plan to better address overall non-native species monitoring and management;
- Collaboration with other conservation area managers to assess and implement new control techniques.

8.5.1.5 Toxic Spills, Dumping, Vandalism, and Other Illegal Human Activity

Definition. Preserve managers and Water Authority staff may transport, store, and use legal but potentially dangerous materials as part of routine operations, and are prepared to address minor spills. Most containers for pesticides, cleaners, and spare gas cans are 10 gallons or less, and an accidental spill of a container generally would involve less than 10 gallons. This Plan defines a Changed Circumstance for a toxic material (as defined by local, state, or federal regulations) spill as an incident that involves any potentially toxic material that is over 10 gallons or 200 square feet and up to 25 gallons or 500 square feet. Unauthorized dumping is often associated with isolated, individual actions (throwing out trash, trash bags, pieces of furniture, etc.) that affect small areas, from five to 50 square feet. This Plan defines a Changed Circumstance for unauthorized dumping as an incident that exceeds 50 square feet and up to 500 square feet.

Risk Assessment. Preserve Area properties managed by this Plan are mostly not close to urban areas or roads that could be used to transport hazardous materials or that increase the potential for unauthorized dumping and vandalism could sustain damage that potentially affects Covered Species. Unlike the preserve lands in other plans, many of which are adjacent to developed areas and/or major roads and potentially subject to spills by municipal/industrial activities and transport vehicles, those risks are less likely for these HMAs. These HMAs will have limited amounts of toxic chemicals (pesticides) stored per local agricultural commissioner's regulations and use will be limited to small containers (gallon containers, etc.) when herbicides or other chemicals are to be used.

Preserve Area staff may store and use materials (i.e., pesticides, cleaners, and fuel for maintenance equipment) in small containers (less than 10 gallons) that could accidentally be spilled. Most spills that could affect Preserve Area activities would be expected to result from Preserve staff activities, be small, and contained/cleaned-up by staff. For example, the Water Authority's standard emergency spill procedures identify spills of less than 10 gallons to be "small events" that can be handled by staff with

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standard spill response kits. Some spills from Preserve Area accidents could exceed 10 gallons (and up to 200 square feet) that could be handled by re-prioritizing Preserve Area staff and resources. Spills greater than 25 gallons or 500 square feet would be unexpected/unlikely and not within the Preserve Area staff's abilities safely/successfully contain and clean-up.

Climate change is not expected to have a predictable effect on toxic spills or unauthorized dumping or vandalism.

Preventive Measures and Responses. The Water Authority's standard operating practices and procedures, and the commitments in Preserve Area management plans would help avoid/minimize illegal human activities. The Preserve Area manager will use reasonable efforts to prepare and submit to the Water Authority and Wildlife Agencies an illegal dumping response plan and may initiate responses within 60 days of determining that Changed Circumstance has occurred. Based on that report and discussions with the Water Authority and Wildlife Agencies, the manager will implement and maintain responses in addition to standard preserve spill control practices. Toxic spills will be responded to immediately. If a Changed Circumstance event occurs within a Preserve Area or right-of-way/facility area that is managed for Covered Species, a qualified individual (e.g., Environmental Surveyor or Hazardous Material Spill Specialist) will assess the area to determine specific actions to be implemented. Dumped material will be assessed for hazardous materials before clean-up. Possible responses to a Changed Circumstance related to illegal human activities may involve:

- Immediately, upon notification of a spill, employ all required hazardous spill precautions, particularly to contain the materials;
- Notify appropriate authorities per hazardous spill reporting requirements and request assistance if the response exceeds Water Authority or Preserve Area manager capabilities (contact lists to be maintained by Water Authority Operations and Maintenance/Dispatcher and Preserve Area managers);
- Determine if continued unauthorized access is allowing illegal activities to occur on Preserve Areas and rights-of-way/facilities managed for Covered Species and, where determined by the Water Authority or land manager, install appropriate barriers or increased monitoring;
- Review and revise storage and use of toxic/hazardous materials at the Preserve Areas;
- Notify regulatory agencies if spills, dumping, or vandalism may violate federal, state or local regulations;
- Notify local enforcement agencies of repeated illegal activities;

- Remove all unauthorized dumped materials;
- If determined appropriate, prosecute and seek remediation from responsible parties.

8.5.1.6 Future Listings of Non-Covered Species and Designation of Proposed or Revised Critical Habitat

Definition. The future listings of non-Covered Species and designation of proposed or revised critical habitat for a Covered or non-Covered Species are reasonably foreseeable during the term of the Permit and are a Changed Circumstance. In the event that a species, which is not a Covered Species pursuant to this Plan and associated take permit, is listed by either the USFWS or CDFG or critical habitat is designated or revised for a listed species within the Plan Area subsequent to the issuance of a take permit pursuant to the Plan, such listing will be considered a Changed Circumstance.

In the event a non-Covered Species is newly listed or critical habitat is designated or revised for a listed species within the Plan Area, the Water Authority will consult with the Wildlife Agencies, and following such consultation will initiate those responsive measures, if any, identified by the Wildlife Agencies as necessary to avoid take of or jeopardy to the newly listed species, and/or adverse modification of any newly designated or revised Critical Habitat within the Plan Area. Those measures will be followed until and unless the Water Authority's permit is amended to include coverage for the newly listed species or the Wildlife Agencies notify the Water Authority that such measures are no longer required to avoid take of or jeopardy to the species or adverse modification of designated Critical Habitat. The Water Authority will obtain appropriate federal and/or state permits to allow take of newly listed animal species prior to impacts occurring. The Major Amendment process for adding a new species to the Covered Species list for this Plan is discussed in Section 8.4 of this Plan.

8.5.2 Unforeseen Circumstances

Unforeseen Circumstances (defined in 50 CFR Section 17.3) refers to 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 the USFWS (or CDFG) at the time of the conservation plan's negotiation and development and that result in a substantial and adverse change in the status of the Covered Species.

Unforeseen Circumstances include future unanticipated conditions, which are either not defined as Changed Circumstances or which exceed the definitions developed for Changed Circumstances particularly in terms or severity or extent (e.g., flood or fire affecting species continued existence).

8.5.2.1 Planned Response in the Event of Unforeseen Circumstances

Unforeseen Circumstances will require immediate consultation and discussion between the Wildlife Agencies and the Water Authority. The Wildlife Agencies bear the burden of demonstrating that Unforeseen Circumstances exist, using the best available scientific and commercial data available and considering certain specific factors. In its evaluation the Wildlife Agencies will consider, but not be limited to, the following factors, which will then be the basis for evaluating what could be affected:

- The size of the current range of the affected Covered Species.
- The percentage of the range of the affected Covered Species that has been adversely affected by Covered Activities under the Plan.
- The percentage of the range of the affected Covered Species that has been conserved by the Plan.
- The ecological significance of that portion of the range of the affected Covered Species affected by the Plan.
- The level of knowledge about the affected Covered Species and the degree of specificity of the Covered Species conservation program under the Plan.
- Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected Covered Species in the wild.

Any findings of Unforeseen Circumstances must be clearly documented and based upon reliable technical information regarding the biological status and habitat requirements of the affected species. Except where there is substantial threat of imminent, significant adverse impacts to a Covered Species, the Wildlife Agencies shall provide the Water Authority at least 60 calendar days written notice of a proposed finding of Unforeseen Circumstances, during which time Wildlife Agencies shall meet with the Water Authority to discuss the proposed finding, to provide the Water Authority with an opportunity to submit information to rebut the proposed finding, and to consider any proposed changes to the conservation land management plans.

If the Wildlife Agencies make a finding of Unforeseen Circumstances in accordance with the procedures described above and determine that additional conservation measures are warranted, such additional conservation measures shall conform to the maximum extent possible to the original terms of this Plan. Additional conservation measures shall be limited to those that would not require additional financial compensation, land or land restrictions, or water or water restrictions beyond those required by the Plan at the time of issuance of the section 10(a)(1)(B) Permit without the consent of the Water Authority.

A finding of Unforeseen Circumstances does not allow Covered Activities undertaken pursuant to the Plan to cause jeopardy to a species, unauthorized take of a species, or adverse modification of the designated critical habitat of a species.

The Water Authority shall cooperate with the Wildlife Agencies in identifying and implementing fair, reasonable, and necessary modifications to the preserve management and habitat acquisition elements of this Plan.

8.5.3 Costs and Timing for Addressing Changed Circumstances

As described previously, the Water Authority will assess the conditions for which Changed Circumstances is being invoked. Funding for addressing Changed Circumstances will be re-allocated from the existing funds appropriated by the Water Authority and Preserve Area managers for this Plan. The Water Authority or Preserve Area managers will estimate the time and costs to address the event within its preserve lands and any right-of-way/facility that is managed for Covered Species. Costs to restore or repair, monitor the involved area(s) are discussed below:

Minor Damages. Minor damages are those costing less than \$25,000. It is anticipated that repairs/restoration will be initiated and the primary work completed within six months of the incident. Examples of minor damage are:

- Damage to fencing, barriers and other facilities that may protect Covered Species, or
- Damage/impacts to small patches (less than five acres) of conserved vegetation communities.

Moderate Damages. Moderate damages are those costing \$25,000-49,999. It is anticipated that repairs/restoration will be initiated and the primary work completed within nine months of the incident. Examples of moderate damage are:

- Damage to roads, flood control facilities, and other facilities that may protect Covered Species, or
- Damage to small patches (less than five acres) of conserved vegetation communities supporting Covered Species and requiring special studies or species collections for on-site re-establishment.

Major Damages. Major damages are those costing \$50,000 or more. The Water Authority will implement plan responses to these events as soon as possible, but note that such responses may require study and trigger the need for regulatory permits before repairs and/or restoration can be initiated

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IMPLEMENTING AGREEMENT

for the

SAN DIEGO COUNTY WATER AUTHORITY
NATURAL COMMUNITY CONSERVATION PLAN/
HABITAT CONSERVATION PLAN

by and between

SAN DIEGO COUNTY WATER AUTHORITY,
UNITED STATES FISH AND WILDLIFE SERVICE
and
CALIFORNIA DEPARTMENT OF FISH AND GAME

October 18, 2010

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EXHIBITS

A: Water Authority Plan Area

B: Covered Species List

AGREEMENT

1.0 PARTIES

This Implementing Agreement (“Agreement”), made and entered into by and among the United States Fish and Wildlife Service (“USFWS”) of the United States Department of the Interior, the California Department of Fish and Game (“CDFG”) of the State of California Natural Resources Agency and the San Diego County Water Authority (the “Water Authority”) implements the San Diego County Water Authority Natural Community Conservation Plan/Habitat Conservation Plan (“NCCP/HCP”) as of the Effective Date.

These entities may be referred to collectively as the “Parties” and individually as a “Party.” The USFWS and CDFG may be referred to collectively as the “Wildlife Agencies.”

2.0 RECITALS

The Parties have entered into this Agreement in consideration of the following facts:

- 2.1** The Water Authority NCCP/HCP provides a comprehensive framework to protect natural resources in western San Diego and southwestern Riverside counties, and improves and streamlines the environmental permitting process for activities likely to result in impacts to endangered, threatened and other sensitive species. The objective of the NCCP/HCP is to provide comprehensive species, wetlands, and ecosystem conservation and to provide for the conservation and management of endangered, threatened, and other sensitive species within western San Diego County and southwestern Riverside County. The NCCP/HCP also facilitates water infrastructure construction and operations to serve development approved by land use agencies through commitments that provide for the conservation and management of, and actions to avoid, minimize, and mitigate to the maximum extent practicable, impacts on Covered Species and their habitats while allowing for planned development in certain regions of the counties and cities.
- 2.2** The Water Authority is a government agency created pursuant to the provisions of Cal. Stats. 1943, chapter 595, as amended. The Water Authority will implement the NCCP/HCP and this Agreement.
- 2.3** The NCCP/HCP Plan Area covers western San Diego County and a small portion of southwestern Riverside County, approximately 992,000 acres, including the Water Authority’s Service Area (920,463 acres within San Diego County), in which impacts from development projects and other activities are evaluated, and in which conservation will occur (Exhibit A).
- 2.4** The area covered by the NCCP/HCP has been determined to provide, or potentially provide, habitat for sixty-six (66) species (“Covered Species”) that are listed as endangered or threatened, or that carry other special status

under federal and state laws, or are otherwise considered sensitive, and for which the Water Authority has requested coverage (Exhibit B).

- 2.5** The Water Authority is seeking an incidental take permit and an NCCP authorization from USFWS and CDFG, respectively, (incidental take permit and NCCP authorization are collectively referred to as “Permits”) covering sixty-three (63) special-status species. Three additional species, Orcutt’s grass (*Orcuttia californica*), Munz’s onion (*Allium munzii*) and vernal pool fairy shrimp (*Branchinecta lynchi*), could potentially have all their impacts occur within the NCCP/HCP’s Major Amendment Area in Riverside County. Take Authorization for these three species will require a Major Amendment to the NCCP/HCP and Permits. The Wildlife Agencies’ Permits will cover Water Authority activities consistent with County Water Authority Act Cal. Stats. 1943, chapter 595, as amended, including maintenance and repair activities within the Plan Area. The Wildlife Agencies’ Permits will also apply to land management activities carried out on certain Habitat Management Area (HMA) lands that are protected and managed by the Water Authority or third parties under its direct control as the NCCP/HCP “Preserve Area,” as described in the NCCP/HCP.
- 2.6** The USFWS has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species under various federal laws, including the Federal Endangered Species Act of 1973 (16 U.S.C. §1531 et seq.) (“FESA”), the Migratory Bird Treaty Act (16 U.S.C. §701 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. §668 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. §§661-666(c)), and the Fish and Wildlife Act of 1956 (16 U.S.C. §742(a) et seq.).
- 2.7** FESA prohibits the Take of animal species listed as endangered or threatened under FESA, as Take is defined under federal law. Under Section 10(a)(1)(B) of FESA (16 U.S.C. §1539(a)), USFWS may issue a permit authorizing the incidental Take of endangered or threatened animal species during otherwise lawful activities if certain statutory requirements are met by the applicant and such Take will not appreciably reduce the likelihood of the survival and recovery of the species in the wild. To obtain a federal incidental Take permit, the applicant must submit a habitat conservation plan (“HCP”) describing, among other things, the steps the applicant will take to minimize and mitigate to the maximum extent practicable the impact of such “taking.” The Water Authority submitted the NCCP/HCP to USFWS, and applied for a Federal permit for incidental Take of Covered animal Species within the Permit Area. The incidental Take permit issued by USFWS based on the NCCP/HCP will be issued concurrently with the USFWS’ execution of this Agreement. Take of federally listed plant species is not prohibited under FESA and cannot be authorized under a federal incidental take permit. Covered Species of plants are listed on the Federal incidental take permit in recognition of the conservation benefits provided for them under the NCCP/HCP and receive

assurances pursuant to the Federal “No Surprises” rule. “Take” when used in this Agreement with reference to Take authorized under the federal incidental take Permit refers only to Take of animal species; however, in assessing mitigation or other plan obligations, if any, owed on account of “Take” of Covered Species, “Take” shall be interpreted to encompass impacts to all Covered Species, including Covered plant Species and non-listed Covered animal species. CDFG has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species under various state laws, including the California Endangered Species Act (Fish & G. Code, §2050 et seq.) (“CESA”), the Natural Community Conservation Planning Act (Fish & G. Code, §2800 et seq.) (“NCCPA”), the Native Plant Protection Act (Fish & G. Code, §1900 et seq.), and other statutes including, but not limited to, California Fish and Game Code sections 1600 et seq., 1801, 1802, 3511, 3513, 4700, 5050 and 5515.

- 2.8** CESA generally prohibits the Take of species listed as endangered, threatened or candidate species under CESA. The NCCPA allows CDFG to authorize by permit the Take of any species, whether or not they are listed as endangered or threatened under CESA, where the conservation and management of the species are provided for in a Natural Community Conservation Plan (“NCCP”) approved by CDFG (Fish & Game Code, §2835). The Water Authority submitted the NCCP/HCP to CDFG for approval and permitting for Take pursuant to NCCPA. The Take authorization issued by CDFG based on the NCCP/HCP will be issued concurrently with CDFG’s execution of this Agreement.
- 2.9** The Water Authority obtained and has entered into agreements with various management entities to manage more than 1,920 acres of natural habitat lands (HMAs, which comprise the Preserve Area) in San Diego County to provide mitigation for its past projects and to provide mitigation credit for its future projects and operations. The Water Authority also previously entered into similar agreements with other entities to manage 1,147 acres of other conserved mitigation lands (Managed Mitigation Area or MMA properties) that comprise part of the environmental baseline of conserved lands. All of the HMA and MMA habitat properties were acquired to meet required and future mitigation obligations. All of these habitat properties complement regional conservation efforts to create a high quality, diverse system of interconnected conservation lands.
- 2.10** The NCCP/HCP was developed by the Water Authority and contains a series of measures to minimize and mitigate to the maximum extent practicable the effects of specified categories of activities on certain special-status species. The NCCP/HCP also includes measures to provide for the conservation and management of the species and certain natural communities.
- 2.11** The Water Authority contracts or will contract with management entities to administer and manage certain HMA properties under the Authority’s

direction and control. These management entities shall receive coverage for approved management (covered) activities that may result in incidental Take when consistent with the NCCP/HCP pursuant to Sections 2.6 and 13.2 of this Agreement. FWS and CDFG have agreed to manage other HMAs in a manner consistent with the HCP. FWS and CDFG will obtain separate incidental take authorization under the Federal and State Endangered Species Acts for their HMA management activities. To streamline other environmental regulatory programs, the NCCP/HCP shall serve as the basis for a Streambed Alteration Agreement issuance program with CDFG, under Section 1602 of the California Fish and Game Code, and is intended to serve as a Regional General Permit, or other programmatic permitting program with the United States Army Corps of Engineers under Section 404 of the federal Clean Water Act, although the Parties acknowledge that the approval of the Army Corps of Engineers is independent of this Agreement.

- 2.12 The NCCP/HCP, including Section 6.7.2, will serve as the basis for CDFG's issuance of Lake or Streambed Alteration Agreements under Section 1602 of the California Fish and Game Code or for a Master Streambed Agreement for Covered Activities conducted in compliance with the NCCP/HCP.
- 2.13 The NCCP/HCP was developed in conformance with Fish and Game Code Section 2830(f). The planning process included intensive study of the species covered by the NCCP/HCP, their habitats, and other natural communities, and proposed development and other activities within the NCCP/HCP area; discussions between the Water Authority and the Wildlife Agencies; input from independent science advisors and the public; and environmental review under the National Environmental Policy Act (42 U.S.C. §4321 et seq.) ("NEPA") and the California Environmental Quality Act (Pub. Resources Code, §21000 et seq.) ("CEQA").
- 2.14 The Water Authority has committed substantial land, natural resources, financial resources, human resources and other assets to conserve and manage the special-status species, their habitats and other natural communities, in order to obtain the authorizations and regulatory assurances identified in this Agreement

3.0 DEFINITIONS

The following terms as used in this Agreement will have the meanings set forth below. Terms specifically defined in FESA, CESA or NCCPA or the regulations adopted by USFWS and DFG under those statutes shall have the same meaning when used in this Agreement. Definitions used in this Agreement may elaborate on, but are not intended to conflict with, such statutory or regulatory definitions.

- 3.1 **"Adaptive Management"** means to use the results of new information gathered through the monitoring program of the NCCP/HCP and from other sources to adjust management strategies and practices to assist in

providing for the conservation of Covered Species. Implementation of the Adaptive Management measures in the NCCP/HCP will respond to monitoring program information, contingencies, Changed Circumstances, and Unforeseen Circumstances affecting Covered Species. The Adaptive Management measures are to be consistent with the goals and objectives of the NCCP/HCP and the terms and conditions of the Permits.

- 3.2** “**Agreement**” means this Implementing Agreement, which incorporates the NCCP/HCP and the Permits by reference.
- 3.3** “**Authorized Take**” means the extent of incidental Take of Covered animal Species authorized by the USFWS in the Federal Permit issued to the Water Authority pursuant to Section 10(a)(1)(B) of FESA, and the extent of Take of Covered Species authorized by CDFG in the State Permit issued to the Water Authority pursuant to California Fish and Game Code §2835.
- 3.4** “**CDFG**” means the California Department of Fish and Game, a department of the California Natural Resources Agency.
- 3.5** “**CEQA**” means the California Environmental Quality Act (Pub. Resources Code, §21000 et seq.) and all rules, regulations and guidelines promulgated pursuant to that Act.
- 3.6** “**CESA**” means the California Endangered Species Act (Fish & Game Code, §2050 et seq.) and all rules, regulations and guidelines promulgated pursuant to that Act.
- 3.7** “**Changed Circumstances**” for purposes of the Federal Permit means, changes in circumstances affecting a species or the geographic area covered by the NCCP/HCP that can reasonably be anticipated by the Parties and that can reasonably be planned for in the NCCP/HCP (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)(50 C.F.R 17.3).
“**Changed Circumstances**” for purposes of the State Permit means reasonably foreseeable circumstances that could affect a Covered Species or Plan Area covered by the NCCP (Fish & G. Code, §2805, subd. (c).). Changed Circumstances and planned responses to Changed Circumstances are more particularly defined in Section 12.2 of this Agreement and Section 8.5.1 of the NCCP/HCP. Changed Circumstances do not include Unforeseen Circumstances.
- 3.8** “**Conserve,**” “**Conserving,**” or “**Conservation**” means to use, and the use of, methods and procedures within the NCCP/HCP Plan Area that are necessary to maintain and improve the status of Federal and state-listed Covered Species, and to maintain or enhance the condition of the non-listed Covered Species
- 3.9** “**Conservation Goal(s)**” means a broad statement of intent that describes how the NCCP/HCP will accomplish the protection of habitat, ecological processes, biological corridors and linkages to ensure that the Covered Species are conserved. Conservation Goals are also designed to ensure the persistence of natural communities.

- 3.10 “Conservation Measure”** means each action detailed in Section 6 and Appendix B of the NCCP/HCP that is a component of the Conservation Strategy.
- 3.11 “Conservation Objectives(s)”** means measurable statements of actions or measures that will lead to attainment of Conservation Goals.
- 3.12 “Conservation Strategy”** means all of the conservation and management measures described in Section 6 and Appendix B of the NCCP/HCP and as further required by the Permits to minimize, mitigate, conserve, and monitor the impacts of Take of the Covered Species, plus all reporting requirements described in Sections 6.12 and 8.10 of the NCCP/HCP, and the Water Authority’ responses to Changed Circumstances described in Section 8.8.1 of the NCCP/HCP. The Conservation Strategy is more particularly defined in Section 7, below.
- 3.13 “Covered Activities”** means those project activities, facility operations and management, and conservation and management activities (including all ground-disturbing projects and activities that may occur within the Plan Area described in Sections 5 and 6 of the NCCP/HCP) to be carried out by the Water Authority or third parties under the Authority’s direct control in the Permit Area that may result in Authorized Take of Covered Species during the term of the NCCP/HCP, and that are otherwise lawful.
- 3.14 “Covered Species”** means the species, listed and non-listed, whose conservation and management are provided for by the NCCP/HCP and for which limited Take is authorized by the Wildlife Agencies pursuant to the Permits. Covered Species are listed in Section 6 of the NCCP/HCP. The Covered Species are listed on Exhibit B.
- 3.15 “Effective Date”** means the date, following execution of this Agreement, on which the State Permit or the Federal Permit is issued, whichever is later.
- 3.16 “Federal Listed Species”** means the Covered Species which are listed as threatened or endangered species under FESA as of the Effective Date, and the Covered Species which are listed as threatened or endangered pursuant to FESA during the term of the NCCP/HCP as of the date of such listing.
- 3.17 “Federal Permit”** means the Federal incidental Take permit issued by USFWS to the Water Authority pursuant to section 10(a)(1)(B) of FESA, as it may be amended from time to time.
- 3.18 “FESA”** means the Federal Endangered Species Act of 1973, as amended (16 U.S.C § 1531 et seq.) and all rules, regulations and guidelines promulgated pursuant to that Act.
- 3.19 “Fully Protected Species”** means any species identified in California Fish and Game Code sections 3511, 4700, 4800, 5050 or 5515 that occur within the Plan Area.
- 3.20 “Habitat Management Area(s)” (HMA)** means specific individual land and/or water areas subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. HMAs may support habitat credits or

upland and/or wetland areas that are eligible to be used as mitigation for Covered Activities pursuant to this Plan. The HMAs collectively comprise the Preserve Area (see 3.37).

- 3.21 **“HCP”** means a habitat conservation plan prepared pursuant to Section 10 of FESA.
- 3.22 **“Jurisdictional Wetlands and Waters”** means State and federally regulated wetlands and other water bodies that cannot be filled or altered without permits from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (33 U.S.C. §1251 et seq.), from the State Water Resources Control Boards under either Section 401 of the Clean Water Act or the Porter-Cologne Water Quality Act (California Water Code, §13000 et seq.), or from CDFG under Section 1602 of the California Fish and Game Code, as further explained in Section 6.7 of the NCCP/HCP.
- 3.23 **“Listed Species”** means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is listed as endangered or threatened under FESA or CESA.
- 3.24 **“Major Amendment Area”** means that portion of the Plan Area within Riverside County that is not authorized for Take of Covered Species until a Major Amendment is approved by the Wildlife Agencies.
- 3.25 **“Managed Mitigation Area(s)” (MMA)** means those properties that were acquired and/or funded by the Water Authority as biological resource mitigation for the Emergency Storage Project or other projects, and that provide baseline conservation associated with this Plan. Property selection was conducted in coordination with the Wildlife Agencies and/or local governments participating in regional conservation, assuring that each MMA was a priority acquisition that significantly contributed to regional conservation. MMAs are not mitigation for covered activities under the NCCP/HCP and therefore do not provide mitigation credits.
- 3.26 **“Management Activities”** means all management actions provided for under the NCCP/HCP to achieve NCCP/HCP biological goals and objectives.
- 3.27 **“Migratory Bird Treaty Act”** means the federal Migratory Bird Treaty Act (16 U.S.C. §703 et seq.) and all rules, regulations and guidelines promulgated pursuant to that Act.
- 3.28 **“NCCP”** means a Natural Community Conservation Plan prepared according to the NCCPA.
- 3.29 **“NCCPA”** means the California Natural Community Conservation Planning Act (Fish & G. Code, §2800 et seq.), as amended on January 1, 2003, and all rules, regulations and guidelines promulgated pursuant to that Act.
- 3.30 **“NCCP/HCP”** means the Natural Community Conservation Plan/Habitat Conservation Plan prepared by the Water Authority and submitted to the Wildlife Agencies under Section 2835 of the California Fish and Game Code and Section 10 of FESA in support of the Water Authority’s Permit applications.

- 3.31 **“NEPA”** means the National Environmental Policy Act (42 U.S.C. §4321 et seq.) and all rules, regulations and guidelines promulgated pursuant to that Act.
- 3.32 **“Non-listed Species”** means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is not listed as endangered or threatened under FESA or CESA.
- 3.33 **“Party”** or **“Parties”** means any or all of the signatories to this Agreement.
- 3.34 **“Permit Area”** means the portion of the Plan Area where the Water Authority has obtained authorization from the Wildlife Agencies for the Authorized Take of Covered Species while carrying out Covered Activities.
- 3.35 **“Permits”** means the Federal Permit and the State Permit.
- 3.36 **“Permittee”** means the Water Authority.
- 3.37 **“Plan Area”** means the geographic area analyzed in the NCCP/HCP and SDCWA NCCP/HCP EIS/EIR, located in western San Diego County and southwestern Riverside County (Exhibit A). The Plan Area is further described in detail in Section 1 of the NCCP/HCP.
- 3.38 **“Preserve Lands”** means those geographic areas that are dedicated as permanent habitat conservation areas and are managed for biological resources.
- 3.39 **“Preserve Area”** means the geographic area that has been dedicated by the Water Authority for permanent habitat/species conservation and management. The Preserve Area is collectively comprised of the individual HMAs.
- 3.40 **“Preserve Area Management Plan”** means a site-specific implementation and management plan for each Habitat Management Area prepared pursuant to Section 10.3.2 of this Agreement.
- 3.41 **“San Diego County Water Authority (SDCWA) NCCP/HCP EIS/EIR”** means the Joint Environmental Impact Statement and Environmental Impact Report prepared to analyze the environmental impacts of the NCCP/HCP and Permits under NEPA and CEQA.
- 3.42 **“Section 1600”** means Section 1600 et seq. of the California Fish and Game Code, which regulates alteration of streambeds through issuance of Lake or Streambed Alteration Agreement.
- 3.43 **“State Listed Species”** means the Covered Species which are listed as threatened or endangered species, or a candidate for such status, under CESA, as of the Effective Date, and the Covered Species that are listed as threatened or endangered, or a candidate for such status pursuant to CESA during the term of the NCCP/HCP, as of the date of such listing.
- 3.44 **“State Permit”** means the state Take authorization issued to the Water Authority pursuant to Section 2835 of the California Fish and Game Code, as it may be amended from time to time.
- 3.45 **“Survey Area”** means the lands within one-mile on either side of the aqueducts, pipelines and facilities that were analyzed for potential take by Planned and Future Covered Activities.

- 3.46** “**Take**” and “**Taking**” have the same meaning provided by FESA and its implementing regulations with regard to activities subject to FESA, and also have the same meaning provided in the California Fish and Game Code, section 86, with regard to activities subject to CESA and NCCPA. Take of listed plant species is not prohibited under the FESA and cannot be authorized under the federal permit.
- 3.47** “**Unforeseen Circumstances**” under the Federal Permit means, pursuant to 50 C.F.R. 17.3, changes in circumstances affecting a species or geographic area covered by the NCCP/HCP that could not reasonably have been anticipated by the plan developers and USFWS at the time of the plan’s negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species (Plan Section 8.5.2). “**Unforeseen Circumstances**” under the State Permit means changes affecting one or more species, habitat, natural community, or the geographic area covered by a conservation plan that could not reasonably have been anticipated at the time of plan development, and that result in a substantial adverse change in the status of one or more Covered Species.
- 3.48** “**USFWS**” means the United States Fish and Wildlife Service, an agency of the United States Department of Interior.
- 3.49** “**Water Authority**” means the San Diego County Water Authority.
- 3.50** “**Wildlife Agencies**” means USFWS and CDFG.

4.0 **PURPOSES**

This Agreement defines the Parties’ roles and responsibilities and sets forth actions that will be undertaken to avoid, minimize and mitigate the effects on the Covered Species caused by the Covered Activities within the Plan Area, and to provide for the conservation of the Covered Species within the Plan Area. The purposes of this Agreement are:

- 4.1** To ensure implementation of each of the terms and conditions of the NCCP/HCP, this Agreement, and the Permits;
- 4.2** To provide assurances to the Water Authority that (1) pursuant to the federal “No Surprises” provisions of 50 Code of Federal Regulations, sections 17.22(b)(5) and 17.32(b)(5), as long as the terms and conditions of this Agreement, the NCCP/HCP, and the Permits are fully satisfied, the USFWS will not require additional measures to the extent restricted or proscribed in the No Surprises rule from the Water Authority without its consent unless required by law; and (2) pursuant to California Fish and Game Code section 2820, subdivision (f)no additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources will be required of the Water Authority, either to minimize and mitigate the impacts of Authorized Take, or to provide for the conservation and management of the Covered Species in the Plan Area, except as provided in this Agreement and the NCCP/HCP, or required by law; and

4.3 To describe remedies and recourse should any Party fail to perform its obligations as set forth in this Agreement.

5.0 INCORPORATION OF THE NCCP/HCP

The NCCP/HCP and each of its provisions, including any subsequent amendments authorized pursuant to Section 17 of this Agreement, are intended to be, and by this reference are, incorporated herein. In the event of any direct contradiction, conflict or inconsistency between this Agreement and the NCCP/HCP, the terms of this Agreement shall control. In the event of any direct contradiction, conflict or inconsistency between this Agreement and the Permits, the Permits will control. In all other cases, the provisions of this Agreement, the NCCP/HCP, and the Permits shall be interpreted to be consistent with and complementary to each other.

6.0 LEGAL FINDINGS AND REVIEW BY THE WILDLIFE AGENCIES

6.1 USFWS Findings

As further described in the Federal Findings issued by USFWS, USFWS has found that the NCCP/HCP satisfies the permit issuance criteria under Section 10(a)(2)(B) of FESA for each Covered Species. The Findings support the Take authorization for the Covered Species issued to the Water Authority as of the Effective Date.

For each Covered animal Species that is not a Federal Listed Species as of the Effective Date, the Take authorization for Federal Non-listed animal Species shall automatically become effective if and when the species is listed pursuant to FESA.

Concurrent with the USFWS' execution of this Agreement, and on satisfaction of all other requirements, USFWS will issue the Water Authority a Federal Permit under Section 10(a)(1)(B) of FESA, authorizing the incidental Take by the Water Authority of each Covered animal Species within the jurisdiction of USFWS resulting from Covered Activities in the Permit Area. The Federal Permit is conditioned on compliance with the terms and conditions of this Agreement, the NCCP/HCP, and the Federal Permit.

6.2 CDFG Findings

6.2.1 State Listed and Non-Listed Species

As further described in the State Permit and the findings issued by CDFG pursuant to the NCCPA, CDFG has found that the NCCP/HCP satisfies the permit issuance criteria listed in Sections 2820, 2821, 2830 and 2835 of the California Fish and Game Code for each Covered Species, both State Listed Species and Non-listed Species. This finding supports the

Take authorization for State Listed Species and Non-Listed Species conferred to the Water Authority as of the Effective Date.

Concurrent with CDFG's execution of this Agreement, and on satisfaction of all other requirements, CDFG issued the Water Authority a State Permit under Section 2835 of the California Fish and Game Code, authorizing the Take by the Water Authority of each Covered Species, both State Listed Species and Non-listed Species, within the jurisdiction of CDFG resulting from Covered Activities in the Permit Area. The State Permit is conditioned on compliance with the terms and conditions of this Agreement, the NCCP/HCP, and the State Permit.

6.2.2 State Fully Protected Species

The current Plan does not include Fully Protected Species (Fish and Game Code sections 3511, 4700, 5050, 5515) in the list of Covered Species. Take of Fully Protected Species is not authorized by the State permit. If at any time there is a change in state law such that CDFG may issue a Section 2835 Permit or other permit or authorization allowing the incidental Take of any of Fully Protected Species, the Water Authority may request an amendment to the Permit or apply for a new permit to authorize Take of such species, as provided in Section 17.4 of this Agreement.

6.3 Environmental Review

6.3.1 Federal Law – National Environmental Policy Act

Issuance of the Federal Permit under Section 10(a)(1)(B) of FESA to the Water Authority by USFWS is an action subject to review under NEPA. USFWS is the lead agency under NEPA. Prior to the Effective Date, USFWS evaluated the NCCP/HCP pursuant to NEPA in the San Diego County Water Authority NCCP/HCP EIS/EIR and issued a record of decision addressing the impacts of the NCCP/HCP and Federal Permit on the environment. To the extent consistent with applicable Federal law, USFWS shall rely on and use relevant portions of the San Diego County Water Authority NCCP/HCP EIS/EIR and the NEPA Findings when conducting future environmental review of Covered Activities.

6.3.2 State Law – California Environmental Quality Act

Approval of the NCCP/HCP and issuance of the State Permit under Section 2835 of the California Fish and Game Code is an action subject to review under CEQA. Prior to the Effective Date, the Water Authority and CDFG each evaluated the NCCP/HCP and NCCP/HCP EIS/EIR pursuant to CEQA and issued findings addressing whether the implementation of the NCCP/HCP would cause significant adverse impacts to the

environment. Unless otherwise required by CEQA or other applicable law, the Water Authority and CDFG shall rely on and use relevant portions of the San Diego County Water Authority NCCP/HCP EIS/EIR and the CEQA Findings when conducting future environmental review of Covered Activities.

7.0 CONSERVATION STRATEGY

NCCP/HCP Section 6 describes a Conservation Strategy that includes: the biological goals and objectives of the NCCP/HCP; avoidance and minimization measures to reduce impacts resulting from Covered Activities; land acquisition and assembly of the Preserve Area; Preserve Area management that includes habitat creation, enhancement and restoration and species population enhancement; Plan Area monitoring and reporting; and adaptive management; and measures described in this paragraph and elsewhere in this Agreement and the NCCP/HCP that contribute to the conservation of Covered Species. As further provided in this Agreement, the NCCP/HCP and the Permits, the Water Authority shall implement every applicable Conservation Measure and other measures described in the NCCP/HCP (including the species-specific measures described in Appendix B of the NCCP/HCP) when engaging in Covered Activities and when otherwise required, as they may be modified through adaptive management, whether or not such measures are specifically referenced in this Agreement. For the purposes of this Agreement, all of these measures are collectively referred to as the “Conservation Strategy.”

8.0 AVOIDANCE & MINIMIZATION OF IMPACTS

8.1 General Framework

As required by FESA and NCCPA, the Conservation Strategy includes measures to avoid and minimize Take of Covered Species and to conserve natural communities and Covered Species at the landscape-, habitat- and species-level. Avoidance and minimization measures include species surveys and specific conditions on Covered Activities, as detailed in NCCP/HCP Section 6. Section 6 provides further instructions to determine which avoidance and minimization measures are applicable to particular Covered Activities. The Water Authority shall implement all applicable avoidance and minimization measures as required by the NCCP/HCP. Prior to approving or carrying out any Covered Activity, the Water Authority shall evaluate the Covered Activity and apply the above referenced provisions to ensure that all applicable avoidance and minimization measures are incorporated into the Covered Activity, as provided by this Agreement.

8.2 Surveys

The Water Authority shall require a Pre-Activity Survey form (PSF) for each Covered Activity/Covered Project in accordance with NCCP/HCP Section 6.4.1.2

prior to carrying out the Covered Activity. However, a Preserve Area management entity that is implementing an approved management plan will not be required to complete a PSF. The Water Authority will ensure that the Covered Activity is implemented and complies with all applicable preconstruction surveys and construction monitoring requirements described in Section 6.4 of the NCCP/HCP.

8.3 Plan Minimization Measures

The Water Authority shall ensure that all Covered Activities (land management, operations and maintenance) within or adjacent to the existing or future preserve lands and development and all other Covered Activities within the Plan Area incorporate plan minimization measures set forth in NCCP/HCP Section 6.4 for development and O&M activities generally and Section 6.11 for HMA management and monitoring, which requires design and operational elements to minimize the impacts of the development on all preserve lands. The Water Authority shall ensure that each Covered Activity incorporates adequate design elements, and shall be responsible for enforcing compliance with all minimization measures. For Covered Activities within or adjacent to preserve lands, all applicable design elements to establish a satisfactory interface shall be within the footprint of the development and not within preserve lands unless the activity is otherwise allowed within preserve lands under the NCCP/ HCP. As described in Section 6.0 of the NCCP/HCP, the Water Authority will prepare a Pre-activity Survey From PSF for each Covered Activity, and shall submit a proposed Minor Amendment for Wildlife Agency review for all Future Projects or activities that fall within the definition of Covered Activities, are outside the Survey Area, but are not specifically identified in the Plan to confirm that the Future Project or activity complies with the Plan.

8.4 Jurisdictional Wetlands and Waters

When Jurisdictional Wetlands and Waters are potentially present within the footprint of a Covered Activity, the Water Authority shall comply with all applicable statutory and regulatory requirements of the U.S. Army Corps of Engineers and the appropriate State regulatory agency. The Water Authority shall implement all avoidance, minimization and mitigation requirements pursuant to this Plan in carrying out the Covered Activity.

9.0 LAND ACQUISITION & ASSEMBLY OF PRESERVE AREAS

9.1 General Framework

The Water Authority has assembled a Preserve Area that supports regional habitat and species conservation by acquiring land and dedicating it in perpetuity for conservation uses through either a fee interest or conservation easement. The Water Authority may also include in the Preserve Area lands acquired through

partnerships with other entities in accordance with Section 9.4, and lands acquired in accordance with Section 9.5 of this Agreement. Where the Water Authority acquires and/or retains a fee interest in land, and if requested by the Wildlife Agencies, preservation shall be ensured through Wildlife Agency approved restrictive covenants, deed restrictions, conservation easements or equivalent title restrictions, recorded in favor of CDFG or a third party approved by the Wildlife Agencies. Where acquisition is by conservation easement, each conservation easement shall provide for the permanent protection and dedication of the land to the Preserve Area. The easement shall be recorded in favor of one or both of the Wildlife Agencies if so requested by the Wildlife Agencies, and the form of conservation easement shall be approved in writing by the Wildlife Agencies. All acquisitions intended to fulfill the requirements of the NCCP/HCP shall be approved by the Wildlife Agencies prior to acquisition and shall adhere to the principles and priorities for preserve design, and for species population and habitat preservation and enhancement, as set forth in NCCP/HCP. The addition of properties to the Preserve Area shall follow the process described in Sections 6.5 and 6.10 of the NCCP/HCP, which allows for some flexibility in how the Preserve Area is ultimately assembled, including the acceptance of credits from approved mitigation or conservation banks, to account for availability and funding. The Water Authority shall also comply with the steps and guidelines for land acquisition described in NCCP/HCP Section 6.10 and the Minor Amendment process (Section 8.3.1).

As detailed in NCCP/HCP Section 6, the Habitat Mitigation Areas (HMAs) currently total 1,920 acres. Within the HMA properties, approximately 704 acres of mitigation credits exist or are proposed to be created to satisfy, as needed, the Water Authority's commitments under the NCCP/HCP.

9.1.1 Assembly of Preserve Areas – Water Authority's and Wildlife Agencies' Responsibilities for Mitigation and Conservation

Under FESA, the Water Authority is required to mitigate the impacts of Take resulting from the Covered Activities to the maximum extent practicable, and under the NCCPA the Water Authority is required to provide for the conservation and management of the Covered Species. To meet these legal requirements, the Water Authority has acquired or shall acquire all land necessary to mitigate foreseeable impacts and assemble the Preserve Area according to the assumptions and criteria set forth in NCCP/HCP Tables 5-3, 6-5, 6-6, 6-7, and 6-8 and Conservation Goals and Objectives 1 and 2.

All 1,920 acres of Preserve Area lands will be dedicated and managed in perpetuity as conservation lands under the Plan. The Wildlife Agencies have agreed to directly manage certain HMA properties (NCCP/HCP Section 6.8) with funds provided by the Water Authority (Section 7.2 of the NCCP/HCP).

9.2 Stay Ahead Commitment

The Water Authority shall ensure that the assembly and enhancement/restoration/creation of conservation and mitigation habitats and use of credits within the Preserve Area stay ahead of impacts to the Covered Species authorized under the Permits as described in NCCP/HCP Section 6.5.1.1. The Water Authority shall report the status of the Preserve Area habitats and mitigation credits/use in each Annual Report (see Section 11.4 of this Agreement). Documentation of compliance with the stay ahead commitment shall be based on each Annual Report. If, based on any Annual Report, the stay ahead commitment has not been met or may not be met during the subsequent two year period for any vegetation community requiring mitigation (Table 6-5 of the NCCP/HCP), the Water Authority and the Wildlife Agencies shall meet and/or confer within thirty (30) days of the Wildlife Agencies' receipt of the Annual Report to develop and implement a strategy to remedy the deficiency and achieve compliance. The Water Authority acknowledges that failure to implement responsive actions in accordance with the stay ahead and rough step commitment may result in suspension or termination of the Permits.

9.3 Rough Step Proportionality Commitment

Pursuant to section 2820, subdivision (b)(9) of the California Fish and Game Code, the Water Authority must "ensure that implementation of mitigation and conservation measures on a plan basis is roughly proportional in time and extent to the impact on habitat or Covered Species authorized under the Plan." Section 2820, subdivision (c) also requires a statement of consequences of the failure to acquire lands in a timely manner.

For purposes of the NCCP/HCP, "rough step proportionality" shall be determined pursuant to Section 6.5.1.2 of the NCCP/HCP. If at any time CDFG provides written notification that rough proportionality on a plan basis has not been met, then the Water Authority will either: (1) regain rough proportionality within forty-five (45) days; or (2) enter into an agreement with CDFG within forty-five (45) days, which will set a course of action to expeditiously regain rough proportionality. The agreement may include any of a variety of commitments or adjustments to the NCCP designed to regain rough proportionality, including but not limited to, a plan to acquire, restore, or enhance lands of appropriate vegetation or land-cover type expeditiously.

If the Water Authority does not regain rough proportionality within forty-five (45) days or enter into an agreement with CDFG within forty-five (45) days setting a course of action to regain rough proportionality, CDFG may suspend or revoke the State Permit, in whole or in part, pursuant to California Fish and Game Code section 2820, subdivision (c). The Parties agree that partial suspension or revocation may include but may not be limited to removal of one or more species

from the Covered Species list for purposes of the Permits or reducing the geographic scope of the Take authorization provided by the Permits. Before suspending or revoking the State Permit in whole or part, due to a failure to maintain rough proportionality, CDFG shall meet with the Water Authority to determine whether mutually agreeable modifications to the NCCP/HCP would obviate a suspension or revocation in whole or part. Any amendments to the NCCP/HCP agreed to by the Water Authority and CDFG must also be concurred with in writing by USFWS and must comply with the minor/major amendment provisions of Sections 8.3 and 8.4 of the NCCP/HCP and Section 17 of this Agreement. The Parties agree that if CDFG suspends or revokes any or all of the State Permit, the Water Authority may, based on the NCCP/HCP, apply for one or more CESA incidental Take permits under section 2081, subdivision (b), of the California Fish and Game Code to replace the State Permit, in which case CDFG shall expeditiously review the application in accordance with CESA. Notwithstanding suspension or revocation of the State Permit, in whole or in part, the Water Authority remains obligated to implement the NCCP/HCP under the Federal Permit.

Under FESA, the Water Authority must assure that all mitigation owing for any impacts to Covered Species resulting from Covered Activities under the NCCP/HCP is in place or assured at the time such impacts occurs. Failure to abide by the stay ahead and rough proportionality requirements outlined in this section may also subject the Federal permit to suspension or revocation in whole or in part.

9.4 Land Acquired Through Partnerships with Other Agencies and Organizations

The Water Authority may enter into agreements and other partnerships involving land acquisitions within the Plan Area with other land management agencies and organizations where those acquisitions meet the goals and objectives of the NCCP/HCP. However, such acquisitions will be formally credited towards the obligations set forth in NCCP/HCP only where the Wildlife Agencies approve the acquisition and concur that the acquisition (a) contributes to meeting the goals and objectives of the NCCP/HCP, (b) contains a conservation easement or other permanent dedication of land to the Preserve Area (unless owned in fee by the Wildlife Agencies) that has been approved in writing by the Wildlife Agencies as a Minor Amendment (Section 8.3), and (c) will be managed in perpetuity pursuant to a Preserve Area Management Plan, as described below in Section 10.3.2 of this Agreement. Such acquisitions may initially be credited toward the obligations set forth in the NCCP/HCP before the Preserve Area Management Plan has been completed, provided the conditions described in Sections 6.10 and 8.3 of the NCCP/HCP are met.

9.5 Lands Acquired Before Issuance of the Permits

The Plan's Preserve Area (Section 6.8 of the NCCP/HCP) includes lands acquired before issuance of the Permits that the Wildlife Agencies have agreed may be credited towards the land commitments and obligations of the NCCP/HCP. The Parties agree that lands acquired as part of the Preserve Area during preparation of the NCCP/HCP and identified at Section 6.8 of the NCCP/HCP shall be formally credited towards the obligations set forth in Tables 6-6, 6-7, and 6-8 and described in Chapter 6.5 of the NCCP/HCP.

10.0 PRESERVE AREA MANAGEMENT

10.1 Responsibility of the Water Authority

The Water Authority shall ensure that it or a Preserve Area (HMA) management entity designated by it and approved by the Wildlife Agencies carries out the preserve management responsibilities described in this Section 10.0 and NCCP/HCP Sections 6 and 8 and Appendix B. The Water Authority may delegate and contract for management planning, plan preparation, and implementation tasks to other qualified parties, land use agencies (cities and counties), non-profit organizations, for-profit land management companies, and other contractors. However, the Water Authority shall remain solely responsible for ensuring the management of the HMAs in perpetuity in accordance with Wildlife Agency-approved Preserve Area Management Plans (PAMP), as those plans may be revised over time and for the timeliness and quality of all requirements of preserve management, except where the Wildlife Agencies have assumed that responsibility as provided in Section 10.2, below.

Management activities on all Preserve Area lands that are formally credited toward the obligations of the Plan, including future additions as described in Section 9.4 above, shall be a Covered Activity, with the exception of management activities undertaken by either Wildlife Agency on Preserve Area lands managed by that agency.

10.2 Management of Preserve Area Properties by the Wildlife Agencies

The Wildlife Agencies have committed to manage several HMAs (Crestridge, San Miguel, and Rancho Canada) in accordance with Preserve Area Management Plans, as described in Section 10.3.2. Nothing in this Agreement shall preclude the Wildlife Agencies from managing other HMAs. Where the Wildlife Agencies have or in the future do assume management of HMAs, the Wildlife Agencies shall be responsible for preparing and implementing management plans for those areas.

10.3 Preserve Area Management Plans

10.3.1 System-Wide Preserve Management

The Water Authority shall ensure that each of its Preserve Area Managers prepares and implements a Wildlife-Agency approved management plan in conformance with the NCCP/HCP Conservation Goals/Objectives 4 and 5, and Sections 6.11 and 6.12, except as noted in Sections 10.1 and 2 of this Agreement. The Water Authority shall evaluate the individual Preserve Area Management Plans for system-wide effectiveness and revise them or have them revised as appropriate: (a) every five (5) years after preserve land acquisition is completed and a management plan has been prepared and (b) whenever necessary under Changed Circumstances pursuant to Section 12.2 of this Agreement.

10.3.2 Preserve Area Management Plans

Within two (2) years of the dedication of any parcel of land to the Preserve Area, the Water Authority shall ensure that a Preserve Area Management Plan (PAMP) is prepared (unless otherwise noted in NCCP/HCP Section 6.8) pursuant to NCCP/HCP Conservation Goals/Objectives 4 and 5 and consistent with Sections 6.11 and 6.12. When a particular parcel of land is dedicated to the Preserve Area, the Water Authority will determine whether an existing Preserve Area Management Plan provides sufficient implementing mechanisms and management guidance to satisfy the requirements of the NCCP/HCP, or whether a new or revised Wildlife Agency-approved Preserve Area Management Plan must be prepared. A new or revised plan shall be prepared within two years of dedication of the property to the Preserve Area. During the preparation of any new or revised Preserve Area Management Plan, the Water Authority shall be responsible for ensuring the land is managed in accordance with the NCCP/HCP to maintain and improve Covered Species habitat using the best available information and management methods in practice within the Plan Area until the Preserve Area Management Plan is completed.

10.3.3 Recreational Uses

The Parties acknowledge that providing low-intensity recreational opportunities on Preserve Area lands may be acceptable, subject to appropriate constraints to protect Covered Species and natural communities. The Parties therefore agree the Water Authority, in consultation with the management entities, may integrate recreation planning goals and objectives into the Preserve Area Management Plans to the extent consistent with the NCCP/HCP's land management goals and objectives and the requirements of this Agreement and the Permits and

subject to the concurrence of the Wildlife Agencies described in Section 10.4.

10.4 Review and Concurrence By the Wildlife Agencies

All Preserve Area Management Plans other than those plans developed and implemented by the Wildlife Agencies, and updates or revisions to such plans, must be reviewed and receive the written concurrence of the Wildlife Agencies. The Water Authority shall submit such plans or revisions to such plans in writing with a cover sheet explaining the plan or revisions and the rationale for such plan or revisions. The Wildlife Agencies shall review the submission and use their reasonable efforts to provide a written response within sixty (60) days. The Wildlife Agencies shall either concur that the plan or revision thereto is adequate or shall describe additional information needed to determine the plan's adequacy or reasonable modifications needed to render the plan adequate along with a written statement explaining the additional information needed or modifications required. Preserve management shall continue according to the NCCP/HCP and best scientific practices during the preparation and agency review of plans and revisions. At the request of either the Wildlife Agencies or the Water Authority, the Parties shall meet to discuss and attempt to resolve any differences over the contents of the Preserve Area Management Plan. Either following such discussion, or if such meeting is not requested, within 30 days of receipt of a Wildlife Agency response that identifies necessary modifications, the Water Authority shall promptly modify the plan as directed by the Wildlife Agencies.

11.0 PLAN AREA MONITORING & REPORTING

11.1 Responsibility of the Water Authority

The Water Authority shall carry out and, within the HMAs, ensure that Preserve Area managers carry out, the compliance and effectiveness monitoring and reporting required by NCCP/HCP Section 6.12. The Water Authority shall remain solely responsible for all monitoring and reporting requirements in perpetuity, including submission to the Wildlife Agencies of the monitoring and reporting plans, and for the timeliness and quality of the monitoring and reporting plan.

11.2 Compliance Monitoring

The Water Authority, in association with the Preserve Area managers of the HMAs, shall conduct compliance monitoring within the Plan Area to track key implementation elements as set forth in NCCP/HCP Section 6.12 and as further provided herein.

11.2.1 Compliance Monitoring

The Water Authority shall develop a data reporting process conforming to the requirements of NCCP/HCP Section 6.12 to organize all required compliance monitoring data. The Water Authority shall create or utilize an existing data repository accessible to the Parties. The Water Authority will consider using the HabiTrak database developed by CDFG or a Geographic Information System-based data repository that is transferable to HabiTrak. The Wildlife Agencies shall safeguard sensitive species information to the extent permitted by the Freedom of Information Act and the California Public Records Act.

11.3 Effectiveness Monitoring

The Water Authority will ensure that the Preserve Area managers of the HMAs, shall conduct effectiveness monitoring of the NCCP/HCP within the Plan Area by implementing all elements of the integrated monitoring and adaptive management program described in NCCP/HCP Section 6.12.2 and 6.12.3.

11.4 Annual Report and Public Workshop

By January 31 of each year following the Effective Date (or other date as agreed upon by the Parties), the Water Authority shall prepare and submit an Annual Report to the Wildlife Agencies that summarizes: the previous calendar year's monitoring results; an accounting, by project and cumulatively, of habitat acreage lost and conserved by Water Authority actions within the Plan Area by habitat type or vegetation community; and an assessment of the rough proportionality under Section 9.3 of this Agreement. The first Annual Report shall be prepared no later than March 15 (or other date agreed to by the Parties) following the first full calendar year of NCCP/HCP implementation and shall report on all applicable activities and results from the Effective Date to the end of the first full calendar year. Each Annual Report shall address, at a minimum, the descriptions and analyses detailed in NCCP/HCP Section 6.12. The Water Authority shall make the latest Annual Report accessible to the public via the Internet, and at a publicly noticed open meeting jointly conducted by the Parties on an annual basis to disseminate and discuss the annual report.

11.5 Annual Implementation Review and Meeting

The Parties will review the Annual Report described in Section 11.4 above and evaluate the implementation of the NCCP/HCP during the preceding year and the adequacy of the overall progress being made towards reaching the conservation goals of the NCCP/HCP. The Annual Report will include information on all contributions towards the assembly of the Preserve Area system, such as use of HMA credits, mitigation or conservation bank credits, land acquisitions, and management activities undertaken or proposed on habitat lands. Habitat

management activities undertaken or proposed will also be discussed. In addition, the Parties will review relevant information prepared and available from other NCCP/HCP efforts involved in preserve management and monitoring. If, based on the Annual Report, Wildlife Agencies determine that adequate progress towards implementation of the NCCP/HCP is not being achieved, Wildlife Agencies shall provide their findings and the basis for such findings in writing to the Water Authority; and the Water Authority will take the actions specified in the NCCP/HCP and this Agreement to remedy that situation. If Wildlife Agencies determine that adequate progress towards implementation of the NCCP/HCP is being achieved, but that it is nevertheless not providing sufficient protection to the Covered Species, the Wildlife Agencies shall provide their findings and the basis for such findings in writing to the Water Authority; and then the Parties shall work cooperatively and take appropriate actions consistent with the NCCP/HCP and this Agreement (such as altering management activities or redirecting mitigation and acquisition) in order to remedy the situation. At least once each year, the Water Authority shall meet with Wildlife Agencies to review and coordinate implementation of the NCCP/HCP.

11.6 Other Reports

Within thirty (30) days of receipt of a written request from the Wildlife Agencies, the Water Authority will provide any additional information in its possession or control related to implementation of the NCCP/HCP for the purpose of assessing whether the terms and conditions of this Agreement, the NCCP/HCP and the Permits are being fully implemented.

11.6.1 Certification of Reports

All reports from the Water Authority pursuant to this section 11 shall include the following certification from the agency responsible official who supervised or directed preparation of the report:

“I certify under penalty of perjury that, to the best of my knowledge, after appropriate inquiries of all relevant persons in the preparation of this report, the information submitted here is true, accurate, and complete.”

11.7 Monitoring by the Wildlife Agencies

The Water Authority acknowledges that the Wildlife Agencies may conduct monitoring of any Covered Activity and may inspect any data or records required by the NCCP/HCP, this Agreement or the Permits in accordance with applicable laws and regulations. See 50 C.F.R. 13.21(e)(2), 13.47. The Water Authority shall cooperate fully with such monitoring and inspections.

12.0 ADAPTIVE MANAGEMENT AND CHANGED CIRCUMSTANCES

12.1 General Framework of Adaptive Management

The Water Authority shall implement or ensure the implementation of an adaptive management program as described in NCCP/HCP Section 6.12.3, in order to gauge the effectiveness of the NCCP/HCP, propose and modify conservation measures as the need arises, and address Changed Circumstances. The adaptive management program will be based on biological monitoring results and directed studies. The specific responsibilities of the Water Authority and Preserve Area managers in carrying out the adaptive management program are further defined in NCCP/HCP Section 6.12.3.

12.1.1 Adaptive Management Initiated by the Water Authority and Preserve Area Managers

Within the Plan Area the Water Authority shall implement, and within the Preserve Area lands shall work with the Preserve Area Managers to implement, the PAMP adaptive management program when changes in management practices are necessary to achieve the NCCP/HCP's biological objectives, or to respond to monitoring results or new scientific information, as described more particularly in NCCP/HCP Section 6.12.3. The Water Authority and non-Wildlife Agency Preserve Area Managers will make such changes without awaiting notice from the Wildlife Agencies, and will report to the Wildlife Agencies on any adaptive management actions taken.

12.1.2 Adaptive Management Initiated by the Wildlife Agencies

If the Wildlife Agencies determine that one or more of the adaptive management provisions in the PAMP have been triggered and that the Water Authority or Preserve Area Managers has not changed management practices in accordance with NCCP/HCP Section 6.12.3, the Wildlife Agencies shall notify the Water Authority and direct it to make the required changes. Within thirty (30) days after receiving such notice, the Water Authority and management entities shall initiate the required changes and report to the Wildlife Agencies on its actions. Such changes are provided for in the NCCP/HCP, and hence do not constitute Unforeseen Circumstances or require amendment of the Permits or NCCP/HCP, except as otherwise provided in this section. The Wildlife Agencies will implement appropriate adaptive management changes on the Preserve Area lands they manage.

12.2 Changed Circumstances

12.2.1 Identification of Changed Circumstances

Changed Circumstances and the planned responses to Changed Circumstances are identified in NCCP/HCCP Section 8.5.1. They include the listing of a new species, fire impacts to natural communities, invasion by exotic species, flooding impacts to riparian or upland natural communities, impacts to natural communities caused by extended periods of reduced precipitation, and toxic spills/dumping that impacts natural communities. If a Changed Circumstance occurs, the Water Authority and Preserve Area management entities shall implement the remedial conservation measures identified in NCCP/HCP Section 8.5.1 for the specific Changed Circumstance. The Parties agree that Section 8.5.1 of the NCCP/HCP addresses all reasonably foreseeable Changed Circumstances and describes specific preventive measures and responses for them. Such responses are provided for in the NCCP/HCP, and hence do not constitute Unforeseen Circumstances or require amendment of the Permits or NCCP/HCP.

12.2.2 Responses to Changed Circumstances Initiated by the Water Authority and Preserve Area Management Entities

The Water Authority shall notify the Wildlife Agencies in writing within thirty (30) days after occurrence of a Changed Circumstance listed in NCCP/HCP Section 8.5.1. The Water Authority or non-Wildlife Agency Preserve Area Manager will use all reasonable efforts to respond as soon as practicable thereafter within thirty (30) days of learning of the Changed Circumstances and will develop a remediation plan in the manner described in Section 8.5.1, as necessary to mitigate the effects of the Changed Circumstances on Covered Species and will report to the Wildlife Agencies on its actions. The Water Authority or non-Wildlife Agency Preserve Area Manager will initiate such actions without awaiting notice from the Wildlife Agencies. The Wildlife Agencies will implement planned responses to Changed Circumstances on Preserve Areas they manage.

12.2.3 Responses to Changed Circumstances Initiated by the Wildlife Agencies

If the Wildlife Agencies determine that Changed Circumstances have occurred and that the Water Authority has not responded in accordance with NCCP/HCP Section 8.5.1, the Wildlife Agencies shall notify the Water Authority about the specific changes that must be made. The Water Authority shall make the required changes expeditiously. Within thirty (30) days after receiving the Wildlife Agencies' notice, the Water Authority or non-Wildlife Agency Preserve Area management entity shall

report on the Water Authority' action(s).

12.2.4 Listing of Species that are Not Covered Species or Designation of Critical Habitat within the Plan Area

In the event that a non-Covered Species that may be affected by a Covered Activity becomes listed under FESA or CESA or critical habitat that may be affected by a Covered Activity is designated or revised for a Covered Species or a non-Covered Species, the Water Authority will consult with the Wildlife Agencies, and following such consultation will initiate necessary responsive actions or measures, if any, identified by the Wildlife Agencies to avoid Take of or jeopardy to a listed species, or adverse modification of critical habitat as provided in NCCP/HCP Section 8.5.1.6.

12.3 No Increases In Take

This section 12 does not authorize any modifications that would (1) result in an increase in the level of incidental take or other impacts to Covered Species, or (2) a change in the nature of incidental take or in the impacts of Covered Activities beyond those analyzed under the original NCCP/HCP and SDCWA NCCP/HCP EIS/EIR. Any modification resulting in increased Take or new or significant impacts to the environment that were not analyzed in the SDCWA NCCP/HCP EIS/EIR must be reviewed and processed as a Major Amendment under Section 8.4 of the NCCP/HCP and Section 17.4.1 of this Agreement.

13.0 IMPLEMENTING MECHANISMS

As of the Effective Date, the Water Authority shall be responsible for overseeing and managing the implementation of the NCCP/HCP. The Water Authority is ultimately responsible for compliance with all applicable terms and conditions of this Agreement, the NCCP/HCP and the Permits including all applicable conservation measures, management plans, monitoring and reporting requirements, and funding.

13.1 Role of the Water Authority

The Water Authority's responsibilities for implementing the NCCP/HCP include, but are not limited to:

- Overseeing the assembly and management of the Preserve Area;
- Funding and overseeing NCCP/HCP implementation, including all take minimization, mitigation and other conservation measures applicable to Covered Activities both within and outside of the Preserve Area;
- Ensuring mitigation and conservation measures are being implemented roughly proportional in time and extent to the impact of Authorized Take, as provided in Section 9.3 of this Agreement, and ensuring compliance with the

stay ahead commitment and the rough step proportionality commitment, as provided in Sections 9.2 and 9.3 of this Agreement;

- Providing technical support and advice to Preserve Area (HMA) Managers about what NCCP/HCP measures apply to Covered Activities and how they should be applied, including, but not limited to, avoidance and minimization measures and the amount of fee payments;
- Promoting coordination among Preserve Area Managers to ensure that the NCCP/HCP is implemented consistently and effectively;
- Preparing or ensuring the preparation of Preserve Area Management Plans, as further described in Section 10.3 of this Agreement and Section 6.12 of the NCCP/HCP; and
- Preparing the Annual Report.

13.1.1 Covered Activities Implemented by Water Authority

Covered Activities will be implemented by the Water Authority and its management entities in conformance with the NCCP/HCP, the Permits, and this Agreement. The Water Authority shall be responsible for ensuring compliance with the terms of this Agreement, the NCCP/HCP and the Permits with regard to any Covered Activity it implements directly or indirectly through third party entities over which it exercises control. To document its compliance, the Water Authority shall complete a PSF (for capital improvement projects/maintenance related activities) in accordance with Section 6.4.1.2 of the NCCP/HCP for each Covered Activity it implements, including implementing Preserve Area management activities not anticipated by the approved Preserve Area Management Plan. A summary of Covered Activities will be reported annually. Copies of each PSF will be retained by the Water Authority in its files for (5) years, or as required by its administrative procedures, whichever period is longer.

13.2 Extension of Take Authorization to Preserve Area Managers

13.2.1 General Provisions

The Water Authority acknowledges and commits that it has sufficient legal control over all non-Wildlife Agency Preserve Area Managers and all other third party entities who conduct Covered Activities under the NCCP/HCP, including contractors and consultants retained by the Water Authority to carry out a Covered Activity, to enforce the provisions of the NCCP/HCP, this Agreement and the Permits against such Managers and third party entities and ensure that the NCCP/HCP provisions are carried out. Consequently, as further provided by this Agreement, the NCCP/HCP and the Permits, the Take authorization extends to all non-Wildlife Agency Preserve Area Managers and other third party entities over which the Water Authority exercises sufficient legal control for

purposes of ensuring implementation of the NCCP/HCP. As necessary, the Water Authority commits that it will enter into or modify existing written agreements with such entities to confer upon the Water Authority legal control sufficient to ensure compliance by the third party entities with all applicable conservation measures and other terms and conditions of this Agreement, the NCCP/HCP and the Permits. Notwithstanding such third party entity agreements, the Water Authority is ultimately responsible for ensuring that all NCCP/HCP measures applicable to the Preserve Area other than those Preserve Areas managed by USFWS or CDFG are carried out and shall be legally liable under the Permits for any noncompliance.

13.2.2 Specific Provisions

To be included under the Permits, the Preserve Area Manager must enter into an agreement with the Water Authority and assume the obligation to comply with all applicable terms and conditions of this Agreement, the NCCP/HCP and the Permits. Provided the Preserve Area Manager is obligated under an agreement or conditions of project approval to comply with such terms and conditions and the Water Authority retains legal authority under such agreement to enforce the provisions of the NCCP/HCP against such Preserve Area Manager, the Permits shall extend to the Preserve Area manager as an agent of the Water Authority. Take authorization for Wildlife Agency Preserve Area managers will be separately granted through appropriate federal and state and regulatory mechanisms. If for any reason the Take authorization is suspended in part, such suspension shall not affect the Take authorization for Covered Activities carried out by Preserve Area managers on Preserve Area lands, unless the cause(s) for such suspension arise out of Preserve Area Covered Activities. The Take Authorization shall remain in effect for Preserve Area Covered Activities for as long as the Preserve Area Manager fully complies with the applicable terms and conditions of this Agreement, the NCCP/HCP, and the Permits, subject to applicable federal and state laws and regulations governing Permit administration. If the Water Authority elects to terminate the Permits early or the Wildlife Agencies take action to revoke the Permits, then the Water Authority commits to transfer the Permits in part to the Preserve Area managers as the Permits apply to Preserve Area Covered Activities in accordance with applicable federal and state regulatory requirements to ensure that Covered Activities required to be conducted within the Preserve Area under the NCCP/HCP, this Agreement and the Permits, may continue.

13.3 Conservation Easements

In addition to acquiring lands for the Preserve Area by fee title, the Water Authority may negotiate conservation easements. The terms of all conservation

easements must be approved in writing by the Wildlife Agencies and identify the Wildlife Agencies and the Water Authority as third party beneficiaries with a right of access to the easement areas and to enforce the terms of the conservation easement. All conservation easements shall be recorded in perpetuity pursuant to Civil Code section 815 et seq. and shall be subject to the Preserve Area commitments of the NCCP/HCP. If requested by the Wildlife Agencies, conservation easements shall be dedicated to the CDFG or another entity approved by the Wildlife Agencies, including but not limited to land trusts, parks agencies, and other qualified nonprofit organizations.

13.4 Coordination between Water Authority and Other NCCP/HCPs

The Parties agree that effectively coordinating the Water Authority's Plan with other NCCP/HCPs will make it possible to create and manage the Preserve Area properties in a cost-efficient manner, allow for better integration of information sharing, and help promote implementation of management activities that have potential benefits to Covered Species and their habitats. As noted in NCCP/HCP Section 3, coordination of the conservation strategies and preserve lands would be beneficial: activities may include, without limitation, developing standard terms and conditions for real property transactions and management plans; acquisition planning; a process for developing joint grant applications; and a strategy for coordinating long-term management among the preserve areas. The Water Authority may participate in regional conservation planning and implementation efforts to make recommendations regarding land acquisitions, land management and monitoring, grant applications and other actions to create or manage the preserve areas. Nothing in this Agreement is intended to prohibit or prevent the Water Authority from collaborating with other public agencies or private entities to help to create and manage the Preserve Area or for any other purpose.

14.0 FUNDING

14.1 General Commitment

The Water Authority shall ensure that all required mitigation, conservation, monitoring, reporting and adaptive management measures are adequately funded during the term of this Agreement, and that management, maintenance and monitoring activities on conservation easement and fee interest habitat lands, monitoring, reporting and adaptive management measures are adequately funded in perpetuity. NCCP/HCP Section 7 describes the Water Authority's funding capacity and process. The Water Authority will promptly notify the Wildlife Agencies of any material change in the Water Authority's financial ability to fulfill its obligations under this Agreement. The Water Authority will also include in its Annual Report to the Wildlife Agencies reasonably available financial information to demonstrate the Water Authority's ability to fulfill existing obligations.

The Water Authority has provided or shall provide sufficient funds to the appropriate Wildlife Agency to pay in perpetuity for land management costs incurred to meet the land management obligations set forth in the management plans, in conformance with a Property Analysis Record (PAR) or equivalent cost-estimating method acceptable to the Wildlife Agencies and the guidance presented in NCCP/HCP Sections 6.11 and 6.12. Where the Wildlife Agencies have already received funds to manage the HMA to meet pre-existing NCCP commitments, funds will only be provided under this Plan to pay for additional obligations under this Plan for Covered Species or for obligations not already addressed by those pre-existing commitments.

14.2 Effect of Inadequate Funding

If funding is inadequate to implement the NCCP/HCP, USFWS and CDFG will assess the impact of the funding deficiency on the scope and validity of the Permits. Unless the Water Authority withdraws pursuant to Section 20.0 of this Agreement or the Wildlife Agencies revoke the Permits pursuant to Section 19.0 of this Agreement, the Parties agree to meet and confer to develop a strategy to address the funding shortfall, and to undertake all practicable efforts to maintain the level of conservation and Take authorization afforded by the Permits until the funding situation can be remedied.

Where the Water Authority has funded an endowment or has provided a supplemental endowment to fully satisfy certain mitigation obligations under the NCCP/HCP and the endowment or supplemental endowment has been reviewed and approved in writing as adequate by the Wildlife Agencies, the endowment and any supplemental endowment are deemed adequate funding to carry out such obligations and the Wildlife Agencies shall not require additional funds or resources.

15.0 RIGHTS, OBLIGATIONS & ASSURANCES

15.1 Rights & Obligations of the Water Authority

15.1.1 Rights

As of the Effective Date, the Water Authority may Take the Covered Species while carrying out Covered Activities in the Plan Area, as further authorized by and subject to the conditions of this Agreement, the NCCP/HCP, and the Permits. The Covered Activities include all activities listed in NCCP/HCP Sections 5 and 6.

The Take authority issued to the Water Authority applies to all respective elected officials, officers, directors, employees, agents, subsidiaries, non-Wildlife Agency Preserve Area managers, contractors and other third persons or entities under the direct control of the Water Agency who

engage in any Covered Activity. The Water Authority shall periodically, but not less than once every two years or as this Agreement, NCCP/HCP, or the Permits are amended, educate all such persons and entities of the terms and conditions of the NCCP/HCP, Permits and this Agreement. The Water Authority shall supervise such persons' and entities' compliance with applicable terms and conditions of this Agreement, the NCCP/HCP and the Permits and shall be legally liable under the Permits for all instances of non-compliance by such persons or entities. All contracts between the Water Authority and such persons and entities regarding the implementation of any Covered Activity or the NCCP/HCP shall require Permit compliance.

15.1.2 General Obligations

The Water Authority will fully and faithfully perform all obligations under this Agreement, the NCCP/HCP, and the Permits, including but not limited to the NCCP/HCP obligations assigned in the following sections: Section 5.0 (Covered Activities), Section 6.0 (Conservation Plan), Section 7.0 (Funding of the Plan) and Section 8.0 (Amending the Plan and Addressing Changed and Unforeseen Circumstances).

The Water Authority's Take authorization shall extend to the Preserve Area managers for Covered Activities that are undertaken by or with the written approval of the Water Authority in accordance with this Agreement, including Section 13.2.1, the Permits and the NCCP/HCP.

15.1.3 Obligations In The Event of Suspension or Revocation

If USFWS and/or CDFG suspend or revoke the Permits, in whole or in part, pursuant to Sections 19.0 and 21.0 of this Agreement, the Water Authority will remain obligated to fulfill its mitigation, enforcement, management, and monitoring obligations, and its other NCCP/HCP obligations, in accordance with this Agreement and applicable statutory and regulatory requirements for all Covered Activities authorized for Take prior to the suspension or revocation.

15.1.4 Assurances for Water Authority

The Water Authority will receive assurances regarding additional mitigation pursuant to the federal "No Surprises" regulations at 50 C.F.R. 17.22(b)(5) and 17.32(b)(5). Likewise, in the event of Unforeseen Circumstances, CDFG shall not require Water Authority to provide, without its consent, additional land, water or financial compensation, or additional restrictions on the use of land, water, or other natural resources, for the purpose of conserving Covered Species with respect to Covered Activities provided the Water Authority is properly implementing this

Agreement, the NCCP/HCP and the terms and conditions of the State Permit.

15.1.5 Interim Obligations upon a Finding of Unforeseen Circumstances

If either Wildlife Agency makes a finding of Unforeseen Circumstances with regard to a Covered Species, then during the period necessary to determine the nature and location of additional or modified mitigation, the Water Authority will avoid contributing to an appreciable reduction in the likelihood of the survival and recovery of the affected species.

15.2 USFWS Obligations and Assurances

15.2.1 General Obligations

Concurrent with its execution of this Agreement and satisfaction of all other applicable legal requirements, USFWS will issue Water Authority a Federal Permit under Section 10(a)(1)(B) of FESA, authorizing incidental Take by the Water Authority of each Federal Listed Covered Species resulting from Covered Activities in the Plan Area. Subject to Section 24.8, USFWS shall monitor the Water Authority's implementation of the NCCP/HCP and compliance with the Federal Permit and also provide technical assistance and timely review, collaboration and consultation to the Water Authority regarding implementation of the NCCP/HCP, as provided in this Agreement and the NCCP/HCP, throughout the duration of the Federal Permit. USFWS shall manage those Preserve Area HMA's over which it has assumed or will assume management responsibility consistent with the provisions of the NCCP/HCP, this Agreement and the Permits.

USFWS shall use its reasonable efforts to respond to all Water Authority submittals within 60 days, unless another time period is specified in this Agreement or the Plan for a particular response. For Water Authority submittals other than proposed plan amendments or permit amendments which are governed by Section 17 of this Agreement, the following procedure shall apply in order to facilitate a timely response by USFWS. USFWS shall either respond to the submittal within 30 days of receipt of a submittal or, within that 30 day period, shall notify the Water Authority of the date by which the USFWS intends to provide a response. Either the Water Authority or USFWS may at any time request a meeting to discuss a submittal.

15.2.2 No Surprises Assurances

Upon issuance of the Federal Permit, the Water Authority shall receive regulatory assurances pursuant to the “No Surprises” regulations at 17.22(b)(5) and 17.32(b)(5). Pursuant to the “No Surprises” regulations, as long as the NCCP/HCP, this Agreement and the federal Permit are being properly implemented, USFWS shall not require additional conservation and mitigation measures that involve the commitment of additional land, water or financial compensation or additional restrictions on the use of land or other natural resources otherwise available for development or use under the NCCP/HCP without the consent of the Water Authority.

15.2.3 Critical Habitat Designations in the Plan Area

Portions of the Plan Area are designated Critical Habitat, or have been proposed as Critical Habitat for San Diego thornmint, thread-leaved brodiaea, willowy monardella, Otay tarplant, spreading navarretia, San Diego fairy shrimp, Riverside fairy shrimp, Quino checkerspot, southwestern willow flycatcher, least Bell’s vireo, San Diego ambrosia, Southwestern arroyo toad and California gnatcatcher. The USFWS acknowledges that the Permit and NCCP/HCP incorporate special management requirements to protect habitat features on the Covered Lands essential for these species. Based on information available to USFWS, the USFWS believes that the NCCP/HCP incorporates special management considerations and protections for each of the Covered Species and their essential habitat within the Covered Lands necessary to provide for the conservation of the species and their habitats within the Covered Lands to the extent such species and habitat may be affected by the Covered Activities. Pursuant to the “No Surprises” rule, no measures, to the extent proscribed or restricted in the rule, in addition to those provided under this Agreement, the NCCP/HCP or the Permits, shall be required of the Water Authority in a future ESA section 7 consultation evaluating the impacts of a Covered Activity on the designated Critical Habitat of a Covered Species unless required by law

15.2.4 Migratory Bird Treaty Act

The Federal Permit issued in reliance on the NCCP/HCP and this Agreement also constitutes a Special Purpose Permit under 50 C.F.R. 21.27 for the Take of listed Covered Species also listed under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. Sections 702 et seq., as amended. The take of any of these birds as the result of any Covered Activity carried out in accordance with the NCCP/HCP, this Agreement and the federal Permit will not constitute a violation of the MBTA. Such Special Purpose Permit shall be valid for a period of three years from the

Effective Date, provided the Permit issued in reliance on this Agreement remains in effect for such period. Such Special Purpose Permit shall be renewed without application provided that the terms of the NCCP/HCP, this Agreement and the Permit are being properly implemented. Each such renewal shall be valid for the maximum period of time allowed under 50 C.F.R. 21.27 or its successor at the time of renewal.

15.3 CDFG Obligations and Assurances

15.3.1 General Obligations

Concurrent with its execution of this Agreement and satisfaction of all other applicable legal requirements, CDFG will issue Water Authority a State Permit under Section 2835 of the California Fish and Game Code authorizing Take by the Water Authority of each State Listed and Non-listed Covered Species resulting from Covered Activities in the Permit Area, to the extent permitted by law and according to the conditions of the NCCP/HCP, the Permits, and this Agreement. CDFG shall monitor the Water Authority's implementation of the NCCP/HCP and compliance with the State Permit. CDFG shall also provide technical assistance and timely review, collaboration and consultation to the Water Authority regarding implementation of the NCCP/HCP, as provided in this Agreement and the NCCP/HCP, throughout the duration of the State Permit. CDFG shall timely review Water Authority submittals required by the NCCP/HCP, the Permits and this Agreement.

15.3.2 Lake or Streambed Alteration Agreement Obligations

Concurrent with its execution of this Agreement and satisfaction of all other applicable legal requirements, CDFG will process associated Section 1600 notifications and agreements for Covered Activities pursuant to Section 6.7.2 of the NCCP/HCP, applying the vegetation communities mitigation ratios (NCCP/HCP Tables 6-6, 6-7, and 6-8), the Wetland Habitat Management Areas (NCCP/HCP Section 6.8.2) as the mitigation locations for permanent and temporal (when applicable) impacts to amend, delete or add conditions of work to Appendix I, and such changes will be processed per Section 8.2 (Administrative Changes) of the NCCP/HCP.

15.3.3 Long-Term Assurances

In the event of Unforeseen Circumstances and provided the Water Authority is implementing the terms and conditions of the NCCP/HCP, this Agreement, and the Permits, CDFG shall not require the Water Authority to provide additional land, water, or other natural resources, or financial compensation, or additional restrictions on the use of land, water or other natural resources without the consent of the Water Authority,

unless CDFG determines that without such additional measures existence of a Covered Species would be jeopardized, which would warrant revocation or suspension of the State Permit. The provisions of this Agreement and the NCCP/HCP that address adaptive management and Changed Circumstances, including changes to the legal status of Fully Protected Species and non-Covered Species, are not Unforeseen Circumstances and therefore are not subject to these assurances. However, CDFG acknowledges that such adaptive management and Changed Circumstances provisions are not intended to require modifications to the NCCP/HCP's mitigation program that would require additional funding or to impose significant additional burdens on Water Authority.

16.0 CONSULTATIONS WITH OTHER PUBLIC AGENCIES

16.1 Section 7 Consultations with USFWS

Nothing in this Agreement alters the obligation of a federal agency to consult USFWS pursuant to Section 7 of FESA (16 U.S.C. §1536(a)). To the maximum extent appropriate, , in any conference or consultation under section 7 subsequent to the date of the biological opinion issued by USFWS on the Federal Permit that evaluates a Covered Activity of the Water Authority that is likely to result in impacts to a Covered Species, USFWS shall ensure that the biological opinion for the proposed project is consistent with the biological opinion issued for the NCCP/HCP and the Federal Permit, provided that the Covered Activity, as proposed in the consultation, is consistent and will be implemented in accordance with the NCCP/HCP, this Agreement and the Federal Permit . Unless otherwise required by law or regulation, USFWS shall not impose measures on the Water Authority in excess of those that have been or will be required by this Agreement, the NCCP/HCP, and the Permits. Any reasonable and prudent measures and implementing terms and conditions included in the incidental take statement accompanying such biological opinion issued with regard to Take of a Covered Species resulting from a Covered Activity, shall, to the maximum extent allowable, be consistent with the NCCP/HCP, this Agreement and the Permits.

16.2 Consultations by CDFG

Except as otherwise required by law, CDFG shall not recommend or otherwise seek to impose through consultation with other public agencies any mitigation, compensation or habitat enhancement requirements regarding impacts of Covered Activities on Covered Species within the Permit Area that are in excess of those that have been or will be required by this Agreement, the NCCP/HCP, and the Permits.

17.0 AMENDMENTS TO THE NCCP/HCP AND THE FEDERAL AND STATE PERMITS

17.1 Clerical and Administrative Changes to the NCCP/HCP

Clerical and administrative changes to the NCCP/HCP that are not substantial shall be made by the Water Authority on its own initiative or in response to a written request submitted by a Wildlife Agency, which includes documentation supporting the proposed administrative change. Administrative changes shall not require any amendment to this Agreement, the NCCP/HCP or the Permits. Clerical/administrative changes made by the Water Authority shall be submitted in writing to the Wildlife Agencies at least 30 days before they become effective and such changes shall not take effect if either Wildlife Agency disagrees, but shall be processed as Minor or Major amendment, as appropriate. Annual Reports shall include a summary of administrative changes made to the NCCP/HCP during the preceding calendar year. Administrative changes shall be processed in accordance with Section 8.2 of the NCCP/HCP. Administrative changes include, but are not limited to:

- (a) minor changes to survey protocols;
- (b) minor changes to reporting and monitoring requirements;
- (c) revisions of maps or exhibits to correct errors in mapping or to reflect previously approved changes in the NCCP/HCP or Permits;
- (d) corrections of typographic, grammatical and similar editing errors that do not change the intended meaning;
- (g) other types of modifications that the Parties agree are minor in relation the NCCP/HCP.

17.2 Regional or Master Wetland Permits

The Water Authority and CDFG acknowledge that NCCP/HCP Section 6.7.2 is consistent with existing State process to obtain master streambed agreements that pertain to water quality impacts to Jurisdictional Wetlands and Waters and that address species, habitat, or natural community conservation needs. Nothing in this Agreement shall prohibit the Water Authority from seeking regional wetland permits, authorizations, agreements or permit program assurances based on the NCCP/HCP.

17.3 Exceptions to the Conservation Strategy

Nothing in the Adaptive Management or Changed Circumstances provisions of this Agreement or the NCCP/HCP, nor any other provision that provides for an exception for the application of any measure included in the Conservation Strategy, authorizes an increase in the amount of Take, or an increase of the

impacts of Take, of Covered Species beyond that authorized by the Permits. Any modification that would result in such an increase in Take beyond that authorized by the Permits must be approved as a Permit Amendment under Section 17.4 of this Agreement.

17.4 Amendments

17.4.1 Amendment of this Agreement

This Agreement may be amended only with the written concurrence of all of the Parties.

17.4.2 Major Amendment of the NCCP/HCP

A Major Amendment to the NCCP/HCP may be made only with the written concurrence of all of the Parties and will require an amendment to the Federal [and State Permit[s]] .

17.4.3 Minor Amendment to the NCCP/HCP

17.4.3.1 Scope and Processing of Minor Amendments

Either the Water Authority or either of the Wildlife Agencies may propose a Minor Amendment to the NCCP/HCP by providing a written submission to the other Parties in accordance with Section 8.3 of the NCCP/HCP. The other Parties will use their reasonable efforts to respond to proposed Minor Amendments within 60 days of receipt of such submission by either approving or denying the Minor Amendment or by notifying the proposing party that the proposed Minor Amendment must be processed as a Permit Amendment in accordance with Section 17.3.4. Proposed Minor Amendments will become effective upon the other Parties' written approval. The Wildlife Agencies will not approve Minor Amendments to the NCCP/HCP if they determine that such Minor Amendments would result in operations under the NCCP/HCP that are different from those analyzed, or may result in adverse effects on the environment that are new or significantly different from those analyzed or may result in additional take that was not analyzed in connection with the original NCCP/HCP. Subject to the provisions of this paragraph, Minor Amendments to the NCCP/HCP may include the following:

- a) Addition of habitat credits to the Preserve Area and acquisition or transfer of Preserve Area properties to an entity approved by a legal mechanism and on terms acceptable to the Wildlife Agencies that ensure the

permanent protection of such lands for conservation purposes consistent with the NCCP/HCP and within the Plan Area;

- (b) future projects within the definition of Covered Activities that are proposed outside the Survey Area and that would not result in additional take;
- (c) modifications to designs to or implementation of Covered Activities that result in equivalent reduced impacts to Covered Species;
- (d) revisions to adaptive management activities developed in response to management and monitoring plan implementation.

17.4.3.1.1 Objection by a Wildlife Agency

Where possible, before denying a proposed Minor Amendment, the Wildlife Agency shall first consult with the Water Authority and suggest reasonable conditions or alterations to the proposal which, if agreed to by the Water Authority, would permit the Wildlife Agency to approve the proposed Minor Amendment

17.4.3.1.2 Objection by Water Authority

The Water Authority may object to a proposed Minor Amendment upon any reasonable basis. Where possible, before objecting to a proposed Minor Amendment, the Water Authority shall first consult with the Wildlife Agencies and suggest reasonable conditions or alterations to the proposal which, if agreed to by the Wildlife Agencies, would permit the Water Authority to agree to the proposed Minor Amendment.

17.4.3.1.3 Date that a Minor Amendment Becomes Effective

A Minor Amendment shall become effective on the last date on which each of the Parties has provided written approval. Written approval may be in the form of a written proposed Minor Amendment that includes a concurrence signature from all Parties.

17.4.4 Major Amendment

Any change to this Agreement or the NCCP/HCP that does not qualify as Clerical or Administrative Change to the NCCP/HCP or a Minor

Amendment under this Section is considered a Major Amendment and shall be processed as a Permit Amendment in accordance with all applicable laws and regulations, including but not limited to FESA, NEPA, NCCPA and CEQA. The Water Authority may, in its sole discretion, reject any Major Amendment proposed by the Wildlife Agencies; however, the Water Authority will state in writing its rationale for any such rejection within thirty (30) days of communicating such rejection to the Wildlife Agencies.

18.0 TERM OF AGREEMENT

18.1 Effective Date

This Agreement shall be effective, on the date following execution by all Parties, on which the later of the federal and state Permits is issued.

18.2 Term of the Agreement

This Agreement shall run for a term of fifty five years (55) from the Effective Date unless both Permits are permanently terminated pursuant to Sections 19.0 or 20.0 of this Agreement, in which case this Agreement shall automatically terminate.

18.3 Term of the Permits

The Permits shall run for a term of fifty-five (55) years from the Effective Date unless terminated as provided for in this Agreement.

19.0 REVOCATION, SUSPENSION BY USFWS or CDFG or SURRENDER OF PERMIT BY WATER AUTHORITY

19.1 Federal Permit

USFWS may suspend or revoke the Federal Permit, in whole or in part, for cause in accordance with the laws and regulations in force at the time of such suspension or revocation. Such suspension or revocation may apply to the entire Permit or only to specified Covered Lands, Covered Species or Covered Activities. USFWS agrees that it will not suspend the permit without first completing the meet and confer process set forth in Section 21.1 Where USFWS proposes to suspend the Federal Permit based on potential jeopardy to, or adverse modification of the designated critical habitat of, a listed species, USFWS, to the maximum extent practicable, will notify the Water Authority of those measures, if any, that the Water Authority may undertake to prevent jeopardy to the listed species and maintain the Federal Permit and give the Water Authority a reasonable opportunity to implement such measures prior to suspending the Permit.. USFWS will not revoke the Federal Permit if the Water Authority is in

compliance with the terms and conditions of this Agreement, the NCCP/HCP and the Federal Permit unless revocation is necessary to avoid jeopardy to, or adverse modification of the designated critical habitat of, a listed species.

19.2 State Permit

CDFG may revoke the State Permit for a material violation of the State Permit or material breach of this Agreement by the Water Authority if the CDFG determines in writing that (a) such violation or breach cannot be effectively redressed by other remedies or enforcement action, or (b) revocation or termination is required to avoid jeopardizing the continued existence of a Covered Species and to fulfill a legal obligation of the CDFG under CESA or NCCPA.

CDFG agrees that it will not revoke the State Permit without first (a) requesting that the Water Authority take, when possible, appropriate remedial action, and (b) providing the Water Authority with notice in writing of the facts or conduct which warrant the revocation and a reasonable opportunity (but not less than forty-five (45) days) to demonstrate or achieve compliance with CESA, NCCPA, the State Permit and this Agreement.

However, in the event that CDFG has determined that the Water Authority has failed to meet the rough proportionality standard in Section 9.3 of this Agreement, and if the Water Authority has failed to cure the default or to enter into an agreement to do so within forty-five (45) days of the written notice of such determination, CDFG may revoke the State Permit in whole or in part in accordance with California Fish and Game Code section 2820.

19.3 Continuing Obligations in the event of suspension or revocation by USFWS or CDFG or surrender by Water Authority

Pursuant to 50 C.F.R. 17.22(b)(7) and 17.32(b)(7) and applicable state law, in the event of suspension, revocation or surrender of the Permits, the Water Authority will remain obligated to fulfill any existing and outstanding minimization and mitigation measures required under this Agreement, the NCCP/HCP and the Permits for any Take that occurs prior to such suspension, revocation, or surrender until the Wildlife Agencies determine that all Take of Covered Species that occurred under the Permits has been fully mitigated in accordance with the NCCP/HCP. USFWS shall not cancel the Federal Permit until it determines that Take of Covered Species has been fully mitigated; however no further take of Covered Species under the Federal Permit shall be authorized upon suspension, revocation or surrender of the federal Permit. Regardless of whether the Permits are suspended, revoked or surrendered, the Water Authority acknowledges that lands dedicated to the Preserve Area system are required to be protected, managed and monitored in perpetuity and commits to such permanent protection, management and monitoring.

20.0 WITHDRAWAL FROM AGREEMENT AND SURRENDER OF THE PERMITS

Upon ninety (90) days written notice to USFWS and CDFG, the Water Authority may unilaterally withdraw from this Agreement and surrender the Permits. As a condition of withdrawal and surrender, the Water Authority shall remain obligated to ensure implementation of all existing and outstanding minimization and mitigation measures required under this Agreement, the NCCP/HCP and the Permits for any Take that occurred prior to withdrawal and surrender. If the Water Authority withdraws and surrenders before causing or authorizing any Take under the Permits as determined by the Wildlife Agencies, it shall have no obligation to ensure implementation of any minimization or mitigation measures. With the exception of all lands dedicated to the Preserve Area prior to surrender of the Permit. With regard to such dedicated Preserve lands, the Water Authority remains obligated to protect, manage and monitor such lands in accordance with the NCCP/HCP in perpetuity. Following surrender of the Permits, any unused credits assigned to such Preserve lands shall remain available for appropriate use by the Water Authority. Withdrawal of the Water Authority from this Agreement or surrender of the Permits shall be deemed a surrender of the Water Authority's Take authorization under the Permits.

If the Water Authority notifies the USFWS in writing that it plans to withdraw from this Agreement or to discontinue the Covered Activities, it shall surrender the Federal Permit pursuant to the requirements of 50 Code of Federal Regulations Sections 13.26, 17.22(b)(7) and 17.32(b)(7). If the Water Authority notifies the CDFG in writing that it plans to withdraw from this Agreement or to discontinue the Covered Activities, it shall surrender the State Permit in accordance with California Fish and Game Code section 2820. Regardless of withdrawal and surrender of the Permits, the Water Authority acknowledges that it remains obligated to protect, manage and monitor all lands dedicated to the Preserve Area in perpetuity, and any unused mitigation credits will be retained for use by the Water Authority for future projects, as needed.

21.0 NCCP/HCP IMPLEMENTATION AND INTERPRETATION, REMEDIES AND ENFORCEMENT

21.1 NCCP/HCP Implementation and Interpretation

The Parties recognize that disputes concerning implementation or interpretation of this Agreement, the NCCP/HCP, and the Permits may arise from time to time. The Parties agree to work together in good faith to resolve such disputes using the informal dispute resolution procedure set forth in this section or such other procedures upon which the Parties may later agree. Any Party may seek any available remedy without regard to this Section 21.1 if the Party concludes that circumstances so warrant. However, unless the Parties agree upon another dispute resolution process, or unless a Party has initiated administrative proceedings or litigation related to the subject of the dispute in federal or state court, the Parties agree to use the following procedures to attempt to resolve disputes.

21.1.1 Notice of Dispute; Meet and Confer

If the USFWS or CDFG objects to any action or inaction by the Water Authority on the basis that the action or inaction is inconsistent with the NCCP/HCP, the Permits, or this Agreement, it shall notify the Water Authority and the other Wildlife Agency in writing, explaining the basis of such objection. The Water Authority shall respond to the notice by sending a response to both Wildlife Agencies within fifteen (15) business days of receiving it, stating what actions it proposes to take to resolve the objection or, alternatively, explaining why the objection is unfounded. If the response resolves the objection to the satisfaction of the objecting Party, the Party shall notify the Water Authority and the other Wildlife Agency, and the Water Authority, shall implement the actions, if any, proposed in the response to the Party. If the response does not resolve the objection to the Party's satisfaction, the Party shall notify the Water Authority and the other Wildlife Agency, and the Party and the Water Authority shall meet and confer to attempt to resolve the dispute. The meeting shall occur as soon as practicable, and no later than 30 (days) after the Water Authority receives the objecting Party's response, or at such later time as the Water Authority and the Party may agree. A representative of the Water Authority shall take notes at the meeting, summarize the outcome, and distribute meeting notes to each Party in attendance.

The Water Authority shall use the same procedure to raise and to resolve objections to any action or inaction of the USFWS or CDFG, and the USFWS and CDFG shall use their reasonable efforts to respond in the same manner to notices delivered by the Water Authority.

21.1.1.1 Disputes Regarding Specific Projects

If a dispute among the Parties pertains to a specific project (Covered Activity), each Party shall be allowed to provide input into the dispute resolution process by reviewing the initial notice of objection and submitting its own response and, if applicable, by participating in the meeting referenced in Section 21.1.1 among the Water Authority and the USFWS and/or CDFG. For purposes of this provision, a dispute exists if the USFWS or CDFG objects to an action or inaction by the Water Authority with regard to a specific project.

21.1.1.2 Elevation of Dispute

If the Parties do not resolve a dispute after completing the dispute resolution procedure in Section 21.1.1, any one of the Parties may

elevate the dispute to a meeting of the chief executives of the involved Parties. For purposes of this provision, “chief executive” shall mean the General Manager of the Water Authority, the CDFG Regional Manager, and the USFWS Field Supervisor. Each Party shall be represented in person by its chief executive at the meeting, and the meeting shall occur within forty-five (45) days of a request by any Party following completion of the dispute resolution procedure or via telephone or another live electronic medium.

21.2 Remedies in General

Except as set forth below, each Party shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement, the NCCP/HCP and the Permits, and to seek redress and compensation for any breach or violation thereof, except that none of the Parties shall be liable in damages to any other Party or to any other person or entity for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement. The Parties acknowledge that the Covered Species are unique and that their loss as species would result in irreparable damage to the environment and that therefore injunctive and temporary relief may be appropriate to ensure compliance with the terms of the NCCP/HCP, this Agreement and the Permits. Nothing in this Agreement is intended to limit the authority of the Federal and State governments to seek civil or criminal penalties or otherwise fulfill their enforcement or other responsibilities under FESA, CESA or other applicable law.

21.3 Federal Permit

21.3.1 Permit Suspension

USFWS may suspend the Federal Permit, in whole or in part, for cause in accordance with 50 Code of Federal Regulations section 13.27 and other applicable laws and regulations in force at the time of such suspension. Except where USFWS determines that emergency action is necessary to avoid irreparable harm to a Covered Species, it will not suspend the Federal Permit without first (1) requesting the Water Authority to take appropriate remedial actions, and (2) providing the Water Authority with written notice of the facts or conduct which may warrant the suspension and an adequate and reasonable opportunity for the Water Authority to demonstrate why suspension is not warranted.

21.3.2 Reinstatement of Suspended Permit

In the event USFWS suspends the Federal Permit, in whole or in part, USFWS will use its reasonable efforts to meet and confer with the Water Authority within ten (10) days after such suspension, concerning how the suspension can be ended. Following the conference, USFWS shall identify reasonable, specific actions, if any exist, that are necessary to effectively redress the suspension. In making this determination, USFWS shall consider the requirements of FESA and its regulations, the conservation needs of the Covered Species, the terms of the Federal Permit, the NCCP/HCP and of this Agreement and any comments or recommendations received during the meet and confer process. USFWS will use its reasonable efforts to send the Water Authority written notice of any available, reasonable actions required to effectively redress the deficiencies giving rise to the suspension as soon as possible, but not later than thirty (30) days following the conference. If USFWS determined that the deficiencies giving rise to the suspension are redressable by the Water Authority, then, upon a determination that the Water Authority has corrected the deficiencies in accordance with the agency's written notice, USFWS shall promptly reinstate the Federal Permit. It is the intent of the Parties that in the event of any total or partial suspension of the Federal Permit, all Parties shall act expeditiously and cooperatively to reinstate the Federal Permit consistent with applicable Federal law.

21.4 The State Permit

21.4.1 Permit Suspension

In the event of any material violation of the State Permit or material breach of this Agreement by the Water Authority, CDFG may suspend the State Permit in whole or in part; provided, however, that it shall not suspend the State Permit without first (1) attempting to resolve any disagreements regarding the implementation or interpretation of the NCCP/HCP or this Agreement in accordance with Section 21.1, (2) requesting the Water Authority, when possible, to take appropriate remedial actions, and (3) providing the Water Authority with written notice of the facts or conduct which may warrant the suspension and an adequate and reasonable opportunity for the Water Authority to demonstrate why suspension is not warranted or to take steps necessary to cure the violation or breach.

21.4.2 Rough Step Proportionality

As provided in Section 9.3, in the event that CDFG determines that the Water Authority has failed to meet the rough step proportionality standard provided in Section 9.3 of this Agreement, and if the Water Authority has

failed to cure the default or entered into an agreement to do so within forty-five (45) days of the written notice of such determination, CDFG may suspend the State Permit in whole or in part in accordance with California Fish and Game Code section 2820.

21.4.3 Reinstatement of Suspended Permit

In the event CDFG suspends the State Permit, as soon as possible but no later than ten (10) days after such suspension, CDFG shall confer with the Water Authority concerning how the violation or breach that led to the suspension can be remedied. At the conclusion of any such conference, CDFG shall identify reasonable specific actions necessary to effectively redress the violation or breach. In making this determination, CDFG shall consider the requirements of NCCPA, the conservation needs of the Covered Species, the terms of the State Permit, the NCCP/HCP and this Agreement and any comments or recommendations received during the meet and confer process. As soon as possible, but not later than thirty (30) days after the conference, CDFG shall send the Water Authority written notice of the reasonable actions required to effectively redress the violation or breach when such actions are available. Upon performance of such actions, CDFG shall immediately reinstate the State Permit. It is the intent of the Parties that in the event of any suspension of the State Permit, all Parties shall act expeditiously and cooperatively to reinstate the State Permit.

21.5 Circumstances Likely to Constitute Jeopardy to Species

In the event of circumstances which appreciably reduce the likelihood of survival and recovery of a species in the wild, USFWS or CDFG may suspend the Permits on an emergency basis, in whole or in part, without resorting to the procedures specified above. The period of such emergency suspension shall not last longer than ninety (90) days unless during the 90 day period, the USFWS and CDFG have complied with Section 21.3 and Section 21.4 of this Agreement, or, with regard to the federal Permit, unless during such 90-day period, USFWS has initiated formal suspension of the federal Permit in accordance with 50 C.F.R. section 13.27. In the event USFWS initiates formal suspension of the federal Permit under the emergency circumstances in this section 21.5, the federal permit shall remain suspended until and unless reinstated by the USFWS in accordance with 50 C.F.R. 13.27.

22.0 FORCE MAJEURE

In the event that the Water Authority is wholly or partially prevented from performing its obligations under this Agreement because of unforeseeable causes beyond the reasonable control of and without the fault or negligence of the Water Authority (“Force Majeure”), including, but not limited to, acts of God, labor disputes, sudden actions of the elements

not identified as Changed Circumstances, or actions of non-participating federal or state agencies or local jurisdictions, the Water Authority shall be excused from whatever performance is affected by such unforeseeable cause to the extent so affected, and such failure to perform shall not be considered a material violation or breach, provided that nothing in this section shall be deemed to authorize any Party to violate FESA, CESA or NCCPA, and provided further that:

- The suspension of performance is of no greater scope and no longer duration than is required by the Force Majeure;
- Within fifteen (15) days after the occurrence of the Force Majeure, the Water Authority shall give the Wildlife Agencies written notice describing the particulars of the occurrence;
- Water Authority shall use its best efforts to remedy its inability to perform (however, this paragraph shall not require the settlement of any strike, walk-out, lock-out or other labor dispute on terms which in the sole judgment of the Water Authority are contrary to their interest); and
- When Water Authority is able to resume performance of its obligations, the Water Authority shall give the Wildlife Agencies written notice to that effect.
- If the Water Authority is not able to perform within 45 days of the notice provided to the Wildlife Agencies under bullet 2 above, the Parties shall meet and confer to determine whether the Permits should be suspended. If a satisfactory resolution is not achieved, the Wildlife Agencies reserve the right to suspend the affected Permit or Permits.

23.0 LEGAL AUTHORITY OF THE WILDLIFE AGENCIES

23.1 Legal Authority of USFWS

USFWS enters into this Agreement pursuant to FESA, the Fish and Wildlife Coordination Act, and the Fish and Wildlife Act of 1956. Section 10(a)(2)(B) of FESA expressly authorizes USFWS to issue a Section 10(a) Permit to allow the incidental Take of animal species listed as threatened or endangered under FESA. The legislative history of Section 10(a)(1)(B) clearly indicates that Congress also contemplated that USFWS would approve a habitat conservation plan that protects non-listed species as if they were listed under FESA, and that in doing so, USFWS would provide assurances for such non-listed species.

23.2 Legal Authority of CDFG

CDFG enters into this Agreement pursuant to its separate and independent authority under NCCPA. CDFG may authorize the Take of Covered Species pursuant to California Fish and Game Code section 2835.

24.0 MISCELLANEOUS PROVISIONS

24.1 Calendar Days

Throughout this Agreement and the NCCP/HCP, the use of the term “day” or “days” means calendar days, unless otherwise specified.

24.2 Response Times

Except as otherwise set forth herein or as statutorily required by CEQA, NEPA, CESA, FESA, NCCPA or any other laws or regulations, the Wildlife Agencies and the Water Authority shall use reasonable efforts to respond to written requests from a Party within a thirty (30) day time period and the Wildlife Agencies shall use reasonable efforts to provide timely review of proposals for Covered Activities to be implemented by the Water Authority, where such review is required by this Agreement, the NCCP/HCP, or the Permits.

24.3 Notices

The Water Authority shall maintain a list of individuals responsible for ensuring NCCP/HCP compliance for each of the Parties, along with addresses at which those individuals may be notified (“Notice List”). The Notice List as of the Effective Date is provided below. Each Party shall report any changes of names or addresses to the Water Authority and the other Parties in writing.

Any notice permitted or required by this Agreement shall be in writing, and delivered personally, by overnight mail, or by United States mail, certified and postage prepaid, return receipt requested. Notices may be delivered by facsimile or electronic mail, provided they are also delivered by one of the means listed above. Delivery shall be to the name and address of the individual responsible for each of the Parties, as stated on the most current Notice List.

Notices shall be transmitted so that they are received within deadlines specified in this Agreement, where any such deadlines are specified. Notices delivered personally shall be deemed received on the date they are delivered. Notices delivered via overnight delivery shall be deemed received on the next business day after deposit with the overnight mail delivery service. Notice delivered via certified mail, return receipt requested, shall be deemed received as of the date on the return receipt or five (5) days after deposit in the United States mail, whichever is sooner. Notices delivered via non-certified mail shall be deemed received seven (7) days after deposit in the United States mail. Notices delivered by facsimile or other electronic means shall be deemed received on the date they are received.

The following Notice List contains the names and notification addresses for the individuals currently responsible for overseeing and coordinating NCCP/HCP compliance:

Mr. Jim Bartel, Field Supervisor
Carlsbad Field Office
United States Fish & Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

Mr. Kevin Hunting
Deputy Director, Ecosystem Conservation Division
California Department of Fish and Game
1416 9th Street, 12th Floor
Sacramento, CA 95814

Mr. Ed Pert, Regional Manager
South Coast Region
California Department of Fish and Game
4949 Viewridge Avenue
San Diego, CA 92123

Mr. Ken Weinberg, Director, Water Resources Department
San Diego County Water Authority
4677 Overland Avenue
San Diego, CA 92123

With a copy to:

Mr. Daniel Hentschke, General Counsel
San Diego County Water Authority
4677 Overland Avenue
San Diego, CA 92123

Ms. Ann Malcolm, General Counsel
California Department of Fish and Game
1416 9th Street, 12th Floor
Sacramento, CA 95814

24.4 Entire Agreement

This Agreement, together with the NCCP/HCP and the Permits, constitutes the entire agreement among the Parties. It supersedes any and all other agreements, either oral or in writing, among the Parties with respect to the subject matter hereof and contains all of the covenants and agreements among them with respect

to said matters, and each Party acknowledges that no representation, inducement, promise of agreement, oral or otherwise, has been made by any other Party or anyone acting on behalf of any other Party that is not embodied herein. Pre-existing agreements between the Parties will not be impacted by this Agreement.

24.5 Defense

Upon request, CDFG, to the extent authorized by California law and as funds are provided by the State of California, shall cooperate with the Water Authority in defending, consistent with the terms of the NCCP/HCP, lawsuits arising out of the Water Authority's adoption of this Agreement and the NCCP/HCP. Upon request and subject to Section 24.8 and to the responsibilities of the U.S. Department of Justice in the conduct of litigation, USFWS will cooperate in providing appropriate support to the Water Authority in defending, consistent with the terms of the NCCP/HCP, this Agreement and the federal Permit, lawsuits arising out of the USFWS's approval of the federal Permit.

24.6 Attorneys' Fees

If any action at law or equity, including any action for declaratory relief is brought to enforce or interpret the provisions of this Agreement, each Party to the litigation shall bear its own attorneys' fees, costs and expenses.

24.7 Officials Not to Benefit

No member of, or delegate to, the California State Legislature, the United States Congress, or the governing board of the Water Authority shall be entitled to any share or part of this Agreement or to any benefit that may arise from it.

24.8 Availability of Funds

Implementation of this Agreement and the NCCP/HCP by USFWS is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the United States Treasury. The Parties acknowledge and agree that USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

Implementation of this Agreement and the NCCP/HCP by CDFG is subject to the availability of appropriated funds. Nothing in this Agreement shall be construed by the Parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The Parties acknowledge and agree that CDFG shall not be required under this Agreement to expend any state

appropriated funds unless and until an authorized official of that agency affirmatively acts to commit such expenditure as evidenced in writing.

24.9 Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the United States and the State of California, as applicable.

24.10 Duplicate Originals

This Agreement may be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each of the Parties hereto.

24.11 Relationship to the FESA, CESA, NCCPA and Other Authorities

The terms of this Agreement shall be governed by and construed in accordance with FESA, CESA, NCCPA and other applicable state and federal laws and regulations. In particular, nothing in this Agreement is intended to limit the authority of the USFWS and CDFG to seek penalties or otherwise fulfill their responsibilities under FESA, CESA and NCCPA. Moreover, nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of the USFWS as an agency of the federal government or CDFG as an agency of the State of California.

24.12 No Third Party Beneficiaries

Without limiting the applicability of rights granted to the public pursuant to FESA, CESA, NCCPA or other applicable law, this Agreement shall not create any right or interest in the public, or any member thereof, as a third party beneficiary thereof, nor shall it authorize anyone not a Party to this Agreement to maintain a suit for personal injuries or property damages under the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third party beneficiaries shall remain as imposed under existing state and federal law.

24.13 References to Regulations

Any reference in this Agreement, the NCCP/HCP, or the Permits to any regulation or rule of the Wildlife Agencies shall be deemed to be a reference to such regulation or rule in existence at the time an action is taken.

24.14 Applicable Laws

All activities undertaken pursuant to this Agreement, the NCCP/HCP, or the Permits must be in compliance with all applicable local, state and federal laws and regulations.

24.15 Severability

In the event one or more of the provisions contained in this Agreement is held to be invalid, illegal or unenforceable by any court of competent jurisdiction, such portion shall be deemed severed from this Agreement and the remaining parts of this Agreement shall remain in full force and effect as though such invalid, illegal, or unenforceable portion had never been a part of this Agreement. The Permits are severable such that revocation of one does not automatically cause revocation of the other.

24.16 Assignment

Except as otherwise provided herein, the Parties shall not assign their rights or obligations under this Agreement, the Permits, or the NCCP/HCP to any other individual or entity. The Water Authority may assign its rights and obligations to a joint exercise of powers agency with powers sufficient to carry out the Water Authority's obligations under this Agreement, the Permits and the NCCP/HCP and may replace Preserve Area managers, with the prior written concurrence from the Wildlife Agencies, provided however that transfer in whole or in part of the Federal Permit shall be governed by applicable Federal law and regulations. Such regulations are currently found at 50 C.F.R. 13.25(b).

24.17 Headings

Headings are used in this Agreement for convenience only and do not affect or define the Agreement's terms and conditions.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementing Agreement to be in effect as of the date last signed below.

Dated: _____, 20__

WATER AUTHORITY

By: _____

APPROVED AS TO FORM

By: _____

Dated: _____, 20__

PACIFIC SOUTHWESTERN REGION,
UNITED STATES FISH & WILDLIFE
SERVICE

By: _____
Ken McDermond, Deputy Regional
Director,

APPROVED AS TO FORM

By: _____

Dated: _____, 20__

CALIFORNIA DEPARTMENT OF FISH
AND GAME

By: _____
Kevin Hunting, Deputy Director,
Ecosystem Conservation Division

APPROVED AS TO FORM

By: _____

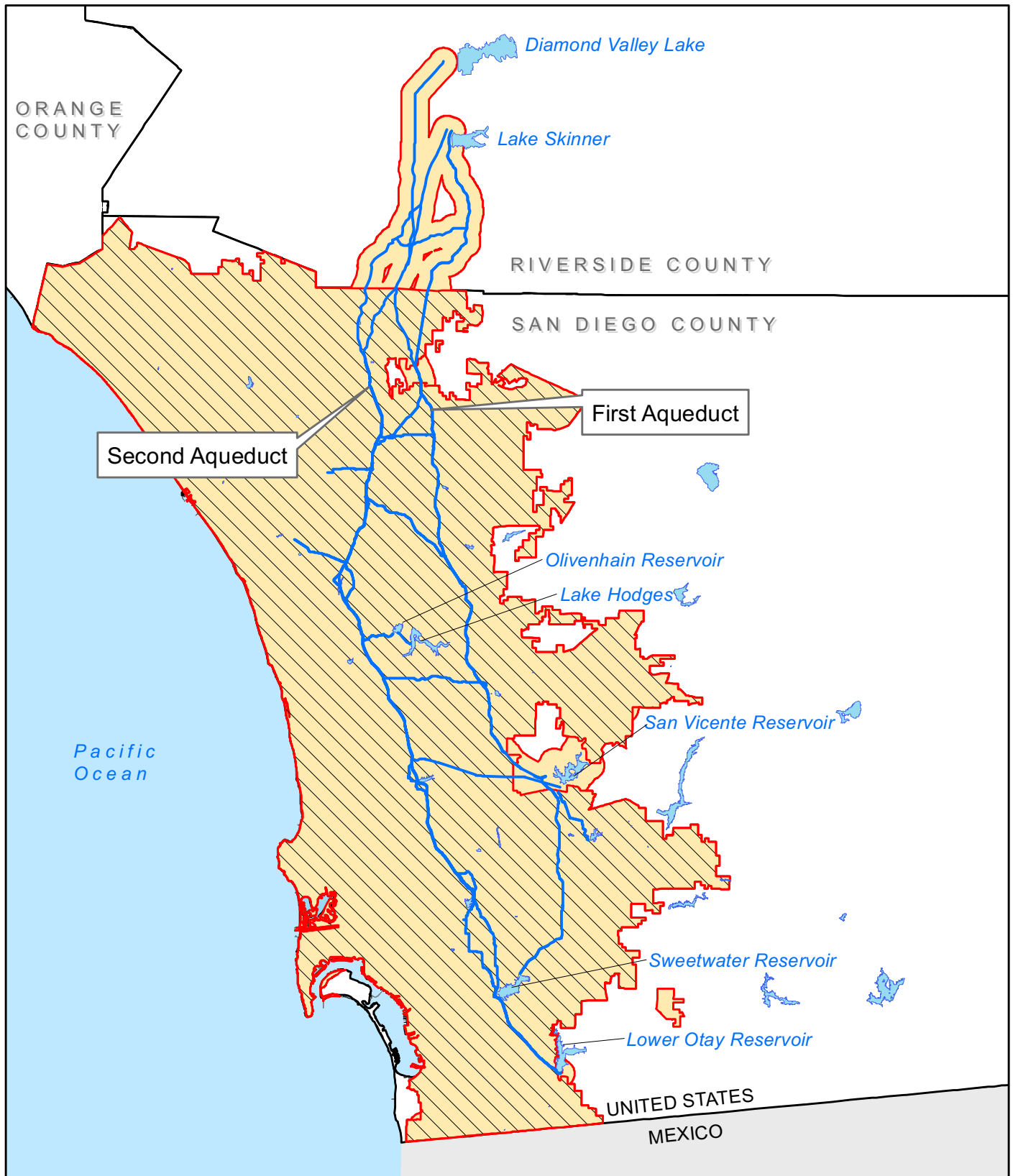
Dated: _____, 20__

CALIFORNIA DEPARTMENT OF FISH
AND GAME

By: _____
Ed Pert, Regional Manager, South
Coast Region

APPROVED AS TO FORM

By: _____



- NCCP/HCP Plan Area
- Water Authority Service Area Boundary
- Existing/Planned Aqueducts and Pipelines

**EXHIBIT B
COVERED SPECIES LIST**

Scientific Name	Common Name	Federal/State Status	CNPS List	Plan Policies
PLANTS				
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint	CE/FT/CH	1B	NE
<i>Adolphia californica</i>	California adolphia	-/-	2	--
<i>Allium munzii</i>	Munz's onion [†]	CT/FE/CH	1B	NE
<i>Ambrosia pumila</i>	San Diego ambrosia	-/FE/CH	1B	NE
<i>Baccharis vanessae</i>	Encinitas baccharis	CE/FT	1B	NE
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea	CE/FT/CH	1B	NE, VP
<i>Brodiaea orcuttii</i>	Orcutt's brodiaea	-/-	1B	--
<i>Calochortus dunnii</i>	Dunn's mariposa lily	CR/-	1B	NE
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	-/-	1B	NE
<i>Centromadia parryi</i> ssp. <i>australis</i>	Southern tarplant	-/-	1B	--
<i>Centromadia pungens</i> ssp. <i>laevis</i>	Smooth tarplant	-/-	1B	--
<i>Deinandra conjugens</i>	Otay tarplant	CE/FT/CH	1B	NE
<i>Dudleya variegata</i>	Variegated dudleya	-/-	1B	NE
<i>Dudleya viscida</i>	Sticky-leaved dudleya	-/-	1B	--
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery	CE/FE	1B	NE, VP
<i>Ferocactus viridescens</i>	San Diego barrel cactus	-/-	2	--
<i>Iva hayesiana</i>	San Diego marsh-elder	-/-	2	--
<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved monardella	-/-	1B	NE
<i>Monardella viminea</i>	Willow monardella	CE/FE/CH	1B	NE
<i>Muilla clevelandii</i>	San Diego goldenstar	-/-	1B	--
<i>Navarretia fossalis</i>	Spreading navarretia	-/FT/CH	1B	NE, VP
<i>Nolina cismontana</i>	Chaparral nolina	-/-	1B	--
<i>Orcuttia californica</i>	California Orcutt grass [†]	CE/FE	1B	NE, VP
<i>Pogogyne abramsii</i>	San Diego mesa mint	CE/FE	1B	NE, VP
<i>Pogogyne nudiuscula</i>	Otay Mesa mint	CE/FE	1B	NE, VP
<i>Quercus dumosa</i>	Nuttall's scrub oak	-/-	1B	--
<i>Salvia munzii</i>	Munz's sage	-/-	2	--
<i>Tetracoccus dioicus</i>	Parry's tetracoccus	-/-	1B	--
INVERTEBRATES				
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp [†]	FT, CH	--	VP
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp	FE, CH	--	NE, VP
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	FE, CH	--	--
<i>Euphyes vestris harbisoni</i>	Harbison's dun skipper	*	--	NE
<i>Lycaena hermes</i>	Hermes copper butterfly	*	--	--
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp	FE, CH	--	NE, VP
AMPHIBIANS				
<i>Anaxyrus</i> (= <i>Bufo</i>) <i>californicus</i>	Arroyo toad	FE, CSC, CH	--	--
<i>Spea hammondi</i>	Western spadefoot toad	CSC	--	VP
REPTILES				
<i>Actinemys marmorata pallida</i>	Southern Pacific (southwestern) pond turtle	CSC	--	--
<i>Aspidoscelis hyperythra beldingi</i>	Belding's orange-throated whiptail	CSC	--	--
<i>Aspidoscelis tigris stejnegeri</i>	Coastal (western) whiptail	*	--	--
<i>Coleonyx variegatus abbottii</i>	San Diego banded gecko	*	--	--
<i>Crotalus ruber ruber</i>	(Northern) red-diamond rattlesnake	CSC	--	--
<i>Diadophis punctatus similis</i>	San Diego ring-neck snake	*	--	--
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink	CSC	--	--
<i>Lichanura trivirgata roseofusca</i>	Coastal rosy boa	*	--	--
<i>Phrynosoma coronatum blainvillii</i>	Coast (San Diego) horned lizard	CSC, *	--	--
BIRDS				
<i>Agelaius tricolor</i>	Tricolored blackbird	CSC	--	--
<i>Aimophila ruficeps canescens</i>	Southern California rufous-crowned sparrow	*	--	--
<i>Ammodramus savannarum</i>	Grasshopper sparrow	CSC	--	--

EXHIBIT B
COVERED PLANT SPECIES (continued)

Scientific Name	Common Name	Federal/State Status	CNPS List	Plan Policies
<i>Amphispiza belli belli</i>	Bell's sage sparrow	*	--	--
<i>Athene cunicularia hypugaea</i>	Western burrowing owl	CSC	--	--
<i>Campylorhynchus brunneicapillus sandiegensis</i>	San Diego cactus wren	CSC, *	--	NE
<i>Dendroica petechia brewsteri</i>	Yellow warbler	CSC	--	--
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	FE, CE, CH	--	--
<i>Eremophila alpestris californica</i>	California horned lark	CSC	--	--
<i>Icteria virens</i>	Yellow-breasted chat	CSC	--	--
<i>Lanius ludovicianus</i>	Loggerhead shrike	CSC	--	--
<i>Polioptila californica californica</i>	Coastal California gnatcatcher	FT, CH, CSC	--	--
<i>Vireo bellii pusillus</i>	Least Bell's vireo	FE, CE, CH	--	--
MAMMALS				
<i>Chaetodipus californicus femoralis</i>	Dulzura (California) pocket mouse	CSC	--	--
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse	CSC	--	--
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat	FE, CT	--	--
<i>Felis concolor</i>	Mountain lion	*	--	--
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit	CSC	--	--
<i>Neotoma lepida intermedia</i>	San Diego desert woodrat	CSC	--	--
<i>Onychomys torridus ramona</i>	Southern grasshopper mouse	CSC	--	--
<i>Perognathus longimembris brevinasus</i>	Los Angeles pocket mouse	CSC	--	--

California Native Plant Society (CNPS) Lists

- 1B = Species rare, threatened, or endangered in California and elsewhere.
 2 = Species rare, threatened, or endangered in California, but more common elsewhere.
 3 = Species for which more information is needed (a review list).
 4 = A watch list of species of limited distribution.

Federal and State Status

- FE = Federally listed, endangered
 FT = Federally listed, threatened
 FC = Federal Candidate for listing
 CH = Critical Habitat
 CE = State listed, endangered
 CT = State listed, threatened
 CR = State listed, rare

Other

- CFP = California Fully Protected Species. No take of individuals is permitted.
 CSC = CDFG Species of Special Concern
 * = Taxa listed with an asterisk fall into one or more of the following categories:
 - Taxa considered under Section 15380(d) of CEQA guidelines.
 - Taxa that are biologically rare, very restricted in distribution, or declining throughout their range
 - Population(s) in California that may be peripheral to the major portion of a taxon's range, but which are threatened with extirpation within California.
 - Taxa closely associated with a habitat that is declining in California.
 (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands).

Plan Policies

- NE = Narrow Endemic Policy
 VP = Vernal Pool Protection Policy

† Covered Species not subject to take.

**Appendix B
Covered Species Analysis**

**San Diego County Water Authority
NCCP/HCP**

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7.6	San Diego Cactus Wren (<i>Campylorhynchus brunneicapillus sandiegonensis</i>)	245
7.7	Coastal California Gnatcatcher (<i>Polioptila californica californica</i>)	249
7.8	Yellow Warbler (<i>Dendroica petechia brewsteri</i>)	254
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1.0 Introduction

This Appendix provides a Conservation Analysis as well as an overview of the methodology and data used to support the proposed coverage of species under the San Diego County Water Authority's (Water Authority) Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP, Plan). Scientific data and experts in the field were consulted in order to provide a comprehensive conservation plan that addresses species-specific concerns and measures that must be met for the species to be adequately covered by the Water Authority. The evaluation describes conservation goals and strategies, conditions for coverage, background information, a conservation analysis, and management actions for specific plant and animal species. Background information includes distribution; abundance, and trends, threats and limiting factors, and special considerations. The Conservation Analysis includes conservation and anticipated take levels and effects on population viability and species recovery.

1.1 Selection Criteria

Selection criteria for species coverage in the Plan include the following:

- The species is known to occur or has the potential to occur within the Water Authority Survey Area and/or the Preserve Area.
- The species is listed or likely to be listed during the permit term.
- Covered Activities are likely to impact the species.
- The Plan provides adequate conservation for the species.

A species' potential to occur in the Survey Area and/or the Preserve Area is determined based on whether a known location of the species is present or, based on available species' information and vegetation mapping, is likely to occur within these areas. It is important to understand the terms used in this Plan, including the Plan Area, the Survey Area, the Probable Impact Zone (PIZ), and Preserve Area.

- **Plan Area.** The Plan Area is an area of approximately 992,000 acres in western San Diego and southwestern Riverside counties within which incidental take will be permitted. The Plan Area encompasses the Service Area and those lands that extend northward into Riverside County within a one-mile area on each side of the First and Second Aqueducts originating at Lake Skinner and Diamond Valley Reservoir, as well as a one-mile area on each side of the rights-of-way,

and exterior boundaries of other facilities within San Diego County that are outside the Service Area boundary.

- **Survey Area.** The Survey Area encompasses existing facilities and lands owned by or under the control of the Water Authority including infrastructure rights-of-way (with and without underlying fee ownership), together with Metropolitan Water District's (MWD) rights-of-way originating at Lake Skinner and Diamond Valley Reservoir that serve San Diego County, and a one-mile area on each side of rights-of-way and facilities. It is expected that most Covered Activities would occur within the PIZ. The Survey Area was delineated as the area within the Plan Area where Covered Activities would be likely to occur if they do not occur within the PIZ.
- **Preserve Area and Managed Mitigation Areas (MMAs).** The Plan Area includes significant preserved areas that contribute to the regional conservation efforts in San Diego County. Within the nearly 1,920 acres of Preserve Area committed by the Plan, over 700 acres are available or will be created to be used as credits to compensate project impacts to upland and wetland habitats, known as the Habitat Management Areas (HMA). In addition, Managed Mitigation Areas (MMA) are conserved lands which were acquired to mitigate previous projects but do not have acres or credits available for future mitigation.
- **Probable Impact Zone (PIZ).** The linear, inter-connected configuration of the Water Authority's water supply system constrains nearly all Covered Activities to be located along or close to the system's rights-of-way and other infrastructure (estimated to be 1,000 feet on either side of the rights-of-way/facilities). For that reason, the Plan identifies an area of approximately 64,600 acres as the PIZ, where most of the Covered Activities and take are expected to occur.

Attachment B-1 illustrates the Survey Area, the Preserve Area, and PIZ with respect to known Covered Species locations. Evaluation of coverage for each species under the Plan was made with the best available data, based on accepted principles of conservation biology and habitat management, knowledge of species biology and habitat needs, and principles of population and landscape ecology derived from the literature and taxon experts.

1.1.1 Literature Review

Species included are federally- and/or state-listed as rare, threatened, or endangered, or are likely candidates for future listing as rare, threatened, or endangered based on present population declines, diminishing habitat, or existing levels of sensitivity. Assessments of the sensitivity of species are based primarily on California Native Plant Society (CNPS; 2001), State of California (2000, 2006a, 2006b, 2007a, 2007b), and

United States Fish and Wildlife Service (USFWS; 2006a) rankings. Botanical nomenclature follows Hickman (1993) as updated by the Jepson Online Interchange (2008). Zoological nomenclature is in accordance with the following: birds—the American Ornithologists' Union Checklist (1998 and supplements); butterflies—Mattoni (1990) and Opler and Wright (1999); amphibians and reptiles—Crother (2001) and Crother et al. (2003); and mammals—Hall (1981) and Baker et al. (2003). Vegetation communities are based on the San Diego Association of Governments (SANDAG) Regional Vegetation data.

Biological data and information for the Plan Area and the Preserve Area include documents made available by the Water Authority including, but not limited to, site specific biological technical reports, conservation bank agreements, biological opinions issued by USFWS for Water Authority projects, and Scientific Review Panel input (Rahn et al. 2008). Reference documents include, but are not limited to:

- General Description and Overview of Biological Features of the San Miguel Conservation Bank (Merkel 1997)
- Monte Vista Ranch Biological Report (Merkel 2004)
- Crestridge Habitat Management Area Interim Habitat Management Plan (Pacific Southwest Biological Services, Inc. [PSBS] 1994)
- Ecological Summary of La Cañada Ranch Mesa Del Padre Barona (TNC 2006)
- Initial Study for the Tijuana River Valley Wetlands Mitigation Project (Water Authority and Dudek 2007)

Data sources for species occurrence points include Plant Atlas data from the San Diego Natural History Museum (SDNHM; 2008), the California Natural Diversity Data Base (CNDDB; 2008), and USFWS biological data for federally listed species (updated monthly, USFWS 2008).

1.1.2 Methodology

This Conservation Analysis is based primarily on an analysis of known occurrences of a Covered Species or potential of that species to occur within the Survey Area/PIZ and the Preserve Area based on the presence of suitable habitat. The analysis considers the following: (1) CNDDB data and SDNHM Plant Atlas occurrences; (2) presence of suitable habitat; (3) proximity of a known location within the Survey Area, PIZ and the Preserve Area; (4) regional context of the species and habitat distribution; (5) life-history characteristics of the species; and (6) factors contributing to species historical decline and current status.

Appendix B Covered Species Analysis

The following general evaluation steps were followed for each species. This systematic approach to reviewing available information ensures that all species are sufficiently evaluated relative to basic principles of preserve design and conservation biology.

1. Evaluate levels of impact (take) and conservation for each vegetation community based on geographic information system (GIS) calculations and other estimates of expected (or projected) project impacts and identified (Preserve Area) conserved lands.
2. Identify specific management or enhancement conditions or other specific measures needed for coverage. Identify those actions assumed by the analysis to be implemented and considered conditions for coverage of that species.
3. For species whose coverage is not justified based on available data, potential impacts, or proposed level of conservation, identify additional information or additional conservation measures needed to justify coverage in the future.

The potential take of each of the proposed covered species was assessed as follows:

1. The acreage of each of the GIS-mapped vegetation communities within the PIZ and Survey Areas were calculated;
2. Each species was associated with the GIS-mapped vegetation communities in the PIZ and Survey Area, based on the habitat preferences identified in Appendix B;
3. The area of potential habitat for each species was calculated as the total of its associated GIS-mapped vegetation communities occurring within the PIZ and Survey Area;
4. Potential impacts or take were assessed by overlaying rights-of-way with the area of potential habitat for each species, plus a proportional increment of potential habitat for otherwise spatially indefinable impacts, based on the total amount of future impacts.

These steps were followed for each of the species analyzed to determine what conditions would be necessary for the Plan to provide adequate conservation for each species and to meet State and federal Permit requirements. However, the final determination of whether a species is conserved, and therefore qualifies for Take Authorizations, is made by the USFWS and California Department of Fish and Game (CDFG), collectively referred to as the Wildlife Agencies.

1.1.3 Independent Science Advisors Review Panel

As required by Senate Bill 572 (codified in Fish and Game Code, Section 2830(f)), the Water Authority is required to facilitate and incorporate independent scientific input of the proposed Plan. The focus of the review by the Independent Science Advisors was those Covered Species proposed for Permits that are not otherwise covered in the San Diego Multiple Species Conservation Program (MSCP) or Multiple Habitat Conservation Program (MHCP) (representing 33 of the proposed Covered Species) and an additional eight vernal pool species and burrowing owl which are considered particularly sensitive. A panel of Independent Science Advisors was selected to review the draft Conservation Analysis prepared for the Plan based on their experience with regional conservation planning and expertise on the taxa within San Diego County.

The Independent Science Advisors were provided with the draft Conservation Analysis (Appendix B) and the draft Plan, dated September 2007, at the time of the Science Advisors Workshop on November 19, 2007. Following the Workshop, the Science Advisors conducted an independent review of the draft Conservation Analysis and provided written feedback regarding the methodology used for the Conservation Analysis and the overall results of the analyses for each of the target proposed Covered Species. The comments and recommendations of the Independent Science Advisors were used to update the species models and conditions for coverage described in this Conservation Analysis (Rahn et. al. 2008). Based on the Independent Science Advisors' recommendations, the following species were removed from the Plan Covered Species list: red-shouldered hawk (*Buteo lineatus elegans*), prairie falcon (*Falco mexicanus*), sharp-shinned hawk (*Accipiter striatus velox*), Pacific pocket mouse (*Perognathus longimembris pacificus*), and arroyo chub (*Gila orcuttii*). The Independent Science Advisors' full review of the draft Plan, including the Conservation Analysis, is provided in a report in Attachment B-2.

Independent scientific review of the Plan also occurred for an earlier version of the Plan and Conservation Analysis prior to 2003; however, substantial changes to the species list and conservation measures since that time warranted a second review of the document.

1.2 Species Coverage

Species that are proposed as "Covered" by the Plan are those plant and animal species, listed or unlisted, that potentially could be impacted by the Covered Activities, are considered adequately conserved and managed by actions outlined in this Plan, and for which impacts have been avoided, minimized, or mitigated such that there can be incidental take of the species or loss of suitable habitat pursuant to the Plan's Implementing Agreement (IA).

In implementing this Plan, the Water Authority contributes to regional conservation of species by conserving areas of suitable habitat for which the Covered Species are known to occur or have the potential to occur. The specific management actions included in this Plan are intended to benefit Covered Species. Other species may also benefit from the avoidance and minimization measures identified in this Plan. Plan implementation is not expected to cause detectable detrimental changes in species viability in the region or to preclude recovery of listed species.

1.2.1 Species Considered For Coverage

Although 89 species are considered in the conservation analysis, not all are proposed as Covered Species under the Plan. In considering which species to cover, the Water Authority determined the different scenarios under which various species' populations decline and become threatened with extirpation on the regional scale. These scenarios represent combinations of the species' distributions and ecologies, relative to the extent and pattern of human-caused landscape changes. Although each species' scenario is unique, species' status, occurrences, and protection levels all contribute to the decision to include a species on the Covered Species list.

Species can be arranged on a spectrum of scales of restriction. At one extreme are species highly restricted to small areas or extremely localized, scattered conditions, such as soil types. Often the reasons for such restricted distributions are not completely understood (i.e., distributions are a small subset of apparently available habitat). These are most often plant species, although certain insects are highly restricted despite apparently more widespread habitat (e.g., Quino checkerspot and Thorne's hairstreak). At the other extreme are very widespread, wide-ranging species that occur in low densities, are often sensitive in one or more aspects of their life histories (e.g., nest sites), and are often vulnerable to landscape-level perturbations, such as pesticide effects on reproduction, freeway mortality, loss and fragmentation of extensive foraging areas. Examples of widespread, wide-ranging species include golden eagle and mountain lion.

The Conservation Analysis is complicated for those species with relatively wide distributions, but which are not particularly mobile and/or are restricted to widely fragmented habitat types. It is important here to distinguish "widespread" from "wide-ranging." This group includes species that may be widespread at the species level, but whose individuals are not wide-ranging. Even though some of these species may occur state-wide or even continent-wide due to their discontinuous distributions, they often exhibit presumably genetically based differences among their regional (meta) populations. Conservation of these species should require recognition of this diversity and formulation of objectives and criteria for the spatial scale at which their conservation is to be achieved.

In order to adequately cover a species under the Plan, the Water Authority must provide reasonable assurance that, even with the proposed levels of take, implementation of the Plan would help conserve the species and not result in the extirpation of that species from the Plan Area and, by extension, from the region. For a species to be considered as covered by this Plan, a species must be either documented to occur or have a reasonable probability of occurring in the Plan Area based on geographic range and suitable habitat exists that can be conserved to address proposed take. The Plan acknowledges that existing geographic databases used in the Conservation Analysis are, at best, incomplete, and potential for occurrence of a species were inferred by other information, such as soils (e.g., edaphically restricted plants) and the size and distribution of remaining habitat patches.

A related factor for well-circumscribed distributions of species with well-understood habitat restrictions is the extent to which known locations are already protected. Although these locations may be protected from direct loss from human activities, this protection may not extend to factors such as fire, invasive vegetation, and climate change. The true, long-term protection of such species is likely to rely in large part on management measures incorporated into adjacent conservation and management plans. As a regional contribution to reduce the likelihood that species would be listed as threatened/endangered, retention on the Covered Species list would maintain attention toward and avoidance of these species.

The Water Authority proposes species for coverage based on the following criteria:

- The species is listed or endangered, threatened/rare and/or significantly declining, such that risk of future listing is credible.
- Impacts are probable/likely, even if current occurrence records (i.e., CNDDDB or SDNHM) do not show species within the PIZ or Survey Area (i.e., substantial potential habitat within the PIZ and Survey Area is known).
- Affirmative conservation and management within Plan Area would substantially benefit species.
- Conservation is likely within the Preserve Area, or the Water Authority may feasibly acquire mitigation properties/bank credits outside the Preserve Area to achieve mitigation for some species.

Table B-1A provides a summary of species considered in the conservation analysis. Of the 89 species, 63 species (26 plant species and 37 wildlife species) are proposed for coverage (Covered) and are listed first in the table as Covered. Three additional species (two plants and one wildlife) are Major Amendment Species because they are known to primarily occur in the Plan's Major Amendment Area in Riverside County. Analysis conducted for the Plan determined that the appropriate process for potential

**TABLE B-1A
LIST OF SPECIES CONSIDERED**

Scientific Name	Common Name	Potential Habitat (acres)					CNDDB Records (occurrences)		SDNHM Records (occurrences)		Federal/State Status	CNPS List
		Survey Area	PIZ**	Planned PIZ Impacts**	Future Covered Activities PIZ Impacts†	HMA Mitigation Credit	Survey Area	PIZ	Survey Area	PIZ		
Covered												
Plants												
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint	90,684	18,024	120	120	641	30	4	10	4	CE/FT/CH	1B
<i>Adolphia californica</i>	California adolphia	43,367	9,422	84	78	518	45	6	17	5	-/-	2
<i>Ambrosia pumila</i>	San Diego ambrosia	114,060	24,208	139	150	132	10	5	4	0	-/FE	1B
<i>Baccharis vanessae</i>	Encinitas baccharis	35,865	8,134	0	36	0‡	11	5	5	1	CE/FT	1B
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea	24	0	0	5	0‡	13	2	2	1	CE/FT/CH	1B
<i>Brodiaea orcuttii</i>	Orcutt's brodiaea	69	11	5	1	1	24	5	5	2	-/-	1B
<i>Calochortus dunnii</i>	Dunn's mariposa lily	4,902	1,046	36	42	8	1	0	0	0	CR/-	1B
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	4,902	1,046	36	42	0‡	8	0	5	4	-/-	1B
<i>Centromadia parryi</i> ssp. <i>australis</i>	Southern tarplant	4,677	1,132	5	1	9	3	0	0	0	-/-	1B
<i>Centromadia pungens</i> ssp. <i>laevis</i>	Smooth tarplant	5,439	1,079	25	32	47	10	1	0	0	-/-	1B
<i>Deinandra conjugens</i>	Otay tarplant	4,199	1,018	0	10	8	13	1	11	2	CE/FT/CH	1B
<i>Dudleya variegata</i>	Variiegated dudleya	113,370	24,233	134	140	649	17	3	9	3	-/-	1B
<i>Dudleya viscida</i>	Sticky-leaved dudleya	89,497	17,629	120	120	641	3	1	0	0	-/-	1B
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery	24	0	0	5	0	11	1	1	1	CE/FE	1B
<i>Ferocactus viridescens</i>	San Diego barrel cactus	44,794	9,865	84	78	123	42	7	0	0	-/-	2
<i>Iva hayesiana</i>	San Diego marsh-elder	2,235	532	5	9	21	21	1	5	1	-/-	2
<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved monardella	45,928	8,163	36	42	123	4	1	0	0	-/-	1B
<i>Monardella viminea</i>	Willowy monardella	1,734	299	5	9	0	6	1	0	0	CE/FE/CH	1B
<i>Muilla clevelandii</i>	San Diego goldenstar	90,682	18,024	120	120	641	18	3	3	1	-/-	1B
<i>Navarretia fossalis</i>	Spreading navarretia	169	34	0	5	0	27	4	3	1	-/FT/CH	1B
<i>Nolina cismontana</i>	Chaparral nolina	42,078	9,054	84	78	0	2	1	0	0	-/-	1B
<i>Pogogyne abramsii</i>	San Diego mesa mint	24	0	0	5	0	7	1	0	0	CE/FE	1B
<i>Pogogyne nudiuscula</i>	Otay Mesa mint	24	0	0	5	0	2	0	1	0	CE/FE	1B
<i>Quercus dumosa</i>	Nuttall's scrub oak	45,921	8,163	36	42	123	5	1	4	0	-/-	1B
<i>Salvia munzii</i>	Munz's sage	90,682	18,024	120	120	641	10	0	3	0	-/-	2
<i>Tetracoccus dioicus</i>	Parry's tetracoccus	696	28	13	15	0‡	15	6	8	0	-/-	1B

Scientific Name	Common Name	Potential Habitat (acres)					CNDDB Records (occurrences)		SDNHM Records (occurrences)		Federal/State Status	CNPS List
		Survey Area	PIZ**	Planned PIZ Impacts**	Future Covered Activities PIZ Impacts†	HMA Mitigation Credit	Survey Area	PIZ	Survey Area	PIZ		
Invertebrates												
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp	24	0	0	5	0	10	1	N/A	N/A	FE, CH	N/A
<i>Euphyes vestris harbisoni</i>	Harbison's dun skipper	7,540	1,513	26	31	33	0	0	N/A	N/A	*	N/A
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	113,542	24,267	133	140	649	18	7	N/A	N/A	FE, CH	N/A
<i>Lycaena hermes</i>	Hermes copper butterfly	1,329	371	84	78	518	5	0	N/A	N/A	*	N/A
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp	24	0	0	5	0	5	0	N/A	N/A	FE, CH	N/A
Amphibians												
<i>Anaxyrus (=Bufo) californicus</i>	Arroyo toad	5,846	1,271	25	30	46	7	2	N/A	N/A	FE, CH, CSC	N/A
<i>Spea (=Scaphiopus) hammondii</i>	Western spadefoot toad	24,422	6,508	18	29	28	13	3	N/A	N/A	CSC	N/A
Reptiles												
<i>Actinemys marmorata pallida</i>	Southern Pacific (Southwestern) pond turtle	4,365	1,497	5	2	1	7	2	N/A	N/A	CSC	N/A
<i>Aspidoscelis hyperythra beldingi</i>	Belding's orange-throated whiptail	95,949	19,059	145	150	686	60	12	N/A	N/A	CSC	N/A
<i>Aspidoscelis tigris stejnegeri</i>	Coastal (western) whiptail	98,184	19,534	146	151	674	13	2	N/A	N/A	*	N/A
<i>Coleonyx variegates abbottii</i>	San Diego banded gecko	90,684	18,024	120	120	641	0	0	N/A	N/A		N/A
<i>Crotalus ruber ruber</i>	(Northern) red diamond rattlesnake	45,492	9,894	120	120	518	14	5	N/A	N/A	CSC	N/A
<i>Diadophis punctatus similis</i>	San Diego ring-neck snake	110,111	23,423	154	162	641	1	1	N/A	N/A	*	N/A
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink	117,514	25,052	145	151	658	9	0	N/A	N/A	CSC	N/A
<i>Lichanura trivirgata roseofusca</i>	Coastal rosy boa	90,684	18,024	120	120	641	3	0	N/A	N/A	*	N/A
<i>Phrynosoma coronatum blainvillii</i>	Coast (San Diego horned) lizard	49,422	10,665	126	130	526	38	8	N/A	N/A	CSC *	N/A
Birds												
<i>Agelaius tricolor</i>	Tricolored blackbird	6,268	1,830	5	11	21	1	0	N/A	N/A	CSC	N/A
<i>Aimophila ruficeps canescens</i>	Southern California rufous-crowned sparrow	44,756	9,862	84	78	518	82	14	N/A	N/A	*	N/A
<i>Ammodramus savannarum</i>	Grasshopper sparrow	22,904	6,253	19	22	9	0	0	N/A	N/A	CSC	N/A
<i>Amphispiza belli belli</i>	Bell's sage sparrow	89,534	17,633	120	120	641	52	10	N/A	N/A	*	N/A
<i>Athene cunicularia hypugaea</i>	Western burrowing owl	35,454	8,692	97	98	8	36	23			CSC	N/A
<i>Campylorhynchus brunneicapillus sandiegensis</i>	San Diego cactus wren	43,439	9,456	84	78	518	34	5	N/A	N/A	CSC *	N/A
<i>Dendroica petechia brewsteri</i>	Yellow warbler	4,940	975	25	30	26	3	0	N/A	N/A	CSC	N/A
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher	4,081	772	25	30	26	4	0	N/A	N/A	FE, CH, CE	N/A
<i>Eremophila alpestris californica</i>	California horned lark	30,110	7,283	14	20	0‡	3	0	N/A	N/A	CSC	N/A
<i>Icteria virens</i>	Yellow-breasted chat	5,265	1,034	25	30	45	8	1	N/A	N/A	CSC	N/A

Scientific Name	Common Name	Potential Habitat (acres)					CNDDB Records (occurrences)		SDNHM Records (occurrences)		Federal/State Status	CNPS List
		Survey Area	PIZ**	Planned PIZ Impacts**	Future Covered Activities PIZ Impacts†	HMA Mitigation Credit	Survey Area	PIZ	Survey Area	PIZ		
<i>Lanius ludovicianus</i>	Loggerhead shrike	111,906	25,154	134	140	123	0	0	N/A	N/A	CSC	N/A
<i>Polioptila californica californica</i>	Coastal California gnatcatcher	44,754	9,862	84	78	518	152	26	N/A	N/A	FT, CH, CSC	N/A
<i>Vireo belli pusillus</i>	Least Bell's vireo	5,265	1,034	25	30	26	30	6	N/A	N/A	FE, CH, CE	N/A
Mammals												
<i>Chaetodipus californicus femoralis</i>	Dulzura pocket mouse	40	4	0	10	0‡	9	2	N/A	N/A	CSC	N/A
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse	108,928	23,167	134	140	641	13	4	N/A	N/A	CSC	N/A
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat	39,667	9,690	14	20	8	21	5	N/A	N/A	FE, CT	N/A
<i>Felis concolor</i>	Mountain lion	122,606	26,042	164	180	702	0	0	N/A	N/A	*	N/A
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit	68,792	17,570	14	20	8	15	4	N/A	N/A	CSC	N/A
<i>Neotoma lepida intermedia</i>	San Diego woodrat	90,682	18,024	120	120	641	13	6	N/A	N/A	CSC	N/A
<i>Onychomys torridus ramona</i>	Southern grasshopper mouse	109,102	23,181	134	140	641	0	0	N/A	N/A	CSC	N/A
<i>Perognathus longimembris brevinasus</i>	Los Angeles pocket mouse	20,725	5,723	18	29	21	4	3	N/A	N/A	CSC	N/A
Major Amendment Species												
Plants												
<i>Allium munzii</i>	Munz's onion	19,634	5,582	97	98	0	4	1	0	0	CT/FE/CH	1B
<i>Orcuttia californica</i>	California Orcutt grass	24	0	0	0	0	2	0	0	0	CE/FE	1B
Invertebrate												
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	24	0	0	0	0	1	0	N/A	N/A	FT, CH	N/A
Not Covered												
Plants												
<i>Arctostaphylos rainbowensis</i>	Rainbow manzanita	7	0	0	0	0	10	2	1	0	-/-	1B
<i>Ceanothus verrucosus</i>	Wart-stemmed ceanothus	35,865	8,134	36	42	0‡	8	3	0	0	-/-	2
<i>Comarostaphylis diversifolia ssp. diversifolia</i>	Summer holly	35,832	8,131	36	42	0‡	19	1	3	0	-/-	1B
<i>Cordylanthus orcuttianus</i>	Orcutt's bird's-beak	0	0	0	0	0	0	0	0	0	-/-	2
<i>Cylindropuntia californica var. californica</i>	Snake cholla	42,078	9,054	84	78	0	1	0	0	0	-/-	1B
<i>Ericameria palmeri ssp. palmeri</i>	Palmer's goldenbush	42,156	9,069	89	80	1	4	1	2	2	-/-	2
<i>Githopsis diffusa ssp. filicaulis</i>	Mission Canyon bluecup	45,928	8,163	36	42	123	1	0	0	0	-/-	3
<i>Hazardia orcuttii</i>	Orcutt's hazardia	696	28	13	15	0	0	0	0	0	CT/FC	1B
<i>Lepechinia cardiophylla</i>	Heart-leaved pitcher sage	49,867	8,936	42	52	130	3	0	0	0	-/-	1B
<i>Myosurus minimus ssp. apus</i>	Little mousetail	24	0	0	0	0	1	0	0	0	-/-	3

Scientific Name	Common Name	Potential Habitat (acres)					CNDDB Records (occurrences)		SDNHM Records (occurrences)		Federal/State Status	CNPS List	
		Survey Area	PIZ**	Planned PIZ Impacts**	Future Covered Activities PIZ Impacts†	HMA Mitigation Credit	Survey Area	PIZ	Survey Area	PIZ			
<i>Navarretia prostrata</i>	Prostrate navarretia	169	34	0	0	0	0	0	0	0	0	–/–	1B
<i>Packera ganderi</i>	Gander's ragwort	45,884	8,159	36	42	0	1	0	0	0	0	CR/–	1B
<i>Quercus engelmannii</i>	Engelmann oak	75	2	1	1	0‡	0	0	3	1	0	–/–	4
<i>Satureja chandleri</i>	San Miguel savory	51,361	9,312	62	73	130	2	0	1	0	0	–/–	1B
Reptiles													
<i>Thamnophis hammondi</i>	Two-striped garter snake	50,453	10,976	109	110	565	6	1	N/A	N/A	0	–/–	N/A
Birds													
<i>Accipiter cooperii</i>	Cooper's hawk	4,969	993	6	10	8	6	0	N/A	N/A	0	CSC *	N/A
<i>Asio otis</i>	Long-eared owl	38,530	9,007	40	52	33	0	0	N/A	N/A	0	CSC	N/A
<i>Circus cyaneus</i>	Northern harrier	76,795	17,435	102	100	9	2	0	N/A	N/A	0	CSC	N/A
<i>Elanus leucurus</i>	White-tailed kite	38,278	9,075	19	30	16	2	0	N/A	N/A	0	CFP *	N/A
<i>Falco peregrinus anatum</i>	American peregrine falcon	34,079	8,057	19	30	8	1	0	N/A	N/A	0	CE, CFP	N/A
<i>Aquila chrysaetos</i>	Golden eagle	67,444	16,070	97	98	528	2	0	N/A	N/A	0	CFP, BEPA	N/A
<i>Haliaeetus leucocephalus</i>	Bald eagle	4,103	1,450	1	1	0	2	0	N/A	N/A	0	CE, CFP, BEPA	N/A
<i>Pelecanus occidentalis californicus</i>	California brown pelican	4,103	1,450	1	1	0	0	0	N/A	N/A	0	FE, CE, CFP	N/A

Listed/Proposed

FE = Federally listed, endangered

FT = Federally listed, threatened

CH = Critical Habitat

CE = State-listed, endangered

CT = State-listed, threatened

N/A = Not applicable

† = Future impacts to the nine vernal pool species, Otay tarplant and Dulzura pocket mouse include the potential for Survey Area impacts (see Appendix B, Section 1.2.1).

‡ = Although no habitat occurs within HMAs based on habitat association projections, these species are expected or known to occur based on observations on or near the Preserve Area. See Appendix B of the Plan for details.

California Native Plant Society (CNPS) Lists

1B = Species rare, threatened, or endangered in California and elsewhere.

2 = Species rare, threatened, or endangered in California, but more common elsewhere.

3 = Species for which more information is needed (a review list).

4 = A watch list of species of limited distribution.

Other

CFP = California Fully Protected Species. No take of individuals is permitted.

CSC = CDFG Species of Special Concern

* = Taxa listed with an asterisk fall into one or more of the following categories:

- Taxa considered under Section 15380(d) of CEQA guidelines.
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range
- Population(s) in California that may be peripheral to the major portion of a taxon's range, but which are threatened with extirpation within California.

- Taxa closely associated with a habitat that is declining in California (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands).

** = Existing geographic databases used in the Conservation Analysis were supplemented with additional information about potential for occurrence of a species. Planned PIZ impacts include estimated project impacts from Pipeline 6 Alternative. Impacts to vegetation communities from Future Projects/O&M are based on known information about Planned Projects/O&M and may not represent the full range of impacts within the PIZ. Once project specific information is available, impacts to vegetation communities with the preferred habitat for species may occur.

take of California Orcutt grass, vernal pool fairy shrimp, and Munz's onion would be through the Major Amendment process for the Riverside County portion of the Plan Area. Twenty-three species (14 plants and 9 wildlife) not proposed for coverage (Not Covered) and also listed. The information presented in this table represents a first order assessment of the impacts for species in the conservation analysis based on the regional and species-specific factors described above. Included in the table is an estimate of potential suitable habitat within the PIZ for each species based on their habitat affinities. Although some species appear to not have habitat within the Survey Area or the PIZ, the information in the table is based on regional GIS vegetation data and is not based on site-specific assessments. The list of species proposed for coverage also takes into account background information on each species, species covered by other regional conservation plans, knowledge of the Water Authority's Covered Projects and Activities.

Also included in Table B-1A is each species' status relative to data on the potential for impacts (e.g., large numbers of occurrences within the PIZ and Survey Area as recorded by CNDDDB for plants and wildlife and SDNHM for plants only). Because the Survey Area includes the area of the PIZ, the number of occurrences in the PIZ is a subset of those within the Survey Area.

For Planned Projects, Appendix B provides an assessment of the potential take by the Covered Activities based on available project detail (based on Table 5-3 in the Plan) and species-vegetation community (i.e. upland and wetland tiers) associations in Table B-1B. The estimate of impacts to potential suitable habitat is based on the total amount of each habitat classification in the Survey Area and PIZ that could be used by each species.

As discussed in the Plan, permanent impacts to mitigable vegetation communities from Future Projects and O&M were estimated assuming the same rate of project build-out (on an acres/year basis) in the remaining 35 years of the full Permit term as during the 20-year period of the Planned (CIP) Projects. This estimate was then increased by 20 percent to account for future project planning uncertainties. Impacts were proportionally assigned to the vegetation community types based on estimates from Planned Projects. The quantification of impacts by Future Projects and O&M are estimated from our current knowledge of Planned Projects and may not account for impacts to vegetation communities which are not proposed to be impacted by Planned Projects. The Water Authority identified the maximum amount of impacts to vegetation communities in Table 5-3 in the Plan. However, the specific location of Future Covered Activities would be determined as project details become available.

The GIS analysis identified eight vernal pool/vernal pool-affiliated species (San Diego button celery, California Orcutt grass, San Diego mesa mint, Otoy mesa mint, thread-leaved brodiaea, vernal pool fairy shrimp, San Diego fairy shrimp, and Riverside fairy shrimp) that have suitable habitat within the Survey Area only, and three species (Otoy tarplant, spreading navarretia, and Dulzura pocket mouse) that have suitable habitat in

TABLE B-1B
COVERED SPECIES HABITAT ANALYSIS

Scientific Name	Common Name	Upland Habitats Tier I																		
		Chaparral I			Coastal		Coniferous Forest I		Grasslands I	Oak Woodland and Forest						Coastal Sage-Scrub I				
Covered		Northern Mixed Chaparral (Mañic)	Southern Maritime Chaparral	Southern Mixed Chaparral (Mañic)	Open Beach	Southern Foredunes	Southern Interior Cypress Forest	Torrey Pine Forest	Native Grassland (Valley and Foothill Needle Grassland)	Black Oak Forest	Black Oak Woodland	Coast Live Oak Forest	Coast Live Oak Woodland	Engelmann Oak Forest (Dense Engelmann Oak Woodland)	Engelmann Oak Woodland (Open Engelmann Oak Woodland)	Mixed Oak Woodland	Alluvial Fan Scrub	Maritime Succulent Scrub	Riverside Alluvial Fan Scrub	Southern Coastal Bluff Scrub
Plants																				
<i>Acanthomintha ilicifolia</i>	San Diego thorn-mint	X	X	X													X	X	X	X
<i>Adolphia californica</i>	California adolphia																			
<i>Ambrosia pumila</i>	San Diego ambrosia								X									X	X	X
<i>Baccharis vanessae</i>	Encinitas baccharis		X	X																
<i>Brodiaea filifolia</i>	Thread-leaved brodiaea																			
<i>Brodiaea orcuttii</i>	Orcutt's brodiaea																			
<i>Calochortus dunnii</i>	Dunn's mariposa lily	X		X					X											
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	X		X																
<i>Centromadia parryi</i> ssp. <i>australis</i>	Southern tarplant								X									X		
<i>Centromadia pungens</i> ssp. <i>laevis</i>	Smooth tarplant																			
<i>Deinandra conjugens</i>	Otay tarplant								X											
<i>Dudleya variegata</i>	Variegated dudleya	X	X	X					X									X	X	X
<i>Dudleya viscida</i>	Sticky-leaved dudleya																	X	X	X
<i>Eryngium aristulatum</i> var. <i>parishii</i>	San Diego button-celery																			
<i>Ferocactus viridescens</i>	San Diego barrel cactus		X	X														X	X	X
<i>Iva hayesiana</i>	San Diego marsh-elder																			
<i>Monardella hypoleuca</i> ssp. <i>lanata</i>	Felt-leaved monardella	X	X	X																
<i>Monardella viminea</i>	Willow monardella																			
<i>Mulla clevelandii</i>	San Diego goldenstar	X	X	X														X	X	X
<i>Navarretia fossalis</i>	Spreading navarretia																			
<i>Nolina cismontana</i>	Chaparral nolina																			
<i>Pogogyne abramsii</i>	San Diego mesa mint																			
<i>Pogogyne nudiuscula</i>	Otay Mesa mint																			
<i>Quercus dumosa</i>	Nuttall's scrub oak		X																	
<i>Salvia munzii</i>	Munz's sage		X	X														X	X	X
<i>Tetracoccus dioicus</i>	Parry's tetracoccus																			
Invertebrates																				
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp																			
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp																			
<i>Euphyes vestris harbisoni</i>	Dun skipper	X	X	X						X	X	X	X	X	X	X				
<i>Lycaena hermes</i>	Hermes copper butterfly	X	X	X																
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	X	X	X					X								X	X	X	X
Reptiles																				
<i>Bufo californicus</i>	Arroyo toad																			
<i>Spea (=Scaphiopus) hammondii</i>	Western spadefoot								X											
<i>Actinemys marmorata pallida</i>	Southern Pacific (Southwestern) pond turtle																			
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Aspidoscelis hyperythra beldingi</i>	Belding's orange-throated whiptail	X	X	X														X	X	X
<i>Aspidoscelis tigris stejnegeri</i>	Coastal (western) whiptail	X	X	X			X	X		X	X	X	X	X	X	X	X	X	X	X
<i>Coleonyx variegates abbottii</i>	San Diego banded gecko	X	X	X													X	X	X	X
<i>Phrynosoma coronatum blainvillii</i>	Coast (San Diego horned) lizard						X	X		X	X	X	X	X	X	X	X	X	X	X
<i>Lichanura trivirgata roseofusca</i>	Coastal rosy boa	X	X	X													X	X	X	X
<i>Diadophis punctatus similis</i>	San Diego ring-neck snake	X	X	X													X	X	X	X

TABLE B-1B
COVERED SPECIES HABITAT ANALYSIS

Common Name	Wetland Habitats														Aquatic, Freshwater III		Tier III Riparian (Disturbed)								
	Aquatic, Marine I	Riparian I					Tier I				Wetland I					Aquatic, Freshwater II	Aquatic, Marine II	Tier II Riparian II			Wetland II		Aquatic, Freshwater III		Tier III Riparian (Disturbed)
Covered	Saltpan/Mudflats	Southern Arroyo Willow Riparian Forest	Southern Coast Live Oak Riparian Forest	Southern Cottonwood-Willow Riparian Forest	Southern Sycamore Woodland	Southern Sycamore-elder Riparian Woodland	White Alder Riparian Forest	Alkali wetlands (Alkali Seep Alkali Marsh, Cismontane Alkali Marsh)	Alkali Vernal Pools	Montane Meadow	San Diego Mesa Claypan Vernal Pools	San Diego Mesa Hardpan Vernal Pools	Southern Coastal Salt Marsh	Vernal Lake	Open Freshwater (Freshwater, Open Water, Water)	Open Saltwater (Bays, Estuarine, Subtidal)	Arrowweed Scrub	Mule Fat Scrub	Southern Willow Scrub	Freshwater Meadow or Seep	Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland)	Non-vegetated Floodplain or Channel	Arundo Scrub	Tamarisk Scrub	
San Diego thorn-mint																									
California adolphia																									
San Diego ambrosia										X	X		X				X	X	X	X					
Encinitas baccharis																									
Thread-leaved brodiaea										X	X		X												
Orcutt's brodiaea										X	X		X							X					
Dunn's mariposa lily																									
Lakeside ceanothus																									
Southern tarplant							X	X												X	X				
Smooth tarplant		X	X	X	X	X	X	X									X	X	X	X					
Otay tarplant																									
Variagated dudleya																									
Sticky-leaved dudleya																									
San Diego button-celery											X	X		X											
San Diego barrel cactus																									
San Diego marsh-elder																	X	X	X			X			
Felt-leaved monardella																									
Willow monardella																		X	X						
San Diego goldenstar																									
Spreading navarretia							X	X		X	X		X												
Chaparral nolina																									
San Diego mesa mint											X	X		X											
Otay Mesa mint											X	X		X											
Nuttall's scrub oak																									
Munz's sage																									
Parry's tetracoccus																									
San Diego fairy shrimp											X	X		X											
Riverside fairy shrimp											X	X		X											
Dun skipper		X	X	X	X	X	X																		
Hermes copper butterfly																									
Quino checkerspot butterfly							X	X	X	X	X														
Arroyo toad		X	X	X	X	X	X										X	X	X			X		X	
Western spadefoot																	X	X	X						
Southern Pacific (Southwestern) pond turtle													X	X						X	X				
Coronado skink							X													X					
Belding's orange-throated whiptail		X	X	X	X	X	X										X	X	X						
Coastal (western) whiptail		X	X	X	X	X	X																		
San Diego banded gecko																									
Coast (San Diego horned) lizard																									
Coastal rosy boa																									
San Diego ring-neck snake			X																						

TABLE B-1B
COVERED SPECIES HABITAT ANALYSIS

Scientific Name	Common Name	Upland Habitats Tier I																		
		Chaparral I			Coastal		Coniferous Forest I		Grasslands I	Oak Woodland and Forest						Coastal Sage-Scrub I				
		Northern Mixed Chaparral (Mañic)	Southern Maritime Chaparral	Southern Mixed Chaparral (Mañic)	Open Beach	Southern Foredunes	Southern Interior Cypress Forest	Torrey Pine Forest	Native Grassland (Valley and Foothill Needle Grassland)	Black Oak Forest	Black Oak Woodland	Coast Live Oak Forest	Coast Live Oak Woodland	Engelmann Oak Forest (Dense Engelmann Oak Woodland)	Engelmann Oak Woodland (Open Engelmann Oak Woodland)	Mixed Oak Woodland	Alluvial Fan Scrub	Maritime Succulent Scrub	Riversidean Alluvial Fan Scrub	Southern Coastal Bluff Scrub
<i>Crotalus ruber ruber</i>	(Northern) red diamond rattlesnake	X	X	X													X	X	X	X
Birds																				
<i>Athene cunicularia hypugaea</i>	Western burrowing owl								X											
<i>Empidonax traillii extimus</i>	Southwestern willow flycatcher																			
<i>Lanius ludovicianus</i>	Loggerhead shrike	X	X	X														X	X	
<i>Vireo belli pusillus</i>	Least Bell's vireo																			
<i>Eremophila alpestris californica</i>	California horned lark																			
<i>Campylorhynchus brunneicapillus sandiegensis</i>	San Diego cactus wren																	X		
<i>Poliotila californica californica</i>	Coastal California gnatcatcher																	X	X	X
<i>Dendroica petechia brewsteri</i>	Yellow warbler																			
<i>Icteria virens</i>	Yellow-breasted chat																			
<i>Amphispiza belli belli</i>	Bell's sage sparrow	X	X	X													X	X	X	X
<i>Aimophila ruficeps canescens</i>	Southern California rufous-crowned sparrow																X	X	X	X
<i>Ammodramus savannarum</i>	Grasshopper sparrow								X											
<i>Agelaius tricolor</i>	Tricolored blackbird																			
Mammals																				
<i>Lepus californicus bennettii</i>	San Diego black-tailed jackrabbit								X								X			
<i>Dipodomys stephensi</i>	Stephens' kangaroo rat								X											
<i>Perognathus longimembris brevinasus</i>	Los Angeles pocket mouse																X			
<i>Chaetodipus californicus femoralis</i>	Dulzura pocket mouse	X	X	X																
<i>Chaetodipus fallax fallax</i>	Northwestern San Diego pocket mouse	X	X	X																
<i>Onychomys torridus ramona</i>	Southern grasshopper mouse	X	X	X													X		X	
<i>Neotoma lepida intermedia</i>	San Diego woodrat	X	X	X														X	X	X
<i>Felis concolor</i>	Mountain lion	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Major Amendment Species																				
<i>Allium munzii</i>	Munz's onion																			
<i>Orcuttia californica</i>	California Orcutt grass																			
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp																			

TABLE B-1B
COVERED SPECIES HABITAT ANALYSIS

Common Name	Coniferous Forest II		Tier II Coastal Sage-Scrub II					Sage-Scrub, Montane /Trans-montane	Upland Habitats Tier III								Grasslands III	Agricultural				Tier IV Disturbed/Developed			Exotic Landscapes					
	Big Cone Spruce-Canyon Oak Forest	Mixed Coniferous Forest	Coastal Sage-Chaparral Scrub	Coastal Sage Scrub (Diegan)	Coastal Sage Scrub (Inland)	Flat-topped Buckwheat Scrub	Riverside Sage Scrub		Big Sagebrush Scrub (Great Valley)	Ceanothus crassifolius Chaparral	Chamise Chaparral (Granitic Chamise chaparral)	Interior Live Oak Chaparral	Northern Mixed Chaparral	Northern Mixed Chaparral (Granitic)	Scrub Oak Chaparral	Southern Mixed Chaparral		Southern Mixed Chaparral (Granitic)	Montane Chaparral	Redshank Chaparral	Non-Native Grassland	General Agriculture	Extensive Agriculture (Row Crops, Pastures)	Intensive Agriculture (Dairies, Nurseries, Chicken Ranches)	Orchards and Vineyards	Bare Ground	Disturbed	Urban/Developed Land	Eucalyptus/Non-native woodland	Ornamental
(Northern) red diamond rattlesnake			X	X	X	X	X	X		X																				
Western burrowing owl					X		X												X	X										
Southwestern willow flycatcher																														
Loggerhead shrike					X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Least Bell's vireo																														
California horned lark																			X	X										
San Diego cactus wren			X	X		X																								
Coastal California gnatcatcher			X	X	X	X	X																							
Yellow warbler																														
Yellow-breasted chat																														
Bell's sage sparrow			X	X		X		X	X	X		X	X		X	X														
Southern California rufous-crowned sparrow			X	X	X	X	X	X																						
Grasshopper sparrow																			X											
Tricolored blackbird																														
San Diego black-tailed jackrabbit																			X	X	X	X	X							
Stephens' kangaroo rat																			X	X				X	X					
Los Angeles pocket mouse																			X											
Dulzura pocket mouse																														
Northwestern San Diego pocket mouse			X	X	X	X	X	X	X	X	X	X	X	X	X	X			X											
Southern grasshopper mouse			X	X	X	X	X		X	X		X	X	X	X	X	X	X												
San Diego woodrat			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Mountain lion	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
Major Amendment Species																														
Munz's onion							X												X											
California Orcutt grass																														
Vernal pool fairy shrimp																														

TABLE B-1B
COVERED SPECIES HABITAT ANALYSIS

Common Name	Wetland Habitats														Tier III									
	Aquatic, Marine I	Riparian I					Tier I	Wetland I				Aquatic, Freshwater II	Aquatic, Marine II	Tier II Riparian II			Wetland II	Aquatic, Freshwater III	Riparian (Disturbed)					
	Saltpan/Mudflats	Southern Arroyo Willow Riparian Forest	Southern Coast Live Oak Riparian Forest	Southern Cottonwood-Willow Riparian Forest	Southern Sycamore Woodland	Southern Sycamore-alder Riparian Woodland	White Alder Riparian Forest	Alkali wetlands (Alkali Seep, Alkali Marsh, Cismontane Alkali Marsh)	Alkali Vernal Pools	Montane Meadow	San Diego Mesa Claypan Vernal Pools	San Diego Mesa Hardpan Vernal Pools	Southern Coastal Salt Marsh	Vernal Lake	Open Freshwater (Freshwater, Open Water, Water)	Open Saltwater (Bays, Estuarine, Subtidal)	Arrowweed Scrub	Mule Fat Scrub	Southern Willow Scrub	Freshwater Meadow or Seep	Freshwater Marsh (Coastal and Valley Freshwater Marsh, Emergent Wetland)	Non-vegetated Floodplain or Channel	Arundo Scrub	Tamarisk Scrub
(Northern) red diamond rattlesnake																								
Western burrowing owl																								
Southwestern willow flycatcher		X		X	X	X													X					X
Loggerhead shrike																								
Least Bell's vireo		X	X	X	X	X	X										X	X						
California horned lark																								
San Diego cactus wren																								
Coastal California gnatcatcher																								
Yellow warbler		X	X	X	X	X	X												X					
Yellow-breasted chat		X	X	X	X	X	X										X	X	X					
Bell's sage sparrow																								
Southern California rufous-crowned sparrow																								
Grasshopper sparrow							X	X	X	X	X								X					
Tricolored blackbird							X	X		X	X			X		X	X	X	X	X				
San Diego black-tailed jackrabbit																								
Stephens' kangaroo rat																								
Los Angeles pocket mouse																	X	X	X			X		
Dulzura pocket mouse																								
Northwestern San Diego pocket mouse																								
Southern grasshopper mouse										X														
San Diego woodrat																								
Mountain lion		X	X	X	X	X	X										X	X	X					
Major Amendment Species																								
Munz's onion																								
California Orcutt grass										X	X		X											
Vernal pool fairy shrimp										X	X		X											

TABLE B-1B
COVERED SPECIES HABITAT ANALYSIS

Scientific Name	Common Name	Upland Habitats Tier I																		
		Chaparral I			Coastal		Coniferous Forest I		Grasslands I	Oak Woodland and Forest						Coastal Sage-Scrub I				
	Not Covered	Northern Mixed Chaparral (Mañic)	Southern Maritime Chaparral	Southern Mixed Chaparral (Mañic)	Open Beach	Southern Foredunes	Southern Interior Cypress Forest	Torrey Pine Forest	Native Grassland (Valley and Foothill Needle Grassland)	Black Oak Forest	Black Oak Woodland	Coast Live Oak Forest	Coast Live Oak Woodland	Engelmann Oak Forest (Dense Engelmann Oak Woodland)	Engelmann Oak Woodland (Open Engelmann Oak Woodland)	Mixed Oak Woodland	Alluvial Fan Scrub	Maritime Succulent Scrub	Riversidean Alluvial Fan Scrub	Southern Coastal Bluff Scrub
Plants																				
<i>Arctostaphylos rainbowensis</i>	Rainbow manzanita			X																
<i>Ceanothus verrucosus</i>	Wart-stemmed ceanothus		X	X																
<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>	Summer holly			X																
<i>Cordylanthus orcuttianus</i>	Orcutt's bird's-beak																			
<i>Cylindropuntia californica</i> var. <i>californica</i>	Snake cholla																			
<i>Ericameria palmeri</i> ssp. <i>palmeri</i>	Palmer's goldenbush		X																	
<i>Githopsis diffusa</i> ssp. <i>filicaulis</i>	Mission Canyon bluecup	X	X	X																
<i>Hazardia orcuttii</i>	Orcutt's hazardia																			
<i>Lepechinia cardiophylla</i>	Heart-leaved pitcher sage	X	X	X						X	X	X	X	X						
<i>Myosurus minimus</i> ssp. <i>apus</i>	Little mousetail																			
<i>Navarretia prostrata</i>	Prostrate navarretia																			
<i>Packera ganderi</i>	Gander's ragwort																			
<i>Quercus engelmannii</i>	Engelmann oak													X	X	X				
<i>Satureja chandleri</i>	San Miguel savory	X		X						X	X	X	X	X	X	X				
Reptiles																				
<i>Thamnophis hammondi</i>	Two-striped garter snake																X	X	X	X
Birds																				
<i>Pelecanus occidentalis californicus</i>	California brown pelican				X	X														
<i>Elanus leucurus</i>	White-tailed kite						X	X	X	X	X	X	X	X	X	X				
<i>Circus cyaneus</i>	Northern harrier								X											
<i>Aquila chrysaetos</i>	Golden eagle								X								X	X	X	X
<i>Haliaeetus leucocephalus</i>	Bald eagle																			
<i>Accipiter cooperii</i>	Cooper's hawk						X	X	X	X	X	X	X	X	X	X				
<i>Falco peregrinus anatum</i>	American peregrine falcon						X	X	X	X	X	X	X	X	X	X				
<i>Asio otis</i>	Long-eared owl						X		X	X	X	X	X	X	X	X				

Notes:
"X" indicates potential suitable habitat

the Survey Area and PIZ, but none of these 11 species were determined to be impacted by the identified footprints of the Planned Projects (Appendix C of the Plan). Because the vegetation community impact projections for Future Project and O&M impacts were based on the identified Planned Projects' impacts over the 20-year CIP time frame (excluding the specific Pipeline 6 alternative impacts), the impact projections for those species do not reflect the real potential for impacts from the future Covered Activities. These potential impact acres are not reflected in Tables 5-3 and 6-8 for vernal pool species, but would be within the projected future wetland habitat impacts (32.8 acres as specified in those tables). That is, the total future impacts to wetland habitats will remain at 32.8 acres. As future Covered Activities are implemented, the specific acres of impacts may change, with a limited amount of the 32.8 acres being vernal pool habitat, as described below.

The Water Authority projects that potential Future Projects/O&M could impact up to 183 acres of all the sensitive habitats within the Survey Area. All of the above species have potential habitat within the Survey Area, and although the Water Authority's vernal pool and narrow endemic policies will strive to avoid or minimize impacts to these species, some take is likely to occur over the 55-year term. To address the potential for impacts/take by the Future Activities for these species, the Plan assumes that up to five acres of impacts could occur to vernal pool habitat, which includes the ponded surface area and associated watersheds, supporting the nine vernal pool/vernal pool-associated species (including spreading navaretia), and up to 10 acres of impacts could occur to occupied habitats supporting Otay tarplant and Dulzura pocket mouse.

The potential impacts to vernal pools (including their watersheds) reflect the vernal pool and narrow endemic policies that direct Covered Activities to avoid and minimize impacts and, based on a review of Water Authority vernal pool impacts over the past 10 years, future Covered Activities would likely not impact more than that. The Planned Project footprints (Appendix J) do not impact vernal pools.

The Plan provides assurance that habitat credits would be available to address the projected habitat acreage impacts from Planned and Future Covered Activities. For certain vegetation communities (e.g., Coastal Sage Scrub II and Chaparral III), the Preserve Area currently have sufficient credits to meet the projected need during the Permit term (see Tables 6-9 through 6-14 in the Plan). If the Preserve Area do not currently provide the credits (acres), then the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations (see Section 6.5.1.1, Stay Ahead Commitment, of the Plan).

1.2.2 Adding Covered Species

In order to elevate a species considered in the analysis but not currently proposed for coverage to Covered Species status under the Plan, a Major Amendment to the Plan

would be required (see Section 8.3.1 of the Plan) and one or more of the conservation options below must be established. At the time of the Major Amendment process, any additional management actions required to avoid, minimize, or mitigate impacts to the species would be identified.

Conservation Options for species not proposed for coverage by the Plan:

1. Demonstrate that adequate suitable habitat already exists (either occupied or not) within the Preserve Area to justify coverage.
2. Acquire additional habitat with known Covered Species' occurrences or the potential to support the species with suitable occupiable habitat. Suitable habitat should have enhancement or restoration potential and should be biologically viable for the species' persistence. Such habitat must be added to the Plan's Preserve Area and managed and monitored in perpetuity consistent with this Plan.
3. Restore and/or enhance habitat within the Plan Area's existing mitigation lands/Preserve Area. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
4. Contribute funds to other regional conservation efforts or species-specific management programs.
5. Implement a biologically superior conservation alternative for the species at appropriate locations within the Plan Area.
6. Propagate species for reintroduction and/or introduction into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.
7. Salvage and relocate species into suitable, occupiable habitat in accordance with a Wildlife Agency-approved restoration and monitoring program.
8. Purchase mitigation bank credits within established mitigation banks that support and provide active management for the species.

1.2.1 Sensitive Status Definitions

1.2.1.1 Federal Designations

Species listed as endangered by the USFWS are in danger of extinction throughout all or a significant portion of their range other than a species of the Class Insecta determined by the Secretary of the Interior to constitute a pest whose protection under

the provisions of this Act would present an overwhelming and overriding risk to man (Section 3(6) of the Endangered Species Act).

Species listed as threatened by the USFWS are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (Section 3(19) of the Endangered Species Act).

1.2.1.2 State Designations

Species classified as endangered by the California Fish and Game Commission are taxa that are in serious danger of becoming extinct throughout all, or a significant portion, of their range due to one or more causes, including loss of habitat, change in habitat, over exploitation, predation, competition, or disease (Section 2062 of the Fish and Game Code).

Species classified as threatened by the California Fish and Game Commission are taxa which, although not presently threatened with extinction, are likely to become endangered species in the foreseeable future (Section 2067 of the Fish and Game Code).

Species of Special Concern are species considered by CDFG to be vulnerable to extinction within California due to declining populations, loss of habitat, limited ranges, and/or continuing threats. It is the responsibility of CDFG to maintain viable populations of all native species. The goal of designating species as Species of Special Concern is to halt or reverse their decline by calling attention to their plight and addressing the issues of concern early enough to secure their long term viability. Not all Species of Special Concern have declined equally; some species may be just starting to decline, while others may have already reached the point where they meet the criteria for listing as threatened or endangered under the State and/or Federal Endangered Species Acts.

California Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except for collecting these species for necessary scientific research. Lists of fully protected species can be found in Fish and Game Code Sections 3511, 4700, 5050, and 5515.

California Rare species are taxa which, although not presently threatened with extinction, are present in such small numbers throughout their range that they may become endangered if the present environment worsens (Section 1901 of the Fish and Game Code).

1.2.1.3 California Native Plant Society

California Native Plant Society list definitions are as follows:

- List 1A species are presumed to be extinct in the State of California.
- List 1B species are rare, threatened, or endangered in California and elsewhere. These are species eligible for State listing.
- List 2 species are rare, threatened, or endangered in California but more common elsewhere and are eligible for State listing.
- List 3 species require additional information as distribution, endangerment, and/or taxonomic information is needed.
- List 4 species are watchlist species that have limited distributions and are species that require monitoring for changes in the status of their populations.

1.3 Covered Species Analysis Summary

Each of the species evaluations included in this appendix is organized using the following standardized format and content.

1.3.1 Species Name and Conservation Status

The header block for each species includes the common and scientific name, along with the federal, state, and CNPS rank (for plant species), and coverage under the Water Authority Plan as Covered or not proposed for coverage (Not Covered). It also identifies specific conservation policies that apply for the species (i.e., Narrow Endemic and/or Vernal Pool Protection policies).

1.3.2 Background

This section summarizes biological information pertinent to conservation planning and management for the species, including its distribution, abundance, and population trends; threats to the species and factors limiting its abundance; and special considerations for conserving, monitoring, and managing the species. Examples of special considerations might include information on the species responses to fire, difficulties in surveying for the species, species dispersal abilities, use of corridors, or susceptibility to non-native predators.

1.3.3 Conservation Analysis

This section summarizes the impact (take) and conservation levels expected for Covered Species based on the calculation methods and assumptions described above, including presence within the Survey Area and Preserve Area, potential impacts to the

species, and effects on population viability and species recovery. As noted on Table B-1A, although no habitat occurs within HMAs based on habitat association projections, species may be expected or known to occur based on observations on or near the Preserve Area. Where information about species' locations and populations or available habitat is available from surveys or reports for the Preserve Area, additional information is provided to supplement the habitat calculations and analysis presented in Table B-1A.

- For most species, one or more calculations summarize the presence of a species within the Survey Area, the PIZ, and Preserve Area, the quantified levels of impacts and conservation expected under the Plan, and the potential impacts to the species as a result of Plan implementation. Given the inherent limitations and biases in the biological database, these assessments represent the best available current information, but as Covered Activities are initiated, additional site-specific information will be provided to verify the take and conservation. For example, species localities or point counts may not represent population estimates, and points may be absent from some areas, due to lack of adequate survey data, even when the species occurs there. Given the uncertainties, the conservation calculations often refer to the following general terms:

Potential/Expected to Occur. Used where no point localities have been detected, but there is a reasonable potential for the species to be present based on other available data (e.g., suitable habitat present, point localities nearby in contiguous habitat).

Not Known to Occur. Used where sources indicate that the species has been found in or near the Survey Area, PIZ, and/or Preserve Area, but the data are not in the GIS database.

Not Expected to Occur. Used where no point localities have been identified, and there is a low potential for the species to be present (e.g., no or little suitable habitat, no known localities nearby).

The anticipated impacts to species are based on projected acreage of suitable habitat and known point locations that are expected to be directly and indirectly impacted as a result of Plan implementation. The conservation level to species identifies acreage of suitable or occupied habitat or individual populations (if known) conserved within the Preserve Area, and identifies conservation policies applicable to species.

The effect on population viability and species recovery statement identifies the Water Authority's contribution to the species' regional viability. For example, the Plan cannot by itself prevent extinction or recover many of the species covered by the Plan, but it can promote species persistence within the Plan Area and contribute to the viability of the regional preserve network (i.e., MSCP and MHCP). The Plan primarily contributes to

population viability and recovery of species through the contribution of a core regional Preserve Area, resource management within Water Authority rights-of-way and fee-owned parcels (including control of edge effects and habitat degradation), and protection of species within the Plan Area in accordance with species specific measures. Water Authority lands represent significant blocks of habitat within the regional MSCP preserve design and provide important habitat cores for some species as well as create local and regional habitat linkages for others. This Plan has played an important role in the MSCP preserve assembly and has the potential to make significant contributions to population viability and recovery for species covered by the Plan.

1.3.4 Conditions for Coverage

This section summarizes the conditions required for Covered Species. The Water Authority developed conservation policies related to all Covered Species, including narrow endemic species and vernal pool species. These policies also include focused breeding dates for avian species, biological buffers for populations, and biologically superior alternatives. In addition to the general conditions described for each species in Section 2.1 below, the Water Authority will strictly adhere to the Plan minimization and mitigation measures as described in Sections 6.4 and 6.5, respectively, of the Plan.

Conservation and mitigation commitments for many of the Covered Species would be provided by the use of habitat credits available at the Preserve Area. For other Covered Species, whose presence has not been documented in the Preserve Area, the Water Authority would be required to meet general conditions, such as demonstration that adequate suitable habitat already exists within the Preserve Area or acquisition additional occupied habitat. For certain species, the Water Authority could contribute funds to other regional conservation efforts or species-specific management programs or propagate species for reintroduction and/or introduction into biologically suitable habitat within the Plan Area (see Section 6.2.2, Conditions for Covered Species Not Documented in the Preserve Area for a full list of conditions).

1.4 Critical Habitat

There is critical habitat designated or proposed for seven plant species and eight wildlife species (including vernal pool fairy shrimp, which is a Major Amendment Species) covered by the Plan. Table B-2 provides a summary of the acres of critical habitat within the PIZ and the Plan Area as compared to the total critical habitat designated or proposed for each plant species. Figures B-17 through B-22 in Attachment B-1 display the location of critical habitat in relation to the Plan Area for San Diego thorn-mint (*Acanthomintha ilicifolia*), San Diego ambrosia (*Ambrosia pumila*), thread-leaved brodiaea (*Brodiaea filifolia*), Otay tarplant (*Deinandra conjugens*), willow monardella (*Monardella viminea*), and spreading navarretia (*Navarretia fossalis*). There is critical

habitat located within the PIZ for San Diego ambrosia, thread-leaved brodiaea, Otay tarplant, and spreading navarretia. There is designated final critical habitat for Munz's onion (*Allium munzii*) within Riverside County; however, critical habitat does not occur within either the PIZ or the Plan Area.

**TABLE B-2
CRITICAL HABITAT FOR COVERED PLANT SPECIES (acres)**

Covered Species	Critical Habitat		Total Critical Habitat
	Within the PIZ	Within the Plan Area	
San Diego thorn-mint <i>Acanthomintha ilicifolia</i>	0	83	671
Munz's onion [‡] <i>Allium munzii</i>	0	0	176
San Diego ambrosia ¹ <i>Ambrosia pumila</i>	76	693	802
Thread-leaved brodiaea <i>Brodiaea filifolia</i>	38	54	597
Otay tarplant <i>Deinandra conjugens</i>	547	6,318	6,330
Willow monardella <i>Monardella viminea</i>	0	73	73
Spreading navarretia ² <i>Navarretia fossalis</i>	118	1,057	6,872

[‡] Major Amendment Species

¹ Proposed critical habitat only.

² Acreages in Table B-2 reflect the area of re-proposed critical habitat. Of the total final critical habitat for spreading navarretia, there are 49 acres designated within the PIZ and 327 acres designated within the Plan Area.

Table B-3 provides a summary of the acres of critical habitat within the PIZ and the Plan Area as compared to the total critical habitat designated or proposed for each wildlife species. Figures B-23 through B-29 in Attachment B-1 display the location of critical habitat in relation to the Plan Area for San Diego fairy shrimp, Riverside fairy shrimp, Quino checkerspot butterfly, arroyo toad, southwestern willow flycatcher, least Bell's vireo, and coastal California gnatcatcher. There is designated final critical habitat for vernal pool fairy shrimp within Riverside County; however critical habitat does not occur within either the PIZ or the Plan Area.

**TABLE B-3
CRITICAL HABITAT FOR COVERED WILDLIFE SPECIES (acres)**

Covered Species	Critical Habitat		Total Critical Habitat
	Within the PIZ	Within the Plan Area	
Invertebrates			
Vernal pool fairy shrimp [‡] <i>Branchinecta lynchi</i>	0	0	597,821
San Diego fairy shrimp <i>Branchinecta sandiegonensis</i>	46	2,854	3,085
Riverside fairy shrimp <i>Streptocephalus woottoni</i>	0	25	306
Quino checkerspot butterfly <i>Euphydryas editha quino</i>	997	23,499	62,125
Amphibians			
Arroyo toad ¹ <i>Anaxyrus (=Bufo) californicus</i>	768	20,260	109,110
Birds			
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	147	3,326	120,824
Least Bell's vireo <i>Vireo bellii pusillus</i>	459	11,258	38,000
Coastal California gnatcatcher <i>Polioptila californica californica</i>	5,372	58,984	197,303

[‡] Major Amendment Species.

¹ Acreages in Table B-2 reflect the area of re-proposed critical habitat. Of the total final critical habitat for arroyo toad, there is no critical habitat designated within the PIZ or Plan Area.

With the exception of the Tijuana River Valley HMA and the San Luis Rey River Valley HMA, the proposed locations of the Planned Projects are not expected to impact critical habitat for any Covered Species. Current areas of critical habitat at the Tijuana River Valley HMA and the San Luis Rey River Valley HMA include disturbed habitat and former agricultural lands, respectively. The two wetland creation projects are expected to improve the areas of critical habitat affected by the restoration work. The locations of Future Projects have not been determined, but the Plan will attempt to avoid and minimize impacts to any critical habitat through the planning process described in Section 6.0 of the Plan. Any unavoidable impacts to critical habitat will be fully mitigated with comparable value habitat by permanently protecting unprotected critical habitat, acquiring and/or permanently protecting essential habitat, restoring/creating additional suitable habitat, or other actions that provide those habitat values.

2.0 Conservation Policies

2.1 Conditions for Coverage

The following general measures will apply to all Covered Species:

1. Conduct pre-activity surveys within suitable habitat to ensure that Covered Species are adequately addressed by impact avoidance, minimization, and mitigation (see Appendix F of the Plan). Surveys must be conducted by an Environmental Surveyor during the appropriate field conditions for detection prior to any proposed impacts in the Plan Area.
2. Avoid and minimize impacts to occupied Covered Species habitat or potential migration and/or dispersal corridors for all new facilities and O&M Activities of existing facilities through project design considerations.
3. Establish a habitat buffer when appropriate and feasible around covered plant species populations to support the natural suite of pollinators unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. Fence and/or flag Covered Species populations and sensitive habitat in or adjacent to work areas. Where necessary, install signage to prohibit access and/or flag areas being restored or protected for their biological value.
5. Avoid driving or parking on sensitive and/or occupied habitat by keeping vehicles on roads and in designated staging areas.
6. Deter unauthorized activities (such as trampling and off-road vehicle use) and perform litter abatement, including proper disposal of illegally dumped materials, as part of routine patrol of access roads.
7. Monitor encroachment of non-native and invasive species into Covered Species populations and perform weed abatement as needed to improve the habitat.
8. Stabilize work areas to control erosion or sedimentation problems when working near Covered Species populations within the Plan Area. Populations within or adjacent to work areas would be protected from vehicular traffic, excessive foot traffic, or other activities that result in soil surface disturbance.
9. Control dust when working near Covered Species populations and/or habitat in accordance with applicable regulations.

10. All identified populations of Covered Species within rights-of-ways must be managed to control edge effects to the maximum extent possible (see Sections 6.4 and 6.5 of the Plan).
11. Any restoration and monitoring program prepared as a component of the mitigation plan for impacts to a Covered Species shall include, but not be limited to, species propagation ratios, restoration site selection and assessment, site preparation, implementation strategies, weed control procedures, required management and monitoring in perpetuity, funding commitment, and reporting procedures. The program would be prepared in advance of project impacts and approved by the Wildlife Agencies.
12. Any planting stock used shall be inspected by an Environmental Surveyor to ensure that it is free of pest species that may invade natural areas, including, but not limited to, Argentine ants (*Iridomyrmex humii*), fire ants (*Solenopsis invicta*), and other pests. Any planting stock that is infested would not be allowed within restoration areas or within 300 feet of native areas unless documentation is provided to the Wildlife Agencies that these pests already occur in the native areas around the project site. The stock would be quarantined, treated, or disposed of according to best management principles by qualified experts in a manner that precludes invasions into native habitat. Runoff from mitigation sites in native habitat would be minimized and managed.
13. To the maximum extent possible, conduct Covered Activities occurring within wetland habitats during the dry season when flows are at their lowest or non-existent to minimize impacts to aquatic species and/or habitats.
14. Reseed temporary impact areas with an appropriate native seed mix (as discussed in Section 6.5.1.4.2, Permanent and Temporary Impacts, of the Plan) and allow for natural recolonization of the area by adjacent populations.
15. For new facilities adjacent to native habitat, minimize ornamental landscaping or irrigation not associated with native habitat restoration.
16. Collection of covered plant and wildlife species by Water Authority personnel and contractors is prohibited.
17. Maintain and manage dispersal/movement corridors within the Plan Area that contribute to long-term population viability (see Section 4.5, Habitat Linkages and Wildlife Corridors and Figure 4-3, Conceptual Habitat Linkages in NCCP/HCP Plan Area, of the Plan).
18. The use of outdoor lighting within or adjacent to potential Covered Species habitat will be discouraged. If lighting must be used for reasons of safety and

security, light sources would be shielded away from habitat and only low pressure sodium lighting would be used.

In addition to the general Conditions for Coverage above, species-specific conditions are listed for all species that the Water Authority is requesting coverage for under the Plan.

Where a general or species-specific condition requires concurrence from the Wildlife Agencies, the Wildlife Agencies will make their best efforts to provide their concurrence or comments within 60 days or as soon as possible based on their respective staffing and work priorities. In the event that the Wildlife Agencies issue a statement of nonconcurrence, the Water Authority will be provided with specific recommendations on how concurrence can be achieved.

2.2 Narrow Endemic Policy and Vernal Pool Protection Policy

Habitat-based protection and mitigation measures are also applicable in accordance with Sections 6.5.1.6 for narrow endemics and 6.7.3 for vernal pools in the Plan. In addition, the Water Authority will attempt to use tunneling and facility location and design planning to avoid vernal pools/vernal pool habitat to the maximum extent feasible. If off-site mitigation is required, then the Water Authority will attempt to acquire property that has suitable potential vernal pool enhancement/restoration (or creation) habitat, preferably property that is near existing vernal pools.

2.3 Avian Breeding Season Policy

Breeding season dates may be modified to reflect the species known or expected to occur on the specific site. For the purposes of Plan implementation, the following general breeding season dates shall be used: January 15 to July 31 for raptor species; March 15 to September 15 for riparian species; and February 15 to August 15 for upland species (Section 6.4.2.1 of the Plan).

2.4 Buffers

Species-specific buffer requirements are identified as needed for Covered Species (including three Major Amendment Species) in Sections 3.0 Covered Plants, 4.0 Covered Invertebrates, 5.0 Covered Amphibians, 6.0 Covered Reptiles, 7.0 Covered Birds, and 8.0 Covered Mammals. Species-specific buffer requirements are identified as needed for non-Covered Species in Sections 9.0 Non-Covered Plants, 10.0 Non-Covered Reptiles, and 11.0 Non-Covered Birds. In the event that the buffer criteria for a

species cannot be achieved at a particular project site, the Water Authority would design and implement alternative compensatory measures during project development to achieve the same or superior level of protection. Any deviations from management actions would be performed in consultation with the Wildlife Agencies and described in the annual report.

In addition, specific buffer requirements may be reduced on a project-by-project basis as appropriate, in consultation with the Wildlife Agencies, based on site considerations such as, but not limited to: extant decibel conditions, topography, vegetative structure, or presence of physical barriers.

2.5 Biologically Superior Alternatives

In the event that an alternative species specific management action should be identified and developed that the Water Authority and Wildlife Agencies deem biologically equivalent or superior, that alternative may be implemented in lieu of otherwise identified Plan management measures.

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3.0 Covered Plants

3.1 San Diego Thorn-mint (*Acanthomintha ilicifolia*)

USFWS: Threatened; Proposed Critical Habitat

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.1.1 Background

Distribution, Abundance, and Trends. San Diego thorn-mint is restricted in distribution to San Diego County and northern Baja California, Mexico (Reiser 2001). An estimated 52 historic populations of this species are known in San Diego County, of which 32 populations are extant (USFWS 1998a). The USFWS (1998a) estimates that these 32 populations support 150,000 to 170,000 individuals and occupy a total of approximately 400 acres. Known populations of San Diego thorn-mint are typically small and known to occur historically or currently in various locales throughout San Diego County. Some of the various locations of thorn-mint populations include Mission Trails Regional Park, Poggi Canyon (Chula Vista), several locations near the summit of McGinty Mountain, and in Alpine. Other locations include Poway, La Mesa near the Sweetwater River, in and around the Lower Otay Reservoir in Rancho Jamul, Chula Vista, Encinitas, Carlsbad, Vista, Olivenhain, San Vicente Valley, Rancho Bernardo, Sycamore and Slaughterhouse Canyons, and in and around Lakeside. Herbarium specimens at the SDNHM record occurrences near vernal pools in San Marcos, in the Merriam Mountains, on Poser Mountain, and at La Mesa Springs.

Grassy openings in the chaparral or sage scrub with friable or broken clay soils are the preferred habitat for this species. These small clay lenses may be associated with Las Posas or San Miguel-Exchequer soils. Typically, the microhabitat favored by San Diego thorn-mint is distinctive. Only spring annuals, bulbous perennials, and a few herbaceous elements are found with this small but colorfully flowering annual. The introduced tecolote (*Centaurea melitensis*) often grows with the thorn-mint; their similar seedlings can often be confused with San Diego thorn-mint seedlings. Occupied sites have a crumbly and/or deeply fissured soil that noticeably compresses when pressure is applied (Reiser 2001).

Critical Habitat. Critical habitat for San Diego thornmint was designated on 671 acres in San Diego County in August 2008 (USFWS 2007a). A total of 83 acres of critical habitat occur within the Plan Area; no critical habitat is present within the PIZ (see Table B-2).

Threats and Limiting Factors. Threats to this species include cumulative habitat loss and degradation, trampling, vehicular traffic and road construction, general development, illegal dumping, livestock grazing, invasive and exotic plants, collecting, edge effects, and possible genetic isolation.

Special Considerations. San Diego thorn-mint is an annual plant that may exhibit yearly fluctuations in population size and location (SANDAG 2000) due to specific climatic conditions. This species may be difficult to detect in the fall and winter unless one is familiar with its distinctive microhabitat, although these tiny plants remain rigid and retain their distinctive shape well into the dry season. This species is susceptible to fire damage and soil surface disturbance. While this annual can be raised from seed, suitable friable clay microhabitats are quite uncommon and place strict limitations on establishment of new populations. Additionally this species may rely in part on wildlife species for seed dispersal.

3.1.2 Conservation Analysis

Presence within Survey Area, PIZ, and Preserve Area.

Survey Area

According to the CNDDDB and the SDNHM specimen records, San Diego thorn-mint is known from 40 occurrences within Survey Area. There are known populations of San Diego thorn-mint within the Survey Area at the following locations: north of Vista (Attachment 1, Figure B-5), a large cluster of populations north of San Marcos Lake in San Marcos (Attachment 1, Figure B-6), east of the I-15 in Rancho Bernardo (Attachment 1, Figure B-10), Rancho Penasquitos (Attachment 1, Figure B-10), along SR-67 west of the San Vicente Reservoir (Attachment 1: Figure B-11, B-12), east of Clairemont Mesa (Attachment 1, Figure B-12), a cluster of populations near Lake Murray (Attachment 1, Figure B-14), and near the Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

Of the 40 occurrences of San Diego thorn-mint within the Survey Area, the CNDDDB and the SDNHM specimen records list 8 occurrences within the PIZ. Known populations of San Diego thorn-mint within the PIZ occur at the following locations: north of San Marcos Lake (Attachment 1, Figure B-6), east of the I-15 on Rancho Bernardo Road (Attachment 1, Figure B-10), south of Los Penasquitos Creek (Attachment 1, Figure B-

10), east of San Vicente Reservoir (Attachment 1, Figure B-11), east of Clairemont Mesa (Attachment 1, Figure B-12), and near Lake Murray (Attachment 1, Figure B-14).

Preserve Area

Although no recorded occurrences of San Diego thorn-mint have been documented within the Preserve Area, Rancho Cañada HMA has suitable habitat and San Diego thorn-mint may occur there (Attachment 1, Figure B-11; TNC 2006). This species also has the potential to occur within the Manchester HMA, which is within proposed critical habitat for this species (EDAW 2004).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. The Gooden Ranch population within the Plan Area along the Second Aqueduct was estimated at 30 plants in 1994 (State of California 2007a). This population has been historically avoided within the aqueduct rights-of-way through the use of jack and bore construction methods. The San Marcos population has not been censused since 1986, when the population was estimated at 25 plants; the occurrence record notes the aqueduct adjacent to the population (State of California 2007a). There is potentially suitable habitat for this species within Rancho Cañada HMA adjacent to a known population off-site. If a population is located and/or introduced within a Preserve Area, mitigation credits may be established for use by the Water Authority. If extant populations of San Diego thorn-mint cannot be found within the Preserve Area, other mitigation options, such as habitat enhancement and species restoration, will be pursued.

In summary, the preferred habitat type for San Diego thorn-mint is grassy openings in chaparral or sage scrub with friable or broken clay soils. Based on the preferred habitat, this species could occur in the Plan Area in chaparral and coastal sage scrub (see Table B-1B). There are 18,024 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities. see Table B-1A). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Currently, critical habitat for this species is located within the Plan Area, but not the PIZ. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a biologically equivalent or superior alternative standard.

Based on available data on populations within or adjacent to the Plan Area, a total of approximately 55 plants have the potential to be directly or indirectly affected by covered projects. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Diego thorn-mint in the Plan Area by conserving contiguous blocks of suitable habitat on which this species has the potential to occur or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.1.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Encroachment of non-native species will be minimized by limiting soil disturbance within 50 feet of San Diego thorn-mint populations.
4. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of San Diego thorn-mint. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once San Diego thorn-mint has been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known San Diego thorn-mint locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an herbaceous annual, surveys for San Diego thorn-mint shall be conducted during its blooming period (April-June) to ensure proper identification.

3.2 California Adolphia (*Adolphia californica*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Covered

Covered by MSCP: No

3.2.1 Background

Distribution, Abundance, and Trends. California adolphia is found at a variety of coastal San Diego County and Mexico locales (Reiser 2001). Substantial populations occur south of Del Dios near Lake Hodges Dam, near Lake Val Soreno, and in the vicinity of the Sweetwater Reservoir, Mother Miguel Mountain, near Batiquitos Lagoon (Carlsbad), along the Escondido Creek, and in the Peñasquitos Canyon Preserve (near Poway). Populations of California adolphia are also known to occur currently and historically in and around the lakes, rivers, streams, and reservoirs of San Diego County. These areas include the Sweetwater Reservoir near Sunnyside and La Presa, Escondido Creek through Vista, San Vicente Dam, southern Otay Mesa, Otay Valley, the northern portion of the Lower Otay Lake, below the Sweetwater Dam, west of Lake Murray Dam, on Black Mountain near Rancho Peñasquitos, below San Marcos Dam, in Rancho Santa Fe, Camp Pendleton at Moro Hill, near Lake Calavera near Agua Hedionda Creek, between Carlsbad and Rancho Santa Fe through La Costa, and San Dieguito Valley to La Mesa and south to the Otay River.

This short spiny shrub is often intermixed with Diegan coastal sage scrub, but occasionally occurs in peripheral chaparral habitats, particularly hillsides near creeks. The California adolphia is usually associated with xeric locales where shrub canopy reaches four to five feet in height. During late summer and fall it may be virtually leafless and not readily apparent from a distance. However, its spiny stems are noted at close range. The San Miguel and Friant soils are both quite amenable to California adolphia. Presence of California adolphia strongly correlates with presence of the federally threatened coastal California gnatcatcher (*Poliioptila californica californica*).

Threats and Limiting Factors. The primary threat to this species is urban development for residential housing. Additional threats to this species include cumulative habitat loss and degradation, vehicular traffic and road construction, illegal dumping, livestock grazing, invasive and exotic plants, and edge effects.

Special Considerations. This species should be considered for restoration/revegetation projects in suitable habitat.

3.2.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, California adolphia is known from 62 locations within the Survey Area. There are known populations of California adolphia within the Survey Area at the following locations: south of San Marcos (Attachment 1, Figure B-6), near San Marcos Creek (Attachment 1, Figure B-8), around the San Dieguito Reservoir (Attachment 1, Figure B-8), near Lake Hodges (Attachment 1, Figure B-9), a large cluster of populations west of Poway and south-east of Rancho Santa Fe (Attachment 1, Figure B-10), near Lake Murray (Attachment 1, Figure B-14), and near the Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

Of the 62 occurrences of California adolphia within the Survey Area, the CNDDDB and the SDNHM specimen records list 11 occurrences within the PIZ. Known populations of California adolphia within the PIZ occur at the following locations: near Rancho Peñasquitos (Attachment 1, Figure B-10) and near Lake Murray (Attachment 1, Figure B-14)

Preserve Area

California adolphia is present within the Plan Area. These areas include the San Miguel HMA (Attachment 1, Figure B-16; Merkel 1997), the Elfin Forest Reserve (Attachment 1, Figure B-6), and the Montaña Mirador property (Attachment 1, Figure B-10, City of San Diego 2004).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage.

In summary, the preferred habitat type for California adolphia is intermixed with Diegan coastal sage scrub. Adolphia occasionally occurs in peripheral chaparral habitats, particularly hillsides near creeks. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage scrub (see Table B-1B). There are 9,422 acres of this vegetation community within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities as shown in Table B-1A).

According to Table B-1A, the Plan provides 518 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8

in the Plan). As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, information about available habitat from surveys or reports for the Preserve Area is provided to supplement the habitat calculations and analysis presented in Table B-1A. In the case of California adolphia, there is less than an acre of suitable habitat documented at the Preserve Area.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of California adolphia in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.2.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Incorporate California adolphia into the restoration plant palette for upland habitat enhancement, restoration, and/or creation projects, where appropriate.

3.3 Munz's Onion (*Allium munzii*)

USFWS: Endangered, Designated Critical Habitat

CDFG: Threatened

CNPS List: 1B

SDCWA Plan: Major Amendment Species, Narrow Endemic Policy

Covered by MSCP: No

3.3.1 Background

Distribution, Abundance, and Trends. Munz's onion is found only in southwestern Riverside County in 15 populations. This corm grows in the Agua Tibia Wilderness Area, the Gavilan Hills, the eastern flanks of the Santa Ana Mountains, and Lake Elsinore, southeast to Lake Skinner. Valley grasslands in isolated rocky outcrops and grassy openings in Riversidian sage scrub are the typical habitats for this species. Munz's onion has an affinity for mesic clay soils and blooms from March to May.

Critical Habitat. Approximately 176 acres of critical habitat for this species occurs within Riverside County; however, no critical habitat for this species occurs within the PIZ or the Plan Area.

Threats and Limiting Factors. Primary threats to this species are collection and livestock grazing. Additional threats to this species include cumulative habitat loss and degradation, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Munz's onion likely reproduces asexually by producing corm offsets, and transplantation/reintroduction of corms and corm offsets may be an effective method of enhancing populations. Little is known about pollination of this species. Seeds are presumably self-dispersed. Munz's onion only flowers during years with adequate rainfall and thus may not be detectable by surveys during years of below-average rainfall.

3.3.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, Munz's onion is known from four locations within the Survey Area. There are known populations of Munz's onion within the Survey Area at the following locations: south of Diamond Valley Lake

(Attachment 1, Figure B-1), near Lake Skinner (Attachment 1, Figure B-1), and north of Lake Skinner (Attachment 1, Figure B-2).

Probable Impact Zone (PIZ)

According to the CNDDDB specimen records, there is one occurrence within the PIZ. This population occurs east of State Highway 79, south-west of Lake Skinner (Attachment 1, Figure B-2).

Preserve Area

Munz's onion is not expected to occur within the Water Authority Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Narrow Endemic Policy. Any impacts to this species would be mitigated through contributions to the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Preserve, separate acquisitions that build the Preserve, purchase of mitigation credits from an approved mitigation bank, or other equivalent action. There is currently no conservation provided for this species within the Plan Area.

In summary, the typical habitat for Munz's onion is valley grasslands in isolated rocky outcrops and grassy openings in Riversidian sage scrub. Munz's onion has an affinity for mesic clay soils. Based on the preferred habitat, this species could occur in the Plan Area in Riversidian sage scrub and nonnative grasslands (see Table B-1B). There are 5,582 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 195 acres of potential habitat for this species could be impacted (97 acres by Planned Projects and 98 acres by Future Projects and O&M Activities as shown in Table B-1A). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

No critical habitat presently occurs within the PIZ or Plan Area. However, if subsequently critical habitat is designated within the Plan Area and impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Given that this species does not occur within the Preserve Area, in the event that a Covered Activity would affect Munz's onion, the Water Authority could pursue mitigation at Skunk Hollow where Munz's onion is known to occur or contribute to other regional conservation efforts for the species.

3.3.3 Conditions for Coverage

In the event of a Major Amendment to allow take of this species, the following conditions would apply:

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Encroachment of non-native species will be minimized by limiting soil disturbance when feasible within 50 feet of Munz's onion populations.
4. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Munz's onion. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. For unavoidable impacts, prepare a mitigation plan to re-establish populations at a minimum 1:1 conservation ratio consistent with the ratios provided in Tables 6-6 and 6-7. The plan shall include, but not limited to, species propagation ratios, restoration site selection and assessment, site preparation, implementation strategies, weed control procedures, required management and monitoring in perpetuity, funding commitment, and reporting procedures. This plan would be prepared in advance of project impacts and approved by the Wildlife Agencies.
7. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is a bulbiferous perennial, surveys for Munz's onion shall be conducted during its blooming period (March-May) to ensure proper identification.

3.4 San Diego Ambrosia (*Ambrosia pumila*)

USFWS: Endangered; Proposed Critical Habitat

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.4.1 Background

Distribution, Abundance, and Trends. San Diego ambrosia is restricted to western Riverside County, San Diego County, and northern Baja California, Mexico (Reiser 2001). According to USFWS, approximately 49 populations of San Diego ambrosia documented throughout its range; 12 are considered extant within San Diego County (USFWS 2002a). Of the 12 occurrences, five are within the Sweetwater River watershed, three are from the San Diego River watershed within Mission Trails Regional Park, one is within the San Dieguito River watershed on privately owned land, and three are within the San Luis Rey watershed near Bonsall.

San Diego ambrosia is typically associated with upper terraces of rivers and drainages, but is also found in open coastal sage scrub, grassland, vernal pools, or disturbed habitats. It may also be found in disturbed areas such as fuel breaks and the edges of dirt access roads (USFWS 2002a). This herbaceous perennial occurs at mid to low elevations, and grows on silt or loamy soils.

Critical Habitat. Critical habitat for San Diego ambrosia was proposed for 802 acres in 2009. Approximately 76 acres of proposed critical habitat occurs in Skunk Hollow Vernal Pool and Santa Gertrudis Creek Watershed in Riverside County. A total of 76 acres of proposed critical habitat occur within the PIZ and 693 acres occur within the Plan Area (see Table B-2).

Threats and Limiting Factors. The primary threat to this species is urban development along riverine systems, where this species is known to occur. Additional threats to this species include cumulative habitat loss and degradation, loss of genetic diversity, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. This species primarily reproduces asexually by rhizomes, and transplantation/reintroduction of rhizomes may be an effective method of enhancing populations (PSBS 1995). However, as San Diego ambrosia is primarily a clonal species with little sexual reproduction, a potential threat to this species is loss of genetic diversity. Therefore, genetics should be considered in any reintroduction effort. This

species is rhizomatous thus many “individuals”—known as ramets—may actually represent a single individual genet; therefore, populations of this species will be defined as acreage of contiguously occupied habitat. Although this species can occur on disturbed sites with low vegetative cover, it is considered a poor competitor with nonnative herbs and grasses.

San Diego ambrosia is difficult to identify in the field when not in fruit, and therefore, it may be missed during surveys conducted in the spring or early summer. The information and conservation guidance included in the USFWS 5-year Review and Recovery Plan would be considered during management strategies as necessary.

3.4.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, San Diego ambrosia is known from 14 locations within the Survey Area. There are known populations of San Diego ambrosia within the Survey Area at the following locations: south-west of Lake Skinner (Attachment 1, Figure B-5), west of Lake Hodges (Attachment 1, Figure B-9), along Los Penasquitos Creek (Attachment 1, Figure B-10), in El Cajon, west of the Crestridge HMA (Attachment 1, Figure B-14), and a large cluster of recorded populations around the Sweetwater Reservoir (Attachment 1, Figure B-14 and B-15).

Probable Impact Zone (PIZ)

Of the 14 occurrences of San Diego ambrosia within the Survey Area, the CNDDDB specimen records list 5 occurrences within the PIZ. Known populations of San Diego ambrosia within the PIZ occur at the following locations: south-west of Lake Skinner, near Nicolas Road (Attachment 1, Figure B-2), in El Cajon west of the Crestridge HMA (Attachment 1, Figure B-14), and along the Sweetwater River, southwest of the Sweetwater Reservoir (Attachment 1, Figure B-15).

Preserve Area

This species is currently not known within the Preserve Area; however, it has been identified as having potential to occur within the Myers property (Attachment 1, Figure B-6; EDAW 2004).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Due to this species general tolerance for disturbance, it has the potential to persist and/or expand within the Plan Area, particularly within Water Authority rights-of-way in areas with mild temporary

disturbance (i.e., vegetation clearing). This species has the potential to occur within the Preserve Area; however, no surveys for this species have been conducted.

In summary, San Diego ambrosia is typically associated with upper terraces of rivers and drainages, but is also found in open coastal sage scrub, grassland, vernal pools, or disturbed habitats. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, montane/trans-montane, and grasslands and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, southern coastal bluff scrub, coastal sage scrub (Diegan), coastal sage scrub (inland), flat-topped buckwheat scrub, Riversidean sage scrub, San Diego mesa claypan vernal pools, San Diego mesa hardpan vernal pools, vernal lakes, mule fat scrub, southern willow scrub, and freshwater meadow and marsh (see Table B-1B). There are 24,208 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 289 acres of potential habitat for this species could be impacted (139 acres by Planned Projects and 150 acres by Future Projects and O&M Activities as shown in Table B-1A). The Plan provides 132 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Proposed critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Diego ambrosia in the Plan Area by maintaining a no-net-loss of populations, providing potentially suitable habitat within the Plan Area, and/or contributing funds to other regional conservation efforts or species-specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.4.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. For unavoidable temporary impacts, this species would be salvaged and restored in accordance with an approved restoration plan. This plan would be prepared in advance of project impacts and approved by the Wildlife Agencies.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of San Diego ambrosia. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once San Diego ambrosia has been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known San Diego ambrosia locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

6. Encroachment of non-native species will be minimized by limiting soil disturbance within 50 feet of San Diego ambrosia populations.
7. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an herbaceous perennial, surveys for San Diego ambrosia shall be conducted during its blooming period (Jun.–Sept.) to ensure proper identification.

3.5 Encinitas Baccharis (*Baccharis vanessae*)

USFWS: Threatened

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.5.1 Background

Distribution, Abundance, and Trends. Encinitas baccharis is endemic to San Diego County and is limited to approximately 14 highly restricted populations within the county. Five of these populations have fewer than six plants each, and no population is known to support more than 300 individuals (USFWS 1996). Several Encinitas baccharis are clustered in Encinitas, near Batiquitos Lagoon, around Lake Hodges, southwest of Bernardo Mountain, from the rocky Montaña Serena area of Crest, east of San Dieguito County Park, and surrounding the Olivenhain Reservoir. Another report is considerably north of known populations near Devil's Creek in the San Mateo Wilderness Area near the Riverside/San Diego County line (Reiser 2001).

Encinitas baccharis occurs in southern maritime chaparral in the vicinity of Encinitas and extends inland to Mount Woodson and Poway where it is associated with dense southern mixed chaparral. Edaphic requirements may significantly restrict dispersal, given the limited range of this species. Soil types associated with this species include Corralitos loamy sand, Cieneba rocky coarse sandy loam, where large granitic boulders occur (Reiser 2001).

Threats and Limiting Factors. Encinitas baccharis is nearing local extirpation on sandstone slopes in Encinitas, and is imperiled by urban development elsewhere in San Diego County. The primary threat to this species is residential development and agricultural conversion within canyon lands. Additional threats to this species include cumulative habitat loss and degradation, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Encinitas baccharis is one of the rarest shrubs in southern California. This species has been transplanted locally without much success (Reiser 2001). A factor limiting the vigor of this species may be poor seed viability. This species is dioecious, meaning the male and female flowers occur on separate plants—this must be considered when developing a management plan for this species (such as including measures for not transplanting male or female plants into unisex populations). Nursery grown stock should be pro-actively transplanted to biological open space

reserves within its historical range. Given its peculiar extant range and its apparent edaphic limitations, the entire population may be retreating naturally due to less than optimal growing conditions (Reiser 2001). Loss of steep slope habitat near known population sites due to fuel modification zones and the introduction of orchards could both be future concerns.

3.5.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, *Encinitas baccharis* is known from 16 locations within the Survey Area. There are known populations of *Encinitas baccharis* within the Survey Area at the following locations: a large cluster of known populations are located near the Olivenhain Reservoir (Attachment 1, Figure B-9) and near Los Penasquitos Creek (Attachment 1, Figure B-10).

Probable Impact Zone (PIZ)

Of the 16 occurrences of *Encinitas baccharis* within the Survey Area, the CNDDDB and SDNHM specimen records list 6 occurrences within the PIZ. Known populations of *Encinitas baccharis* within the PIZ occur at the following locations: near Escondido Creek, north of Rancho Santa Fe (Attachment 1, Figure B-8) and lands near the Olivenhain Reservoir (Attachment 1, Figure B-9).

Preserve Area

A sizeable population occurs within areas controlled by the Water Authority at the upper elevations within the Elfin Forest Reserve surrounding Olivenhain Reservoir (Attachment 1, Figure B-9; Ogden 1995; State of California 2007a).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Populations near the Olivenhain Reservoir within the Elfin Forest Reserve will be conserved.

In summary, *Encinitas baccharis* prefers southern maritime chaparral in the vicinity of Encinitas but also extends inland to Mount Woodson and Poway where it is associated with dense southern mixed chaparral. Based on the preferred habitat, this species could occur in the Plan Area in southern maritime chaparral, southern mixed chaparral (mafic and granitic), and southern mixed chaparral (see Table B-1B). There are 8,134 acres of these vegetation subcommunities within the PIZ. Of the 183 acres of potential impacts from Future Projects and O&M, there is potential to impact approximately 36 acres of habitat potentially used by this species (see Table 6-8 in the Plan). As discussed in

Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities, including reservoir maintenance. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

The majority of direct impacts due to permanent loss of habitat from project construction have already been completed as a result of the Olivenhain Reservoir. Minor direct impacts may occur as a result of Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Encinitas baccharis in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur and achieving a no-net-loss of populations within the Plan Area. In addition, protection for individuals and habitat through the Plan conditions for coverage for this species.

3.5.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Any locations identified in the Plan Area must be avoided due to this species Narrow Endemic status unless a biologically superior mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.

4. Maintain a minimum habitat buffer of 100 feet around locations to support the natural suite of pollinators, unless a biologically superior mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Due to the high sensitivity and limited population distribution of this species, a no-net-loss of individuals and occupied acreage would be achieved through restoration and enhancement in a Preserve Area.
6. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of *Encinitas baccharis*. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7, and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
7. As this species is dioecious, care will be taken in plantings and transplantations to include a mixture of male and female individuals in restoration efforts.

8. Declining populations in the PIZ and/or Preserve Area would be enhanced by the adaptive management program through restoration of damaged habitat, transplantation of individuals, and, if determined necessary, through monitoring.

3.6 Thread-leaved Brodiaea (*Brodiaea filifolia*)

USFWS: Threatened; Designated Critical Habitat

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

3.6.1 Background

Distribution, Abundance, and Trends. Thread-leaved brodiaea is known from Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties (CNPS 2001). This species is reported from southern Riverside County in the San Mateo Wilderness Area, on Miller Mountain, on Squaw Mountain, north of Kabian County Park on the western flanks of the San Jacinto River floodplain and riverbed. It also is reported in San Bernardino County around Arrowhead Hot Springs. Confirmed reports are from near Glendora in Los Angeles County Englewood Canyon and near Wildwood Canyon. In Orange County a population occurs in Bell Canyon in the Santa Ana Mountains (Reiser 2001). A sizeable population is still extant at the Nature Conservancy's Santa Rosa Plateau Preserve on Mesa de Colorado and Mesa de Burro in western Riverside County. Known locations in Orange County occur in San Clemente and San Onofre. In San Diego County, this species is concentrated in Oceanside, Carlsbad, Vista, San Marcos, and south through La Costa and Olivenhain to Rancho Santa Fe. There are 46 reported populations of this species, 37 of which are presumed extant (MHCP 2003).

The majority of extant populations occur within the MHCP cities of San Marcos, Oceanside, and Carlsbad. Over the last 15 years, USFWS (1998a) estimates that nearly 150 acres of occupied habitat supporting over 80,000 plants have been eliminated from the San Marcos and Vista areas. The largest extant population of thread-leaved brodiaea, an estimated 342,000 plants occurring on 40-acres is present in San Marcos and is considered a critical population under the MHCP (USFWS 1998a, MHCP 2003). Most known populations support fewer than 2,000 individuals.

Suitable habitat for this species includes vernal moist grasslands with clay soils and the periphery of vernal pools.

Critical Habitat. Critical habitat was designated for thread-leaved brodiaea on December 13, 2005, and includes 597 acres of habitat in Los Angeles and San Diego Counties. A total of 38 acres of critical habitat occur within the PIZ and 54 acres are present within the Plan Area (see Table B-2).

Threats and Limiting Factors. The primary threat to this species is development of suitable habitat without the appropriate late spring surveys to detect its presence. Additional threats to this species include changes in hydrological conditions, cumulative habitat loss and degradation, trampling, vehicular traffic and road construction, illegal manure and sludge dumping, invasive and exotic plants (specifically artichoke thistle *Cynara cardunculus*), and edge effects.

Special Considerations. Thread-leaved brodiaea is an herbaceous perennial from a corm (i.e., geophyte). It is presumably insect-pollinated, but also reproduces asexually by producing corm offsets. Transplantation/reintroduction of corms and corm offsets may be an effective way of enhancing populations. Seeds of this species are presumably self-dispersed (i.e., rely on gravity for dispersal and typically do not disperse far from the parental plant). Timing and magnitude of flowering of corm species depends on climatic conditions, so this species could be missed during a poor survey year. A known reference population should be used to determine the appropriate time to survey for this species.

In addition, studies have shown that fire can be beneficial to geophytes because it removes thatch and non-native grasses/forbs and the resulting increase in light level at the ground surface and/or influx of post-fire nutrients stimulates growth and blooming. In addition, most bulbs/corms are buried deeply enough that they are not damaged by fire. Prescribed burning and mechanical methods to reduce thatch may be considered as management tools for this species.

3.6.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, thread-leaved brodiaea is known from 15 locations within the Survey Area. There are known populations of thread-leaved brodiaea within the Survey Area at the following locations: north-east of Lake Skinner near State Highway 79 (Attachment 1, Figure B-1), a cluster of populations in San Marcos near San Marcos Lake (Attachment 1, Figure B-6), south-east of the San Dieguito Reservoir (Attachment 1, Figure B-8), and near Rancho Santa Fe (Attachment 1, Figure B-10).

Probable Impact Zone (PIZ)

Of the 15 occurrences of thread-leaved brodiaea within the Survey Area, the CNDDDB and SDNHM specimen records list 3 occurrences within the PIZ. The known populations of thread-leaved brodiaea within the PIZ occur in San Marcos, north of West Mission Road (Attachment 1, Figure B-6).

Preserve Area

This species is not currently known to occur within the Preserve Area. There are, however, known populations of thread-leaved brodiaea near the Myers property. There is potential for this species to occur within this Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy and the Vernal Pool Protection Policy. Critical locations of this species are also protected under the MHCP and the draft San Marcos Subarea Plan and have been avoided by the Water Authority during pipeline installation activities. Incidental take may occur if this species inhabits grassy areas on the rights-of-way near vernal pools.

In summary, the preferred habitat type for thread-leaved brodiaea is vernal moist grasslands with clay soils and the periphery of vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in San Diego mesa claypan vernal pools, San Diego mesa hardpan vernal pools, and vernal lakes (see Table B-1B). There are no acres of these vegetation subcommunities within the PIZ. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat for this species. As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted.

Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

No new construction projects are proposed in this area, the majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is contribute to the regional conservation of thread-leaved brodiaea in the Plan Area by maintaining a no-net-loss of populations and/or by contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species. Effective conservation of this species must also include management of the watershed to maintain hydrological conditions that support vernal pools and other ephemeral wetlands.

3.6.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy Policy (see Section 6.5.1.6 of the Plan).
3. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Encroachment of non-native species will be minimized by limiting soil disturbance when feasible within 50 feet of thread-leaved brodiaea populations.
5. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
6. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of thread-leaved brodiaea. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once thread-leaved brodiaea has been mapped in the Preserve

Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known thread-leaved brodiaea locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
7. Prescribed burning or mechanical thatch reduction can be effectively used to encourage thread-leaved brodiaea populations.
 8. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is a bulbiferous perennial, surveys for thread-leaved brodiaea shall be conducted during its blooming period (March to June) to ensure proper identification.

3.7 Orcutt's Brodiaea (*Brodiaea orcuttii*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: Yes

3.7.1 Background

Distribution, Abundance, and Trends. Orcutt's brodiaea is found in Orange, Riverside, and San Diego counties, and in northern Baja California, Mexico (Reiser 2001). In San Diego County, this species is infrequent, occurring in coastal and foothill regions below 1,500-meter elevation. A very large population of Orcutt's brodiaea exists in San Marcos. It is very rare near Guajome Regional Park. Small colonies exist around Camp Pendleton and Horno Summit between San Onofre and Carlsbad. It is known to occur in Carlsbad, La Costa, Vista, Los Vallecitos in Olivenhain, and at the Nature Conservancy's Santa Rosa Plateau Preserve on Mesa de Colorado, and Mesa de Burro in western Riverside County. This corm is reported from southern Riverside County in Miller Canyon and Devil Canyon within the San Mateo Wilderness Area, and in Kabian County Park on the San Jacinto River floodplain. In Orange County a population occurs in Bell Canyon in the Santa Ana Mountains.

A corm-sprouting species, Orcutt's brodiaea occurs in vernal moist grasslands, areas with mima mound topography, and the periphery of vernal pools. Orcutt's brodiaea will occasionally grow on streamside embankments. In vernal pool locales Orcutt's brodiaea will typically grow in the swales leading into the more developed pools, and on the lower flanks of small mima mounds. Within San Diego County, it is found on Stockpen gravelly loam on Otay Mesa and Redding gravelly loam on Mira Mesa.

Threats and Limiting Factors. The primary threat to this species is development of suitable habitat without the appropriate late spring surveys to detect its presence. Additional threats to this species include changes in hydrological conditions, cumulative habitat loss and degradation, trampling, vehicular traffic and road construction, illegal dumping, competition from exotic grasses and forbs, bulb collection, alteration of vernal pool watershed hydrology, and edge effects.

Special Considerations. Orcutt's brodiaea is an herbaceous perennial from a corm and relies on seed germination. Since this species is self-incompatible it relies on pollinators for cross-pollination between individuals, therefore maintaining populations of pollinators near locations is important. The flowering of corm species depends on climatic

conditions and, as such, this species could be missed during a poor survey year; therefore, a known reference population should be used to determine the appropriate time to survey for this species.

Studies have shown that fire can be beneficial to geophytes because it removes thatch and non-native grasses/forbs and the resulting increase in light level at the ground surface and/or influx of post-fire nutrients stimulates growth and blooming. In addition, most bulbs/corms are buried deeply enough that they are not damaged by fire. Prescribed burning or mechanical methods to reduce thatch should be considered as management tools.

Because Orcutt's brodiaea is often associated with wetland habitat, it is susceptible to changes in hydrological conditions. Effective conservation of this species must include management of the watershed. Transplantation/reintroduction of corms may be an effective means of population enhancement.

3.7.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, Orcutt's brodiaea is known from 29 locations within the Survey Area. There are known populations of Orcutt's brodiaea within the Survey Area at the following locations: near the community of Rainbow (Attachment 1, Figure B-3), near San Marcos by Palomar Airport Road (Attachment 1, Figure B-6), south of San Marcos near San Marcos Creek (Attachment 1, Figure B-8), near the Miramar Reservoir (Attachment 1, Figure B-12), near Kearny Mesa (Attachment 1, Figure B-12), near Lake Murray (Attachment 1, Figure B-14), and near the Lower Otay Reservoir (Attachment 1, Figure B-16). The San Marcos population is considered a critical population under the MHCP (MHCP 2003).

Probable Impact Zone (PIZ)

Of the 29 occurrence of Orcutt's brodiaea within the Survey Area, the CNDDDB and SDNHM specimen records list 7 occurrences within the PIZ. Known populations of Orcutt's brodiaea within the PIZ occur at the following locations: near San Marcos by Palomar Airport Road (Attachment 1, Figure B-6), the Miramar Reservoir (Attachment 1, Figure B-12), near Kearny Mesa (Attachment 1, Figure B-12), and near the San Vicente Reservoir (Attachment 1, Figure B-13).

Preserve Area

This species is not known to occur within the Water Authority Preserve Area; however, there is potential for this species to occur within the Elfin Forest Reserve (Odgen 1995).

Conservation and Take Levels. Where this species occurs within vernal pool complexes, impacts to populations will be avoided or minimized in accordance with the Vernal Pool Protection Policy. Incidental take may occur if this species inhabits grassy areas on the rights-of-way near vernal pools. The San Marcos critical population occurring in the downtown area is only 13 percent conserved according the MHCP and is within a relatively small parcel surrounded largely by development (MHCP 2003). These populations have been avoided by the Water Authority during pipeline installation activities.

In summary, the preferred habitat for Orcutt's brodiaea is vernal moist grasslands, areas with mima mound topography, and the periphery of vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in San Diego mesa claypan vernal pools, San Diego mesa hardpan vernal pools, vernal lakes, and freshwater meadow or seep (see Table B-1B). There are 11 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, six acres of potential habitat for this species could be impacted (5 acres by Planned Projects and 1 acre by Future Projects and O&M Activities as shown in Table B-1A). The Plan provides 1 acre of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species though direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. No new construction projects are proposed in the San Marcos Critical Population Area. The majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected contribute to the regional conservation of Orcutt's brodiaea by contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for

coverage for this species. Effective conservation of this species must also include conditions for coverage which avoid watershed boundaries and hydrological inputs that support vernal pools and other ephemeral wetlands.

3.7.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Vernal Pool Protection Policy, where this species occurs in vernal pool habitat (see Section 6.7.3 of the Plan).
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Orcutt's brodiaea. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once Orcutt's brodiaea has been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. Impacts to this species will be mitigated according to the mitigation ratios in Tables 6-6 and 6-7, and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Orcutt's brodiaea locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - d. Propagate for reintroduction and/or introduction of species into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.

Appendix B Covered Species Analysis

4. Where impacts to vernal pools supporting Orcutt's brodiaea occur, mitigation should include salvage of seed and/or corms to be included in any suitable vernal pool restoration.

3.8 Dunn's Mariposa Lily (*Calochortus dunnii*)

USFWS: None

CDFG: Rare

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.8.1 Background

Distribution, Abundance, and Trends. Dunn's mariposa lily is endemic to San Diego County and is mainly restricted to the interior mountains and northern Baja California. Historical reports include records on Otay Mountain, East Mesa in the Cuyamaca Mountains, Cuyamaca Peak, Featherstone Creek, Guatay Peak, outside Descanso, Japacha Peak, southeast of Oakzanita Peak, and Tecate Peak. Populations in the Cuyamaca Mountains; however, on close inspection the flowers of these plants appear to display a spectrum of traits (Reiser 2001).

This species typically occurs in rocky openings in chaparral or in the grassland/chaparral ecotone. Dunn's mariposa lily seems restricted to metavolcanic and gabbroic derived soils. The San Miguel Mountain population occurs in San Miguel-Exchequer rocky silt loams in arid chaparral habitat.

Threats and Limiting Factors. The primary threats to this species are residential development and orchard establishment on steep chaparral slopes that retain this cryptic bulb species. Additional threats to this species include cumulative habitat loss and degradation, trampling, vehicular traffic and road construction, illegal dumping, competition with invasive and exotic plants, bulb collection for horticultural purposes, and edge effects. Its vulnerability to high frequency fire is unknown and the isolated dispersal of populations may be of concern in terms of genetic exchange.

Special Considerations. Dunn's mariposa lily is limited in range by its edaphic preferences, and has not been heavily impacted, as yet, by urban development. Proposals to intensively develop houses along Proctor Valley Road, and the adjacent metavolcanic hillsides, could result in significant future impacts.

Studies have shown that fire can be beneficial to geophytes because it removes thatch and non-native grasses/forbs and the resulting increase in light level at the ground surface and/or influx of post-fire nutrients stimulates growth and blooming. In addition, most bulbs/corms are buried deeply enough that they are not damaged by fire. Prescribed burning and mechanical methods to reduce thatch should be considered as management tools.

3.8.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there is 1 occurrence of Dunn's mariposa lily within the Survey Area east of Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of Dunn's mariposa lily within the PIZ.

Preserve Area

This species occurs within the Survey Area buffer north of San Miguel HMA and thus has the potential to occur in San Miguel HMA where suitable clay soils exist (Attachment 1, Figure B-15).

Conservation and Take Levels. Should this species be found within the Plan Area, impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. This species is expected to occur within the boundaries of the San Miguel HMA where suitable gabbro and metavolcanic soils are present.

In summary, Dunn's mariposa lily prefers rocky openings in chaparral or in the grassland/chaparral ecotone. Dunn's mariposa lily seems restricted to metavolcanic and gabbroic derived soils. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: northern mixed chaparral (mafic), southern mixed chaparral (mafic), northern mixed chaparral (granitic), southern mixed chaparral, southern mixed chaparral (mafic), native grasslands, chamise chaparral (granitic chamise chaparral), northern mixed chaparral (granitic), and southern mixed chaparral (granitic) (see Table B-1B). There are 1,046 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities as shown in Table B-1A). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted.

The Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Dunn's mariposa lily in the Plan Area by conserving contiguous blocks of suitable habitat at San Miguel on which this species has the potential to occur. Given that this species is not currently known to occur within the Preserve Area, in the event that a Covered Activity would affect Dunn's mariposa lily, any impacts to this species would be mitigated through contributions to regional conservation efforts for the species.

3.8.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Dunn's mariposa lily. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once Dunn's mariposa lily has been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated with occupied

habitat credits in accordance with the ratios provided in Tables 6-6 and 6-7 in the Plan.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Dunn's mariposa lily locations.
- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

3.9 Lakeside Ceanothus (*Ceanothus cyaneus*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.9.1 Background

Distribution, Abundance, and Trends. Lakeside ceanothus is restricted to a narrow range in interior San Diego County. This shrub is common northwest of Crest. Old herbarium specimens at the San Diego Natural History Museum include a regional cluster of sites on and near El Cajon Mountain, Barona Valley between San Vicente Creek and the San Diego River, near the Silverwood Wildlife Sanctuary, Lakeside, the San Vicente Reservoir, and east of Poway to Ramona (Reiser 2001). Historical reports show shrubs occurring near Alpine, which is adjacent to Flinn Springs Park near Harbison Canyon.

Inland mixed chaparral, specifically in the region from Crest to the Lakeside foothills, includes the known habitat and range for Lakeside ceanothus. Hybrid shrubs seem to occur regularly in the latter area. Typically, this ceanothus occurs in a dense, almost impenetrable chaparral with a mix of chamise and other shrubs, such as manzanita. This chaparral is taller growing than other woody scrub areas in the region. In Crest, the soil types are mapped as acid igneous rock land and Cienega very rocky coarse sandy loam.

Threats and Limiting Factors. Although the Lakeside ceanothus is currently stable in distribution, it is imperiled by a number of encroaching residential projects. The primary threats to this species are rural development and orchard plantings. The species' response to repeated fire and invasion by non-native plant species is unknown.

Special Considerations. Any reports of this species from outside of the Crest or El Cajon Mountain region should be considered questionable due to possible intergeneric hybrids of other species, which sometimes superficially resemble Lakeside ceanothus (Reiser 2001). This may be a somewhat newly evolving species that has stabilized following hybridization of California lilac (*Ceanothus tomentosus*) and chaparral whitethorn (*Ceanothus leucodermis*). Both reputed parents are common in the region, and this could account for the limited distribution of Lakeside ceanothus in chaparral covered foothills that otherwise extend well beyond the current range of this species. Soil requirements may also be a primary factor (Reiser 2001).

3.9.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 13 known populations of Lakeside ceanothus within the Survey Area. There are known populations of Lakeside ceanothus within the Survey Area at the following locations: near Rainbow (Attachment 1, Figure B-3), near the San Vicente Reservoir (Attachment 1, Figure B-11), and within Santee (Attachment 1, Figure B-13)

Probable Impact Zone (PIZ)

According to the SDNHM specimen records, there are four known populations of Lakeside ceanothus within the PIZ. Lakeside ceanothus occurs within the PIZ surrounding the San Vicente Reservoir (Attachment 1, Figure B-11 and B-13).

Preserve Area

Lakeside ceanothus potentially occurs at the Rancho Cañada HMA, as it is known to occur in adjacent contiguous habitat (TNC 2006). Additionally, it is known to occur within the Crestridge HMA (PSBS 1994) and within the community of Lakeside (State of California 2007a, SDNHM 2008).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. There are approximately 84 acres of suitable habitat for this species present at the Rancho Cañada HMA, which may support Lakeside ceanothus, as it is known to occur in contiguous suitable habitat. If a population is located at the bank, mitigation credits may be established for use by the Water Authority. This species is also conserved within the Crestridge HMA.

In summary, Lakeside ceanothus prefers inland mixed chaparral, specifically in the region from Crest to the Lakeside foothills. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: northern mixed chaparral (mafic), southern mixed chaparral (mafic), northern mixed chaparral (granitic), southern mixed chaparral, and southern mixed chaparral (granitic) (see Table B-1B). There are 1,046 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full

range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species.

This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities for reservoir maintenance. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance, and mitigated to a minimum 1:1 conservation ratio.

Minor direct impacts would occur as a result of Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Lakeside ceanothus in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur, maintenance of a no-net-loss of populations within the Plan Area, and by implementation the Plan conditions for coverage for this species.

3.9.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Any locations identified in the Plan Area must be avoided to the maximum extent practicable due to this species Narrow Endemic Status, unless a biologically superior mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. Maintain a minimum habitat buffer of 100 feet around locations to support the natural suite of pollinators, unless a biologically superior mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.

5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Lakeside ceanothus. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

3.10 Southern Tarplant (*Centromadia parryi* ssp. *australis*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: No

3.10.1 Background

Distribution, Abundance, and Trends. Southern tarplant occurs in San Diego County, Orange County, Ventura County, Los Angeles County, and Santa Barbara County (Reiser 2001). The southern tarplant is almost extirpated in San Diego County and severely declining throughout its U.S. range. Small colonies occur immediately east of I-5 on the periphery of the salt marsh in Del Mar, around a large vernal pool in Ramona, and downtown San Marcos. A number of scattered colonies occur in Orange County at Newport's Back Bay, Bonita Canyon, at the mouth of the Santa Ana River, Near Kalmus in Costa Mesa, and near Bolsa Chica. Historical locations in Orange County occurred in Santa Ana, Rossmoor, Cypress, Westminster, Garden Grove, and the Santa Barbara area between Goleta and Ellwood (Reiser 2001).

Much of this species' probable habitat no longer exists; it is largely farmed or developed. Southern tarplant is generally found on alkaline soils along the margins of marshes and swamps, in vernal mesic grassland areas, and near vernal pools. At the Del Mar locale, the soils are mapped as Chino silt loam and the salt marsh vegetation is found only yards away. At Newport Back Bay, this tarplant grows in mesic grasslands with an ocean influence. Most of the surrounding vegetation here consists of invasive non-native weeds.

Threats and Limiting Factors. Rampant coastal development and historical alterations to most coastal drainages in southern California appear to be the primary culprit in the severe decline of this species. The few remaining San Diego County sites are imperiled by development. Extensive recreational use of Newport Back Bay in Orange County threatens various scattered colonies. Additional threats to this subspecies include cumulative habitat loss and degradation, changes in hydrological conditions, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Southern tarplant is an annual plant that may experience yearly fluctuations in population size. This species may also occur on relatively disturbed sites

adjacent to suitable habitat. The subspecies was formerly included in the genus *Hemizonia*, with the spiny-leaved section now segregated into the genus *Centromadia*.

3.10.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are three known population of Southern tarplant within the Survey Area. This species occurs just north of San Marcos Lake (Attachment 1, Figure B-6) and east of Lake Hodges (Attachment 1, Figure B-9).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of Southern tarplant within the PIZ.

Preserve Area

This species is not currently known to occur nor has the potential to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. Southern tarplant is capable of pioneering at the edge of highly disturbed road easements in suitable clay substrates. As a result, some take may be necessary to perform standard maintenance.

In summary, southern tarplant occurs on alkaline soils along the margins of marshes and swamps, in vernal mesic grassland areas, and near vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: native grassland, maritime succulent scrub, alkalai wetlands and vernal pools, and freshwater meadow and marsh (see Table B-1B). There are 1,132 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, six acres of potential habitat for this species could be impacted (5 acres by Planned Projects and 1 acre by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of southern tarplant in the Plan Area by providing potentially suitable habitat within the Plan Area, minimizing and mitigating impacts in accordance with the conditions for coverage for this species, and/or contributing funds to other regional conservation efforts or species specific management programs.

3.10.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known southern tarplant locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.

3.11 Smooth Tarplant (*Centromadia pungens ssp. laevis*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: No

3.11.1 Background

Distribution, Abundance, and Trends. Smooth tarplant is found in southwestern California and northwestern Baja California, Mexico. This species is found in Hemet, San Jacinto River, Beaumont, Lake Elsinore, Sycamore Canyon Park, Temecula Creek, Diamond Valley Lake, and Lake Skinner in Riverside County. In San Diego County this species is known to occur in Santee and along the San Dieguito River near Lake Hodges (Reiser 2001; State of California 2007a). The preferred habitat is mesic grasslands with alkaline soils and riparian areas within the Plan Area.

Threats and Limiting Factors. Smooth tarplant is severely declining in Riverside County due to flood control measures and residential development. The population in San Diego is under development pressure as well. Other threats include alteration of hydrology and flood plain dynamics, off-road vehicle activity, trampling by cattle and sheep, fire-suppression practices (including discing and plowing), and competition from exotic plant species.

Special Considerations. Significant portions of populations of this species should be protected. Smooth tarplant is tolerant of some disturbance. Additionally, when this species is in juvenile form during spring months, it is difficult to distinguish from San Diego tarweed (*Hemizonia paniculata*).

3.11.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are 10 known populations of Southern tarplant within the Survey Area. This species occurs in the following locations: there is a cluster of populations west of Diamond Valley Lake in Temecula (Attachment 1, Figure B-1), west of Lake Skinner (Attachment 1, Figure B-2), near I-15 in Temecula

(Attachment 1, Figure B-3), and along the San Dieguito River, east of Lake Hodges (Attachment 1, Figure B-9).

Probable Impact Zone (PIZ)

According to the CNDDDB specimen records, there is one known population of Smooth tarplant within the PIZ. This population occurs in Temecula near the I-15 (Attachment 1, Figure B-3)

Preserve Area

This species is not currently known to occur nor has the potential to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. Smooth tarplant is capable of pioneering at the edge of highly disturbed road easements in suitable clay substrates. As a result, some take may be necessary to perform standard maintenance.

In summary, smooth tarplant prefers mesic grasslands with alkaline soils and riparian areas. Based on the preferred habitat, this species could occur in the Plan Area in riparian, alkalai wetlands, and freshwater meadows or seeps (see Table B-1B). There are 1,079 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 57 acres of potential habitat for this species could be impacted (25 acres by Planned Projects and 32 acres by Future Projects and O&M Activities).

The Plan provides 47 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of smooth tarplant in the Plan Area by providing potentially suitable habitat within the Plan Area, minimizing and mitigating impacts in accordance with the conditions for coverage for this species, and/or contributing funds to other regional conservation efforts or species specific management programs.

3.11.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known smooth tarplant locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.

3.12 Otay Tarplant (*Deinandra [= Hemizonia] conjugens*)

USFWS: Threatened; Designated Critical Habitat

CDFG: Endangered

CNPS: List 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: No

3.12.1 Background

Distribution, Abundance, and Trends. This herbaceous plant is restricted to southern San Diego County and northern Baja California, Mexico. All U.S. sites for this state endangered and federally threatened plant occur in the Chula Vista, Spring Valley, and Otay Mesa region.

This tall, late spring and summer-blooming annual is restricted to fractured clay soils (Munz and Keck 1968, Reiser 2001). It is most often associated with low elevation grasslands, but can occur in grassy areas with sparse shrub cover. Most of the sites near Sweetwater Reservoir are mapped as Diablo clay. Additionally, this species location at the south side of Sweetwater Reservoir is identified as a core population according to the Recovery Plan for this species.

Threats and Limiting Factors. This species' range corresponds with one of the most actively changing parts of the county. The primary threats to this species are encroaching development and associated edge effects, fragmentation of existing populations, reduced populations of pollinators, and competition with exotic plant species. The effects of grazing and fire on this herb are not well understood although the former is a declining industry in the urbanizing south county.

Critical Habitat. Critical habitat for this species was designated in 2002 on 6,330 acres in San Diego County (USFWS 2002b). A total of approximately 547 acres of designated critical habitat for Otay tarplant occurs within the PIZ and 6,318 acres within the Plan Area (see Table B-2).

Special Considerations. Otay tarplant is an annual plant that may experience yearly fluctuations in population size, which makes censusing populations of this species difficult during years of below-average rainfall. Sympatric presence of the closely related tarweed (*Deinandra paniculata*) within the very limited range of Otay tarplant is considered doubtful, despite old reports that place the latter at nearby locales (e.g., Paradise Valley, Spring Valley, and Telegraph Canyon). Specimens examined from

these locales at the herbarium of the San Diego Natural History Museum were misidentified and properly belonged to Otay tarplant.

3.12.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 24 known populations of Otay tarplant within the Survey Area. This species occurs in the following locations: there is a cluster of populations of Otay tarplant around the Sweet Water Reservoir (Attachment 1, Figure B-15) and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 24 occurrences of Otay tarplant within the Survey Area, the CNDDDB and SDNHM species records list 3 occurrences within the PIZ. Known populations of Otay tarplant within the PIZ occur at the following locations: near the Sweetwater River and Reservoir (Attachment 1, Figure B-14) and a population north of the Lower Otay Reservoir (Attachment 1, Figure B-15)

Preserve Area

Otay tarplant is present at San Miguel HMA on approximately 25.5 acres (Merkel 1997). Approximately 6,318 acres of critical habitat occurs within the Plan Area (approximately 32 acres within fee-owned parcels in Sub-units 1B and 3A) and Preserve Area (approximately 754 acres at the San Miguel HMA within Sub-unit 1B).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized and mitigated in accordance with the Narrow Endemic Policy. Approximate population data for Otay tarplant in the Proctor Valley area identified 100,000 individuals at the time of 1994 surveys (State of California 2007a); however, no recent surveys have been conducted. This species will be conserved within the San Miguel HMA for a total 25.5 acres supporting approximately 12,260 plants and are available as mitigation credits. In areas where unavoidable take of Otay tarplant will occur, species-specific mitigation credits will be deducted or the restoration measures implemented.

In summary, Otay tarplant prefers fractured clay soils and is most often associated with low elevation grasslands, but can occur in grassy areas with sparse shrub cover. Based on the preferred habitat, this species could occur in the Plan Area in native grasslands (see Table B-1B). There are 1,018 acres of this vegetation subcommunity within the PIZ. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that

there is potential to impact up to 10 acres of habitat of this species. As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted.

According to Table B-1A, the Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, information about available habitat from surveys or reports for the Preserve Area is provided to supplement the habitat calculations and analysis presented in Table B-1A. In the event that the 25.5 acres of available habitat at the existing Preserve Area does not provide sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Given that the Otay tarplant is capable of pioneering at the edge of highly disturbed road easements in suitable clay substrates, implementation of the Water Authority Plan could impact this species within the aqueduct alignment as a result of disturbance from Covered Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Otay tarplant in the Plan Area by

maintaining a no-net-loss of populations, providing potentially suitable habitat within the Plan Area, conserving a large block of habitat known to support the species, and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.12.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. For unavoidable temporary impacts, this species would be salvaged and restored in accordance with an approved restoration plan. This plan would be prepared in advance of project impacts and approved by the Wildlife Agencies.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Otay tarplant. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. For unavoidable permanent impacts, prepare a mitigation plan to re-establish populations at a final mitigation ratio that results in a no-net-loss of species population. The plan shall include, but not limited to, species propagation ratios, restoration site selection and assessment, site preparation, implementation strategies, weed control procedures, required management and monitoring in perpetuity, funding commitment, and reporting procedures. This plan would be prepared in advance of project impacts and approved by the Wildlife Agencies.

3.13 Variegated Dudleya (*Dudleya variegata*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.13.1 Background

Distribution, Abundance, and Trends. Variegated dudleya is restricted in distribution to southern San Diego County and Baja California, Mexico (Reiser 2001). These plants occur in several locales in and around bluffs and vernal pools of Otay Mesa, Otay Mountain, Otay Valley to Mexico, Santee, Miramar Mounds, and Chula Vista. Herbarium specimens include the north side of La Jolla Valley, east of Del Mar, the Sweetwater River, San Miguel Mountain, Rice Canyon in Chula Vista, and Otay Mountain. Other areas include Sycamore Canyon, Mother Miguel Mountain, El Cajon, the Sweetwater Reservoir, and Poway.

Openings in sage scrub and chaparral, isolated rocky substrates in open grasslands, and a close proximity to vernal pools and mima mound topography on clay soils characterize habitats utilized by this small, corm-like sprouting perennial with succulent leaves. Stockpen gravelly clay loams are utilized on Otay Mesa, while Redding gravelly loams are mapped for the Miramar Mounds area. Usually this dudleya grows in small areas devoid of shrub cover, even though chamise, scrub oak, or sage scrub elements may occur nearby.

Threats and Limiting Factors. The primary threats to this species are livestock grazing on northern Otay Mesa and residential construction. Widespread grading on Otay Mesa has eliminated major populations and outlying colonies. Additional threats to this species include cumulative habitat loss and degradation, trampling, off-road vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Variegated dudleya is an herbaceous perennial plant arising from a small corm. The cryptic nature of this species, except during spring and early summer, makes focused botanical surveys in potential habitat suspect outside these seasons. Therefore, surveys should be conducted exclusively during the blooming season. Variegated dudleya is insect-pollinated (e.g., bees, bee flies), and seeds are presumably self-dispersed. Therefore, effective conservation of this species must include adequately sized preserves to allow for appropriate pollinators. In addition, since

this species is particularly susceptible to soil disturbance, efforts should be made during surveys to avoid and/or minimize soil disturbance in areas of potential habitat.

3.13.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 26 known populations of variegated dudleya within the Survey Area. This species occurs in the following locations: there is a cluster of reported populations northwest of Poway (Attachment 1, Figure B-10), around the Sweet Water Reservoir (Attachment 1, Figure B-15), and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 26 occurrences of variegated dudleya within the Survey Area, the CNDDDB and SDNHM species records list 6 occurrences within the PIZ. Known populations of variegated dudleya within the PIZ occur at the following locations: northwest of Poway (Attachment 1, Figure B-10) and south of the Sweetwater River and Reservoir (Attachment 1, Figure B-15).

Preserve Area

Variegated dudleya is present at the San Miguel HMA (State of California 2007a; Merkel 1997) and the Montaña Mirador property (City of San Diego 2004).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Variegated dudleya is present at the San Miguel HMA and Montaña Mirador property. If a population census is conducted within the Preserve Area, mitigation credits may be established for use by the Water Authority. In areas where unavoidable take of variegated dudleya will occur, mitigation credits will be deducted or the local population will be counted and restored at a no-net-loss for the species.

In summary, the preferred habitat type for variegated dudleya is sage scrub and chaparral and isolated rocky substrates in open grasslands. They can also be found in close proximity to vernal pools and mima mound topography on clay soils. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, coastal sage scrub, native and nonnative grasslands, and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, and southern coastal bluff scrub (see Table B-1B). There are 24,233 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from

Covered Activities estimated to occur within the PIZ, 274 acres of potential habitat for this species could be impacted (134 acres by Planned Projects and 140 acres by Future Projects and O&M Activities). The Plan provides 649 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of variegated dudleya in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur and providing a no-net-loss of populations within the Plan Area. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.13.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. For unavoidable impacts, prepare a mitigation plan to re-establish populations at a final mitigation ratio that results in a no-net-loss of species population. The plan shall include, but not limited to, species propagation ratios, restoration site selection and assessment, site preparation, implementation strategies, weed control procedures, required management and monitoring in perpetuity, funding commitment, and reporting procedures. This plan would be prepared in advance of project impacts and approved by the Wildlife Agencies.

3.14 Sticky Dudleya (*Dudleya viscida*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: Yes

3.14.1 Background

Distribution, Abundance, and Trends. Sticky dudleya occurs in Orange, Riverside, and San Diego counties (Reiser 2001). A large population occurs in "Devil's Gorge," on Camp Pendleton. Additional populations are scattered throughout Camp Pendleton (near Ysidora) and north of the Santa Margarita River. Other scattered populations occur on bluffs south of the San Luis Rey River in Oceanside; however, several have been impacted by urban development projects, and herbivory was another problem for the success of transplanted populations. Other reports are known from Cole Spring Canyon, Lake Hodges area, and Escondido Creek. Reports for Orange County include the Santa Ana Mountains, Lucas Canyon at the boundary fence of the Cleveland National Forest in Orange County, San Mateo Canyon within the wilderness area for extreme southwestern Riverside County.

This conspicuous succulent perennial grows predominantly on very steep north-facing slopes, typically in association with coastal sage scrub or chaparral. It is amenable to shade and mesic conditions. San Miguel-Exchequer rocky silt loams are utilized near Del Dios Highway, and Blasingame loams are found in the northern Camp Pendleton sites. Typically, sticky dudleya is situated on exposed gabbroic rock, growing on very shallow soils or from cracks on vertical rock slabs.

Threats and Limiting Factors. The primary threat to this species is loss of habitat due to urban development projects. Additional threats to this species include cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Sticky dudleya is an herbaceous perennial plant. It is insect pollinated, and seeds are presumably self-dispersed. Therefore, adequate conservation for this species should include sufficient habitat to support a natural suite of pollinators. This species may also be susceptible to fires and disturbances associated with fire suppression (MHCP 2003). Rarity of the species is strongly correlated with a paucity of exposed, volcanically derived soil/rock within its limited range (Reiser 2001).

3.14.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, sticky dudleya occurs within the Survey Area at 3 locations. Sticky dudleya is found north of Squires Dam, west of San Marcos (Attachment 1, Figure B-6) and north of Escondido Creek in Escondido (Attachment 1, Figure B-8).

Probable Impact Zone (PIZ)

Of the three occurrences of variegated dudleya within the Survey Area, the CNDDDB species records list 1 occurrence within the PIZ, north of Escondido Creek in Escondido (Attachment 1, Figure B-8).

Preserve Area

This species is not currently known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. Any impacts to this species would be mitigated through appropriate restoration or contributions to regional planning efforts.

In summary, sticky-leaved dudley prefers very steep north-facing slopes, typically in association with coastal sage scrub or chaparral. Based on the preferred habitat, this species could occur in the Plan Area in chaparral and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, southern coastal bluff scrub, coastal sage-chaparral scrub, coastal sage scrub (Diegan), coastal sage scrub (inland), and flat-topped buckwheat scrub (see Table B-1B). There are 17,629 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of sticky dudleya in the Plan Area by protecting populations in accordance with the conditions for coverage for these species or by contributing to regional conservation programs for the species.

3.14.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of sticky dudleya. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management

programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

3.15 San Diego Button-celery (*Eryngium aristulatum* var. *parishii*)

USFWS: Endangered

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

3.15.1 Background

Distribution, Abundance, and Trends. San Diego button-celery is found in Riverside and San Diego counties, and in Baja California, Mexico (Reiser 2001). Vernal pools or mima mound areas with vernal moist conditions and clay soils are the preferred habitats for this species. Redding gravelly loams appear to provide optimal soils for the populations at Miramar Mounds. This species is more tolerant of peripheral vernal pool habitat than most obligate vernal pool species.

This herbaceous prostrate biennial or perennial is usually restricted to vernal pool watersheds, and has been radically depleted in numbers over the last two decades on Kearny Mesa and Otay Mesa. San Diego button-celery is slowly declining with continued losses despite its federally endangered status. The number of known historical sites is misleading. Many of these locations were previously contiguous and now are remnant, peripheral colonies of once much larger populations. It is still locally common within vernal pools in the Otay Mesa area, and at the Lower Otay Reservoir. It is currently known to occur in isolated vernal pools in and around Carlsbad, San Marcos, on Marine Corps Air Station Miramar, and southern Camp Pendleton at Wire Mountain. Database information for Riverside County notes sites on the Santa Rosa Plateau on Mesa de Colorado, and on Mesa de Burro.

Threats and Limiting Factors. Threats to San Diego button-celery include agriculture, urbanization, road maintenance, vehicular traffic, foot traffic, edge effects, and alteration of drainage patterns and hydrology.

Special Considerations. The species may also occur in coastal sage scrub and chaparral habitat if associated with appropriate clay soils and mesic conditions. It reproduces by outcrossing and is presumably insect-pollinated. Seeds are self- and, possibly, animal-dispersed (Zedler 1987). San Diego button-celery relies on animal vectors for pollination. In addition, plants have specific hydrological requirements. Therefore, effective conservation of this species must include sufficient habitat to maintain an appropriate

fauna and must manage the vernal pool watershed in a manner that maintains both the hydrological regime and water quality.

3.15.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, San Diego button-celery occurs within the Survey Area at 12 locations. San Diego button-celery has been reported in San Marcos (Attachment 1, Figure B-6). This locality is considered a critical location under the MHCP (MHCP 2003). In addition the CNDDDB and SDNHM records indicate populations north of Poway (Attachment 1, Figure B-10), Miramar (Attachment 1, Figure B-12), and south of the Lower Otoy Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, San Diego button-celery occurs within the PIZ in San Marcos (Attachment 1, Figure B-6) at 2 locations.

Preserve Area

This species is not currently known or expected to occur on the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy and the Vernal Pool Protection Policy. Approximately 180 plants were observed at the San Marcos location when the species was last censused in 2003 (State of California 2007b). Critical locations of this species are also protected under the MHCP and the draft San Marcos Subarea Plan and have been avoided by the Water Authority during pipeline installation activities. Incidental take may occur if this species inhabits disturbed areas on the rights-of-way near vernal pools. There are no known San Diego button-celery populations on the Preserve Area; however, focused surveys have not been conducted.

In summary, San Diego button-celery is restricted to vernal pool watersheds. Based on the preferred habitat, this species could occur in the Plan Area in San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities identified within the PIZ, 24 acres occur within the Survey Area. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat of this species. As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and

subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. No new construction projects are proposed in the San Marcos area, the majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential indirect impacts would result from encroachment of non-native plant species, off-road vehicle use, and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Diego button-celery in the Plan Area by maintaining a no-net-loss of populations and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan Conditions for coverage for this species.

3.15.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Establish a minimum habitat buffer of 100 feet when feasible around population to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.

5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known San Diego Button-celery locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an herbaceous biennial, surveys for San Diego button-celery shall be conducted during its blooming period (Apr-Jun) to ensure proper identification.

3.16 San Diego Barrel Cactus (*Ferocactus viridescens*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Covered

Covered by MSCP: Yes

3.16.1 Background

Distribution, Abundance, and Trends. San Diego barrel cactus is restricted to San Diego County and Baja California, Mexico (Reiser 2001). San Diego barrel cactus occurs at numerous locales throughout the coastal region. Its highest densities are found on Otay Mesa, the Naval Subbase at Point Loma, Miramar Airfield lands, the east end of Otay Valley, and Mother Miguel Mountain. Barrel cactus is rarer in northern San Diego County. This species is known to occur in and around various cities including Poway, Santee, Chula Vista, Encinitas, Point Loma, Miramar, Mission Valley, Lemon Grove, Olivenhain, Del Mar, Rancho Santa Fe, Bonita, and Rancho Bernardo. Colonies have been found specifically near the mouth of the San Luis Rey River, sites north of I-8 occurring west of I-15; the San Diego River in Lakeside, Mount Soledad, Poggi Canyon, the Rancho San Dieguito Boundary, north of Otay Lakes, Otay Valley, Otay Mountain, Tijuana Hills, Torrey Pines State Park, Carrol Canyon, Lake Murray Dam, Upper Otay Reservoir, Miramar Reservoir, southwest of the San Vicente Reservoir, the Peñasquitos Canyon Preserve, and Black Mountain.

It primarily occurs on mild to moderate slopes with rocky or cobbly soils in association with coastal sage scrub. This species has also been documented in chaparral and grassland habitats, as well as on mima mound topography in association with vernal pools. This barrel cactus utilizes a number of soil types such as Stockpen gravelly clay loams, San Miguel-Exchequer rocky silt loams, and Redding gravelly loams.

Threats and Limiting Factors. The primary threats to this species are urban expansion along the coastal plain, off-road vehicular traffic, horticultural collecting, and edge effects. Spread of the species into new areas appears to be very slow and may be impaired by soil disturbance and associated invasion by weedy plant species.

Special Considerations. Coast barrel cactus is a perennial plant (stem succulent) that presumably is not particularly well adapted to fire because of its succulence. It is insect-pollinated. It has a fleshy fruit, and seeds are presumably self-dispersed. It apparently

spreads slowly and requires relatively open, undisturbed ground with sparse herbaceous cover within open shrublands.

3.16.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey Area

According to the CNDDDB records, San Diego barrel cactus is known from 42 occurrences within Survey Area. There are known populations of San Diego barrel cactus within the Survey Area at the following locations: south of Lake Hodges (Attachment 1, Figure B-9), a cluster of populations west of Poway (Attachment 1, Figure B-10), west of San Vicente Reservoir (Attachment 1, Figure B-11), in Miramar (Attachment 1, Figure B-12), north of Lake Murray (Attachment 1, Figure B-14), near the Sweetwater reservoir (Attachment 1, Figures B-14 and B-15), near Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 42 occurrences of San Diego within the Survey Area, the CNDDDB records list 7 occurrences within the PIZ. Known populations of San Diego barrel cactus occur within the PIZ occur at the following locations: west of the Olivenhain Reservoir (Attachment 1, Figure B-8), west of Poway (Attachment 1, Figure B-10), in Miramar (Attachment 1, Figure B-12), and near the Sweetwater Reservoir (Attachment 1, Figure B-15).

Preserve Area

This species is present at the San Miguel HMA (Attachment 1, Figure B-16; State of California 2007b; Merkel 1997) and the Montaña Mirador property (Attachment 1, Figure B-10; City of San Diego 2004).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. The San Miguel HMA supports the San Diego barrel cactus. Exhibit J of the banking agreement lists 1,620 cactus plants in a small, approximately 1.8-acre area and 6,235 cactus plants distributed on 39 acres, at a density of 160 plants per acre. These cactus plants are available as mitigation credits. For O&M Activities, if avoidance is not possible, mitigation credits will be deducted or a restoration program implemented.

In summary, San Diego barrel cactus prefers habitat with mild to moderate slopes with rocky or cobbly soils in association with coastal sage scrub. This species has also been documented in chaparral and grassland habitats, as well as on mima mound topography in association with vernal pools. Based on the preferred habitat, this species could occur

in the Plan Area in chaparral and coastal sage scrub and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, and southern coastal bluff scrub (see Table B-1B). There are 9,865 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (see Table B-1A). Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities).

According to Table B-1A, the Plan provides 123 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, information about available habitat from surveys or reports for the Preserve Area is provided to supplement the habitat calculations and analysis presented in Table B-1A. In the case of San Diego barrel cactus, there are over 40 acres of suitable habitat documented at the Preserve Area. In the event that the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego barrel cactus in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.16.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:

Appendix B Covered Species Analysis

- a. Survey the Preserve Area to determine presence of San Diego barrel cactus. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

3.17 San Diego Marsh-elder (*Iva hayesiana*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Covered

Covered by MSCP: No

3.17.1 Background

Distribution, Abundance, and Trends. San Diego marsh-elder is a perennial subshrub and is restricted to southwestern San Diego County and northern Baja California, Mexico (Reiser 2001). In San Diego County, the species' range is primarily west of Interstate 15 and south of Highway 78 and is to be looked for in any drainage in the south County near the coast. The highest concentrations for this shrub occur in the Otay River. It also is found near Lower Otay Lake, Otay Mesa, the Tijuana River in Marron Valley, Tecate Creek, Otay Mountain, San Miguel Mountain, Mother Miguel Mountain, Peñasquitos Creek, Escondido Creek, San Marcos Creek, San Dieguito River and tributaries to these streams.

Sandy alluvial embankments with cobbles along creeks or intermittent streams are the preferred habitat for this low-growing, conspicuous shrub. It is rarely situated on seeps near creeks. Typically, the riparian canopy is open allowing substantial sunlight to reach the substory where this species is found. Within the southwestern portion of the County this plant may occur in steep watercourses where other riparian vegetation is not present. While soils are usually mapped as Riverwash, these steeper locales can include various series including San Miguel-Exchequer or Huerhuero loams.

Threats and Limiting Factors. The primary threats to this species are flood control projects and competition from invasive tamarisk. Additional threats to this species include changes in hydrological patterns and/or water quality, cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, and edge effects.

Special Considerations. This species is commercially propagated and has been successfully planted into suitable habitat in restoration projects. It is wind-pollinated and seeds are self-dispersed.

3.17.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey Area

According to the CNDDDB and the SDNHM records, San Diego marsh-elder is known from 26 occurrences within Survey Area. There are known populations of San Diego marsh-elder within the Survey Area at the following locations: along Escondido Creek in Encinitas (Attachment 1, Figure B-8), south of Lake Hodges (Attachment 1, Figure B-9), along the San Dieguito River in Rancho Penasquitos (Attachment 1, Figure B-10), near Lake Murray (Attachment 1, Figure B-14), and near the Lower Otay Reservoir (Attachment 1, Figures B-15 and B-16).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are two populations of San Diego marsh-elder within the PIZ.

Preserve Area

San Diego marsh-elder is present at the San Miguel HMA (Merkel 1997) and is expected to occur within the Water Authority wetland mitigation sites.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. The San Miguel HMA supports the San Diego marsh-elder. Exhibit J of the bank agreement lists 340 plants on 5 acres as available for mitigation credits.

In summary, the preferred habitat type for San Diego marsh-elder is sandy alluvial embankments with cobbles along creeks or intermittent streams. Based on the preferred habitat, this species could occur in the Plan Area in riparian and freshwater aquatic communities (see Table B-1B). There are 532 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 14 acres of potential habitat for this species could be impacted (5 acres by Planned Projects and 9 acres by Future Projects and O&M Activities). According to Table B-1A, the Plan provides 21 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, information about available habitat from surveys or reports for the Preserve Area is provided to supplement the habitat calculations and analysis presented in Table B-1A. In the case of San Diego marsh-elder, there are five acres of suitable habitat documented at the Preserve Area.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego marsh-elder in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.17.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).

3.18 Felt-leaved Monardella (*Monardella hypoleuca* ssp. *lanata*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.18.1 Background

Distribution, Abundance, and Trends. Felt-leaved monardella ranges from Orange County south into San Diego County and Baja California, Mexico. In San Diego County, populations occur in the upper elevations of Otay Mountain, the San Marcos Mountains, and white-leaf monardella (*M. hypoleuca* ssp. *hypoleuca*) occurs in the Delta Sector of the Santa Margarita Mountains on Camp Pendleton. Felt-leaved monardella occurs in low numbers on Mount Woodson, the summit of Black Mountain-Lusardi, Tecate Peak, Iron Mountain, and Sequan Peak. Collections in the San Diego Herbarium are from the vicinity of Lake Hodges, El Cajon Mountain, McGinty Peak, Lawson Peak, Lyons Peak, Cuyamaca Peak, Potrero Peak, Featherstone Creek near Barona, and Poser Mountain. It is also reported from San Miguel Mountain, Viejas Mountain, south of Hidden Glen, Rancho Ballena, northwest of Lyons Peak, around the San Luis Rey River, west of Lusardi Canyon, Cuyamaca Rancho State Park; Barber Mountain, on old Viejas Grade (Reiser 2001).

This suffrutescent perennial occurs in the understory of chaparral habitat. Typically, it occurs beneath mature stands of chamise on dry slopes. San Miguel-Exchequer rocky silt loams are found at the Otay Mountain sites, while Acid Igneous rock lands occur on Mount Woodson.

Threats and Limiting Factors. The primary threats to this species are short-interval fires that remove the seed bank. Additional threats to this species include cumulative habitat degradation, trampling, invasive and exotic plants, and edge effects.

Special Considerations. Felt-leaved monardella populations are presumed stable in San Diego County, given this subspecies' tendency to occupy undeveloped peaks and mountainous ridgelines; however, along with a suite of other sensitive shrubs restricted to metavolcanic and gabbroic soils in the County, the rarity of this species is strongly correlated with the scarcity of suitable habitat in the region.

3.18.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are 4 known populations of felt-leaved monardella within the Survey Area, some of which are east of Vista at Old Castle Road (Attachment 1, Figure B-5, Ogden 1995) and near the Olivenhain Reservoir (Attachment 1, Figure B-9).

Probable Impact Zone (PIZ)

According to the CNDDDB specimen records, felt-leaved monardella occurs at 1 location within the PIZ near the Olivenhain Reservoir (Attachment 1, Figure B-9).

Preserve Area

This species is not currently known to occur within the Preserve Area, but has potential to occur within the Elfin Forest Reserve in suitable habitat.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. There is potential for this species to occur in suitable habitat within the Elfin Forest Reserve.

In summary, the preferred habitat type for felt-leaved monardella is chaparral. Based on the preferred habitat, this species could occur in the Plan Area in chaparral and chaparral montane/trans-montane (see Table B-1B). There are 8,163 acres of this vegetation community within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). The Plan provides 123 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of felt-leaved monardella by maintaining a no-net-loss of populations within the Plan Area and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.18.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following
 - a. Survey the Preserve Area to determine presence of felt-leaved monardella. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once felt-leaved monardella has been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, it may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known felt-leaved monardella locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

4. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an herbaceous annual, surveys for felt-leaved monardella shall be conducted during its blooming period (June-July) to ensure proper identification.

3.19 Willowy Monardella (*Monardella viminea*)

USFWS: Endangered, Designated Critical Habitat

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

3.19.1 Background

Distribution, Abundance, and Trends. The range of willowy monardella is limited to central San Diego County and northwestern Baja California, Mexico. Historical and current colonies occur in the Mira Mesa and Miramar regions. The populations in San Clemente Canyon, West Sycamore Canyon, Lopez Canyon, Carroll Canyon, and Murphy Canyon are subject to impacts from erosion, invasive species, and industrial development. A vigorous Otay Mountain population of *M. linoides* has wider leaves than typical *M. viminea*, and is similar to specimens collected in Baja California, Mexico.

Riparian scrub with sandy soils and cobbles along the periphery of seasonal drainages or intermittent creeks is the typical habitat of this small subshrub. Generally there is no canopy cover, although scattered western sycamores may grow nearby. Willowy monardella is likely adapted to occasional flooding episodes that may serve to expand local populations downstream; pioneering in newly created embankments of cobble and silty materials. Soils are mapped as stony lands in West Sycamore Canyon and Riverwash in San Clemente Canyon.

Critical Habitat. Seventy-three acres of critical habitat for willowy monardella was designated in 2007. All of the critical habitat for this species is within San Diego County and occurs within the Plan Area (USFWS 2006a; see Table B-2).

Threats and Limiting Factors. The primary threats to this subspecies are various urban development projects within floodplains and watersheds, increased urban runoff, degradation of washes and adjacent terraces (e.g., increase erosion), and invasion from exotic species.

Special Considerations. Willowy monardella is severely declining in San Diego County. Sandy embankments in major canyon riparian systems along the coast that are primary microhabitat of willowy monardella are rapidly being developed, degraded, or eroded and lost due to urban runoff and occasional heavy flooding. Horse and hiking trails could be cumulatively damaging in some areas that coincide with known populations. It is seriously imperiled throughout most of its extremely narrow range. This species can be cultivated, which may facilitate restoration of degraded populations, although some

nursery grown stock has been found to be drought intolerant and suffered high mortality at restoration sites (Reiser 1994).

3.19.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are six known populations of willowy monardella within the Survey Area. These populations are all clustered in Mirarmar, MCAS Mirarmar (MCAS INRMP 2006, Attachment 1, Figure B-12).

Probable Impact Zone (PIZ)

According to the CNDDDB specimen records, willowy monardella occurs at 1 location within the PIZ.

Preserve Area

This species is not currently known or expected to occur on the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy and the Wetland Protection Program. Where avoidance is not possible, the population to be impacted will be counted and restored at a no-net-loss to the population.

In summary, the preferred habitat type for willowy monardella is riparian scrub. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: mule fat scrub and southern willow scrub (see Table B-1B). There are 299 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 14 acres of potential habitat for this species could be impacted (5 acres by Planned Projects and 9 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Critical habitat for this species is present both within the Plan Area and the PIZ. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with

credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. This species is a riparian species and riparian habitat can be avoided by boring beneath stream courses and setting staging areas away from the riparian habitat. Wetland buffers implemented under the Wetland Protection Program will also reduce indirect impacts to this species. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of willow monardella in the Plan Area by maintaining a no-net-loss of populations and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.19.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. For unavoidable temporary impacts, this species would be salvaged and restored in accordance with an approved restoration plan. This plan would be prepared in advance of project impacts and approved by the Wildlife Agencies.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the

potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known willow monardella locations.

- b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

3.20 San Diego Goldenstar (*Muilla clevelandii*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: Yes

3.20.1 Background

Distribution, Abundance, and Trends. San Diego goldenstar is found only in southwestern San Diego County and northwestern Baja California, Mexico (Reiser 2001). This corm grows near vernal pools on and around Otay Mesa, Miramar Mounds, Miramar Air Station, around the Otay Lakes and Reservoirs, Proctor Valley, Escondido Creek near Via de las Flores, East Lake Chula Vista, Santee (here plants grow in great masses around ashy spike-moss [*Selaginella cinerascens*] balds), the Sweetwater Reservoir, the San Dieguito Reservoir, Lopez Canyon, near Beeler Creek in Poway, west of Escondido Creek, Mission Trails Park, Los Peñasquitos Canyon, Murphy Canyon, San Miguel Mountain, and Lake San Marcos Dam. Herbarium specimens include Foster (i.e., San Vicente Reservoir) and a locale at Rancho Santa Fe.

Clay soils in valley grasslands, coastal sage scrub, and chaparral, particularly in association with mima mound topography or vernal pools, are the preferred habitat of this perennial corm. This plant does not typically grow in the shade of woody perennials, but is found in more open locales. Redding Cobbly loams are mapped for locations near Miramar, while Stockpen gravelly clay loam is found with the populations on northeastern Otay Mesa. Given the dearth of shrubs associated with goldenstar, clay soils with good shrink/swell potential (which discourages the establishment of shrubs) are preferred.

Threats and Limiting Factors. The primary threats to this species are landfill expansion and various urban development projects in southwestern San Diego County. Additional threats to this species include cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, bulb collecting, invasive and exotic plants, and edge effects.

Special Considerations. San Diego goldenstar is an herbaceous perennial that reproduces asexually by producing corm offsets. Transplantation/reintroduction of corms and corm offsets may be an effective method of enhancing populations (ERCE 1993). Seeds are presumably self-dispersed. The flowering of corm species depends on climatic conditions and, as such, this species has been found to dramatically differ in

expression among growing seasons depending on rainfall and could be missed during a poor survey year. Effective conservation of San Diego goldenstar will require conservation of adequate habitat to support insect pollinators, to allow for population expansion through production of corm offsets, and to buffer (at least 100 feet) against adverse edge effects.

Studies have shown that fire can be beneficial to geophytes because it removes thatch and non-native grasses/forbs and the resulting increase in light level at the ground surface and/or influx of post-fire nutrients stimulates growth and blooming. In addition, most bulbs/corms are buried deeply enough that they are not damaged by fire.

3.20.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 21 known populations of San Diego goldenstar within the Survey Area. There are known populations of San Diego goldenstar within the Survey Area at the following locations: south of Escondido Creek in Encinitas (Attachment 1, Figure B-8), south of Rancho Bernardo Road and west of I-15 (Attachment 1, Figure B-10), east of I-15 and south of San Vicente Reservoir (Attachment 1, Figure B-12 and B-13), north and south of Lake Murray (Attachment 1, Figure B-14), south of Sweetwater River (Attachment 1, Figures B-14), and east of Lower Otay Reservoir (Attachment 1, Figure B16).

Probable Impact Zone (PIZ)

Of the 21 occurrences of San Diego goldenstar within the Survey Area, CNDDDB and SDNHM list 4 occurrences within the PIZ. Known populations of San Diego goldenstar within the PIZ occur at the following locations: south of Escondido Creek (Attachment 1, Figure B-8), south of Rancho Bernardo Road (Attachment 1, Figure B-10), south of San Vicente Reservoir (Attachment 1, Figure B-12 and B-13), and north of Lake Murray (Attachment 1, Figure B-14).

Preserve Area

This species occurs within the San Miguel HMA (Attachment 1, Figure B-15). A high density population of San Diego goldenstar is present at San Miguel HMA within the perennial grassland (Merkel 1997).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage.

In summary, San Diego goldenstar prefers clay soils in valley grasslands, coastal sage scrub, and chaparral, particularly in association with mima mound topography or vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub and southern coastal bluff scrub (see Table B-1B). There are 18,024 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Diego goldenstar in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.20.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Vernal Pool Protection Policy, where the species occurs in vernal pool habitat (see Section 6.7.3 of the Plan).
3. Establish a minimum habitat buffer of 100 feet when feasible around population to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
4. Where impacts to vernal pools supporting San Diego goldenstar are unavoidable, mitigation should include salvage of seed and/or corms to be included in any suitable vernal pool restoration.
5. Encroachment of non-native species will be minimized by limiting soil disturbance when feasible within 50 feet of San Diego goldenstar populations.

6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is a bulbiferous perennial herb, surveys for San Diego goldenstar shall be conducted during its blooming period (April-May) to ensure proper identification.

3.21 Spreading *Navarretia* (*Navarretia fossalis*)

USFWS: Threatened; Re-Proposed Critical Habitat

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

3.21.1 Background

Distribution, Abundance, and Trends. Spreading *navarretia* occurs in western Riverside and southwestern San Diego counties and in northwestern Baja California, Mexico (Reiser 2001). Populations grow in vernal pools on Otay Mesa and within the surrounding region to Tijuana, Mexico. Spreading *navarretia* also grows in conspicuous mounded pools in the Chula Vista region, in a large vernal pool on Camp Pendleton, in the vast vernal pool in Ramona (near the Airport and downtown), and possibly in a highly degraded vernal pool system in San Marcos. Historic and current reports note this species in Carlsbad, in the vicinity of Highway 163 and Miramar; and for Riverside County in Hemet, Skunk Hollow, south of Highway 79 near Vail Lake, in the vicinity of Perris, and in the San Jacinto Wildlife Area.

This species is found in vernal pools and swales and in alkali grasslands, sinks and playas with clay soils. Depth of pool is a significant factor determining suitable habitat for this species; it is typically found in deeper, more permanent pools and is rarely found in shallower pools. Huerhuero loam is mapped for both the Dillon Road population and the vernal pool complex on Stewart Mesa at Camp Pendleton.

Critical Habitat. Although the original final critical habitat only covered 652 acres, a total of 6,872 acres of critical habitat in Los Angeles and San Diego County has been re-proposed for spreading *navarretia*. The re-proposed critical habitat for spreading *navarretia* is present on 118 acres in the PIZ and on 1,057 acres within the Plan Area (see Table B-2).

Threats and Limiting Factors. The primary threat to this species is general loss of vernal pool habitat to urban development and associated edge effects (including alterations in the watershed that may reduce the source and/or quality of water and encourage invasion of habitat by upland plant species) (MHCP 2003). Additional threats to this species include cumulative habitat degradation, alteration of vernal pool habitat, and introduction of non-native plants.

Special Considerations. Spreading *navarretia* is a low, spreading or ascending annual herb that may experience yearly fluctuations in population size. Population size in any

given year is strongly correlated with rainfall, and plant numbers may be drastically reduced during drought. This species is presumably self-breeding (autogamous) (Grant and Grant 1965; Spencer and Rieseberg 1998), and seeds are presumably self-dispersed; as a result, genetic consequences may be less of a concern in terms of preserve design for this species as opposed to most other vernal pool species. Spreading navarretia has specific hydrological requirements. Therefore, effective conservation of this species must manage the vernal pool watershed in a manner that maintains the hydrological regime and associated watershed.

3.21.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 30 known populations of spreading navarretia within the Survey Area. There are known populations of spreading navarretia within the Survey Area at the following locations: southwest of Lake Skinner (Attachment 1, Figure B-2), northeast of San Marcos Lake and north of Agua Hedionda Creek (Attachment 1, Figure B-6), south of San Dieguito River (Attachment 1, Figure B-8), north and east of San Dieguito River (Attachment 1, Figure B-10), and south of Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

Of the occurrences of spreading navarretia within the Survey Area, the CNDDDB lists 4 occurrences within the PIZ, and SDNHM records indicate that there is 1 occurrence within the PIZ. Known populations of spreading navarretia within the PIZ occur at the following locations: southwest of Lake Skinner (Attachment 1, Figure B-2), and northeast of San Marcos Lake and north of Agua Hedionda Creek (Attachment 1, Figure B-6).

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Vernal pool impacts will be avoided and minimized in accordance with the Vernal Pool Protection Policy; however, incidental take may occur.

In summary, the preferred habitat types for spreading navarretia are vernal pools and swales and in alkali grasslands, sinks, and playatas with clay soils. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: alkali wetlands (alkali seep, alkali marsh, cismontane alkali marsh),

alkali vernal pools, San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). There are 34 acres of these vegetation subcommunities within the PIZ. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat of this species. As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

Impacts from new construction projects are not proposed to impact this species, as the majority of vernal pool complexes are avoided by design considerations. The majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of spreading navarretia in the Plan Area by maintaining a no-net-loss of populations and/or contributing funds to other regional conservation efforts or species specific management programs. In addition,

protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.21.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known spreading navarretia locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an annual herb, surveys for spreading navarretia shall be conducted during its blooming period (April-June) to ensure proper identification.

3.22 Chaparral Nolina (*Nolina cisMontaña*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: No

3.22.1 Background

Distribution, Abundance, and Trends. This species ranges from Ventura to San Diego counties on the coastal side of the interior mountain ranges below 3,000 feet (Hess and Dice 1995). Chaparral nolina grows in considerable numbers northeast of Gregory Canyon overlooking the San Luis Rey River, near Highway S-16 just north of Pala, and northeast of Mount Olympus and Viejas Mountain. It is locally common in the rugged terrain near Live Oak Canyon in Orange County. A number of reports are for the Santa Ana Mountains in this region, as well as Claymine Canyon. Additional reports are from near Medea Creek south-southeast of Simi Peak, as well as the foothills of the Santa Ynez Mountains near the head of the Santa Ana Valley in Ventura County (Reiser 2001).

This distinctive shrub generally grows in xeric Diegan coastal sage scrub and open chaparral on sandstone or shale substrates. In Orange County erosion is often conspicuous where it occurs on Cieneba soils. Las Posas fine sandy loams are mapped for the San Luis Rey River HMA. Also, reportedly utilized are other soil types including Lodo, Calleguas-Arnold complex, and Anaheim.

Threats and Limiting Factors. The primary threats to this species are orchard expansion and rural habitat clearance within individual lots. Additional threats to this species include cumulative habitat degradation, alteration of the natural fire regime, invasive and exotic plants, and edge effects.

Special Considerations. The erratic distribution of this species indicates it may be a relict component of a juniper woodland association, now almost absent from cismontane southern California (Reiser 2001).

3.22.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are two known populations of chaparral nolina within the Survey Area. There are known populations of chaparral nolina within the survey area at the following locations: north and south of Pala Road (Attachment 1, Figure B-4).

Probable Impact Zone (PIZ)

Of the 2 occurrences of chaparral nolina within the Survey Area, the CNDDDB lists 1 occurrence within the PIZ. Known populations of chaparral nolina within the PIZ occur near Pala Road (Attachment 1, Figure B-4).

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan conditions for coverage. Any impacts to this species would be mitigated through coordination with other regional planning efforts (e.g., NCMSCP).

In summary, chaparral nolina prefers xeric Diegan coastal sage scrub and open chaparral on sandstone or shale substrates as habitat. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage scrub (Diegan) (see Table B-1B). There are 9,054 acres of this vegetation subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank,

acquire additional habitat acreage to add to a Preserve Area, or provide a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of chaparral nolina by contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.22.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Areas and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known chaparral nolina locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in

accordance with a Wildlife Agency-approved restoration and monitoring program.

3.23 California Orcutt Grass (*Orcuttia californica*)

USFWS: Endangered

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Major Amendment Species, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

3.23.1 Background

Distribution, Abundance, and Trends. California Orcutt grass is currently known from Ventura, Riverside, and San Diego counties, and Baja California, Mexico. It is apparently extirpated from Los Angeles County and is currently reported from fewer than 20 locations throughout its range (Reiser 2001). California Orcutt grass is common in very few vernal pools on Otay Mesa and near Spring Canyon. This grass is reported near the Miramar Air Field runway, the vernal pools in Carlsbad (next to the Carlsbad Poinsettia Train Station), near Brown Field on Otay Mesa, Skunk Hollow in western Riverside County (very rarely ponds substantial water) on the Santa Rosa Plateau, and almost monotypic stands grow in a vernal pool complex near Hemet. Database records for Riverside County are for six pools on Mesa de Burro and three pools of the Mesa de Colorado of the Santa Rosa Plateau.

Vernal pools are the preferred habitat of this inconspicuous prostrate grass. At the few locales examined, vernal pool associates were not representative of the pool flora in the region, but limited to certain species (Reiser 2001). California Orcutt grass tends to grow in wetter portions of the vernal pool basins, with the majority of annual growth occurring once the basins become somewhat desiccated.

Threats and Limiting Factors. The primary threats to this species in San Diego County are general loss of vernal pool habitat to urban development and associated edge effects (including alterations in the watershed that may reduce the source and/or quality of water and encourage invasion of habitat by upland plant species), agriculture, introduction of non-native plant species and road construction (MHCP 2003). In Riverside County, this species is threatened by urbanization, pipeline construction, alteration of hydrologic regimes, off-road vehicle use, grazing, and introduction of non-native plants (RCIP 2003).

Special Considerations. California Orcutt grass is an annual plant that may experience yearly fluctuations in population size in association with climatic variation. This species

also has specific hydrological requirements. Therefore, effective conservation of this species must manage the vernal pool watershed in a manner that maintains both the hydrological regime and water quality.

3.23.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are two known populations of California Orcutt grass within the Survey Area. There are known populations of California Orcutt grass within the Survey Area east of State Route 79 (Attachment 1, Figure B-2).

Probable Impact Zone (PIZ)

CNDDDB and SDNHM do not list any occurrences of California Orcutt grass within the PIZ.

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Vernal pool impacts will be avoided and minimized in accordance with the Vernal Pool Protection Policy.

In summary, the preferred habitat for California Orcutt grass is vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities identified within the PIZ, 24 acres occur within the Survey Area. Within the Plan Area, California Orcutt grass is only known to occur within the Major Amendment Area in Riverside County. Given this, no take is assumed to occur for this species under this Plan. If project-specific information becomes available indicating that vegetation communities with the preferred habitat for this species may be impacted, then a Major Amendment for this species will be required. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan does not anticipate an impact to this species though direct temporary habitat disturbance or other indirect impacts as a result of disturbance from O&M Activities. Impacts from new construction projects are not proposed to impact this species, as the majority of vernal pool complexes are avoided by design considerations.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of California Orcutt grass in the Plan Area by maintaining a no-net-loss of populations and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.23.3 Conditions for Coverage

In the event of a Major Amendment to allow take of this species, the following conditions would apply:

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement the Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Areas and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known California Orcutt Grass locations.

- b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an annual herb, surveys for California Orcutt grass shall be conducted during its blooming period (April-June) to ensure proper identification.

3.24 San Diego Mesa Mint (*Pogogyne abramsii*)

USFWS: Endangered

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

3.24.1 Background

Distribution, Abundance, and Trends. San Diego mesa mint is endemic to San Diego County. San Diego mesa mint is locally common at Miramar mounds. The majority of the remaining San Diego mesa mint now grows in vernal pool areas clustered within the limited mesa lands of MCAS Miramar, Clairemont, and La Mesa.

Vernal pools, often associated with pronounced mima mound areas with vernal moist conditions, are the preferred habitat for this species. Redding gravelly loams appear to provide optimal soils for the populations at Miramar Mounds. Oftentimes this mint blooms profusely following heavy inundation and standing water in the pools; sometimes blanketing pool basins with flowers. Individual flowers may bloom late, well into the summer. During drought years, only sporadic portions of the pool basins may exhibit coverage with this mint. An unusually open chamise chaparral often occurs on the periphery of the pools and typically includes the Nuttall's scrub oak. Sometimes habitat can be identified from aerial photographs by searching for mima mound topography. The surface of these small mounds is quite distinctive and may harbor vernal pools in the low-lying, intervening areas between the mounds.

Threats and Limiting Factors. The primary threats to this species are continued loss of general vernal pool habitat to urban development and associated edge effects (including alterations in the watershed that may reduce the source and/or quality of water and encourage invasion of habitat by upland plant species). Additional threats to this species include cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, and invasive and exotic plants.

Special Considerations. San Diego mesa mint is an annual that may not bloom, or may bloom in very limited numbers, in drought years.

3.24.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB specimen records, there are seven known populations of San Diego mesa mint within the Survey Area. There are known populations of San Diego mesa mint within the Survey Area at the following locations: west and of Interstate 15 and north of Los Penasquitos Creek (Attachment 1, Figure B-10 and B-12).

Probable Impact Zone (PIZ)

According to the CNDDDB records, there is 1 known occurrence within the PIZ. This population occurs east of Interstate 15 (Attachment 1, Figure B-12).

Preserve Area

According to the CNDDDB and the SDNHM specimen records, San Diego mesa mint does not occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Vernal pool impacts will be avoided and minimized in accordance with the Vernal Pool Protection Policy.

In summary, the preferred habitat for San Diego mesa mint is vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities identified within the PIZ, 24 acres occur within the Survey Area. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat of this species (see Table 6-8 in the Plan). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank,

acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. Impacts from new construction projects are not proposed to impact this species, as the majority of vernal pool complexes are avoided by design considerations. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

The majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Diego mesa mint in the Plan Area by maintaining a no-net-loss of populations, providing conservation within the Mission Trails Regional Park restoration site, and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.24.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement the Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of San Diego mesa mint. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once San Diego mesa mint has been mapped in the Preserve Area, the

occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known San Diego mesa mint locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an annual herb, surveys for San Diego mesa mint shall be conducted during its blooming period (April-June) to ensure proper identification.

3.25 Otay Mesa Mint (*Pogogyne nudiuscula*)

USFWS: Endangered

CDFG: Endangered

CNPS List: 1B

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

3.25.1 Background

Distribution, Abundance, and Trends. Otay Mesa mint is found only in southern San Diego County. This mint grows in vernal pools near the Otay Mesa region. The plants in the somewhat more protected pools on northeastern Otay Mesa possess the only healthy, well-protected, and vigorous populations. Historically, the plant occurred in pools east of Brown Field, Mission Valley near Adobe Falls, in the former extensive vernal pool complex that once occurred at San Diego State University, and within surrounding residential areas may have had populations of this annual. It also historically grew in nearby vernal pools near the Tijuana Airport in Baja California, Mexico, but may be extirpated there due to urban development.

Oftentimes, this mint blooms profusely following heavy inundation and standing water in the pools; sometimes blanketing pool basins with flowers. Individual flowers may bloom late well into the summer. During drought years, only sporadic portions of the pool basins may exhibit coverage with this mint. Stockpen gravelly clay loam is the preferred soil type. While some chamise chaparral is associated with Otay Mesa mint in the extreme northeastern corner of Otay Mesa, most of the colonies occur in open grasslands with mima mound topography.

Threats and Limiting Factors. The primary threat to this species is the continued loss of general vernal pool habitat to development on Otay Mesa and associated edge effects (including alterations in the watershed that may reduce the source and/or quality of water and encourage invasion of habitat by upland plant species). Additional threats to this species include cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Otay Mesa mint is an annual and may not appear some years under drought conditions. This species must be managed through vernal pool management and restoration, including species salvage and seeding, exotic species management, and the establishment of adequate buffers (at least 100 feet) around existing populations to reduce edge effects.

3.25.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are three known populations of Otay Mesa mint within the Survey Area. The known population of Otay Mesa mint within the Survey Area is location south of Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of Otay Mesa mint within the PIZ.

Preserve Area

According to the CNDDDB and the SDNHM specimen records, Otay Mesa mint is not expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Vernal pool impacts will be avoided and minimized in accordance with the Vernal Pool Protection Policy.

In summary, the preferred habitat for Otay Mesa mint is vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities identified within the PIZ, 24 acres occur within the Survey Area. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat of this species (see Table 6-8 in the Plan). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank,

acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. Impacts from new construction projects are not proposed to impact this species, as the majority of vernal pool complexes are avoided by design considerations. Per the Narrow Endemic Policy, populations within the Plan Area will be avoided to the maximum extent practicable, with a minimum 80-percent avoidance for Planned and Future Projects, and mitigated to a minimum 1:1 conservation ratio.

The majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Otay mesa mint in the Plan Area by maintaining a no-net-loss of populations within the Plan Area and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.25.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved

restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Otay Mesa mint locations.

- b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an annual herb, surveys for Otay Mesa mint shall be conducted during its blooming period (May-June) to ensure proper identification.

3.26 Nuttall's Scrub Oak (*Quercus dumosa*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: No

3.26.1 Background

Distribution, Abundance, and Trends. Nuttall's scrub oak has a disjunct distribution that includes Orange and San Diego counties. In San Diego County, Nuttall's scrub oak is known to occur at Point Loma, Torrey Pines State Park along the immediate coast, Carlsbad, Del Mar, Rancho Sante Fe, Peñasquitos Canyon Preserve, La Jolla, Miramar Naval Airbase, Camp Elliott, neighborhoods surrounding Linda Vista and Clairemont, and on the northwestern slopes of Otay Mesa. A characteristic, low-growing colony is found in the vicinity of Poway. Hybrid traits exist north of Carlsbad. Herbarium specimens examined from San Diego County include the sites mentioned above, at Dana Point in Orange County, and in Laguna Niguel. A small stand occurs near Newport Beach on Pelican Hill where some shrubs show hybrid tendencies; this may be the northernmost colony. This species is also reported for Orange County in Aliso-Wood Canyon Regional Park and Los Truncos Canyon.

Coastal chaparral on flat terrain and/or sandy soils with a relatively open canopy is the preferred habitat for this species (on north-facing slopes this shrub may grow in dense monotypic stands). Chesterton fine sandy loams are mapped for the MCAS Miramar population.

Threats and Limiting Factors. The primary threats to this species are loss of potential habitat and direct impacts from residential construction. Additional threats to this species include cumulative habitat degradation and fragmentation, alteration in the natural fire regime, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects. Present rarity of Nuttall's scrub oak is directly related to urban development and loss of habitat along the coast.

Special Considerations. Nuttall's scrub oak is a fire-adapted evergreen shrub that resprouts from buried root crowns. It is also wind-pollinated, and seeds (acorns) are both self- and animal-dispersed. Nuttall's scrub oak hybridizes with scrub oak (*Q. berberidifolia*), making identification difficult. Although the species' range is fairly well defined along the immediate coast, its inland extent is not as clearly established.

3.26.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are nine known populations of Nuttall's scrub oak within the Survey Area. There are known populations of Nuttall's scrub oak within the Survey Area at the following locations: north and south of San Dieguito River, and south of Los Penasquitos Creek (Attachment 1, Figure B-10), south of Scripps Poway Parkway (Attachment 1, Figure B-11), and south of Miramar Reservoir (Attachment 1, Figure B-12).

Probable Impact Zone (PIZ)

According to the CNDDDB specimen records, there is one known population of Nuttall's scrub oak within the PIZ.

Preserve Area

According to the CNDDDB and the SDNHM specimen records, Nuttall's scrub oak is not expected to occur within the designated Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. Avoidance and minimization measures are described in the Plan conditions for coverage.

In summary, the preferred habitat for Nuttall's scrub oak is coastal chaparral. Based on the preferred habitat, this species could occur in the Plan Area in the following chaparral subcommunities: southern maritime chaparral, ceanothus crassifolius chaparral, chamise chaparral (granitic chamise chaparral), northern mixed chaparral, northern mixed chaparral (granitic), scrub oak chaparral, southern mixed chaparral, and southern mixed chaparral (granitic) (see Table B-1B). There are 8,163 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). The Plan provides 123 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss

of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Nuttall's scrub oak by contributing funds to other regional conservation efforts or species specific management programs should impacts occur. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.26.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Nuttall's scrub oak locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.

3.27 Munz's Sage (*Salvia munzii*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Covered

Covered by MSCP: No

3.27.1 Background

Distribution, Abundance, and Trends. The range of this species includes San Diego County and Baja California, Mexico. This is a dominant shrub growing in the many thousands north of the eastern arm of Lower Otay Lake. It is locally common in the Jamul Mountains and on the slopes of San Miguel Mountain. Dictionary Hill is its northernmost known locale (Reiser 2001).

Munz's sage is found in coastal sage scrub and lower chaparral habitats below 2,500 feet. It is dominant to common in sage scrub near Lower Otay Lake, San Miguel Mountain, and Jamul Mountain, and is relatively common in northern Baja California, Mexico (Reiser 2001).

Threats and Limiting Factors. The primary threats to this species are urbanization and alteration of the natural fire regime. Additional threats to this species include cumulative habitat degradation, invasive and exotic plants, and edge effects. Although the species is relatively common in northern Baja California, substantial human disturbance in the border region may affect the long term viability of the species (Rahn et al. 2008).

Special Considerations. The majority of U.S. populations of Munz's sage are presently stable, with the exception of a vigorous population that is imperiled by residential development in the Otay Lakes area (Reiser 2001). Locally it is restricted to metavolcanic soils that are uncommon in southern San Diego County.

3.27.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 13 known populations of Munz's sage within the Survey Area. There are known populations of Munz's sage within the Survey Area at the following locations: north and south of

Sweetwater Reservoir (Attachment 1, Figure B-15), and northwest, west, and south of Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 13 occurrences of Munz's sage within the Survey Area, no occurrences are within the PIZ; however, this species could occur within the PIZ.

Preserve Area

This species occurs within the San Miguel HMA (Attachment 1, Figure B-15). Munz's sage is common in the coastal sage scrub at the San Miguel HMA (Merkel 1997).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. This species is conserved at San Miguel HMA. Mitigation credits may be established for use by the Water Authority at the San Miguel HMA. For O&M Activities, if avoidance is not possible, mitigation credits will be deducted or a restoration program will be implemented.

In summary, the preferred habitat for Munz's sage is coastal sage scrub and lower chaparral. Based on the preferred habitat, this species could occur in the Plan Area in chaparral and coastal sage scrub and the following subcommunities: southern maritime chaparral, southern mixed chaparral (mafic), maritime succulent scrub, Riversidean alluvial fan scrub, and southern coastal bluff scrub (see Table B-1B). There are 18,024 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Munz's sage in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known to occur or contributing funds to other regional conservation efforts or species specific

management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.27.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).

3.28 Parry's Tetracoccus (*Tetracoccus dioicus*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Covered

Covered by MSCP: Yes

3.28.1 Background

Distribution, Abundance, and Trends. Parry's tetracoccus occurs in Orange, Riverside, and San Diego Counties, and in Baja California, Mexico (Reiser 2001). Parry's tetracoccus is rare in the southern portions of San Diego County, such as on McGinty Peak. There are known locations in the vicinity of Loveland Reservoir, Sequan Peak, Sloan Canyon, McGinty Peak and in the vicinity of Rainbow, Pala, and San Marcos Hills (Reiser 2001). Current and historic reports site areas in San Diego County from the Agua Tibia Mountains, Monserate Mountain, De Luz, Tecate Junction, The Mesa, Merriam Mountains, Mount Olympus, Jacumba, and Barona Valley. Parry's tetracoccus was also reported in Orange County for the San Juan Canyon in the Santa Ana Mountains.

A low-growing chamise chaparral with moderately dense canopy cover is the typical habitat of this robust shrub. Usually conditions are xeric with only limited annual growth. This species shows a preference for Las Posas soils.

Threats and Limiting Factors. The primary threats to this species are loss of chaparral habitat due to rural residential construction, clearance of large peripheral areas to deter wild fires, and clearance for orchard plantings. Additional threats to this species include cumulative habitat degradation, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects. Parry's tetracoccus is slowly declining. It is particularly susceptible to orchard expansion in the Pala Mesa region, where clearance of chaparral for avocados and citrus has not historically required biological surveys to determine potential impacts to sensitive shrubs.

Special Considerations. Parry's tetracoccus is restricted to uncommon gabbro-derived soils. It is likely a fire-adapted shrub, although its fire-response mechanism is not known. Like other species that rely on fire for recruitment or regeneration, it may be adversely affected by unnatural fire regimes (e.g., frequent fires, high-intensity fires resulting from fire suppression policies).

3.28.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are 23 known populations of Parry's tetracoccus within the Survey Area. There are known populations of Parry's tetracoccus within the Survey Area at the following locations: near Santa Margarita River and near Interstate 15 (Attachment 1, Figure B-3), near Interstate 15 and west of Pala Temecula Road (Attachment 1, Figure B-4), east of Monte Vista Drive (Attachment 1, Figure B-6), southwest of Interstate 15 (Attachment 1, Figure B-7), and east of San Vicente Reservoir (Attachment 1, Figure B11).

Probable Impact Zone (PIZ)

Of the 23 occurrences of Parry's tetracoccus within the Survey Area, the CNDDDB lists 6 occurrences within the PIZ. Known populations of Parry's tetracoccus within the PIZ occur at the following locations: near Interstate 15 (Attachment 1, Figure B-3), near Interstate 15 and west of Pala Temecula Road (Attachment 1, Figure B-4), east of Monte Vista Drive (Attachment 1, Figure B-6).

Preserve Area

This species is not currently known to occur within the Preserve Area. There are, however, known populations of Parry's tetracoccus near the Rancho Cañada HMA (Attachment 1, Figure 11). There is potential for this species to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. Any impacts to this species would be mitigated through restoration and/or contributions to conservation efforts and in accordance with the North County MSCP.

In summary, chamise chaparral is the preferred habitat for Parry's tetracoccus. Based on the preferred habitat, this species could occur in the Plan Area in interior live oak chaparral (see Table B-1B). There are 28 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 28 acres of potential habitat for this species could be impacted (10 acres by Planned Projects and 18 acres by Future Projects and O&M Activities). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was

developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Parry's tetracoccus in the Plan Area by contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

3.28.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Parry's tetracoccus locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to

other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

- c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.

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4.0 Covered Invertebrates

4.1 Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

USFWS: Threatened; Designated Critical Habitat

CDFG: None

SDCWA Plan: Major Amendment Species, Vernal Pool Protection Policy

Covered by MSCP: No

4.1.1 Background

Distribution, Abundance, and Trends. The vernal pool fairy shrimp is found primarily in the Central Valley and the foothills of the Sierra Nevada in northern California, however, it can be found in vernal pools ranging from Oregon south to western Riverside County, California (USFWS 2003a). At this time, vernal pool fairy shrimp are known from three locations in western Riverside County: the Santa Rosa Plateau Ecological Reserve, Skunk Hollow, and the west Hemet portion of Salt Creek (RCIP 2003).

Vernal pool fairy shrimp is restricted to seasonal (December to early May) cool-water vernal pools that have low to moderate dissolved solids, are unpredictable, and often short lived (Eriksen and Belk 1999). In the southern part of their range, vernal pool fairy shrimp occur in small swales, earthen slumps, and basalt flow depression basins (Belk and Eriksen 1999). Like the San Diego fairy shrimp, this species can occupy very disturbed locations, including pools as small as 1.2 inches deep and covering only 1.8 square feet (Belk and Eriksen 1999), but in southern California, it tends to occur in larger vernal pools. It has been observed in pools with temperatures ranging from 40.1 to 73.4 degrees Fahrenheit (°F), with low to moderate total dissolved solids and alkalinity, and a pH ranging from 6.3 to 8.5 (Keeley 1984).

Vernal pool fairy shrimp are typically found in low population densities (Simovich et al. 1992) and rarely occur in pools with other fairy shrimp species (Eng et al. 1990). Helm (1998) reports a maximum longevity for this species of 139 days, with a mean longevity of 90 days under protected conditions (i.e., no predators present). Multiple hatches (up to six) may occur in a single season. Ephemeral pools occupied by this species may occur for as little as three weeks in the spring, and for six to seven weeks during the winter. The vernal pool fairy shrimp female has a distinctive pear-shaped egg sac that is unlike the more linear egg sacs of other fairy shrimp species in southern California, a feature that is visible with the naked eye.

Critical Habitat. Critical habitat was designated for vernal pool fairy shrimp in 2003, along with three other vernal pool crustaceans and eleven vernal pools plants (USFWS 2003). Economic exclusions were removed from this critical habitat in 2005 (USFWS 2005), and re-defined by species in 2006 (USFWS 2006b). The 2006 administrative revision defines 597,821 acres of critical habitat for the vernal pool fairy shrimp. Although there is designated critical habitat for this species, critical habitat for the vernal pool fairy shrimp does not occur within the Plan Area or PIZ.

Threats and Limiting Factors. The principal threat to this species is habitat fragmentation and loss of vernal pool habitat. Other threats include water quality problems associated with pollutants, alteration of hydrology, and invasion of non-native species (USFWS 2003a).

Special Considerations. Watersheds surrounding pools must be maintained to collect sufficient water to sustain the pools. Surface disturbance to pools by off-road vehicles, livestock grazing, mountain biking, or other such activities can break the hardpan and destroy the natural hydrology of pools at any time of year (e.g., when pools are wet or dry).

Local dispersal of fairy shrimp between pools in a complex may occur during periods of high inundation when several pools may be connected within a watershed (USFWS 1998b). Long distance dispersal of fairy shrimp is thought to occur primarily by the transport of cysts and adults on the bodies of animals (e.g., on the feet of birds), and possibly wind transport of cysts. Proximity to other vernal pools within a vernal pool complex facilitates local recolonization and long-term persistence of the complex. However, isolated pools can receive immigrants, primarily by avian dispersal.

Conservation and management for the species must also include management of the watershed surrounding pools and possibly the subsurface hydrology, both of which must be conserved to provide sufficient water to sustain the pools. Some pools may be too isolated to be quickly recolonized following local extirpation. Therefore, artificial reintroduction of soil inoculum containing vernal pool fairy shrimp cysts may be required to expedite recolonization. Inoculum should be from pools in the same complex and should be tested for genetic similarity prior to reintroduction.

No critical habitat currently occurs within the PIZ or Plan Area. However, if subsequently critical habitat is established within the Plan Area and impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

4.1.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there is one known population of vernal pool fairy shrimp within the Survey Area. The known population of vernal pool fairy shrimp is located within the Survey Area southwest of Lake Skinner (Attachment 1, Figure B-2).

Probable Impact Zone (PIZ)

There are no known occurrences of vernal pool fairy shrimp within the PIZ.

Preserve Area

This species is not currently known or expected to occur on the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Vernal Pool Protection Policy.

In summary, the preferred habitat for vernal pool fairy shrimp is vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities within the PIZ, 24 acres occur within the Survey Area. Within the Plan Area, vernal pool fairy shrimp is only known to occur within the Major Amendment Area in Riverside County. Given this, no take is assumed to occur for this species under this Plan. If project-specific information becomes available indicating that vegetation communities with the preferred habitat for this species may be impacted, then a Major Amendment for this species will be required. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan does not anticipate an impact to this species through direct temporary habitat disturbance or other indirect impacts as a result of disturbance from O&M Activities. Impacts from new construction projects are not proposed to impact this species, as the majority of vernal pool complexes are avoided by design considerations.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan. Given that this species does not currently occur within the Preserve Area, in the event that a Covered Activity would affect vernal pool fairy shrimp, a Major Amendment would be required and any impacts to this species would be mitigated through contributions to the MSHCP Preserve, separate acquisitions that build the Preserve, purchase of mitigation credits from an approved mitigation bank, or other equivalent action.

4.1.3 Conditions for Coverage

In the event of a Major Amendment to allow take of this species, the following conditions would apply:

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of vernal pool fairy shrimp. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
4. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
5. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs.

Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

4.2 San Diego Fairy Shrimp (*Branchinecta sandiegonensis*)

USFWS: Endangered; Designated Critical Habitat

CDFG: None

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

4.2.1 Background

Distribution, Abundance, and Trends. In San Diego County, San Diego fairy shrimp occurs in vernal pools from Camp Pendleton, inland to Ramona and south through Del Mar Mesa, Proctor Valley, and Otay Mesa (USFWS 2007b). San Diego fairy shrimp are also known from vernal pools in Orange and Santa Barbara counties (USFWS 1997a).

San Diego fairy shrimp are apparently restricted to vernal pools with water temperatures ranging from 50 to 80 °F. They are typically found in pools less than 12 inches deep, but have been found in deeper pools as well. San Diego fairy shrimp are occasionally found in ditches and road ruts in degraded vernal pool habitat.

Fairy shrimp cysts are capable of withstanding extreme temperatures and prolonged drying. The microscopic (0.01 to 0.011 inch) cysts are substantially larger than those of versatile fairy shrimp (*Branchinecta lindahli*), the only similar species found within the San Diego fairy shrimp's geographical range. Larvae emerge from cysts and develop into adults sometime between mid-December and early May, after the pools have filled with water (Belk and Eriksen 1999). Development takes between 10 and 20 days and is dependent on water temperature. The San Diego fairy shrimp looks very similar to the much wider-ranging and locally common versatile fairy shrimp. Unlike the versatile fairy shrimp (*B. lynchii*), the clasping antennae of the male San Diego fairy shrimp do not pinch inward on the anterior side, near the tip. In addition, the females have a row of distinctive bifid dorsal processes that look like tiny split hummocks under the microscope, unlike the single-hummocked females of versatile fairy shrimp.

Critical Habitat. Critical habitat was designated for San Diego fairy shrimp in 2000. As a result of litigation, the critical habitat was remanded, but not vacated, in 2002 and re-proposed in 2003. The final critical habitat was re-designated in December 2007 (USFWS 2007c). Approximately 4.7 acres of critical habitat for the San Diego fairy shrimp is present within the Plan Area within rights-of-way and fee-owned parcels (Unit 3C). A total of 46 acres of critical habitat are present in the PIZ, for a total of 2,854 acres are present in the Plan Area (see Table B-2).

Threats and Limiting Factors. Threats to this species include degradation or loss of habitat to urban and water development, flood control, highway and utility projects, off-road vehicular traffic (including mountain biking), illegal dumping, degraded water quality (including changes in water temperature or chemistry), livestock grazing or equestrian uses, and edge effects (USFWS 2007b). As a vernal pool endemic species, the San Diego fairy shrimp is limited by the distribution of soils and hydrology conducive to vernal pool development. Therefore, anything that disrupts the soils or hydrology is considered a limiting factor. Other threats include fragmentation of vernal pool complexes (restricting gene flow between pools), alteration of drainage patterns within the surrounding watershed, and invasion by exotic plants (which can choke out vernal pool basins and impact hydrology) and animals (especially bullfrogs). Long-term threats include the effect of isolation on genetic diversity and locally adapted genotypes, climate changes, air pollution and reduced water quality, and changes in nutrient availability (Bauder 1986, USFWS 1998b, and Bohonak 2005 as cited in USFWS 2007b).

Special Considerations. Watersheds surrounding pools must be maintained to collect sufficient water to sustain the pools. Surface disturbance to pools by off-road vehicles, livestock grazing, mountain biking, or other such activities can break the hardpan and destroy the natural hydrology of pools at any time of year (e.g., when pools are wet or dry).

Local dispersal of fairy shrimp between pools in a complex may occur during periods of high inundation when several pools may be connected within a watershed (USFWS 1998b). Long distance dispersal of San Diego fairy shrimp is thought to occur primarily by the transport of cysts and adults on the bodies of animals (e.g., on the feet of birds), and possibly wind transport of cysts. Proximity to other vernal pools within a vernal pool complex facilitates local recolonization and long-term persistence of the complex. However, isolated pools can receive immigrants, primarily by avian dispersal.

Surveys should be done in any pools having appropriate hydrological and chemical characteristics to potentially support this species, which may include natural or man-made depressions not necessarily classified as vernal pools. Conservation and management for the species must also include management of the watershed surrounding pools and possibly the subsurface hydrology, both of which must be conserved to provide sufficient water to sustain the pools. Some pools may be too isolated to be quickly recolonized following local extirpation. Therefore, artificial reintroduction of soil inoculum containing San Diego fairy shrimp cysts may be required to expedite recolonization. Inoculum should be from pools in the same complex and should be tested for genetic similarity prior to reintroduction.

4.2.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are 10 known populations of San Diego fairy shrimp within the Survey Area. There are known populations of San Diego fairy shrimp within the Survey Area at the following locations: along Las Posas Road in San Marcos near State Route 78 (Attachment 1, Figure B-6), near Interstate 15 (Attachment 1, Figure B-12), and near Chollas Heights Reservoir (Attachment 1, Figure B-14). In addition, one population of San Diego fairy shrimp borders the Survey Area south of Lower Otay Reservoir (Attachment 1, Figure B-16). The San Marcos population along Las Posas Road is considered a critical location under the MHCP (MHCP 2003). The CNDDDB record describes the Mission Trails Regional Park occurrence as a series of 35 vernal pools, one of which is an elongated road rut (State of California 2007b), a total of 9 occupied pools occur west of the second San Diego Aqueduct near the Mission Trails Regional Park Flow Regulatory Structure (FRS II) project area authorized under BO 2007-B-14/2007-F-0022 (USFWS 2007c).

Probable Impact Zone (PIZ)

Of the 10 occurrences of San Diego fairy shrimp within the Survey Area, the CNDDDB lists 1 occurrence within the PIZ. The known population of San Diego fairy shrimp within the PIZ occurs near Interstate 15 (Attachment 1, Figure B-12).

Preserve Area

San Diego fairy shrimp is not currently known or expected to occur within the Water Authority Preserve Area. However, in February 2009 the Water Authority put a contractor under contract to develop and implement a vernal pool restoration plan at the Mission Trails Regional Park. The contractor will consult with the Fish and Wildlife Service regarding the availability of San Diego fairy shrimp inoculums.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy and Vernal Pool Protection Policy. Take of San Diego fairy shrimp associated with the FRS II facility was authorized under BO 2007-B-14/2007-F-0022. However, the BO does not cover take that may occur as part of O&M Activities. Project impacts to San Diego fairy shrimp were mitigated through enhancement of one existing pool and restoration of three new vernal pools within the FRS II project footprint (USFWS 2007c). For the purposes of this Plan, San Diego fairy shrimp is considered to be conserved within the restoration pools at Mission Trails Regional Park. In San Marcos, critical locations of this species are also protected

under the MHCP and the draft San Marcos Subarea Plan. Incidental take may occur if this species inhabits road ruts on the rights-of-way near vernal pools.

In summary, the preferred habitat for San Diego fairy shrimp is vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities identified within the PIZ, 24 acres occur within the Survey Area. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat of this species. As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 in the Plan).

Potential Impacts to the Species. No new construction projects are proposed within San Diego fairy shrimp habitat in the Plan Area, therefore no permanent impacts to this species are anticipated. The majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Impacts to this species are most likely to occur in occupied road ruts. Potential indirect effects would result from encroachment of non-native plant species, off-road vehicle use, hydrological changes, and weed abatement. No significant impacts to critical habitat for this species are anticipated; as stated above, only temporary impacts such as site transit during the dry season and temporary impacts to upland vegetation within designated critical habitat would occur.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Diego fairy shrimp in the Plan

Area by maintaining a minimum 1:1 conservation ratio of populations within the PIZ or at future project sites, conserving contiguous blocks of suitable habitat on which this species is known to occur, and/or contributing funds to other regional conservation efforts or species specific management programs

4.2.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement the Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Conduct USFWS protocol surveys for the San Diego fairy shrimp under favorable conditions in areas of suitable habitat for all new facilities and O&M Activities, or assume occupancy of potential habitat, to ensure that this species is adequately addressed by impact avoidance, minimization, and mitigation. A permitted Environmental Surveyor would conduct surveys.
5. Where impacts to habitat (including road ruts) occupied by this species occur, mitigation would include salvage of inoculum to be included in a suitable vernal pool restoration plan.
6. Avoid or minimize impacts to San Diego fairy shrimp habitat through project design and placement.
7. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of San Diego fairy shrimp. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If

the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

4.3 Riverside Fairy Shrimp (*Streptocephalus woottoni*)

USFWS: Endangered; Designated Critical Habitat

CDFG: None

SDCWA Plan: Covered, Narrow Endemic Policy, Vernal Pool Protection Policy

Covered by MSCP: Yes

4.3.1 Background

Distribution, Abundance, and Trends. The Riverside fairy shrimp is described in the listing rule as being known from only four vernal pools near Temecula in southwestern Riverside County; from one population in Orange County; in a pond on MCAS Miramar; and in one pond on Otay Mesa in San Diego County (USFWS 1993a). Fieldwork subsequent to the listing indicates a wider distribution. Riverside fairy shrimp are currently known from Ventura, Los Angeles, Orange, Riverside, and San Diego counties and northern Baja California, Mexico (USFWS 2003a). In western Riverside County, vernal pools support this species at Skunk Hollow, Murrieta, the Lake Elsinore back basin, and the Santa Rosa Plateau (RCIP 2003). The species was found in 88 pools on Marine Corps Base Camp Pendleton in surveys conducted from 1997 to 1999 (RECON 2001). Riverside fairy shrimp have also been found in 35 basins and temporary ponds on Otay Mesa (RECON 1996) and in a number of restored pools on Cal Terraces (RECON 2005), and are known from two populations in Baja California, Mexico. Many of the currently known localities for the species are artificial basins such as stock ponds, road ruts, and backhoe trenches, which emulate the hydrologic characteristics of the deeper natural vernal pools that have all but disappeared from the few vernal pool localities remaining in southern California.

Riverside fairy shrimp are found in vernal pools and other temporal aquatic freshwater habitats. Pools in Riverside County, where this species was originally found, generally have depths exceeding 11 inches (30 centimeters) and areas exceeding 8,000 square feet (750 square meters) at maximum filling (Eng et al. 1990). Riverside fairy shrimp deposit cysts that remain dormant during dry periods in the pool soils. Cysts usually hatch between January and March within 7 to 21 days after the pools fill. Shrimps develop to the adult stage in 48 to 56 days, depending on water temperature, with adults beginning to feed and reproduce rapidly.

Critical Habitat. Approximately 306 acres of land are designated as critical habitat for the Riverside fairy shrimp in Ventura, Orange, and San Diego counties, with approximately 25 acres occurring in San Diego County. Although there is no designated

critical habitat for the Riverside fairy shrimp in the PIZ, approximately 25 acres of critical habitat occur within the Plan Area.

Threats and Limiting Factors. Threats to this species include urbanization, road construction, off-road vehicular traffic (including mountain biking), illegal dumping, degraded water quality (including changes in water temperature or chemistry), livestock grazing or equestrian uses, and edge effects. As a vernal pool endemic species, the Riverside fairy shrimp is limited by the distribution of soils and hydrology conducive to vernal pool development. Therefore, anything that disrupts the soils or hydrology is considered a limiting factor. Other threats include fragmentation of vernal pool complexes (restricting gene flow between pools), alteration of drainage patterns within the surrounding watershed, and invasion by exotic plants (which can choke out vernal pool basins and impact hydrology) and animals (especially bullfrogs).

Special Considerations. Surface disturbance to pools by off-road vehicles, livestock grazing, mountain biking, or other such activities can break the hardpan and destroy the natural hydrology of pools at any time of year (e.g., when pools are wet or dry).

Local dispersal of fairy shrimp between pools in a complex may occur during periods of high inundation when several pools may be connected within a watershed (USFWS 1998b). Long distance dispersal of fairy shrimp is thought to occur primarily by the transport of cysts and adults on the bodies of animals (e.g., on the feet of birds), and possibly wind transport of cysts. Proximity to other vernal pools within a vernal pool complex facilitates local recolonization and long-term persistence of the complex. However, isolated pools can receive immigrants, primarily by avian dispersal.

Surveys should be done in any pools having appropriate hydrological and chemical characteristics to potentially support this species, which may include natural or man-made depressions not necessarily classified as vernal pools. Conservation and management for the species must also include management of the watershed surrounding pools and possibly the subsurface hydrology, both of which must be conserved to provide sufficient water to sustain the pools. Some pools may be too isolated to be quickly recolonized following local extirpation. Therefore, artificial reintroduction of soil inoculum containing San Diego fairy shrimp cysts may be required to expedite recolonization. Inoculum should be from pools in the same complex and should be tested for genetic similarity prior to reintroduction between complexes.

4.3.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are five known populations of Riverside fairy shrimp within the Survey Area. There are known populations of Riverside fairy shrimp within the Survey Area at the following locations: southwest of Lake Skinner (Attachment 1, Figure B-2), south of Temecula Creek (Attachment 1, Figure B-3), and southwest of Miramar Reservoir (Attachment 1, Figure B-12).

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known populations of Riverside fairy shrimp within the PIZ.

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Should this species be found within the Plan Area, impacts to populations will be avoided or minimized in accordance with the Narrow Endemic Policy and the Vernal Pool Protection Policy. This species does not currently occur within the Preserve Area.

In summary, the preferred habitat for Riverside fairy shrimp is vernal pools. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). Although there are no acres of these vegetation subcommunities identified within the PIZ, 24 acres occur within the Survey Area. Of the 183 acres of potential impacts from Future Projects and O&M, it is assumed that there is potential to impact up to five acres of habitat of this species. As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a

Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Critical habitat for this species is present within the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 of the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan is not anticipated to impact this species. However, should it be found within the Plan Area in the future, Plan implementation could impact this species through direct temporary habitat disturbance and other indirect effects as a result of disturbance from O&M Activities. Potential indirect effects could result from encroachment of non-native plant species, weed abatement, or effects on vernal pool watershed hydrology and/or water quality.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan. Given that this species does not occur within the Preserve Area, in the event that a Covered Activity would affect Riverside fairy shrimp, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

4.3.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Implement the Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
4. Conduct USFWS protocol surveys for the Riverside fairy shrimp under favorable conditions in areas of suitable habitat for all new facilities and O&M Activities, or assume occupancy of potential habitat, to ensure that this species is adequately addressed by impact avoidance, minimization, and mitigation. A permitted Environmental Surveyor would conduct surveys.

Appendix B Covered Species Analysis

5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following (per the Narrow Endemic Policy, the implemented action shall result in minimum 1:1 conservation ratio for this species within the Plan Area):
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Riverside fairy shrimp locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. Where impacts to habitat (including road ruts) occupied by this species occur, mitigation would include salvage of inoculum to be included in a suitable vernal pool restoration plan.
7. Avoid or minimize impacts to Riverside fairy shrimp habitat through project design and placement.

4.4 Harbison's Dun Skipper (*Euphyes vestris harbisoni*)

USFWS: None

CDFG: None

SDCWA Plan: Covered, Narrow Endemic Policy

Covered by MSCP: No

4.4.1 Background

Distribution, Abundance, and Trends. This butterfly is found only in San Diego County, with the exception of one possibly extirpated population in Silverado Canyon, Orange County. In San Diego County, Harbison's dun skipper has been documented from Flinn Springs, Tecate Peak, Moosa Canyon, Rios Canyon, Hellhole Creek, Fallbrook, Blossom Valley, Poway, El Monte Oaks, Old Viejas Grade, Goodan Ranch, and San Pasqual Academy (Faulkner and Klein 2006).

The oviposition and larval host plant is San Diego sedge (*Carex spissa*). The host plant requires perennial water in order to survive; as a result, Harbison's dun skipper is found primarily in riparian areas, especially in chaparral and oak riparian habitats along narrow canyons and lower order drainages (Faulkner and Klein 2006).

Eggs are laid singly, generally on the undersurface of the sedge leaf near the base. Harbison's dun skipper larvae are translucent green with a caramel brown colored head, and are generally found in a silk-lined tube formed by the attachment of two to four sedge leaves. This is a single brood subspecies; adults emerge from mid-May through mid-July. Nectaring plants include morning glory (*Calystegia macrostegia tenuifolia*), red thistle (*Cirsium occidentale*), loosestrife (*Lythrum californicum*), and black mustard (*Brassica nigra*) (Faulkner and Klein 2006).

Threats and Limiting Factors. The principal threat to this subspecies is loss of significant stands of its host plant due to loss of inland oak riparian and wetland habitats and changes to hydrologic regime (e.g., increased runoff from development) that alter watercourses. Additional threats include introduction of pollutants into riparian systems, and elimination of host plant populations through competition with invasive nonnative plants (Brown and McGuire 1983; Brown 1991).

Special Considerations. This species is restricted to riparian areas, inland streams, chaparral, and oak woodlands, where its larval host plant, San Diego sedge, is present. San Diego sedge usually occurs in scattered patches on channel banks of undisturbed streams with persistent water flow. Wetland habitats in which San Diego sedge is not expected to occur include vernal pools, disturbed wetlands, and tamarisk scrub.

Maintaining good water quality in streams will be important in maintaining healthy host plant populations (Faulkner and Klein 2002). Males of this species will venture into upland habitats (coastal sage scrub and chaparral; MHCP 2003) adjacent to occupied riparian habitats, suggesting that wide (at least 100 feet) upland buffers to riparian areas should be maintained.

Suitable habitat must be maintained in the form of contiguous, undisturbed watercourses with host plant patches. Enhancement of potentially suitable habitat should be pursued if this species is discovered in the Plan Area to encourage colonization of new sites. Management should attempt to prevent or counter threats posed by changes in water quality or amount, stream alterations, introduced herbivores, and other disturbances.

This drab butterfly is regularly mistaken for a moth, and therefore may be under-reported. It has been suggested that dun skipper populations may occur throughout the range of the host plant, San Diego sedge (Faulkner and Klein 2006); this possibility should be taken into account whenever the host plant is encountered.

4.4.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are no known occurrences of the Harbison's dun skipper in the Survey Area. Due to potential CNDDDB undersampling and the Harbison's dun skipper correlation with San Diego sedge; this species may occur at creek crossings in the Survey Area in or near Fallbrook, Moosa Canyon, San Pasqual, Goodan Ranch, Poway, Flinn Springs, and Blossom Valley (Faulkner and Klein 2002).

Probable Impact Zone (PIZ)

According to the CNDDDB, there are also no known occurrences of the Harbison's dun skipper in the PIZ; however, for similar reasons as stated above, there is a potential for this species to occur within the PIZ.

Preserve Area

According to the CNDDDB, there are no known occurrences of the Harbison's dun skipper in the Preserve Area. San Diego sedge occurs at Rancho Cañada HMA, so there is potential for the skipper to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species and impacts to riparian habitat will be avoided or minimized in accordance with the Narrow Endemic Policy and wetlands protection policies under the Plan. No surveys for this species have

been conducted to date. Given the presence of suitable habitat (host plant), this species has the potential to occur at Rancho Cañada HMA, but is not likely to occur within the other wetland mitigation sites in the Plan Area.

In summary, the preferred habitat for Harbison's dun skipper is riparian areas, especially in chaparral and oak riparian habitats along narrow canyons and drainages. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, oak woodland forest, and riparian (see Table B-1B). There are 1,513 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 57 acres of potential habitat for this species could be impacted (26 acres by Planned Projects and 31 acres by Future Projects and O&M Activities).

The Plan provides 33 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, construction or use of Arizona crossings and access roads, and draindowns. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, alteration of hydrology, encroachment of non-native plant species, and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Harbison's dun skipper in the Plan Area by allowing for continued breeding, foraging, and sheltering through avoidance of impacts to riparian areas, maintaining a no-net-loss of populations within the Plan Area, and conserving contiguous blocks of suitable habitat on which this species has the potential to occur. In addition, protection for individuals and habitat is provided by the Conditions for Coverage for this species.

4.4.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Mitigation for impacts to Harbison's dun skipper habitat shall include salvage and reestablishment of suitable stands of San Diego sedge as directed by an approved restoration maintenance and monitoring program, as per Section 6.5, for site-specific impacts.
4. Where feasible, a minimum 100-foot project construction buffer will be established adjacent to occupied or suitable Harbison's dun skipper habitat (as determined by a qualified environmental surveyor), measured from the outer edge of oviposition and larval San Diego sedge (host plant) patches.
5. Incorporate San Diego sedge into the restoration plant palette for wetland enhancement, restoration, and/or creation projects, where appropriate.
6. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Harbison's dun skipper. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited

to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

4.5 Hermes Copper Butterfly (*Lycaena hermes*)

USFWS: None

CDFG: None

SDCWA Plan: Covered

Covered by MSCP: No

4.5.1 Background

Distribution, Abundance, and Trends. Apart from a few isolated records in Baja California, Mexico, the Hermes copper butterfly is known only from western San Diego County. Within the county, its' range extends from the Bonsall/Fallbrook area inland to Guatay and Pine Valley.

The flight period for adult Hermes copper is from mid-May to mid-July. Adults are usually found in close proximity to its specific larval host plant, spiny redberry (*Rhamnus crocea*). Spiny redberry is found in coastal sage scrub and chaparral. The preferred Hermes copper habitat appears to be mature mixed chaparral/sage scrub, particularly in well-drained areas such as canyon bottoms and north-facing hillsides (Faulkner and Klein 2006). Adult butterflies are known to nectar on chamise (*Adenostoma fasciculatum*), golden yarrow (*Eriophyllum confertiflorum*), flat-topped buckwheat (*Eriogonum fasciculatum*) slender sunflower (*Helianthus gracilentus*), poison oak (*Toxicodendron diversilobum*), and short-podded mustard (*Hirshfeldia incana*) (Faulkner and Klein 2006).

Threats and Limiting Factors. The principal threat to this species is loss of significant stands of its host plant due to urban development, as well as destruction of colonies by wildfire.

Special Considerations. The Hermes copper butterfly is known to occur in mature coastal sage scrub and chaparral in which its' larval host plant, spiny redberry, constitutes at least five percent of the shrub cover. Fire suppression may play an important role in allowing "old growth" scrub habitat containing sufficient densities of host plants to develop. It has been suggested that natural colonization of this species may be very slow due to the sedentary nature of the adult butterfly (MHCP 2003). This species is rarely expected to disperse more than 50 to 100 yards from the larval host plant in a single season (Rahn et al. 2008)

Adaptive management and monitoring to maintain areas containing spiny redberry with at least five percent shrub cover that provide suitable habitat should be a primary management target for this species.

4.5.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

According to the CNDDDB, there are 5 known occurrences of the Hermes copper butterfly in the Survey Area. The Hermes copper butterfly can be found at the following locations within the Survey Area: east of Miramar (Attachment 1, Figure B-12), near the Sweetwater Reservoir (Attachment 1, Figure B-15), and the aqueduct system on Mission Trails Regional Park (Attachment 1, Figure B-14).

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of the Hermes copper butterfly in the PIZ. Due to its proximity to the aqueduct system on Mission Trails Regional Park, there is a potential for this species to occur within the PIZ.

Preserve Area

The Hermes copper is known to occur at San Miguel HMA and Crestridge HMA (Klein and Edwards 2004, State of California 2007b).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Conditions for Coverage. There are no population estimates for this species within the Plan Area, as no surveys have been conducted to date. At the San Miguel HMA, Klein and Edwards (2004) identified 108 acres of suitable and occupied Hermes copper butterfly habitat by mapping dense stands of spiny redberry. San Miguel HMA contains 108 acres of suitable and occupied habitat for this species. The Crestridge HMA contains approximately 43 acres of suitable coastal sage scrub and chaparral habitat supporting spiny redberry.

In summary, the preferred habitat for Hermes copper butterfly is mature mixed chaparral/sage scrub, particularly in well-drained areas such as canyon bottoms and north-facing hillsides. Based on the preferred habitat, this species could occur in the Plan Area in chaparral and coastal sage-chaparral scrub (see Table B-1B). There are 371 acres of this vegetation community and this subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities). According to Table B-1A, the Plan provides 518 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, information about available habitat from surveys or reports for the Preserve Area is provided to supplement the habitat calculations and analysis presented in Table B-1A. In

the case of Hermes copper butterfly, there are 151 acres of suitable habitat documented at the Preserve Area.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Hermes copper in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving large, contiguous blocks suitable habitat on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Conditions for Coverage for this species.

4.5.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Impacts to suitable Hermes copper habitat (defined as coastal sage scrub or chaparral in which spiny redberry constitutes at least five percent of the shrub cover) from Covered Activities shall be avoided through project design considerations, to the extent feasible. If impacts are avoided, no species-specific mitigation is required.
3. If impacts to suitable Hermes copper habitat cannot be avoided and project timing allows, survey of all suitable habitat with potential to be impacted by an Environmental Surveyor during the adult flight season using appropriate survey techniques to determine presence of the Hermes copper butterfly. For the purposes of determining five percent cover of spiny redberry, a stand is defined as the outer boundary limit of spiny redberry occurrence within a contiguous patch.
4. In areas of suitable habitat where Hermes copper are detected, the project should be re-designed to avoid impacts. Any impacts that cannot be avoided shall be mitigated at a ratio consistent with Tables 6-6 and 6-7 and any other specific mitigation, if required.
5. If project timing does not allow for adult flight season surveys, it will be assumed that all suitable habitat to be impacted is occupied and will be mitigated as described in 4 above.

6. If deemed appropriate by the Wildlife Agencies, in areas with unavoidable impacts to Hermes copper, larvae and possibly adults may be salvaged for relocation or other purposes. Before any impacts occur, the Water Authority will contact the Wildlife Agencies to determine if this conservation measure should be undertaken and, if so, what methods should be used.
7. Where feasible, a minimum 100-foot project construction buffer will be established adjacent to occupied or suitable Hermes copper butterfly habitat (as determined by a qualified environmental surveyor), measured from the outer edge of habitat patches, which are defined as the outer edge of the patch of redberry.
8. Incorporate larval host plant species (e.g. *Rhamnus crocea*) into native habitat restoration plans, where appropriate.

4.6 Quino Checkerspot Butterfly (*Euphydryas editha quino*)

USFWS: Endangered; Designated Critical Habitat

CDFG: None

SDCWA Plan: Covered

Covered by MSCP: No

4.6.1 Background

Distribution, Abundance, and Trends. Quino checkerspot butterfly historically occurred from Los Angeles County south through western Riverside, western San Bernardino, Orange, and San Diego counties, and in Mexico from Baja California to Santo Tomas (Faulkner and Klein 2006). The Quino checkerspot butterfly is known to occur in several locations in southwestern Riverside County around Temecula, Murrieta, Vail Lake, Aguanga, and Anza. In San Diego County, the Quino checkerspot is known to occur at Otay Mesa, Otay Lake, Otay Mountain, Marron Valley, Jamul, Alpine, San Vicente Reservoir, and Jacumba (Mattoni et al. 1997, Faulkner and Klein 2006).

The Quino checkerspot butterfly is restricted to openings on clay soils within coastal sage scrub, chaparral, grasslands, and vernal pool complexes of the interior foothills of southwestern California and northwestern Baja California, Mexico (Mattoni et al. 1997). They are found at elevations ranging from sea level to 5,000 feet.

The Quino checkerspot's distribution is defined primarily by that of its primary larval host plant, dot-seed plantain (*Plantago erecta*). Additional host plants may include woolly plantain (*Plantago patagonia*), owl's clover (*Castilleja exserta*), seaside bird's beak (*Cordylanthus rigidus*), and white snapdragon (*Antirrhinum coulterianum*) (USFWS 2003b). Nectar sources include a variety of wildflowers that bloom during the Quino checkerspot's flight period (Mattoni et al. 1997). This species exhibits a preference for low-growing vegetation interspersed with barren spots, as its thermodynamic needs require it to avoid shaded areas and flight below the canopy level (Osborne and Redak 2000).

Typically, there is one adult generation of Quino checkerspot per year, with a four- to six-week weather dependent flight period beginning in late February and continuing through May (Emmel and Emmel 1973). Adult life span averages 10 to 14 days, and emergence is staggered (USFWS 2003b). Adult Quino checkerspot butterflies spend their time searching for mates, feeding on nectar, defending territories, basking in the sun, and, in the case of females, searching for sites to deposit eggs (USFWS 2003b).

Critical Habitat. There are approximately 997 acres of critical habitat within the PIZ. The entire San Miguel HMA is within designated critical habitat for the Quino checkerspot butterfly.

Threats and Limiting Factors. The principal threat to this subspecies is loss of habitat and fragmentation where its host plant once grew in substantial numbers. The host plant for this butterfly also exhibits dramatic fluctuations in population size between years of drought and years of normal to high rainfall. Invasion of exotic plant species, which compete with native larval host plants, is another important threat.

Special Considerations. Potential habitat for Quino checkerspot in the region includes vegetation communities with relatively open areas that support patches of larval host plants and a variety of adult nectar sources, as well as small to large topographic rises (i.e., hilltops) in close proximity. These habitats include vernal pools, lake margins (Emmel and Emmel 1973), non-native grassland, perennial grassland, disturbed habitat, disturbed wetlands, and open areas within shrub communities (Mattoni et al. 1997). Bare hilltops and ridgelines are important components of suitable Quino habitat as locations for male “hilltopping” behavior, which is used to locate mates.

This species apparently needs large, unfragmented areas of suitable habitat to maintain its natural metapopulation dynamics, which involve regional expansions and contractions of populations, with periodic recolonization of satellite sites from core sites (Murphy 1990; Mattoni et al. 1997). Recolonization is less likely for more isolated populations, thus the maintenance of connections between patches of suitable Quino checkerspot butterfly habitat is vital to conservation of this species. This species is difficult to detect in some years due to the species patterns of dispersal, reliance on specific host plants, and extended diapause. Diapause can last for multiple years, thus repetitive visits to a particular site are generally required to increase the likelihood of detecting this species. The impacts of fire on this species are not well known.

4.6.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Quino checkerspot butterfly is known from 18 locations within the Survey Area. There are known populations of Quino checkerspot butterfly within the Survey Area at the following locations: south of Diamond Valley Lake (Attachment 1, Figure B-1), near Lake Skinner (Attachment 1, Figure B-2), near Mission Trails Regional Park south of the FRS II project at the Elliott Vent 4 site (Attachment 1, Figure B-12), near San Diego River (Attachment 1, Figure B-14), and near Sweetwater Reservoir (Attachment 1, Figure B-15), near Lower Otay Reservoir (Attachment 1, Figure B-16)

Probable Impact Zone (PIZ)

Of the 18 occurrences of Quino checkerspot butterfly within the Survey Area, the CNDDDB lists 7 occurrences within the PIZ. Known populations of Quino checkerspot butterfly within the PIZ occur at the following locations: near Lake Skinner (Attachment 1, Figure B-2), near the San Diego River (Attachment 1, Figure B-14) and near the aqueduct system at Skunk Hollow, at Nicholas Road, and near the intersection of Borel and Leon Roads (State of California 2007b). The latter two sites appeared developed or under development, respectively, in August 2007.

Preserve Area

This species occurs within the San Miguel HMA (Attachment 1, Figure B-15). This species has been observed in other parts of the San Diego Wildlife Refuge in 1998, 1999, and 2001 (USFWS 2008); these sightings occur in the Survey Area near the Sweetwater Reservoir.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the species-specific Conditions for Coverage. No recent population data for this species is available for the Plan Area. The Mission Trails Regional Park location from 2005 indicates a single adult was observed within suitable, revegetated habitat in the Plan Area on the aqueduct system and nearby access road (State of California 2007c). The Quino checkerspot butterfly is known to occur at the San Miguel HMA; approximately 127 acres of habitat at San Miguel HMA contains the host plant, dot-seed plantain, and another 65 acres of habitat contain nectar sources for the Quino checkerspot (Klein and Edwards 2004). This Covered Species will be authorized for take upon the modification of the San Miguel banking agreement to address any additional species' management and monitoring, and additional funding, if necessary.

In summary, the preferred habitat for Quino checkerspot butterfly is openings on clay soils within coastal sage scrub, chaparral, grasslands, and vernal pool complexes. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, grasslands, coastal sage scrub, and sage-scrub montane/trans-montane (see Table B-1B). There are 24,267 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 274 acres of potential habitat for this species could be impacted (134 acres by Planned Projects and 140 acres by Future Projects and O&M Activities). According to Table B-1A, the Plan provides 649 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, information about available habitat from surveys or reports for the Preserve Area is provided to supplement the habitat calculations and analysis presented in Table B-1A. In the case of Quino checkerspot butterfly, there are 127 acres of suitable habitat documented at the Preserve Area.

If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 of the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities, and would mostly be temporary in nature. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan will contribute to the regional conservation of Quino checkerspot butterfly by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving large, contiguous blocks of suitable habitat on which the Quino checkerspot and its host plants are known to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

4.6.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Conduct a habitat assessment per USFWS protocol as part of the pre-activity survey to identify if suitable Quino checkerspot butterfly habitat (as defined by USFWS 2002) is present within the project area. The pre-activity survey may be conducted year-round, regardless of the butterfly flight season.
3. Where no suitable habitat for Quino checkerspot butterfly is present, construction may occur in accordance with the Plan general Conditions for Coverage (see Section 2.1).
4. If suitable Quino checkerspot butterfly habitat is present, the project will avoid impacts to the habitat through project design considerations, to the extent feasible. If impacts are avoided, no species-specific mitigation is required.
5. If impacts to suitable Quino checkerspot butterfly habitat cannot be avoided and project timing allows, conduct USFWS protocol adult flight season surveys by a permitted Environmental Survey under favorable conditions in areas of suitable habitat for all Covered Activities.
6. If project timing does not allow adult flight season surveys in suitable Quino checkerspot butterfly habitat, it will be assumed that the habitat is occupied.

Unavoidable impacts to suitable but unoccupied habitat (as determined by protocol adult flight season surveys) will be mitigated in accordance with Tables 6-6 and 6-7 in the Plan. Unavoidable impacts to occupied Quino checkerspot butterfly habitat will be mitigated at a 2:1 ratio with occupied habitat.

7. If proposed impacts to occupied Quino checkerspot butterfly habitat, as determined by surveys or assumed, are greater than 1 acre, the Water Authority will consult with the Wildlife Agencies to ensure that project implementation will not cause the extirpation of a Quino checkerspot butterfly population.
8. Where feasible, a minimum 100-foot project construction buffer will be established adjacent to occupied or suitable Quino checkerspot butterfly habitat (as determined by a qualified environmental surveyor), measured from the outer edge of habitat patches.
9. Reseed temporarily disturbed areas with appropriate native seed mix including Quino checkerspot butterfly nectar sources and dot-seed plantain in appropriate habitat to regionally enhance re-colonization efforts.
10. Participate in regional Quino checkerspot butterfly recovery efforts and implementation of recovery actions as specified in the recovery plan and by actively coordinating with the Wildlife Agencies and other Quino conservation entities.

5.0 Covered Amphibians

5.1 Arroyo Toad (*Anaxyrus [=Bufo] californicus*)

USFWS: Endangered; Re-Proposed Critical Habitat

CDFG: Species of Special Concern

SDCWA Plan: Covered

Covered by MSCP: Yes

5.1.1 Background

Distribution, Abundance, and Trends. The arroyo toad is restricted to specific habitat conditions, inhabiting sandy banks of washes, streams, and arroyos with low currents and large, deciduous trees. Arroyo toads breed in pools with a substrate of sand, gravel, or pebbles, in water greater than one foot deep. Breeding pools tend to lack vegetation (Sweet 1991, 1993). Arroyo toad adults are nocturnal and breed from March to July (depending on local climate). Metamorphosis may occur at any time between April and the beginning of September, depending on the time of breeding, weather, and water quality (USFWS 2001). Females lay between 2,000 and 10,000 eggs in strings in the breeding pools, peak metamorphosis occurs from late April to mid-May in Southern California (USFWS 2001). Adult toads estivate through the summer in burrows that they dig on sandbars (Jennings and Hayes 1994). Adult arroyo toads consume a wide variety of insects and arthropods including ants, beetles, spiders, and caterpillars; juveniles feed on interstitial algae, diatoms, and bacteria (USFWS 1999). According to Frost *et al.* 2006 and Crother *et al.* 2008, the currently recognized name for the arroyo toad is now *Anaxyrus californicus*.

The arroyo toad ranges along the coast of California from Monterey County south into northwestern Baja California, Mexico (USFWS 1994b). The arroyo toad is currently known from 22 drainages in southern California and from six drainages in the desert (USFWS 1999; Jennings and Hayes 1994). No published data is available to determine the total population of the species. Most of the population now is found in the coastal ranges of central California, and the watercourses of the Peninsular and Transverse ranges. Presently, occupied drainages in southwestern Riverside County include Temecula Creek, Arroyo Seco Creek, San Mateo Creek, and Tenaja Creek. Extant populations known to occur in San Diego County in portions of Temescal Creek, Agua Caliente Creek, Guejito Creek, scattered locales on the San Luis Rey River, De Luz Creek, the Santa Margarita River, San Vicente Creek, Santa Maria Creek, Lusardi Creek, Witch Creek, Pala Creek, Pine Valley Creek, Noble Creek, Cottonwood Creek,

Kitchen Creek, Potrero Creek, the upper San Diego River, San Vicente Creek, Scove Canyon Creek, the upper Sweetwater River, Morena Creek, and Viejas Valley Creek.

Critical Habitat. Designated critical habitat for arroyo toad originally proposed in 2000 and finalized in 2005 is being revisited by the USFWS as result of litigation. As recently as October 2009, re-proposed critical habitat was released by USFWS. Within the Plan area there are approximately 20,260 acres of proposed critical habitat within units 11A, 11B, 12A, 12B, 14, 16A, 17B, 17D, 18A and 18C. San Luis Rey HMA has 2.5 acres and Rancho Cañanda HMA has 288 acres. No critical habitat occurs within the MMAs. There are approximately 72 acres of critical habitat within the footprint of Water Authority right-of-way and fee-owned parcels (60.4 acres in Unit 14 and 11.8 acres in Unit 17B)

Threats and Limiting Factors. Threats to this species include dam construction, urbanization, construction of campgrounds, off-road vehicle activity, livestock grazing, loss of riparian habitat, and sand and gravel mining (Hayes and Jennings 1986). Predation by introduced species including bullfrogs and exotic fishes (USFWS 1994b) is also a threat. The emergence of the chytrid fungus has been linked to the mortality of amphibian species in the U.S. and worldwide (USFWS 2000).

Special Considerations. Control of non-native predators (e.g., carp, largemouth bass, and bull frogs) is necessary to maintain populations. Although possible, control of such exotic species is difficult to maintain in perpetuity.

The arroyo toad occurs along the sandy or gravelly banks of clear, slow-moving streams and rivers that sustain a sufficient flow and still backwaters to allow the development of eggs and tadpoles (Stebbins 1985; Sweet 1992). Adults forage and burrow in friable soils within both riparian and upland habitats adjacent to breeding areas. Upland habitats include oak woodlands, open grasslands, coastal sage scrub, and fallow agricultural fields. Adults are known to range up to 3,000 feet from breeding pools (Griffin et al. 1999). Toads require unconstrained access to both aquatic breeding habitat and adjacent upland habitat (within 1 kilometer of riparian corridors) where they aestivate. Adult toads often migrate upstream and downstream in search of suitable breeding habitat (Griffin et al. 1999), and tadpoles can be washed significant distances downstream into unoccupied potential habitat.

Newly emerged toadlets require streamside gravel bars for basking and shallow banks for dispersal. High velocity releases from upstream impoundments can flush eggs and toadlets from suitable habitat and can seriously impact downstream populations.

Effective conservation of this species should include protection of relatively large, streamside flats with scattered vegetation adjacent to shallow pools with open sand or gravel bars, and may necessitate drastic changes in current patterns of hydrologic manipulation and land use policies. Disturbance or development of streamside flats in the vicinity of known populations of arroyo toads should be eliminated. Manipulations of

the hydrologic regime that scour overflow pools during the interval between breeding and metamorphosis of any year's cohort of arroyo toads should be avoided. Land use conditions that contribute to siltation of streams during the breeding interval should also be avoided. Isolation of existing arroyo toad populations from the exotic aquatic fauna should be maximized; translocation of the exotic aquatic fauna should be prohibited.

5.1.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, arroyo toad is known from 7 occurrences within the Survey Area. There are known populations of arroyo toad within the Survey Area at Temecula Creek and the San Luis Rey River near the proposed Pipeline 6; the First Aqueduct Pipelines 1 and 2 cross the San Luis Rey River in or near occupied arroyo toad habitat (Attachment 1, Figure B-4, B-3) and upstream of the San Vicente Reservoir (Attachment 1, Figure B-11).

Probable Impact Zone (PIZ)

Of the occurrences of arroyo toad within the Survey Area, the CNDDDB lists 2 occurrences within the PIZ: along Temecula Creek in Temecula (Attachment 1, B-3) and at the San Luis Rey River near Pala (Attachment 1, Figure B-4).

Preserve Area

The arroyo toad has been observed at the Rancho Cañada HMA in San Vicente Creek; both adults and tadpoles were present in the sandy stretches of San Vicente Creek (TNC 2006).

Conservation and Take Levels. Impacts to arroyo toad habitat will be avoided and minimized in accordance with the Plan Conditions for Coverage. No population data was available for the known occurrences within the Plan Area; no focused surveys have been conducted in suitable habitat to date. Breeding, sheltering, and foraging habitat for this species will be conserved at the Rancho Cañada HMA approximately 35 acres of southern coast live oak riparian forest, which is contiguous with occupied habitat in San Vicente Creek. This species is also expected to occur at the San Luis Rey River HMA.

In summary, the preferred habitat for arroyo toad is sandy banks of washes, streams, and arroyos with low currents and large, deciduous trees. Based on the preferred habitat, this species could occur in the Plan Area in riparian, disturbed riparian, and freshwater aquatic (see Table B-1B). There are 1,271 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from

Covered Activities estimated to occur within the PIZ, 55 acres of potential habitat for this species could be impacted (25 acres by Planned Projects and 30 acres by Future Projects and O&M Activities).

The Plan provides 46 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Proposed critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 of the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species in Temecula Creek and the San Luis Rey River through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, alteration of surface water hydrology, encroachment of non-native plant and wildlife species (such as tamarisk and bullfrogs), and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of arroyo toad by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of suitable habitat on which this species has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

5.1.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Conduct USFWS protocol surveys for the arroyo toad in areas of suitable habitat (San Luis Rey River, Temecula Creek) for all new facilities and pre-activity

surveys for O&M Activities conducted during the breeding and active foraging season of March 1 through June 30. Extreme weather conditions can cause variations in the breeding season; these conditions would be fully considered when developing a schedule of surveys. Surveys would include foraging habitat that is contiguous with potential breeding habitat. Additionally, surveys must occur under favorable conditions for detection by a permitted Environmental Surveyor.

3. To minimize further effects to breeding populations and to reduce sedimentation and erosion, such projects shall be timed so that work within or near the stream channel is conducted during the dry season when flows are at their lowest or are nonexistent. If work must occur in occupied arroyo toad habitat during the breeding season, the following measures would be used to avoid or reduce impacts:
 - a. Tadpoles, toadlets, and toads would be moved to the nearest suitable habitat as determined by an Environmental Surveyor. Exclusionary toad fences would be installed at least 21 days prior to impact to keep toads out of construction areas. A permitted biologist experienced with the identification, handling, and ecology of the arroyo toad would implement and oversee proper execution of the toad exclusion fencing and relocation efforts. The exclusion fencing would be maintained until the completion of construction activities within or adjacent to occupied arroyo toad habitat. For the duration of construction, the enclosure would be surveyed on a daily basis early in the morning.
 - b. To minimize injury to or mortality of individual arroyo toads, the USFWS may authorize qualified project biologists to relocate individual arroyo toads to nearby suitable habitat. All proposed arroyo toad relocations must be approved by the Wildlife Agencies.
4. For activities such as drawdowns and draindowns, implement the following measures summarized below:
 - a. To the maximum extent feasible, avoid controlled releases in suitable breeding habitat during the arroyo toad breeding season, generally March through August.
 - b. If a release must occur during the arroyo toad breeding season, conduct pre-activity surveys for breeding activity within potentially impacted suitable habitat within 72 hours prior to the release. An Environmental Surveyor shall consider weather and stream conditions when assessing potential impacts within the water release areas.

Appendix B Covered Species Analysis

- c. Negative survey results would allow for the release to commence immediately. Positive survey results (i.e., presence of calling males, egg strings, or larvae) may postpone the transfer until such time that toads are no longer breeding. Alternatively, the Water Authority would determine and implement the appropriate flow release rate to avoid flushing egg masses, tadpoles, and toadlets downstream. A follow up survey must be performed upon completion of the water transfer to investigate species and recruitment status.
5. To ensure that diseases are not conveyed between work sites by the authorized biologist or assistants, the fieldwork code of practice developed by the DAPTF will be followed at all times. The DAPTF fieldwork code of practice is contained in Attachment B-1.
6. Bullfrogs observed during protocol and pre-activity surveys that prey upon or displace arroyo toads would be removed from suitable habitat areas, if possible.
7. Avoid or minimize impacts to arroyo toad habitat through project design and placement.
8. If feasible, projects would be designed to avoid the placement of equipment and personnel near any the portion of stream channel or on sand and gravel bars, banks, or adjacent upland habitats used by arroyo toads.
9. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of arroyo toad. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they

may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

5.2 Western Spadefoot Toad (*Spea [=Scaphiopus] hammondi*)

USFWS: None

CDFG: Species of Special Concern, Vernal Pool Protection Policy

SDCWA Plan: Covered

Covered by MSCP: No

5.2.1. Background

Distribution, Abundance, and Trends. The western spadefoot toad occurs west of the coastal ranges from Point Conception, Santa Barbara County, to northern Baja California, Mexico, and in the Central Valley of California (Zeiner et al. 1988). This species occurs primarily in grasslands but is also found in valley-foothill woodlands at elevations up to 4,500 feet (State of California 2006a). The range of the western spadefoot in San Diego County may closely parallel the distribution of vernal pool habitat in the coast and foothills, including areas of concentrated vernal pools on Otay Mesa, Kearny Mesa, Del Mar Mesa, around Otay Lake, and near the Ramona Airport. This species is also found in playas, vernal pools, and other suitable habitat throughout western Riverside County, including the Skunk Hollow vernal pool (RCIP 2003).

Breeding is generally from January through May, with water temperatures between 48 and 86 degrees Fahrenheit needed to stimulate activity (State of California 2006a). Females lay eggs in shallow temporary pools, with peak egg-laying periods during March. Small, gelatinous masses of 10 to 42 eggs are often visible and attached to plant stalks or small rocks. Eggs hatch within two weeks (State of California 2006a). Spadefoot tadpoles eat a variety of food items, including small invertebrates, crustaceans, and smaller western spadefoot tadpoles. Adult western spadefoots spend eight to nine months aestivating in burrows as deep as 36 inches. Adults eat many small invertebrates, including butterfly and moth larvae, ground beetles, flies, ants, and earthworms. The short, hoarse call of the western spadefoot sounds a bit like the bleat of a sheep, is unlike the call of other amphibians in the region, and can be utilized for seasonal identification.

Threats and Limiting Factors. Western spadefoots are threatened by urbanization, road construction, off-road vehicular traffic, illegal dumping, livestock grazing, and other edge effects that degrade vernal pools and other seasonal ponds. Toadlets and tadpoles are preyed upon by wading birds such as herons. Non-native aquatic animals such as mosquito fish and bullfrogs (*Rana catesbeiana*) have been implicated in the decline of the spadefoot, either through competition or predation (Jennings and Hayes 1994). The

emergence of the chytrid fungus (*Batrachochytrium dendrobatidis*) has been linked to the mortality of amphibian species in the U.S. and worldwide (USFWS 2000).

Special Considerations. The western spadefoot prefers areas of open vegetation and short grasses where the soil is sandy or gravelly (e.g., coastal sage scrub, chaparral, and grasslands). During the dry season of the year, spadefoots live beneath the soil surface in burrows in upland habitats in proximity to the pools. Spadefoots require unconstrained access to both aquatic breeding habitat and adjacent upland habitat where they aestivate. Substantial upland habitat (at least 1,500 feet) should be maintained around aquatic breeding habitats to increase available aestivating habitat and reduce disturbances and edge effects. Mosquito control measures may harm spadefoots and should be avoided in or near the preserve. Spadefoots readily breed in road ruts and other depressions pooled with water. Driving through these pools should be avoided if spadefoots are detected. There is also evidence that spadefoots imprint on their natal pool and return to it to breed. Relocation may disrupt this process and reduce or eliminate breeding success and therefore should not be attempted.

5.2.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, western spadefoot toad is known from 13 locations within the Survey Area. There are known populations of western spadefoot toad within the Survey Area at the following locations: south of Diamond Valley Lake (Attachment 1, Figure B-1), near Lake Skinner (Attachment 1, Figure B-2), south of Temecula (Attachment 1, Figure B-3), northern Escondido (Attachment 1, Figure B-8), Miramar (Attachment 1, Figure B-16), and north of the Lower Otay Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

Of the 13 occurrences of western spadefoot toad within the Survey Area, the CNDDDB lists 3 occurrences within the PIZ. Known populations of western spadefoot toad within the PIZ occur at the following locations: southwest Lake Skinner (Attachment 1, Figure B-2), south of Temecula (Attachment 1, Figure B-3) and near Miramar (Attachment 1, Figure B-12).

Preserve Area

Western spadefoot toads are known to occur in the Preserve Area at the San Miguel HMA, Crestridge HMA, and the Elfin Forest Reserve. Given the presence of suitable

habitat in San Vicente Creek and adjacent known locations, this species is also expected to occur at Rancho Cañada HMA.

Conservation and Take Levels. Impacts to western spadefoot habitat (e.g., ephemeral ponds, vernal pools, road ruts, and seasonal washes) will be avoided and minimized in accordance with the Wetland or Vernal Pool Protection Policies, in addition to the Plan Conditions for Coverage. No population data were available for the known occurrences within the Plan Area. Western spadefoots were noted in high numbers at the San Miguel HMA (Merkel and Associates 1997). This bank contains a one-acre stockpond and three acres of dry marsh and riparian scrub for breeding habitat. Crestridge HMA supports the western spadefoot; however the numbers and density are unknown (PSBS 1994). There is potential for the western spadefoot to use Rancho Cañada HMA as it has been observed in other portions of San Vicente Creek (Merkel and Associates 2004).

In summary, the preferred habitat for western spadefoot toad is grasslands and valley-foothill woodlands. Based on the preferred habitat, this species could occur in the Plan Area in grasslands and riparian (see Table B-1B). There are 6,508 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 47 acres of potential habitat for this species could be impacted (18 acres by Planned Projects and 29 acres by Future Projects and O&M Activities).

The Plan provides 28 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct habitat disturbance and/or other indirect effects as a result of Covered Activities. No new construction projects are proposed within vernal pool habitat in the Plan Area, thus the majority of any direct and indirect impacts would result from Covered Activities and be temporary in nature. Potential indirect effects would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of western spadefoot in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conservation of contiguous blocks of suitable habitat on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

5.2.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement the Vernal Pool Protection Policy where this species occupies vernal pools or road ruts (see Section 6.7.3 of the Plan).
3. Avoid or minimize impacts to western spadefoot toad habitat through project design and placement.
4. Conduct pre-activity surveys under favorable conditions for the western spadefoot in areas of potential habitat (including both potential breeding habitat and adjacent upland aestivation habitat) for all new facilities and O&M Activities conducted during the breeding and active foraging season of January 1 through June 30. Surveys must be performed for this species during appropriate field conditions (e.g., following adequate rainfall that would trigger breeding activity) in all vernal pools, seasonal depressions, or other areas that show evidence of standing water, prior to any proposed impact as part of the project review process (e.g., CEQA process). Surveys shall be conducted for potential spadefoot habitat within the project impact area and within a 1,500 foot buffer around the impact area.
5. If work must be done in occupied breeding habitat during the breeding season, the following measures would be used to avoid or reduce impacts:
 - a. If an Environmental Surveyor determines a need for fencing, exclusionary toad fences would be used to keep toads out of construction areas. These fences would be placed and monitored daily by an Environmental Surveyor familiar with western spadefoot ecology.
 - b. Silt fence/drift fence and pitfall traps would be installed around the impact area adjacent to occupied breeding habitat at least 21 days prior to impact to minimize access by spadefoots and to allow for removal of spadefoots from the impact area to an adjacent protected area. An Environmental Surveyor experienced with the identification, handling, and ecology of the spadefoot shall implement and oversee proper installation of the toad exclusion fencing, relocation efforts, and monitoring. The exclusion fencing would be maintained until the completion of all construction activities within or adjacent to occupied spadefoot habitat. For the duration of construction, the enclosure would be surveyed on a daily basis early in the morning, and any spadefoots that may have breached the fencing would be relocated.

6. Any wetlands created for mitigation for impacts to wetlands occupied by western spadefoot toads must be demonstrated to be capable of supporting the species prior to impacts, to ensure no-net-loss of occupied breeding habitat.
7. To ensure that diseases are not conveyed between work sites by the authorized biologist or assistants, the fieldwork code of practice developed by the Declining Amphibian Populations Task Force (DAPTF) will be followed at all times. The DAPTF fieldwork code of practice is contained in Attachment B-3 at the end of this Appendix.
8. When available, maintain and manage a 100-foot buffer area as foraging and burrowing habitat around known and newly discovered locations of this species.
9. When possible, enhance populations that are declining and restore damaged habitat based on information obtained through monitoring or research of this species. Enhancement may include reduction of non-native species and other site-specific habitat improvement activities.
10. Bullfrogs and other exotic species that prey upon or displace spadefoots would be removed from occupied habitat areas during restoration efforts.
11. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of western spadefoot. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

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6.2 Coronado Skink (*Eumeces skiltonianus interparietalis*)

USFWS: None

CDFG: Species of Special Concern

SDCWA Plan: Covered

Covered by MSCP: No

6.2.1 Background

Distribution, Abundance, and Trends. The Coronado skink ranges from the Peninsular Ranges to the coast; from approximately San Geronio Pass in Riverside County to San Quentin, Baja California, Mexico. It is also found on Todos Santos Island, the Los Coronado Islands, and Santa Catalina Island.

The Coronado skink occurs in a variety of habitats including in mesic open grassland, chaparral, areas of mature sage scrub, and pine-oak forests (occasionally extending into the higher montane elevations) and is often associated with mesic areas. It is regularly found beneath rocks and leaf litter, and found burrowing within rotting logs.

The Coronado skink is diurnal and most active from early spring until fall; eggs are laid in June or July (Zweifel 1952; Jennings and Hayes 1994). Occasionally this species is found in extremely disturbed grasslands or fallow fields beneath construction debris. The Coronado skink feeds on a variety of invertebrates including earthworms, spiders, moths, beetles, crickets, and grasshoppers. Juveniles typically hatch in July and August. Skinks may be observed foraging earlier in the year than some other native lizards; observations in January are not uncommon.

Threats and Limiting Factors. The principal threat to the skink is degradation and loss of habitat. Jennings and Hayes (1994) express concern about the drying up of mesic microhabitats due to human use of surface and underground water resources.

Special Considerations. The closely related subspecies *E. s. skiltonianus* is poorly differentiated from the more southern *E. s. interparietalis*, and more taxonomic study is warranted to separate the two. The former may intergrade with the latter in Orange and Los Angeles counties. Fisher and Case (1997) indicated that trends in skink abundance can be effectively monitored using pitfall trap arrays. Management consideration should be given to identifying and conserving microhabitats used by the Coronado skink.

6.0 Covered Reptiles

6.1 Southern Pacific (Southwestern) Pond Turtle (*Actinemys marmorata pallida*)

USFWS: None

CDFG: Species of Special Concern

SDCWA Plan: Covered

Covered by MSCP: Yes

6.1.1 Background

Distribution, Abundance, and Trends. The range of the southern Pacific (southwestern) pond turtle extends from San Francisco Bay to northern Baja California, Mexico. It occurs primarily west of the Peninsular and Sierran crests, with outlier populations on the Mojave River in California, as well as, the Truckee and Carson rivers in Nevada. In western Riverside County, the pond turtle is known from the Temecula area, San Jacinto River, Santa Ana River, and Santa Rosa Plateau (RCIP 2003). In San Diego County, this species occurs in eight locations (RCIP 2003).

The Southern Pacific pond turtle inhabits slow-moving permanent or intermittent streams, small ponds, and lakes. Turtles often spend significant portions of the daytime basking to thermoregulate their bodies. When not basking, turtles may position themselves just below the water's surface, where elevated water temperatures occur (Bash 1999), and will dive to underwater refugia when threatened.

Pond turtles are active year-round in southern California. Nesting occurs primarily from May to late-July, with clutch sizes of 3 to 13 eggs laid yearly or every other year (Jennings and Hayes 1994). The female typically nests in uplands at dry, open sites in full sunlight (e.g., warm, southern exposures). Average nesting distance to water in one study was approximately 328 feet (Hayes et al. 1999). Pond turtles are omnivorous and eat a variety of items such as small fish, insects, invertebrates, carrion, crayfish, tadpoles, and frogs. They also eat some plant food such as filamentous algae, tules, and cat-tail roots (Bash 1999). The life span of southwestern pond turtles can exceed 30 years (Storm et al. 1995).

Threats and Limiting Factors. Southern Pacific pond turtle populations have declined because of the loss and alteration of aquatic habitats, degradation of habitat due to non-native species, predation on young by introduced aquatic species (e.g., bullfrogs, bass, and catfish), collection for pets, enhanced predation (e.g., dogs, raccoons, and skunks),

and competition with exotic feral turtle species (Holland 1991; San Diego Herpetological Society 1980). Additionally, fragmentation of suitable breeding sites and introduced diseases from released pet turtles may pose a threat to local populations. Nests are often susceptible to predators and trampling by cattle or people. The presence of bullfrogs in breeding habitat is also a threat to this species.

Special Considerations. Water depth greater than two meters is generally preferred. This species requires adjacent uplands (up to 1,500 feet on either side of a populated watercourse) for nesting, including logs, rocks, or vegetation mats for basking, and emergent marsh vegetation for cover. A minimum of 1,500 feet upland buffer should be maintained, where possible, around aquatic habitats to increase available nesting habitat and reduce disturbances and edge effects.

6.1.2 Conservation Analysis

Presence in Plan Area and Preserve Area.

Survey area

According to the CNDDDB, southern pacific pond turtle is known from 7 locations within the Survey Area. There are known populations of southern pacific pond turtle within the Survey Area at the following locations: near Lake Skinner (Attachment 1, Figure B-2), east of Fallbrook (Attachment 1, Figure B-3), near the community of Rainbow (Attachment 1, Figure B-4), Escondido (Attachment 1, Figure B-7), and Rancho Bernardo (Attachment 1, Figure B-10).

Probable Impact Zone (PIZ)

Of the 7 occurrences of southern pacific pond turtle within the Survey Area, the CNDDDB lists 2 occurrences within the PIZ. Known populations of southern pacific pond turtle within the PIZ occur at the following locations: southwest Lake Skinner (Attachment 1, Figure B-2), Escondido (Attachment 1, Figure B-7) and Rancho Bernardo (Attachment 1, Figure B-10).

Preserve Area

This species has the potential to occur in suitable habitat at the Rancho Cañada HMA and at the San Luis Rey River HMA.

Conservation and Take Levels. Impacts to Southern Pacific pond turtle habitat will be avoided and minimized in accordance with the Plan Conditions for Coverage. No population data was available for the known occurrences within the Plan Area. Breeding, sheltering, and foraging habitat for this species will be conserved at the Rancho Cañada HMA as the pond turtle has the potential to occur in the perennial ponds along San

Vicente Creek (TNC 2006); Rancho Cañada HMA contains approximately 40 acres of suitable southern coast live oak riparian forest and freshwater marsh habitat that could support the pond turtle.

In summary, the preferred habitat for southern Pacific (southwestern) pond turtle is slow-moving permanent or intermittent streams, small ponds, and lakes. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: vernal lake, open freshwater, freshwater meadow, and freshwater marsh (see Table B-1B). There are 1,497 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 7 acres of potential habitat for this species could be impacted (5 acres by Planned Projects and 2 acres by Future Projects and O&M Activities).

The Plan provides one acre of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, alteration of hydrology, encroachment of non-native plant species, and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected contribute to the regional conservation of southwestern pond turtle in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving large, contiguous blocks of suitable habitat on which this species has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

6.1.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).

2. All construction activities in occupied southwestern pond turtle habitat, including staging of equipment, should take place outside the breeding season (May 1-July 1) to avoid impacts to emigrating pond turtle adults that are heading into the uplands to lay eggs.
3. Avoid or minimize impacts to southern pacific pond turtle habitat through project design and placement.
4. If work must be done in occupied pond turtle habitat, the following measures will be used to avoid or reduce impacts:
 - a. If encountered in areas to be impacted, southwestern pond turtles will be relocated to other suitable habitat in the vicinity, but outside the expected disturbance zones. Exclusionary fences may be used to keep turtles out of construction areas. These fences should be placed and monitored daily by a biologist familiar with pond turtle ecology. Any eggs discovered during pre-construction or construction activities will be salvaged by an authorized person and hatched in a protected offsite area. Successful hatchlings will be released back into suitable habitat in the vicinity of the salvage area or in an alternate location approved by the Wildlife Agencies. Any relocation of pond turtles or salvaging of turtle eggs shall occur in consultation with the Wildlife Agencies and may require preparation and approval of a Pond Turtle Holding Plan prior to implementation. Any Pond Turtle Holding Plan will include, but not be limited to: capture and reintroduction protocols, designation of hatching facilities and holding areas, feeding strategy, and expected length of time the animals will be held.
 - b. For temporary impacts, restore and/or improve hydrologic and vegetative conditions following project activities. For example, appropriate basking material such as boulders and/or small logs placed into open sunny areas may be added to supplement the existing wetlands habitat. In addition, submerged logs, with interstitial spaces beneath and away from the shoreline, may be added to provide underwater refugia.
 - c. Where possible, minimize impacts within a 1,500-foot upland buffer area as nesting habitat around known and newly discovered locations of this species within the Plan Area. If impacts within 1,500 feet cannot be minimized, exclusionary fences should be installed around active construction sites within the 1,500 foot buffer. Impacts proposed in natural upland vegetation that is contiguous with and within 1,500 feet of potential aquatic habitats may affect turtle nests or hibernating turtles. Consequently, potential suitable habitats within 1,500 feet of the

proposed impact area would be surveyed for pond turtles and/or turtle nests prior to any proposed impact as part of the project review.

5. Bullfrogs observed during pre-activity surveys that prey upon or displace pacific pond turtles (especially juveniles) would be removed from suitable habitat areas, if possible.
6. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of southwestern pond turtle. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

6.2.2 Conservation Analysis

Presence in Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Coronado skink is known from 9 locations within the Survey Area. There are known populations of Coronado skink within the Survey Area at the following locations: east of Fallbrook (Attachment 1, Figure B-4), off Champagne Blvd north of Jesmond Dene (Attachment 1, Figure B-5), east of Carlsbad (Attachment 1, Figure B-6), in Poway (Attachment 1, Figure B-10) and near Lake Jennings (Attachment 1, Figure B-13)

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no records of Coronado skink occurring within the PIZ, however, given the presence of suitable habitat in the vicinity of the PIZ, there is a potential for this species to occur.

Preserve Area

The Coronado skink is known to occur at Rancho Cañada HMA, as it was observed at Monte Vista Ranch and suitable habitat is present (TNC 2006), the Elfin Forest Reserve, and San Miguel HMA. Coronado skink is known to occur in the Crestridge HMA (PSBS 1994).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage for this species. No recent population data for this species is available. This species is expected to occur within the Rancho Cañada HMA, approximately 382 acres of suitable sage scrub, chaparral, oak woodland, and oak riparian habitat is present for this species. This species is known to occur at the Crestridge HMA and also has the potential to occur the Elfin Forest Reserve and San Miguel HMA.

In summary, Coronado skink prefers habitat such as mesic open grassland, chaparral, areas of mature sage scrub, and pine-oak forests. Preferred habitat for the Coronado skink occasionally extends into the higher montane elevations. This species is also often associated with mesic areas. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, coniferous forest, grasslands, oak woodland and forest, chaparral montane/trans-montane, coastal sage scrub, sage-scrub montane/trans-montane, alkalai wetlands, and freshwater meadow (see Table B-1B). There are 25,052 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 296

acres of potential habitat for this species could be impacted (145 acres by Planned Projects and 151 acres by Future Projects and O&M Activities).

The Plan provides 658 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to allow for regional conservation of the Coronado skink in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which the species is known to occur. In addition, protection for individuals and potential habitat is provided by the Plan's Conditions for Coverage for this species.

6.2.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Avoid or minimize impacts to Coronado skink habitat through project design and placement.

6.3 Belding's Orange-throated Whiptail (*Aspidoscelis hyperythrus beldingi*)

USFWS: None

CDFG: Species of Special Concern

SDCWA Plan: Covered

Covered by MSCP: Yes

6.3.1 Background

Distribution, Abundance, and Trends. In southern California, Belding's orange-throated whiptail is found in Orange, Riverside, San Diego, and San Bernardino counties, from sea level to 3,400 feet (State of California 2006a). Belding's orange-throated whiptails are typically found in sage scrub, open chaparral, and along the edges of riparian zones. The species prefers washes and sandy areas, preferably with rocks and brush patches (Stebbins 2003).

Hatchlings are usually observed during August and September. From October through December, only juvenile lizards are typically observed foraging on the surface, although unseasonably warm weather can bring adults out in the winter. Individuals generally emerge from winter hibernation in late March through April; most young have reached adult size by mid June (Bostic 1966). Belding's orange-throated whiptails forage primarily on small arthropods, particularly small termites. In one study, a single species of subterranean termite (*Reticulitermes hesperus*) comprised 85 percent of all prey items consumed by the lizards (Bostic 1964).

Threats and Limiting Factors. Threats to the Belding's orange-throated whiptail include degradation, loss, and fragmentation of native habitat, drought, displacement of food source by non-native species, susceptibility to extirpation due to habitat fragmentation (Jennings and Hayes 1994). This subspecies can also be impacted by off-road vehicle activity, over-grazing of sage scrub by livestock, and predation by introduced predators (e.g., cats and dogs).

Special Considerations. Whiptail populations are closely associated with sites that support their principal food source, western subterranean termites. Orange-throated whiptails are able to adjust their diet seasonally where termites are unavailable (MHCP 2003). Typical habitat includes semi-arid brushy areas typically with loose soil and rocks, including washes, streamsides, rocky hillsides, and coastal shrublands. Flat-topped buckwheat (*Eriogonum fasciculatum*) may serve as an indicator of suitable habitat. Friable soil is preferred for excavating burrows and hiding eggs.

It is possible that invasive non-native ant species [*i.e.*, Argentine ant (*Iridomyrmex humilis*) and fire ant (*Solenopsis invicta*)] could significantly reduce or eliminate the native termite prey base in smaller, edge-affected habitat patches (Suarez et al. 1998).

6.3.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Belding's orange-throated whiptail is known from 60 locations within the Survey Area. There are known populations of Belding's orange-throated whiptail within the Survey Area at the following locations: near Diamond Valley Lake (Attachment 1, Figure B-1), near Lake Skinner (Attachment 1, Figure B-2), near Santa Margarita River and south of Temecula Creek (Attachment 1, Figure B-3), near Red Mountain Reservoir, near San Luis Rey River and near Beck Reservoir (Attachment 1, Figure B-4), near Old Castle Road, near East Vista Way (Attachment 1, Figure B-5), near Squires Dam (Attachment 1, Figure B-6), near Champagne Boulevard (Attachment 1, Figure B-7), near Escondido Creek and near San Dieguito Reservoir (Attachment 1, Figure B-8), near San Dieguito River and Olivenhain Reservoir (Attachment 1, Figure B-9), near Los Penasquitos Creek (Attachment 1, Figure B-10), near Poway Road (Attachment 1, Figure B-11), near Interstate 15 (Attachment 1, Figure B-12), near San Vicente Reservoir, Lake Lindo and San Diego River (Attachment 1, Figure B-13), near Lake Murray, Pepper Drive, Jamacha Road and San Diego River (Attachment 1, Figure B-14), near Sweetwater Reservoir (Attachment 1, Figure B-15), and near Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 60 occurrences of Belding's orange-throated whiptail within the Survey Area, the CNDDDB lists 12 occurrences within the PIZ. Known populations of Belding's orange-throated whiptail within the PIZ occur at the following locations: near Lake Skinner (Attachment 1, Figure B-2), near Santa Margarita River (Attachment 1, Figure B-3), near East Vista Way (Attachment 1, Figure B-5), near Escondido Creek and San Dieguito Reservoir (Attachment 1, Figure B-8), near Olivenhain Reservoir and San Dieguito River (Attachment 1, Figure B-9), near Los Penasquitos Creek (Attachment 1, Figure B-10), near San Diego River (Attachment 1, Figure B-14), and near Sweetwater Reservoir (Attachment 1, Figure B-15).

Preserve Area

This species occurs within the San Miguel HMA (Attachment 1, Figure B-15), the Montaña Mirador property (TNC 2006; Merkel and Associates 2004 and 1997; Ogden

1995; City of San Diego 2004), and the Rancho Cañada HMA (Attachment 1, Figure B-11).

There are known populations of Belding's orange-throated whiptail near the Elfin Forest Reserve (Attachment 1, Figure B-9), Crestridge HMA (Attachment 1, Figure B-14), and the Manchester HMA (Attachment 1, Figure B-8). There is potential for this species to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. No recent population data for this species within the Plan Area is available. Suitable habitat for the Belding's orange-throated whiptail is present at four the Preserve Area, San Miguel HMA, Rancho Cañada HMA, Elfin Forest Reserve, and the Montaña Mirador property, and has the potential to occur at Crestridge HMA.

In summary, Belding's orange-throated whiptail prefers sage scrub, open chaparral, and the edges of riparian zones. Based on their preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, sage-scrub montane/trans-montane, and riparian (see Table B-1B). There are 19,059 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 295 acres of potential habitat for this species could be impacted (145 acres by Planned Projects and 150 acres by Future Projects and O&M Activities). The Plan provides 686 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Belding's orange-throated whiptail in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of suitable habitat on which this species is known to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

6.3.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Avoid or minimize impacts to Belding's orange-throated whiptail habitat through project design and placement.

3. Minimize and manage effects from introduced ant species that may exclude the termite prey base during restoration efforts. All nursery stock plants will be checked for non-native ants before installation at restoration sites. Non-native ants that penetrate native habitats appear to be partially supported by artificial irrigation associated with landscaping (Suarez et al. 1998). Therefore, runoff from mitigation sites in native habitat would be minimized and managed.

6.4 Coastal (Western) Whiptail (*Aspidoscelis tigris stejnegeri*)

USFWS: None

CDFG: None

SDCWA Plan: Covered

Covered by MSCP: No

6.4.1 Background

Distribution, Abundance, and Trends. This subspecies is found from Santa Barbara County southward through the northern two-thirds of Baja California, Mexico. Glaser (1970) reports this species at a variety of locales in western Riverside County, extending into the foothills of the San Jacinto Mountains. In San Diego County, this species ranges from the coast into the inland foothills.

This whiptail lizard occupies semi-open areas and sunny microhabitats in sage scrub, chaparral, open woodlands, peripheral edges of riparian zones and washes, as well as desert and other arid habitats. During extremely hot portions of the day, this prey-stalking lizard may seek refuge in burrows or deep shade to control its thermoregulatory requirements.

Pianka (1970) reports that many more individuals are active during a morning warming-up period between seven o'clock and noon compared to an afternoon cooling-off period. Whiptails may occupy home ranges up to 1.2 acres, although they are not territorial (Parker 1972). Their diet may consist up to 80 percent of termites. Total prey items, including beetles, may vary substantially due to availability. Variations in annual rainfall may substantially impact population numbers. The coastal whiptail is a very active hunter and has been observed to move in excess of 180 yards during a thirty-minute period (Milstead 1957). No preference for habitat occupied by specific plant species has been reported. Juveniles may generally be observed from July through October; adults are rarely encountered from September through February.

Threats and Limiting Factors. The principal threat to the coastal whiptail is degradation and loss of high quality habitat. It is also said to be susceptible to injury or death from vehicles and mountain bikes along frequently utilized dirt roads (Fisher et al. 2002).

6.4.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, coastal whiptail is known from 13 locations within the Survey Area. There are known populations of coastal whiptail within the Survey Area at the following locations: near Old Castle Road, at Pala and Temecula (Attachment 1, Figure B-4), Rancho Santa Fe (Attachment 1, Figure B-8), Miramar (Attachment 1, Figure B-12), Poway (Attachment 1, Figure B-10), west of Highway 67 near the entrance to San Vicente Reservoir (Attachment 1, Figure B-13), the Slaughterhouse Canyon diversion structure (Attachment 1, Figure B-13), and the Sweetwater Reservoir (Attachment 1, Figure B-15),

Probable Impact Zone (PIZ)

According to the CNDDDB, there are 2 records of coastal whiptail occurring within the PIZ. Known populations of coastal whiptail within the PIZ occur at the following locations: along Temecula Creek in Temecula (Attachment 1, Figure B-3), in Escondido (Attachment 1, Figure B-8), near the San Vicente Reservoir (Attachment 1, Figure B-13), and near the Sweetwater Reservoir (Attachment 1, Figure B-15).

Preserve Area

The coastal whiptail is known to occur at Rancho Cañada HMA (TNC 2006), San Miguel HMA (Attachment 1, Figure B-16), the Elfin Forest Reserve (Ogden 1995), and is expected to occur at the Crestridge HMA (PSBS 1994).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage for this species. No recent population data for this species within the Plan Area is available. The coastal whiptail is present at three the Preserve Area, San Miguel HMA, Rancho Cañada HMA, and the Elfin Forest Reserve, and has the potential to occur at Crestridge HMA.

In summary, coastal (western) whiptail prefers sage scrub, chaparral, open woodlands, and peripheral edges of riparian zones and washes, as well as desert and other arid habitats. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, coastal sage scrub montane/trans-montane, and riparian (see Table B-1B). There are 19,534 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 297 acres of potential habitat for this species could be impacted (146 acres by Planned Projects and 151 acres by Future Projects and O&M Activities). The Plan provides 674 acres of available habitat in

the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of coastal whiptail in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of suitable habitat on which this species is known to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

6.4.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Avoid or minimize impacts to coastal whiptail habitat through project design and placement.

6.5 San Diego Banded Gecko (*Coleonyx variegatus abbotti*)

USFWS: None

CDFG: None

SDCWA Plan: Covered

Covered by MSCP: No

6.5.1 Background

Distribution, Abundance, and Trends. The range of this gecko species is from coastal southern California southward into Baja California, Mexico. It is reported by Glaser (1970) for Riverside County from Moreno, San Jacinto, Arlington, Riverside, and Box Spring Mountain. There are eight subspecies of this gecko, four of which occur in the southwestern U.S. The banded gecko (*C. v. variegatus*) occurs on the Mojave Desert and Colorado Desert where it replaces the coastal dwelling San Diego banded gecko. Klauber (1934) San Diego County indicates this gecko is found primarily in the lower foothills of this region. Sites noted include Agua Tibia, Pala, Rincon, Poway, Foster, El Capitan, Jamul, Dulzura, and Cottonwood; as well as closer to the coast at Mission Gorge, Lake Hodges, Mission Valley, and near Chollas Heights. During extensive recent herpetofaunal monitoring in the San Diego County MSCP area this gecko was found at only three locations: Marron Valley, La Cresta, and the Wild Animal Park in Escondido (where it was locally common) (Rochester et al. 2001).

The San Diego banded gecko prefers sage scrub and chaparral habitats. This nocturnal gecko is also regularly associated with granite and rocky outcrops and large boulders with deep fissures. The San Diego banded gecko can sometimes be located under cap rocks in areas of sizeable granitic boulders; and is more likely to be observed near the surface during warmer periods of weather.

The female lays two eggs in a humid location in late spring, and later in the summer may lay an additional 1-2 clutches. Gestation time is approximately 45 days. Hatchlings are found from July to November. Geckos eat small invertebrates such as grasshoppers, beetles, spiders, termites, and sowbugs. In captivity, this species shows a preference for temperatures in the 75–88 degree Fahrenheit range. The nocturnal banded gecko has evolved a more economical/efficient means of locomotion, to compensate for the loss of “energy” acquired by sun-dwelling diurnal lizards. In one study, muscle efficiency for this species was 37 percent as compared with 19 percent for the Coronado skink (Farley and Emshwiller 1996). Fat is stored in the tail of banded geckos, and while it is specifically adapted to lose its tail under duress (with specialized fracture planes), such incidents

can be extremely taxing on an individual's ability to survive through inactive periods during the winter.

Threats and Limiting Factors. The primary threat to this species is the general degradation of suitable habitat, including rocky outcrops.

Special Considerations. Nocturnal activity and inaccessible habitat make detection especially difficult. This animal is very difficult to census, even during optimal seasonal weather; it may be restricted to deep cavities within boulder fields during cooler weather.

6.5.2 Conservation Analysis

Presence in Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are no known occurrences of the San Diego banded gecko in the Survey Area. Due to potential CNDDDB undersampling and the availability of suitable rocky habitat within the Survey Area, San Diego banded gecko are expected to occur.

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of the San Diego banded gecko in the PIZ.

Preserve Area

The San Diego banded gecko has a high potential to occur at Rancho Cañada HMA as it is known from contiguous suitable habitat (TNC 2006) and at the Elfin Forest Reserve (Ogden 1995).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage for this species. No recent population data for this species within the Plan Area is available. The San Diego banded gecko is present at two the Preserve Area, Rancho Cañada HMA and the Elfin Forest Reserve, and has the potential to occur at the Crestridge HMA.

In summary, San Diego banded gecko prefers granite outcrops and boulders in sage scrub and chaparral habitats. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, and coastal sage scrub montane/trans-montane (see Table B-1B). There are 18,024 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and

120 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to allow for continued breeding, foraging, and sheltering by the San Diego banded gecko in the Plan Area by conserving large, contiguous blocks of mitigation lands on which the species is known to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

6.5.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Avoid or minimize impacts to rocky outcrop boulder-dominated microhabitats through project design and placement.

6.6 Coast (San Diego) Horned Lizard (*Phrynosoma coronatum blainvillii*)

USFWS: None

CDFG: Species of Special Concern

SDCWA Plan: Covered

Covered by MSCP: Yes

6.6.1 Background

Distribution, Abundance, and Trends. The coast (San Diego) horned lizard ranges from southern Kern County, southern Ventura County, and the Los Angeles basin southward through Orange, San Bernardino, Riverside, and San Diego Counties into northern Baja California, Mexico, at San Vicente. A closely related subspecies, California coast horned lizard (*P. c. frontale*), with smaller head scales that are similar in size, occurs from northern Los Angeles County to San Francisco Bay. Glaser (1970) reports individual San Diego horned lizards have been collected near Joshua Tree National Monument in the Little San Bernardino Mountains, as well as at 6,500 feet in elevation on the west side of Palm Canyon. The distribution of horned lizards is locally patchy and dependent upon a variety of factors including microhabitat and the availability of its primary food item, harvester ants (e.g., *Pogonomyrmex* and *Pheidole* spp.). Substantial populations still occur in the western foothills in large blocks of relatively undeveloped lands.

Coast horned lizards utilize chamise chaparral, sage scrub, and lower montane forest habitats. Generally, it is found in (but not restricted to) relatively level or gently sloping terrain, and near the coast it shows some affinity for ancient alluvial terraces and floodplains. Vegetative understory is often sparse in its habitat. It sometimes occurs along seldom-used dirt roads where native species of harvester ants, its primary prey item, are particularly prevalent. Distinctive scat filled with ant remains can be diagnostic even if these lizards are not observed. The horned lizard utilizes a sit-and-wait approach to foraging. Most feeding activities are confined to the morning hours, starting approximately two hours after sunrise (Whitford and Bryant 1979). Daily activity may peak in the late morning, or again later in the afternoon, with reduced activity during particularly hot temperatures.

Juveniles are found from July to September. The coast horned lizard generally emerges from winter hibernation in late March, and is particularly active in the spring from April 15 to May 15. Some populations may aestivate during warm periods of late July (Jennings 1987). Hibernation occurs in September or early October with the onset of markedly colder weather. Clutch size ranges from six to 16 eggs (Stebbins 2003) with a mean of

13 eggs (Pianka and Parker 1975). Egg laying occurs from late May through June (Pianka and Parker 1975).

Threats and Limiting Factors. The principal threat to the coast horned lizard is loss and degradation of habitat. This species can also be impacted by off-road vehicle activity, collection for pets, ecological effects of introduced ant species, and predation by introduced predators (e.g., cats).

Special Considerations. The distribution of horned lizards is locally patchy and dependent upon a variety of factors, including microhabitat characteristics (e.g., areas with loose sand; MHCP 2003) and the availability of its primary food item, harvester ants. It consequently disappears where introduced Argentinean ants (*Iridomyrmex humilis*) competitively exclude harvester ants. Argentine ant invasion has a significant edge effect on San Diego horned lizard habitat. Argentine ants penetrate up to 656 feet into native habitat from the urban edge or irrigated landscaping. Therefore, smaller fragments (e.g., less than 30 acres) of habitat would lack core area refugia that are not invaded by Argentine ants, and may not be able to sustain native harvester ants that support horned lizards (Suarez et al. 1998). Other factors affecting lizard abundance include vegetation (positive correlation with scrub and chaparral indicator plants) and soil (positive correlation with sandy substrates) (Fisher et al. 2002). Horned lizards were absent or very uncommon on nearly all of the smaller habitat areas sampled (Fisher et al. 2002).

6.6.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, coast horned lizard is known from 38 locations within the Survey Area. There are known populations of coast horned lizard within the Survey Area at the following locations: near Diamond Lake (Attachment 1, Figure B-1), near Lake Skinner (Attachment 1, Figure B-2), south of Santa Margarita River and south of Temecula Creek (Attachment 1, Figure B-3), east of East Vista Way (Attachment 1, Figure B-5), east of Champagne Boulevard (Attachment 1, Figure B-7), south of San Marcos Creek (Attachment 1, Figure B-8), north of Escondido Creek, south of Lake Hodges and near Olivenhain Reservoir (Attachment 1, Figure B-9), near San Dieguito River and Los Penasquitos Creek (Attachment 1, Figure B-10), south of Paway Road and near San Vicente Reservoir (Attachment 1, Figure B-11), east of Interstate 15 (Attachment 1, Figure B-12), near San Vicente Reservoir (Attachment 1, Figure B-13), near Lake Murray (Attachment 1, Figure B-14), and near Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the occurrences of coast horned lizard within the Survey Area, the CNDDDB lists 8 occurrences within the PIZ. Known populations of coast horned lizard within the PIZ occur at the following locations: near Lake Skinner (Attachment 1, Figure B-2), south of Santa Margarita River and south of Temecula Creek (Attachment 1, Figure B-3), near Olivenhain Reservoir (Attachment 1, Figure B-9), near San Vicente Reservoir (Attachment 1, Figures B-11 and B-13), and near Lake Murray (Attachment 1, Figure B-14).

Preserve Area

This species occurs within the Elfin Forest Reserve (Attachment 1, Figure B-9). The coast horned lizard is common at Rancho Cañada HMA (TNC 2006), regularly observed at the San Miguel HMA (Attachment 1, Figure B-16; Merkel and Associates 1997), and is present in similar habitat adjacent to Crestridge HMA (PSBS 1994), at the Myers property (EDAW 2004), and the Montaña Mirador property (Attachment 1, Figure B-10, State of California 2007c; City of San Diego 2004).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. There are no population estimates for this species within the Plan Area; no surveys have been conducted to date. There are no population estimates for this species within the Plan Area. This species is known to occur at San Miguel HMA, Elfin Forest Reserve, the Myers property, and the Montaña Mirador property. Suitable habitat for the coast horned lizard is present at Rancho Cañada HMA.

In summary, the preferred habitat for coast (San Diego horned) lizard is chamise chaparral, sage scrub, and lower montane forest habitats. Based on the preferred habitat, this species could occur in the Plan Area in coniferous forest, oak woodland forest, coastal sage scrub, coastal sage scrub montane/trans-montane, and in the subcommunity chamise chaparral (granitic chamise chaparral) (see Table B-1B). There are 10,665 acres of these vegetation communities and subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 256 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 146 acres by Future Projects and O&M Activities). The Plan provides 526 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego horned lizard in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of mitigation lands on which the species is known to occur. In addition, protection for San Diego horned lizard individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

6.6.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Avoid or minimize impacts to coast horned lizard habitat through project design and placement.
3. Minimize and manage effects from introduced ant species that may exclude the horned lizard's termite prey base during restoration efforts. All nursery stock plants will be checked for non-native ants before installation at restoration sites. Non-native ants that penetrate native habitats appear to be partially supported by artificial irrigation associated with landscaping (Suarez et al. 1998). Therefore, runoff from mitigation sites in native habitat would be minimized and managed.

6.7 Coastal Rosy Boa (*Lichanura trivirgata roseofusca*)

USFWS: None

CDFG: None

SDCWA Plan: Covered

Covered by MSCP: No

6.7.1 Background

Distribution, Abundance, and Trends. The coastal rosy boa ranges from the lower slopes of the Peninsular Ranges and Transverse Mountains of extreme southern California, southward into Baja California, Mexico. Glaser (1970) reports this snake from a variety of locales in western Riverside County including Palm Springs, Pinyon Flat, Snow Creek, Banning, Hemet, San Jacinto, Reche Canyon, the western slope of Box Springs Mountain, chaparral north of Elsinore, and a number of sites in the Santa Ana Mountains. Klauber (1934) records the coastal rosy boa primarily in the hilly regions near the coast and the montane foothills for San Diego County, with numerous sightings from Pamo southward to the border at Tecate, Mexico.

The coastal rosy boa snake inhabits a wide range of habitats including rocky coastal sage scrub and chaparral and desert habitat. It shows a preference for areas with high annual sun exposure and can sometimes be found “sunning” on large, exposed slab rocks. Other microhabitats where it is sometimes observed include on talus, under cap rock, on sandy alluvial fans, and among granitic boulder piles.

Rosy boas adapt their foraging to conserve or manage heat. A hibernation period extends from approximately November into early March, depending upon the elevation and local conditions. Nocturnal and crepuscular activity occurs primarily in late spring through summer, followed by increased diurnal foraging as the temperatures become cooler. This snake can reach 40 inches in length. Rosy boas may ambush, hunt, or stalk their prey that includes small rodents, such as deer mice. Mating occurs from May to July and females give birth to three to 12 young (Stebbins 2003).

Threats and Limiting Factors. This snake is illegally collected for the pet trade. It is also a slow moving subspecies that is susceptible to road kills. Degradation of rock outcrops is also a contributing factor the decline of this species.

6.7.2 Conservation Analysis

Presence on within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, coastal rosy boa is known from 3 occurrences within the Survey Area. There are known populations of coastal rosy boa within the Survey Area at the following locations: east of Mirarmar (Attachment 1, Figure B-12) and north of the Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

Of the 3 occurrences of coastal rosy boa within the Survey Area, the CNDDDB lists no occurrences within the PIZ.

Preserve Area

The coastal rosy boa is known to occur at the San Miguel HMA (Merkel and Associates 1997) and the Elfin Forest Reserve (Ogden 1995) and has a high potential to occur at the Rancho Cañada HMA (TNC 2006).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. There are no population estimates for this species within the Plan Area; no surveys have been conducted to date. Suitable habitat for the coastal rosy boa is present at San Miguel HMA and the Elfin Forest Reserve; suitable habitat is present at the Rancho Cañada HMA.

In summary, coastal rosy boa prefers rocky coastal sage scrub and chaparral and desert habitat. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, and coastal sage scrub montane/trans-montane (see Table B-1B). There are 18,024 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of coastal rosy boa in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of suitable habitat on which this species is known to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

6.7.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Maintain adequate rocky, downed woody, and other organic debris.
3. Avoid or minimize impacts to coastal rosy boa habitat through project design and placement.

6.8 San Diego Ring-neck Snake (*Diadophis punctatus similis*)

USFWS: None

CDFG: None

SDCWA Plan: Covered

Covered by MSCP: No

6.8.1 Background

Distribution, Abundance, and Trends. The San Diego ring-neck snake is found in Orange, western Riverside, and San Diego counties southward to northern Baja California, Mexico. It occurs from sea level to 7,000 feet. Glaser (1970) reports this species in Riverside County at Silverado Canyon, Temescal, Alessandro, and Strawberry Valley. Klauber (1934) indicates concentrations of sightings in San Diego County along the immediate southern coast where much urban development now occurs; then from Mission Valley eastward to Dehesa and Barona; as well as at scattered locales in the mountains. Given the intensity of Klauber's collections over many decades, there is a pronounced dearth of sightings in interior northern portions of the County.

This small snake prefers mesic areas in chaparral, sage scrub, non-native grassland, and oak woodlands, often with high numbers of boulders (Stebbins 2003).

Approximately 1–10 eggs about an inch long are laid in June or July at what may be communal nest sites (Lapin 1983). These eggs are usually deposited in heavy cover such as within rotting logs, beneath rocks, or in small animal burrows. Young hatch in approximately eight weeks in August or September. Diet for this small snake includes salamanders, newborn rodents, earthworms, slugs, small lizards, and soft-bodied insects (RCIP 2003). While sometimes active diurnally (e.g., near stream sides and substantial cover), the ring-neck snake is apt to be nocturnal or crepuscular during hot weather (Zeiner et al. 1988). They aestivate underground during the colder portions of the winter.

Threats and Limiting Factors. This species has not been documented to be widely distributed (Rochester et. al 2001) and to date no widely recognized threats to the species have been identified (Hallock and MacAllister 2005; RCIP 2003).

6.8.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, San Diego ring-neck snake is known from 1 occurrence within the Survey Area

Probable Impact Zone (PIZ)

The CNDDDB lists 1 occurrence of San Diego ring-neck snake within the PIZ, in Rancho Peñasquitos north of the Montaña Mirador property (Attachment 1, B-10).

Preserve Area

The San Diego ring-neck is known to occur at the Elfin Forest Reserve (Ogden 1995) has a high potential to occur at Rancho Cañada HMA due to the presence of known locations on adjacent contiguous habitat (TNC 2006).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. There are no population estimates for this species within the Plan Area; no surveys have been conducted to date. This species is known to occur at the Elfin Forest Reserve, Suitable habitat for the San Diego ring-neck snake is present at Rancho Cañada HMA, on approximately 380 acres of suitable habitat.

In summary, San Diego ring-neck snake prefers chaparral, sage scrub, non-native grassland, and oak woodlands. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, coastal sage scrub montane/trans-montane, nonnative grasslands, and in the subcommunity southern coast live oak riparian forest (see Table B-1B). There are 23,423 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 316 acres of potential habitat for this species could be impacted (154 acres by Planned Projects and 162 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects could result from habitat loss due to encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego ring-neck snake in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of mitigation lands on which the species is known to occur. In addition, protection for individuals and ring-neck snake habitat is provided by the Plan's Conditions for Coverage for this species.

6.8.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Avoid or minimize impacts to rocky outcrop and/or boulder-dominated microhabitats through project design and placement.

6.9 (Northern) Red Diamond Rattlesnake (*Crotalus ruber ruber*)

USFWS: None

CDFG: Species of Special Concern

SDCWA Plan: Covered

Covered by MSCP: No

6.9.1 Background

Distribution, Abundance, and Trends. Within its limited U.S. range, this species is confined primarily to areas from the Peninsular Ranges westward to the coast. Northern red-diamond rattlesnakes are found from extreme southern Los Angeles County and near Pioneertown in Morongo Valley, southward into Baja California, Mexico (Stebbins 2003).

Klauber (1934) records sites almost throughout the coastal slope of San Diego County. Sightings are fewer near Camp Pendleton in the northwestern corner of the County and are extremely sparse at higher elevations. In the desert there are a number of records, particularly near locales with boulder-strewn low mountains such as in Sentenac Canyon, the Narrows, Borrego Palm Canyon, Vallecito, and Dos Cabezas. Glaser (1970) also reports many locales throughout the interior valleys and foothills of western Riverside County, into the extreme western edge of the Little San Bernardino Mountains near Morongo Valley, and down the rocky western side of the Coachella Valley.

This snake frequents rocky outcrops and areas of heavy brush or rugged terrain in chamise chaparral, sage scrub, or desert scrub, on both coastal and desert slopes. Observations are typically below 4,000 feet in elevation; however, the red-diamond rattlesnake has been observed near 5,000 feet on Palomar Mountain.

This relatively docile and potentially long-lived rattlesnake is active all year, but numbers of observations are higher in April and May coinciding with mating activities. Young are born from late July through September (Klauber 1937). Prey items are primarily squirrels, rabbits, and lizards. Evidence is lacking to suggest that this species is territorial, although an individual may be dominant within a particular spatial area, and subordinate outside of that area (Gillingham 1987).

Threats and Limiting Factors. At least 20 percent of the (northern) red diamond rattlesnake's former habitat is estimated to have been lost to urban and agricultural development (Jennings and Hayes 1994). Where extensive tracts of suitable habitat remain, this rattlesnake can still be common.

Special Considerations. This snake is feared because of its venomous bite, and is often killed due to general fear rather than any potential to do immediate harm. This large bodied snake is known to eat rodents and serves an integral role in limiting population explosions of prey species

6.9.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, red diamond rattlesnake is known from 14 locations within the Survey Area. There are known populations of red diamond rattlesnake within the Survey Area at the following locations: near Diamond Valley Lake (Attachment 1, Figure B-1), near Santa Margarita River and Frontage Road (Attachment 1, Figure B-3), north of Beck Reservoir and near San Luis Rey River (Attachment 1, Figure B-4), near Old Highway 395 (Attachment 1, Figure B-5), near Lake Hodges (Attachment 1, Figure B-9), near San Dieguito River (Attachment 1, Figure B-10), south of Scripps Poway Parkway (Attachment 1, Figure B-11), east of Interstate 15 (Attachment 1, Figure B-12), and near Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

Of the occurrences of red diamond rattlesnake within the Survey Area, the CNDDDB lists 5 occurrences within the PIZ. Known populations of red diamond rattlesnake within the PIZ occur at the following locations: near Santa Margarita River and near Frontage Road (Attachment 1, Figure B-3), north of Scripps Poway Parkway (Attachment 1, Figure B-11), and east of Interstate 15 (Attachment 1, Figure B-12).

Preserve Area

This species occurs within the San Miguel HMA (Attachment 1, Figure B-15). In addition, this species is expected to occur at, the Rancho Cañada HMA, Elfin Forest Reserve, and Crestridge HMA.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. There are no population estimates for this species within the Plan Area; no surveys have been conducted to date. This species is expected to occur at the Rancho Cañada HMA, Elfin Forest Reserve, and Crestridge HMA due to the presence of suitable habitat and the proximity to known locations.

In summary, the preferred habitat for (northern) red diamond rattlesnake is rocky outcrops and areas of heavy brush or rugged terrain in chamise chaparral, sage scrub,

or desert scrub. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, coastal sage scrub, and coastal sage scrub montane/trans-montane, and in the subcommunity chamise chaparral (granitic chamise chaparral) (see Table B-1B). There are 9,894 acres of these vegetation communities and subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). The Plan provides 518 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the northern red diamond rattlesnake in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of suitable habitat on which this species is known to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

6.9.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If a northern red diamond rattlesnake is observed in the construction area, the snake should be moved by an Environmental Surveyor to the closest safe, suitable habitat in the area. Exclusionary fences may be used to keep snakes out of construction areas. These fences would be placed and monitored daily.
3. Avoid or minimize impacts to red diamond rattlesnake habitat through project design and placement.

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7.0 Covered Birds

7.1 Western Burrowing Owl (*Athene cunicularia hypugaea*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: Yes

7.1.1 Background

Distribution, Abundance, and Trends. The western subspecies of burrowing owl was formerly a common resident of coastal southern California, but has been reduced to a few scattered areas. Burrowing owls depend on grasslands and open scrub habitats, which are frequently threatened by development. Currently, breeding western burrowing owls are found at only six locations in San Diego County: North Island Naval Air Station, Imperial Beach Naval Auxiliary Landing Field, Otay Mesa (including Otay Mountain and Brown Field), Sweetwater Reservoir, Warner Valley, and Borrego Valley (Unitt 2004). Habitat near Lake Skinner has been identified as a core area (RCIP 2003).

Western burrowing owl habitat includes grasslands, open scrub, pastures, and the edges of agricultural fields. These owls use burrows of small mammals, especially the California ground squirrel (*Spermophilus beecheyi*), for cover and nesting. Because burrowing owls are so rare, reliable data regarding nesting and reproduction are hard to come by (Unitt 2004). However, breeding for the western burrowing owl is generally between March and August.

Threats and Limiting Factors. In addition to direct habitat loss due to development and urbanization, western burrowing owl populations are declining due to incidental poisoning, destruction of their burrows by ground squirrel control programs, collisions with cars, introduction of non-native predators, and artificial enhancement of certain native predator populations (Unitt 2004). Recent observations indicate a loss of documented colonies and the severe reduction in the number of breeding individuals. This subspecies should be considered among the most endangered in the county in terms of breeding territory losses (Unitt 2004).

Special Considerations. Western burrowing owls will sometimes use artificially created nesting burrows with at least 6.5 acres of adjacent suitable foraging habitat (State of California 2006a). Nest sites need minimal human disturbance. Western burrowing owls

regularly stand next to their exposed nesting burrows during daylight hours. Several burrows within an area may be used sequentially by these owls; hence, their absence from one set of burrows does not necessarily confirm they no longer occur within a territory.

7.1.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, burrowing owl is known from 36 locations within the Survey Area. There are known populations of burrowing owl within the Survey Area at the following locations: near State Highway 79 and Diamond Lake (Attachment 1, Figure B-1), near Lake Skinner (Attachment 1, Figure B-2), and near Vail Ranch Parkway (Attachment 1, Figure B-3).

Probable Impact Zone (PIZ)

Of the 36 occurrences of burrowing owl within the Survey Area, the CNDDDB lists 23 occurrences within the PIZ. Known populations of burrowing owl within the PIZ occur at the following locations: near Diamond Lake (Attachment 1, Figure B-1) and Lake Skinner (Attachment 1, Figure B-2).

Preserve Area

This species is not currently known to occur within the Preserve Area. Burrowing owl has been observed at the San Miguel HMA, although no colonies have been found (Merkel and Associates 1997). Nesting is currently occurring both on the Sweetwater Reservoir vernal pool mitigation bank and on adjacent San Diego National Wildlife Refuge land (H. Crowell, pers. comm., 2008).

Conservation and Take Levels. No population data within the Survey Area is available. There will be no direct take of burrowing owl individuals or nests. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Management. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade potential burrowing owl habitat or disturb breeding activities include rodent poisoning programs, management for other sensitive species, human disturbance, vehicular activity, and presence of introduced predators.

In summary, western burrowing owl prefers grasslands, open scrub, pastures, and the edges of agricultural fields. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: native and nonnative grasslands, coastal sage scrub (Diegan), Riversidean sage scrub, and general agriculture (see Table B-1B). There are 8,692 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 195 acres of potential habitat for this species could be impacted (97 acres by Planned Projects and 98 acres by Future Projects and O&M Activities).

The Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the western burrowing owl by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.1.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Conduct preconstruction surveys in potentially suitable burrowing owl habitat in accordance with Wildlife Agency protocols.
3. Minimize impacts through timing of work to avoid sensitive biological activity periods (e.g., active breeding at a nest site, winter roosting).
4. Nest surveys within 300 feet of all proposed activities should be conducted during the breeding season (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers).

5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of burrowing owl. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once burrowing owls have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known burrowing owl locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
6. All unavoidable impacts to occupied burrow habitat must be mitigated with habitat that is occupied with similar densities of burrowing owls and/or the establishment of artificial burrows in suitable habitat. Any artificial burrow installation will require a management and monitoring plan for the installation site to be approved by the Wildlife Agencies prior to the onset of impacts. Any burrowing owls to be impacted would be evicted by an Environmental Surveyor prior to project impact; eviction would not occur during the breeding season. Mitigation must occur within a Wildlife Agency sanctioned mitigation bank or a location approved by the Wildlife Agencies. Habitat mitigation ratios would be determined based on the habitat types impacted. Mitigation may also be required for occupied areas that occur in habitat that typically does not require mitigation (i.e., agriculture, disturbed habitat) where such habitat is found to be supporting this species. Mitigation shall be consistent with the ratios provided in Tables 6-6 and 6-7 in the Plan, and 0.5:1 for Tier IV habitats where such habitat is found to

be supporting burrowing owl. Mitigation using artificial burrows will be done at a minimum ratio of 2:1.

7. Because burrowing owls use California ground squirrel (*Spermophilus beecheyi*) burrows for cover and nesting, ground squirrel populations should be encouraged when possible. In areas occupied or potentially occupied by burrowing owls where ground squirrels are also causing a specific management problem (e.g., undermining concrete/damaging structural integrity), focused squirrel control may occur on a case-by-case basis using methods that avoid the potential for secondary poisoning.
8. Direct take of individuals and destruction of nests and/or burrows within an active territory is not allowed.
9. Evaluate the Preserve Area for the potential to re-establish burrowing owls and consider translocation of individuals to currently unoccupied, suitable habitats in the Preserve.
10. Where possible, provide for additional or enhanced foraging or nesting habitat to maximize reproductive success and facilitate the dispersal of individual birds.
11. The Water Authority and Wildlife Agencies may choose to enter into an advanced mitigation agreement (e.g., by proactively banking credits through restoration opportunities) to avoid potential project delays.

7.2 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

USFWS: Endangered; Designated Critical Habitat

CDFG: Endangered

SDCWA: Covered

Covered by MSCP: Yes

7.2.1 Background

Distribution, Abundance, and Trends. This subspecies of willow flycatcher is restricted to a few major river drainages in the southwestern U.S. Within San Diego County, there are two main colonies: the San Luis Rey River just below Lake Henshaw, with 45-50 territorial males; and the Santa Margarita River in Camp Pendleton, with 18-19 territories. Smaller colonies and isolated pairs have been documented near the lower San Luis Rey River, Guajome Lake, Couser Canyon, Pala, near Lake Hodges, near El Capitan Reservoir, and San Felipe Valley. Finally, scattered pairs and unmated individuals have been observed at Macario Canyon, Warner Springs, William Heise County Park, Sweetwater Reservoir, Temecula Creek, and near San Ignacio (Unitt 2004). In the Riverside County portion of the Plan Area, the southwestern willow flycatcher is known occasionally from Temecula Creek (RCIP 2003).

This subspecies is restricted to willow-dominated riparian habitats, frequently in close proximity to surface water during June (Sanders and Fleet 1989; USFWS 1995).

Nests are typically placed in upright forks of trees/shrubs such as willows, with clutch sizes averaging three to four eggs. Southwestern willow flycatchers feed primarily on flying insects, generally during short sallies from a perch. Egg dates reported for San Diego County are from May 25 to June 20 (Unitt 2004). Aside from the local breeding birds, additional spring (mid-May through early June) and fall migrants (early August through early October) move through the Plan Area. Southwestern willow flycatchers found in the intervening period between migrations (i.e., during summer months) are usually resident breeders.

Critical Habitat. There is approximately 10.3 acres of designated critical habitat for this species within the right-of-way and fee-owned parcels within the Plan Area in the Agua Hedionda and San Luis Rey units. Approximately 147 acres of critical habitat are present within the PIZ, and a total of 3,326 acres are within the Plan Area.

Threats and Limiting Factors. The southwestern willow flycatcher has declined primarily due to loss, alteration, and degradation of riparian habitats, and brown-headed cowbird (*Molothrus ater*) nest parasitism (Taylor and Littlefield 1986; Unitt 1987).

Special Considerations. Nesting sites are often near slow moving streams, standing water, or seeps. Habitat most often used is mature, closed canopy riparian forest. Reduction or elimination of cowbirds through trapping in southwestern willow flycatcher nesting habitat should benefit this subspecies. This is a migratory species with the ability to cover large distances. This species is primarily confined to riparian woodland and riparian willow habitats during the breeding season. Riparian species are especially vulnerable to edge effects due to the linear nature of riparian habitat (i.e., high edge-to-core area ratio). Therefore, substantial upland buffers should be provided wherever possible. Due to the limited distribution of southwestern willow flycatcher habitat in the study area, habitat is vulnerable to stochastic events (e.g., fire, flooding) that could degrade habitat. Management of this species habitat should maintain a diversity of age structures, including mature trees.

7.2.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, southwestern willow flycatcher has been documented from four locations: along the San Luis Rey River, near the community of Pala (Attachment 1, B-4), east of Lake Hodges (Attachment 1, B-19), and the Sweetwater Reservoir (Unitt 2004).

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known to occur within the PIZ. As it has been observed near the PIZ, it is likely that southwestern willow flycatcher may occupy suitable riparian habitat within the PIZ.

Preserve Area

This species is not expected to occur in the Preserve Area.

Conservation and Take Levels. Suitable habitat for the southwestern willow flycatcher occurs along the aqueduct system at the San Luis Rey and San Dieguito rivers and at the reservoir fringe at Lake Hodges. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of active nests of the southwestern willow flycatcher. Incidental take or impacts to critical habitat may occur due to temporary vegetation removal at Lake Hodges or the San Luis Rey River rights-of-way. Any unavoidable impacts to critical habitat will be fully mitigated with comparable value habitat, including, but not limited to, permanently protecting unprotected critical habitat, acquiring and/or permanently protecting essential habitat, restoring/creating additional

suitable habitat, or other actions that provide those habitat values (see Section 6.5.1.7 in the Plan).

The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, construction and use of Arizona crossings and access roads, and draindowns. Potential direct effects include temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, encroachment of non-native plant species, and weed abatement, construction noise, and degradation of foraging habitat.

In summary, southwestern willow flycatcher prefers willow-dominated riparian habitat. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: southern arroyo willow riparian forest, southern cottonwood-willow riparian forest, southern sycamore woodland, southern sycamore-alder riparian woodland, southern willow scrub, and tamarisk scrub (see Table B-1B). There are 772 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 55 acres of potential habitat for this species could be impacted (20 acres by Planned Projects and 30 acres by Future Projects and O&M Activities).

The Plan provides 26 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 of the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the southwestern willow flycatcher in the Plan Area by allowing for the continued breeding, foraging, and sheltering by conserving large, contiguous blocks of suitable habitat on which the species is known to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.2.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Conduct USFWS protocol surveys for the southwestern willow flycatcher under favorable conditions in areas of potential foraging or breeding habitat for all new facilities and O&M Activities, or assume occupancy of potential habitat, to ensure that this species is adequately addressed by impact avoidance, minimization, and mitigation. A federally-permitted Environmental Surveyor would conduct surveys. If occupancy is assumed, a biomonitor must be on site during impacts to ensure that no direct take of individuals occurs. Surveys would also be conducted when impacts could occur as a result of indirect impacts by placement of the project in or adjacent to occupied habitat or through creation of suitable conditions for brown-headed cowbirds (e.g., agricultural fields, livestock presence, woodland parks, roadsides).
3. Monitoring and control of cowbirds shall be incorporated into preserve management plans. Southwestern willow flycatcher nests shall be monitored for cowbird nest parasitism within preserves. If nest parasitism rates exceed 10 percent, a cowbird trapping plan shall be developed and implemented.
4. Minimize impacts through timing of work in riparian habitat to avoid the nesting season for riparian avian species whenever possible, or ensure that habitat is removed prior to the initiation of the riparian avian breeding season.
5. If construction activities must commence during the riparian avian breeding season, minimize impact through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers).
6. Direct take of individuals and destruction of nests within an active territory is not permitted.
7. For temporary impacts to occupied southwestern willow flycatcher habitat, the work site would be returned to preexisting contours, where appropriate, and revegetated with appropriate native species. Revegetation specifications would ensure creation and restoration of riparian vegetation suitable for southwestern willow flycatcher. All revegetation plans would require written concurrence of the Wildlife Agencies. Also see Section 6.4, Plan Minimization Measures, of the Plan.

8. Where feasible for any wetland creation and/or restoration projects, maintain structural elements that provide age class and structure diversification for the project area to help promote the expansion of existing, or establishment of new, populations.
9. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with Tables 6-6 and 6-7) with known southwestern willow flycatcher locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

7.3 Loggerhead Shrike (*Lanius ludovicianus*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

7.3.1 Background

Distribution, Abundance, and Trends. The loggerhead shrike is found throughout most of the continental U.S. and Mexico, and it is a year-round resident of southern California. In San Diego County, the species is most abundant in the Anza-Borrego desert, and it is also found in the Tecate Divide, Campo Plateau, Otay Mesa, all along the Mexican border to the coast, and in some parts of Camp Pendleton and Marine Corps Air Station Miramar (Unitt 2004). Suitable habitat for this species is in the Plan Area in western Riverside County around Temecula, Lake Skinner, and Diamond Valley Lake.

The loggerhead shrike prefers open habitat with perches for hunting and fairly dense shrubs for nesting (Yosef 1996). In southern California, loggerhead shrikes inhabit grasslands, agricultural fields, open chaparral, and desert scrub (Unitt 2004). Their diet includes small reptiles, mammals, amphibians, and insects, which they often impale on sticks or thorns before eating. Loggerhead shrikes are highly territorial and usually live in pairs in permanent territories (Yosef 1996). The breeding season is from March to August.

Loggerhead shrike populations have declined throughout the U.S. since the 1990s. The reasons for the sudden onset of the species' decline are not well understood; Unitt (2004) hypothesized that the loggerhead shrike is particularly susceptible to effects of habitat fragmentation.

Threats and Limiting Factors. Loggerhead shrike populations are declining, likely due to urbanization and loss of habitat and, to a lesser degree, pesticide use (Yosef 1996).

Special Considerations. Loggerhead shrikes have fidelity to previously used nest sites. However, fires may significantly impact distributions. Partially recovered scrub or chaparral with considerable open ground remaining is favorable to this species. The Water Authority rights-of-way may provide suitable foraging habitat where vegetation is regularly cleared adjacent to suitable nesting habitat with a few large shrubs.

7.3.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are no occurrences of loggerhead within the Survey Area. This species, however, is expected to use suitable habitat (open CSS and chaparral) within the Plan Area in low density and discontinuously (Rahn et al. 2008).

Probable Impact Zone (PIZ)

According to the CNDDDB, there are also no occurrences of this species within the PIZ.

Preserve Area

The loggerhead shrike has been observed at San Miguel HMA (Merkel and Associates 1997) and the Elfin Forest Reserve (Ogden 1995). This species has the potential to occupy suitable habitat at the Crestridge HMA (PSBS 1994).

Conservation and Take Levels. No population data for this species is available. Suitable habitat for the loggerhead shrike is present at properties within the Preserve Area: San Miguel HMA, the Elfin Forest Reserve, and the Crestridge HMA. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Management. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Temporary impacts may have marginal impacts to this species and could potentially improve foraging habitat by clearing dense vegetation. Potential indirect effects that would degrade potential loggerhead shrike habitat include human disturbance, vehicular activity, and presence of introduced predators.

In summary, the preferred habitat for loggerhead shrike is grasslands, agricultural fields, open chaparral, and desert scrub. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, sage-scrub montane/trans-montane, grasslands, agricultural, and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, coastal sage scrub (inland), and Riversidean sage scrub (see Table B-1B). There are 25,154 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 274 acres of potential habitat for this species could be impacted (134 acres by Planned Projects and 140 acres by Future Projects and O&M Activities).

The Plan provides 123 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to allow for continued breeding, foraging, and sheltering by the loggerhead shrike in the Plan Area by conserving large, contiguous blocks of mitigation lands on which the species is known to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan Conditions for Coverage for this species.

7.3.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in suitable habitat to avoid the nesting season whenever possible, or ensure that habitat is removed prior to the initiation of the breeding season. If construction activities must commence during the breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed activities should be conducted during the breeding season (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). Direct take of individuals and destruction of nests within an active territory is not allowed.
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of loggerhead shrike. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

Appendix B Covered Species Analysis

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

7.4 Least Bell's Vireo (*Vireo bellii pusillus*)

USFWS: Endangered; Designated Critical Habitat

CDFG: Endangered

SDCWA: Covered

Covered by MSCP: Yes

7.4.1 Background

Distribution, Abundance, and Trends. The least Bell's vireo is restricted to willow and mule fat-dominated riparian woodlands in southern California, with the majority of breeding pairs found in San Diego, Santa Barbara, and Riverside counties. Major vireo populations are currently present on six rivers/major creeks in San Diego County: Tijuana River, Sweetwater River, San Diego River, Santa Ysabel Creek, San Luis Rey River/Pilgrim Creek, and the Santa Margarita River. Smaller populations occur on other drainages throughout the Plan Area, as well as nearby locations such as near Scissor's Crossing in Anza Borrego on the western edge of the Colorado Desert. The population of least Bell's vireo in California was estimated to be 1,346 pairs in 1996 (USFWS 1998c); in 2006, over 1,532 least Bell's vireo territories were recorded in San Diego County (USFWS 2006a). In the Plan Area in western Riverside County, this species is known from Temecula and Murrieta creeks (RCIP 2003).

Least Bell's vireo is a migratory songbird that winters in Baja California, Mexico. Breeding season generally ranges from March through July. Males establish breeding territories that range in size from 0.5 to 4 acres (RECON 1988). Least Bell's vireos use riparian areas with dense shrub cover and a well-developed understory for nesting. Nests are commonly located on branches approximately 1.5 to 5 feet above the ground (Brown 1993). Most pairs produce only one brood per season but have been documented to produce up to four in one season (Franzreb 1989). Least Bell's vireo is parasitized throughout its breeding range by brown-headed cowbirds, which are the cause of a substantial proportion of nest failures (Brown 1993).

Critical Habitat. A total of 459 acres of critical habitat are present in the PIZ, and a total of 11,258 acres are present within the Plan Area (see Table B-2). Specifically, designated critical habitat for this species is present on approximately 11.5 acres of the San Miguel HMA (Unit 8), approximately 12.1 acres of the Tijuana River Valley HMA (Unit 10), and approximately 58.8 acres is present within the Plan Area in right-of-way and fee-owned parcels (Units 6 and 7).

Threats and Limiting Factors. The least Bell's vireo is endangered due to loss, degradation, and fragmentation of riparian habitat, water diversions, lowered water tables, gravel mining, agricultural development, and invasion of exotic species

(USFWS 1998c). This subspecies is also vulnerable to brown-headed cowbird parasitism (Kus 1991). Much of the reversal in the regional population trend is probably attributable to extensive cowbird management in core least Bell's vireo habitat areas (Brown 1993; USFWS 1998c).

Special Considerations. Least Bell's vireos tend to prefer semi-open riparian woodlands with dense shrub understory. Reduction or elimination of cowbirds in least Bell's vireo nesting habitat appears to substantially benefit this subspecies. Excessive noise (i.e., greater than 62 decibels, averaged over a one-hour period on an A-weighted decibel [dB(A) $L_{eq(1)}$]) during the nesting season may interfere with territorial behaviors and reduce reproductive success (MHCP 2003). Due to similar habitat requirements, management for least Bell's vireo will also benefit the yellow-breasted chat, southwestern willow flycatcher, and many other riparian birds.

7.4.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, least Bell's vireo is known from 30 occurrences within the Survey Area. There are known populations of least Bell's vireo within the Survey Area at the following locations: along the San Luis Rey River in Fallbrook (Attachment 1, Figure B-4), along the San Luis Rey River in the community of Pala (Attachment 1, Figure B-4), near Old Castle Road, north of Jesmond Dene (Attachment 1, Figure B-5), in San Marcos (Attachment 1, Figure B-6), east of Lake Hodges (Attachment 1, Figure B-9), along Los Penasquitos Creek in Rancho Penasquitos, along the San Diego River in Lakeside (Attachment 1, Figure B-13), near Lake Murray (Attachment 1, Figure B-14), Sweetwater River and Reservoir (Attachment 1, Figure B-15), and near the Lower Otay Reservoir (Attachment 1, Figure B-16). Additionally, least Bell's vireo has potential to occur at Temecula and Murrieta Creeks in the Plan Area in Riverside County

Probable Impact Zone (PIZ)

Of the 30 occurrences of least Bell's vireo within the Survey Area, the CNDDDB lists 6 occurrences within the PIZ. Known populations of least Bell's vireo within the PIZ occur at the following locations: along the San Luis Rey River in the community of Pala (Attachment 1, Figure B-4), in San Marcos (Attachment 1, Figure B-6), east of Lake Hodges (Attachment 1, Figure B-9), Sweetwater River and Reservoir (Attachment 1, Figure B-15), and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Preserve Area

The least Bell's vireo has the potential to occur at Rancho Cañada HMA in San Vicente Creek, as it has been noted in adjacent contiguous habitat (TNC 2006). This species is expected to occur at the San Luis Rey River HMA, the Tijuana River Valley HMA, and the Myers property based on presence of suitable habitat and proximity to known locations (State of California 2007c; EDAW 2004).

Conservation and Take Levels. Suitable habitat for this species is present in the Plan Area at San Luis Rey River, San Diego River, and Lake Hodges. The Rancho Cañada HMA contains approximately 35 acres of potential habitat (southern coast live oak riparian forest and southern cottonwood-willow riparian forest) for the least Bell's vireo. Suitable habitat for this species is also conserved at the San Luis Rey River HMA, the Tijuana River Valley HMA, and the Myers property. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There would be no direct take of active nests of the least Bell's vireo. Incidental take may occur due to temporary vegetation removal at Lake Hodges or the San Luis Rey River rights-of-way. The proposed Plan could impact this species and critical habitat through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 of the Plan).

Potential direct effects include temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Activities that could degrade least Bell's vireo habitat include human disturbance, clearing or alteration of riparian vegetation, brown-headed cowbird parasitism, and insufficient water levels leading to loss of riparian habitat and surface water.

In summary, the preferred habitat for least Bell's vireo is riparian areas with dense shrub cover and a well-developed understory. Based on the preferred habitat, this species could occur in the Plan Area in the following riparian subcommunities: mule fat scrub and southern willow scrub (see Table B-1B). There are 1,034 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 55 acres of potential habitat for this species could be impacted (25 acres by Planned Projects and 30 acres by Future Projects and O&M Activities). The Plan provides 26 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the least Bell's vireo in the Plan Area by allowing for the continued breeding, foraging, and sheltering by conserving large, contiguous blocks of suitable habitat on which the species is known to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.4.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Conduct USFWS protocol surveys for the least Bell's vireo under favorable conditions in areas of potential foraging or breeding habitat for all new facilities and O&M Activities, or assume occupancy of potential habitat, to ensure that this species is adequately addressed by impact avoidance, minimization, and mitigation. A permitted Environmental Surveyor would conduct surveys. Surveys would also be conducted when impacts could occur as a result of indirect impacts by placement of the project in or adjacent to occupied habitat or through creation of suitable conditions for brown-headed cowbirds (e.g., agricultural fields, livestock presence, woodland parks, roadsides).
3. Monitoring and control of cowbirds shall be incorporated into preserve management plans. Least Bell's vireo nests shall be monitored for cowbird nest parasitism within preserves. If nest parasitism rates exceed 10 percent, a cowbird trapping plan shall be developed and implemented.
4. Minimize impacts through timing of work in riparian habitat to avoid the nesting season for riparian avian species whenever possible, and/or ensure that habitat is removed prior to the initiation of the riparian avian breeding season.
5. Nest surveys within 300 feet of all proposed activities should be conducted during the breeding season (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered and construction activities must occur during the riparian avian breeding season, noise levels from human activities at the nest shall be restricted to less than 60 dB(A) $L_{eq(1)}$ or the ambient noise level plus three decibels (perceptible change threshold), whichever is greater. Noise levels will be monitored, and monitoring reports will be provided to the Water Authority to be included in the annual reports. Noise levels in excess of this threshold will require consultation with the Wildlife Agencies and may require additional minimization measures (e.g., sound barriers).
6. Take of active nests is not authorized.

7. For temporary impacts to occupied least Bell's vireo habitat, the work site would be returned to preexisting contours, where appropriate, and revegetated with appropriate native species. Revegetation specifications would ensure creation and restoration of riparian vegetation suitable for least Bell's vireo. All revegetation plans would require written concurrence of the Wildlife Agencies. Also see Section 6.4, Plan Minimization Measures, of the Plan.
8. Where feasible for any wetland creation and/or restoration projects, maintain structural elements that provide age class and structure diversification for the project area to help promote the expansion of existing, or establishment of new, vireo populations.
9. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with Tables 6-6 and 6-7) with known least Bell's vireo locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
10. If construction activities must commence during the riparian avian breeding season, minimize impact through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers).

7.5 California Horned Lark (*Eremophila alpestris actia*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

7.5.1 Background

Distribution, Abundance, and Trends. The horned lark ranges throughout North America. However, the range of the California horned lark subspecies (*E. a. actia*) is along the coastal slopes of California from Sonoma County south to northwestern Baja California, Mexico, and includes most of the San Joaquin Valley (Grinnell and Miller 1944). Horned larks that occur in southern California during the breeding season are California horned larks. This bird is found in suitable habitat throughout the Survey Area.

The California horned lark breeds primarily in open fields, short grasslands, and rangelands (Garrett and Dunn 1981). Territories are established by male horned larks at the initiation of pairing in mid-January or February and are defended only against other males (Mumford and Keller 1984). Two to five eggs are laid per nest from March to June (Mumford and Keller 1984, Unitt 2004). There is a tendency for this species to have multiple broods (Mumford and Keller 1984, Unitt 2004). Incubation takes 10 to 11 days, and is performed exclusively by the female and the young are brooded for about 9 to 10 days (Ehrlich et al. 1988). Horned larks primarily feed on grains and other seeds, and occasionally on insects. The ground-dwelling California horned lark forages by walking, rather than hopping, as do most other passerines (Ehrlich et al. 1988).

Threats and Limiting Factors. Horned larks are ground-dwelling birds, primarily of open or sparsely vegetated grasslands. The species has declined with the removal of native grassland habitat. However, many horned lark populations have adapted to agricultural fields and nest and roost within them (Unitt 2004). Root (1988) stated that cultivated lands now support the highest abundances of this species in the U.S. However, a drawback of this adaptation is reduced nesting success due to nest destruction by heavy machinery.

Special Considerations. In southern California, the decline of the California horned lark is attributed to the loss of natural habitats due to development. Conversion of agricultural lands to other uses further limits the availability of potential nesting and roosting habitat. Horned lark responds positively to disturbance and utilizes bare ground with scattered weedy vegetation. Therefore, maintenance of the rights-of-way could incidentally benefit

this species (P. Unitt, pers. comm., 2008). Nests of this species are very difficult to find during surveys.

7.5.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, California horned lark has been documented from 3 locations within the Survey Area; south of Lake Skinner (Attachment 1, B-2), in Temecula (Attachment 1, B-4), and near the Sweetwater Reservoir (Attachment 1, B-15). Bird Atlas data indicate records near the Plan Area in San Pasqual Valley and MCAS Miramar (Rahn et. al 2008).

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known to occur within the PIZ. As it has been observed near the PIZ, it is likely that California horned lark may occupy suitable open habitat within the PIZ.

Preserve Area

The California horned lark is present at the San Miguel HMA and is known to breed there (Merkel and Associates 1997).

Conservation and Take Levels. Suitable habitat occupied by the California horned lark will be conserved at the San Miguel HMA. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade horned lark habitat include human disturbance and vehicular activity.

In summary, the preferred habitat for California horned lark is open fields, short grasslands, and rangelands. Based on the preferred habitat, this species could occur in the Plan Area in nonnative grasslands and general agriculture subcommunities (see Table B-1B). There are 7,283 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 34 acres of potential habitat for this species could be impacted (14 acres by Planned Projects and 20 acres by Future Projects and O&M Activities).

Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the California horned lark by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.5.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in grassland habitat to avoid the breeding season for upland avian species whenever possible, or ensure that habitat is removed prior to the initiation of the breeding season. If construction activities must commence during the upland avian breeding season, develop a Wildlife Agency approved survey protocol to improve the detectability of horned lark nests (see Section 2.3 for the Avian Breeding Season Policy). Minimize impacts through conducting nest surveys within 300 feet of all proposed activities. If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). Take of active nests is not authorized.

7.6 San Diego Cactus Wren (*Campylorhynchus brunneicapillus sandiegensis*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered, Narrow Endemic Policy

Covered by MSCP: Yes

7.6.1 Background

Distribution, Abundance, and Trends. Cactus wrens are a common species in deserts, but have a limited distribution on the coastal slopes of southern California. The cactus wren ranges from Ventura County south to Valle de las Palmas in northern Baja California, Mexico. The total population of the coastal cactus wren is estimated to be 2,400 pairs throughout its range (Harper and Salata 1992). The San Diego subspecies of cactus wren occurs on the coastal plain of Southern California and has a relatively disjunct distribution within San Diego County. Populations are concentrated in four primary areas: southern Camp Pendleton/Fallbrook; Lake Hodges/San Pasqual; Lake Jennings; and Sweetwater/Otay (Unitt 2004). The San Diego County population is estimated approximately 315 pairs (Unitt 2004). San Diego cactus wrens are a non-migratory bird restricted to coastal sage scrub and maritime succulent scrub habitats containing thickets of tall cactus (*Opuntia* spp.). The range of height of cactus in which cactus wrens place their nests is 2.5 to 7.5 feet. Cactus wrens also show a preference for coastal sage scrub with California sagebrush and California buckwheat and tend to avoid areas dominated by sages (Rea and Weaver 1990).

Reported egg dates for San Diego County are early March to mid-July (Unitt 2004). The cylindrical nests are conspicuous when located in cactus thickets, but slowly decompose. As a result, observations of nests without birds do not necessarily support recent habitation and nesting activities. The diet of this omnivorous wren includes as much as 15 to 20 percent fruit (Ehrlich et al. 1988). It also eats spiders, insects, and seeds. A study of territories in Arizona (Anderson and Anderson 1973) indicated size varied from 2.9 to 6.9 acres.

Threats and Limiting Factors. The San Diego cactus wren is declining due to loss, degradation, and fragmentation of Diegan coastal sage scrub habitat containing cactus (Rea and Weaver 1990).

Special Considerations. This subspecies generally nests only in tall (greater than 2.5 feet) thickets of chollas (*Opuntia prolifera*) or prickly pear cacti (*O. littoralis*, *O. oricola*) in

coastal sage scrub. Unoccupied suitable habitat may be re-colonized in future years; suitable habitat within the Plan Area should be conserved. This species also builds and utilizes multiple nests within a territory, thus an apparently unoccupied nest may still contribute to breeding and fledging success as part of the larger territory.

As a result of its small population size and fragmented distribution, the coastal cactus wren is extremely vulnerable to chance events, including environmental stochasticity (e.g., extended periods of drought), demographic stochasticity (e.g., skewed sex ratio and lack of suitable mates), genetic stochasticity (e.g., loss of heterozygosity resulting in increased genetic disorders and decreased evolutionary adaptability), and catastrophes (e.g., major wildfires). Active adaptive management and close monitoring is required to identify and respond to these potential impacts as quickly as possible. Their dispersal abilities, although not well understood, are expected to allow cactus wrens to colonize created habitat areas across other natural habitats but they probably will not colonize across urban areas.

7.6.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, San Diego cactus wren is known from 34 locations within the Survey Area. There are known populations of San Diego cactus wren within the Survey Area at the following locations: near the San Luis Rey River near the community of Pala (Attachment 1, Figure B-4), near Lake Hodges (Attachment 1, Figure B-9), south of SR-78 (Attachment 1, Figure B-9), east of the San Dieguito River (Attachment 1, Figure B-10), near Lake Jennings (Attachment 1, Figure B-13), near the Sweetwater Reservoir (Attachment 1, Figure B-15) and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 34 occurrences of San Diego cactus wren within the Survey Area, the CNDDDB lists 5 occurrences within the PIZ. Known populations of San Diego cactus wren within the PIZ occur at the following locations: near the Del Dios Highway (Attachment 1, Figure B-8), north of the San Dieguito River (Attachment 1, Figure B-9), near the Sweetwater Reservoir (Attachment 1, Figure B-15) and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Preserve Area

The San Diego cactus wren is present at the San Miguel HMA, with five territories located within the bank area (Attachment 1, Figure B-16; Merkel & Associates 1997).

Conservation and Take Levels. Suitable habitat occupied by five pairs of San Diego cactus wren are conserved within the San Miguel HMA. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. There will be no direct take of San Diego cactus wren individuals or active nests. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade potential cactus wren habitat or disturb breeding activities include habitat fragmentation, management for other sensitive species, human disturbance, vehicular activity, and presence of introduced predators.

In summary, the preferred habitat for San Diego cactus wren is coastal sage scrub and maritime succulent scrub habitats containing thickets of tall cactus. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: maritime succulent scrub, coastal sage-chaparral scrub, coastal sage scrub (Diegan), and flat-topped buckwheat scrub (see Table B-1B). There are 9,456 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities). The Plan provides 518 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego cactus wren by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.6.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
3. Minimize impacts through timing of work in suitable habitat to avoid the nesting season for upland avian species whenever possible, or ensure that habitat is removed prior to the initiation of the upland avian breeding season. If construction activities must commence during the upland avian breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed

activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). Direct take of individuals and destruction of nests within an active territory is not allowed.

4. For temporary impacts to occupied cactus wren habitat, a work site will be returned to pre-existing topographic conditions, where feasible, and revegetated with appropriate species, which must include appropriate cactus species. A restoration plan will be prepared and submitted to the Wildlife Agencies for their concurrence. Preserve Area lands that are identified as capable of supporting suitable conditions for the cactus wren will either have species present or support suitable habitat. If a cactus wren habitat area is not naturally re-establishing suitable vegetation elements within a time period that is consistent with natural regrowth, then the Preserve Area manager will restore the site to suitable habitat, pursuant to a restoration plan that has the concurrence of the Wildlife Agencies.

7.7 Coastal California Gnatcatcher (*Polioptila californica californica*)

USFWS: Threatened; Designated Critical Habitat

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: Yes

7.7.1 Background

Distribution, Abundance, and Trends. The coastal California gnatcatcher is a non-migratory songbird found within coastal sage scrub habitats on the coastal slopes of southern California. Population estimates for the species vary. Atwood and Bolsinger (1992) estimated that 1,811 to 2,291 pairs of coastal California gnatcatchers existed throughout its range in southern California. According to a 1999 population estimate in San Diego and other southern California counties, the USFWS estimated the population in San Diego at 1,917 pairs, Orange County at 643 pairs, Riverside County at 300 pairs, Los Angeles County at 144 pairs, San Bernardino County at 27 pairs, and Ventura County at 4 pairs (Atwood and Bontrager 2001).

Critical Habitat. A total of 5,372 acres of critical habitat are present in the PIZ, for a total of 58,984 acres are present within the Plan Area (see Table B-2). A portion of the San Miguel HMA has been designated as critical habitat for the coastal California gnatcatcher, totaling approximately 1,608 acres within Unit 1. Critical habitat is also present within the Preserve Area: approximately 36.9 acres on the Escondido Creek Uplands (Unit 3), approximately 4.7 acres on the Manchester HMA (Unit 3), approximately 35 acres on the Myers property (Unit 3), approximately 14.5 acres on the San Luis Rey River HMA (Unit 5). There are approximately 228 acres of critical habitat within the footprint of Water Authority right-of-way and fee-owned parcels (28 acres in Unit 1; 97 acres in Unit 3 and 103 acres in Unit 5).

Threats and Limiting Factors. The primary cause of this subspecies' decline is the cumulative loss and fragmentation of coastal sage scrub vegetation by urban and agricultural development. Early studies suggested that the coastal California gnatcatcher is highly sensitive to the effects of habitat fragmentation and development activity (Atwood 1990). The USFWS has estimated that Diegan coastal sage scrub habitat has been reduced by 70 to 90 percent of its historical extent (USFWS 1991).

Predation is thought to be the primary cause of reproductive failure in many land birds (Ricklefs 1969), including the coastal California gnatcatcher (Sockman 1997; Braden et al. 1997). Gnatcatchers are also subject to predation by a wide variety of vertebrate predators (Sockman 1997; Braden et al. 1997), including typical urban predators (e.g.,

house cats, raccoons, ground squirrels, and scrub jays), and nest parasitism by brown-headed cowbirds (USFWS 1993b; Braden et al. 1997). Although nest parasitism may adversely affect gnatcatcher nest fates, this effect may be overwhelmed by other causes, especially predation and nest abandonment (Braden et al. 1997).

Special Considerations. The coastal California gnatcatcher is strongly associated with coastal sage scrub habitats below 820 feet in coastal areas and between 820 and 1,640 feet in inland areas (Atwood and Bolsinger 1992); however, not all types of coastal sage scrub communities are used or preferred. This bird appears to be most abundant in areas dominated by California sagebrush (*Artemisia californica*) (ERC Environmental 1990) and flat-topped buckwheat (*Eriogonum fasciculatum*), and less commonly in subassociations dominated by black sage (*Salvia mellifera*) or lemonade berry (*Rhus integrifolia*) (Atwood 1980, 1990; Bontrager 1991). The breeding season of the coastal California gnatcatcher extends from late February through August, with peak nesting from mid-March through mid-May. The breeding territory size of the coastal California gnatcatcher ranges from 2 to 14 acres, with home ranges expanding from 13 to 39 acres during the non-breeding season (USFWS 1993b). The territory size requirements of the gnatcatcher appear to vary with habitat quality. Preston et al. (1998) identified a pattern of increasing territory size with increasing distance from the coast, and hypothesized that larger inland territories were a result of lower overall quality of habitat.

Studies of banded individuals in southern San Diego County (Mock and Bolger 1992) and Palos Verdes in Los Angeles County (Atwood et al. 1995) documented median dispersal distances of less than two miles with maximum recorded distances of about five miles.

7.7.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are 152 known occurrences of coastal California gnatcatcher within the Survey Area. There are known occurrences of coastal California gnatcatcher within the Survey Area at the following locations: southwest of Diamond Valley Lake (Attachment 1, Figure B-1), southwest of Lake Skinner (Attachment 1, Figure B-2), north and south of Temecula Creek (Attachment 1, Figure B-3), north and south of Beck Reservoir and south of San Luis Rey River (Attachment 1, Figure B-4), near Old Highway 395 and Gopher Canyon (Attachment 1, Figure B-5), near Calaveras Lake and Agua Hedionda Creek (Attachment 1, Figure B-6), near Champagne Boulevard and Escondido Creek (Attachment 1, Figure B-7), south of San Marcos Creek and north of Escondido Creek (Attachment 1, Figure B-8), north of Escondido Creek, near Lake Hodges, south of San Dieguito River and near San Pasqual Valley Road

(Attachment 1, Figure B-9), near San Dieguito River and Los Penasquitos Creek (Attachment 1, Figure B-10), near Lake Poway, north of Scripps Poway Parkway, near San Vicente Reservoir and Poway Road (Attachment 1, Figure B-11), southeast of Pomerado Road, near Interstate 15, State Route 52 and Miramar Reservoir (Attachment 1, Figure B-12), near San Vicente Reservoir, San Vicente Creek, San Diego River and Lake Jennings (Attachment 1, Figure B-13), near San Dieguito River, Lake Murray, Chollas Heights Reservoir and Sweetwater River (Attachment 1, Figure B-14), near Hansen Reservoir (Attachment 1, Figure B-15), and near Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 152 occurrences of coastal California gnatcatcher within the Survey Area, the CNDDDB lists 26 occurrences within the PIZ. Known populations of coastal California gnatcatcher within the PIZ occur at the following locations: southwest of Lake Skinner (Attachment 1, Figure B-2), north of Temecula Creek (Attachment 1, Figure B-3), near Old Highway 395 (Attachment 1, Figure B-5), near Agua Hedionda Creek (Attachment 1, Figure B-6), south of San Dieguito River and near San Pasqual Valley Road (Attachment 1, Figure B-9), south of San Dieguito River and near Los Penasquitos Creek (Attachment 1, Figure B-10), north of Scripps Poway Parkway, near San Vicente Reservoir and Poway Road (Attachment 1, Figure B-11), near Miramar Reservoir and State Route 52 (Attachment 1, Figure B-12), near San Vicente Reservoir, San Vicente Creek and Lake Jennings (Attachment 1, Figure B-13), near Sweetwater River (Attachment 1, Figure B-14), near Hansen Reservoir (Attachment 1, Figure B-15), and near Lower Otay Reservoir (Attachment 1, Figure B-16).

Preserve Area

This species occurs within the Montaña Mirador property (Attachment 1, Figure B-10; City of San Diego 2004), San Miguel HMA (Attachment 1, Figure B-15; Merkel and Associates 1997), Crestridge HMA (Attachment 1, Figure B-14; PSBS 1994), the Manchester HMA (Attachment 1, Figure B-8; Water Authority and Dudek 2007), the Myers property (Attachment 1, Figure B-6; EDAW 2004), and the Escondido Creek Uplands (Attachment 1, Figure B-8; Water Authority 2004).

There are known populations of coastal California gnatcatcher near the Elfin Forest Reserve (Attachment 1, Figure B-9), and the Rancho Cañada HMA (Attachment 1, Figure B-11). There is potential for this species to occur within the Preserve Area.

Conservation and Take Levels. The coastal California gnatcatcher is present at the San Miguel HMA, with 13 territories located within the bank (Merkel and Associates 1997) and at Crestridge HMA, with one territory located within the remaining credits (PSBS 1994). San Miguel HMA supports a dense, stable core population of this species (Merkel and Associates 1997) and the species is known to occur at the Elfin Forest Reserve

(Ogden 1995). The gnatcatcher has also been observed in approximately 6 acres of upland habitat at the Manchester HMA (Water Authority and Dudek 2007). Core gnatcatcher habitat is present within the Water Authority upland mitigation sites: 21 acres at the Myers property (Water Authority 2004), approximately 185 acres at the Montaña Mirador property (City of San Diego 2004), and approximately 29 acres at the Escondido Creek Uplands. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of coastal California gnatcatcher individuals or active nests. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade potential gnatcatcher habitat include fire prevention and management methods, presence of brown-headed cowbirds, and the enhanced presence of predators.

In summary, coastal California gnatcatcher prefers coastal sage scrub habitats dominated by California sagebrush and flat-topped buckwheat. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage scrub and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, and southern coastal bluff scrub (see Table B-1B). There are 9,862 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities). The Plan provides 518 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Critical habitat for this species is present both within the PIZ and the Plan Area. If impacts to critical habitat cannot be avoided, the Plan will attempt to limit impacts to temporary effects. Permanent impacts that cannot be avoided will be mitigated with credits in the HMAs that have critical habitat or other lands that are designated as critical habitat. Only if those options are not available, the Water Authority will provide a justification for acquiring suitable habitat land that will benefit the species, with the concurrence of the Wildlife Agencies (see Section 6.5.1.7 of the Plan).

Effects on Population Viability and Species Recovery Implementation of the Plan is expected to contribute to the regional conservation of the California gnatcatcher by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.7.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Conduct USFWS protocol surveys for the California gnatcatcher under favorable conditions in areas of potential foraging or breeding habitat for all new facilities and O&M Activities, or assume occupancy of potential habitat, to ensure that this species is adequately addressed by impact avoidance, minimization, and mitigation. A permitted Environmental Surveyor would conduct surveys.
3. Minimize impacts through timing of work in suitable California gnatcatcher habitat to avoid the nesting season for upland avian species whenever possible, or ensure that habitat is removed prior to the initiation of the breeding season. If construction activities must commence during the upland avian breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers).
4. Direct take of individuals and destruction of nests within an active territory is not allowed.
5. For temporary impacts to occupied California gnatcatcher habitat, the work site would be returned to preexisting contours, where feasible, and revegetated with appropriate locally native species. All revegetation plans would require written concurrence of the Wildlife Agencies. Also see Section 6.4, Plan Minimization Measures, of the Plan.

7.8 Yellow Warbler (*Dendroica petechia brewsteri*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

7.8.1 Background

Distribution, Abundance, and Trends. The local subspecies of yellow warbler comprises the majority of those breeding and migrating through southern California. Breeding of this subspecies within San Diego County occurs within a number of drainages; however, knowledge of both nesting and migratory presence of yellow warbler is complicated by the temporal overlap of both categories. Breeding occurs in most rivers and major creeks within San Diego County (Unitt 2004). This species is known from Temecula and Murrieta Creeks within the Plan Area in Riverside County (RCIP 2003).

Mature riparian forests are selected, with nest building taking place entirely at mid- to upper-canopy level. Major drainages are desired nearer the coast, but inland nesting takes place along short linear strips or patches of habitat where groundwater is sufficient to support growth of tall riparian trees.

Reported egg dates for this subspecies in San Diego extend from May 3 to June 10 (Unitt 2004); four to five eggs comprise the typical clutch size. Diet of yellow warblers includes insects and spiders gleaned from trees, occasional flying insects, and sometimes berries (Bent 1953).

Threats and Limiting Factors. The yellow warbler is threatened by loss, degradation, and fragmentation of mature riparian forest and southern willow scrub. This species is also parasitized by cowbirds (Unitt 2004). The recovery of the yellow warbler in San Diego county appears to be linked to the maintenance of riparian woodland and widespread cowbird trapping (Rahn et al. 2008). Prolonged drought, groundwater pumping, and prevention of water from reaching natural stream courses could eliminate riparian woodland habitat and reverse the recovery of this species. Maintenance of stream flows through the early parts of the summer is critical the survival of the yellow warbler (and other riparian birds) (Rahn et al. 2008).

Special Considerations. Reduction or elimination of brown-headed cowbirds in yellow warbler nesting habitat appears to substantially benefit this species. As with least Bell's vireo, excessive noise (greater than 60 dB(A) $L_{eq(1)}$) during the nesting season may interfere with territorial behaviors and reduce reproductive success (MHCP 2003).

7.8.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, yellow warbler has been documented from 3 locations within the Survey Area; along the San Luis Rey River in Pala (Attachment 1, Figure B-4) and near the Sweetwater Reservoir (Attachment 1, Figure B-15). Yellow warblers may also occupy suitable riparian habitat in the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known to occur within the PIZ. As it has been observed near the PIZ, it is likely that yellow warbler may occupy suitable riparian habitat within the PIZ.

Preserve Area

The yellow warbler is known to occur in Rancho Cañada in San Vicente Creek and is expected to breed in the riparian habitat on-site (TNC 2006). This species is expected to occur at the San Luis Rey River HMA (Attachment 1, Figure B-4) and Tijuana River Valley HMA (Attachment 1, Figure B-18) based on presence of suitable habitat and proximity to known locations (State of California 2007c). Suitable habitat for this species is present at the Manchester HMA.

Conservation and Take Levels. Suitable habitat for this species is present in the Plan Area at San Luis Rey River, San Diego River, and Lake Hodges. The Rancho Cañada HMA contains approximately 35 acres of potential habitat (southern coast live oak riparian forest and southern cottonwood-willow riparian forest) for the yellow warbler. Suitable habitat for this species is also conserved at the San Luis Rey River HMA, Manchester HMA, and Tijuana River Valley HMA. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There would be no direct take of active nests of the yellow. Incidental take may occur due to temporary vegetation removal at Lake Hodges or the San Luis Rey River rights-of-way. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, encroachment of non-native plant species, and weed abatement, construction noise and degradation of foraging habitat.

In summary, the preferred habitat for yellow warbler is mature riparian forests. Based on the preferred habitat, this species could occur in the Plan Area in riparian as well as the southern willow scrub subcommunity (see Table B-1B). There are 975 acres of this vegetation community and subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 55 acres of potential habitat for this species could be impacted (25 acres by Planned Projects and 30 acres by Future Projects and O&M Activities).

The Plan provides 26 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery Implementation of the Plan is expected to contribute to the regional conservation of the yellow warbler by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.8.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in riparian habitat to avoid the nesting season for riparian avian species whenever possible, or ensure that habitat is removed prior to the initiation of the breeding season. If construction activities must commence during the riparian avian breeding season, minimize impact through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). Direct take of individuals and destruction of nests within an active territory is not allowed.
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:

- a. Survey the Preserve Area to determine presence of yellow warbler. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

7.9 Yellow-breasted Chat (*Icteria virens auricollis*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

7.9.1 Background

Distribution, Abundance, and Trends. The North American range of the various subspecies of yellow-breasted chats extends throughout Mexico and the U.S., except in portions of Nebraska and Minnesota; it is rarely observed in the northeastern U.S. and southern Canada. The yellow-breasted chat is an uncommon, localized, breeding summer resident of riparian woodland and scrub of the coastal plain and foothills of California. Within the Plan Area, documented yellow-breasted chat locations include Temecula Creek, San Luis Rey River, central Oceanside, lower Escondido Creek in Encinitas, and Kit Carson Park in Escondido, San Diego River Valley, Otay River Valley, and the Tijuana River Valley in San Diego County. Most sizeable stands of dense riparian woodland habitat within the Plan Area can potentially support this species. The yellow-breasted chat is considered an indicator species for potential least Bell's vireo habitat.

Breeding occurs from late April through July (Unitt 2004) and clutch size is typically 3-4 eggs. Various breeding territory sizes for the chat have been recorded in different vegetation types across the U.S. (0.3 to 3.1 acres in Zeiner et al. 1990). This species is a foliage gleaner that eats a variety of insects, spiders, and fruit.

Threats and Limiting Factors. Population declines are associated with the loss of suitable habitat and brown-headed cowbird nest parasitism.

Special Considerations. This species is sensitive to habitat fragmentation and associated increases in cowbird parasitism rates. Potential nest predators in California include western scrub jays, dusky-footed woodrats, raccoons, and several species of snakes.

Due to similar habitat requirements, management to benefit yellow-breasted chat should also benefit the least Bell's vireo, southwestern willow flycatcher, and many other riparian birds.

7.9.2 Conservation Analysis

Presence Plan Area and Preserve Area.

Survey area

According to the CNDDDB, yellow-breasted chat has been documented from 8 occurrences within the Survey Area; along the San Luis Rey River in Pala (Attachment 1, Figure B-4), Rancho Bernardo (Attachment 1, Figure B-10), on the San Diego River near Lake Jennings (Attachment 1, Figure B-13), near the Sweetwater Reservoir (Attachment 1, Figure B-15), and near the Lower Otay Reservoir (Attachment 1, Figure B-16). Yellow-breasted chat may also occupy additional suitable riparian habitats in the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is known to occur within the PIZ in 1 location. As it has been observed near the PIZ, it is likely that yellow-breasted chat may occupy suitable riparian habitat within the PIZ.

Preserve Area

The yellow-breasted chat is known to occur at San Miguel HMA (Merkel and Associates 1997), and is expected to occur in suitable habitat in San Vicente Creek at the Rancho Cañada HMA. This species is also expected to occur at the San Luis Rey River HMA and the Tijuana River Valley HMA based on presence of suitable habitat and proximity to known locations (State of California 2007c).

Conservation and Take Levels. Suitable habitat for this species is present in the Plan Area at San Luis Rey River, San Diego River, and Lake Hodges. The yellow-breasted chat occurs in low numbers in riparian scrub habitat at San Miguel HMA. The Rancho Cañada HMA contains approximately 35 acres of potential habitat (southern coast live oak riparian forest and southern cottonwood-willow riparian forest) for the yellow-breasted chat. Suitable habitat for this species is also conserved at the San Luis Rey River HMA, Manchester HMA, and Tijuana River Valley HMA.

Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There would be no direct take of active nests of the yellow-breasted chat. Incidental take may occur due to temporary vegetation removal at Lake Hodges or the San Luis Rey River rights-of-way. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, the construction and use of Arizona crossings and access roads, and draindowns. Potential direct effects include

permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, encroachment of non-native plant species, and weed abatement, construction noise and degradation of foraging habitat.

In summary, the preferred habitat for yellow-breasted chat is riparian woodland and scrub. Based on the preferred habitat, this species could occur in the Plan Area in riparian (see Table B-1B). There are 1,034 acres of this vegetation community within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 55 acres of potential habitat for this species could be impacted (25 acres by Planned Projects and 30 acres by Future Projects and O&M Activities).

The Plan provides 45 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the yellow-breasted chat by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.9.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in riparian habitat to avoid the nesting season for riparian avian species whenever possible, or ensure that habitat is removed prior to the initiation of the riparian avian breeding season. If construction activities must commence during the riparian avian breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other

biological considerations (see Section 2.4, Buffers). Direct take of individuals and destruction of nests within an active territory is not allowed.

3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of yellow-breasted chat. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

7.10 Bell's Sage Sparrow (*Amphispiza belli belli*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

7.10.1 Background

Distribution, Abundance, and Trends. The North American range of the various subspecies of sage sparrow extends from central Washington State and throughout Wyoming, south from California to western Colorado, extreme western Texas, and northern Mexico. The sage sparrow is largely absent from coastal California north of San Francisco and the Central Valley. Bell's sage sparrow ranges from coastal northern California to Baja California, Mexico, and is resident in San Diego County.

Bell's sage sparrow is locally uncommon in Diegan coastal sage scrub and open chaparral in San Diego County (Johnson and Marten 1992). Documented Bell's sage sparrow locations include northern and southeastern Carlsbad, eastern Encinitas, northern and southern San Marcos, southern Escondido, near San Vicente Reservoir, on MCAS Miramar, and on Otay Mountain. It is also locally common on open chaparral and sage scrub in southwestern Riverside County, including the Diamond Valley Lake and Lake Skinner area. Bell's sage sparrow habitat includes dense and tall coastal sage scrub and open chaparral on relatively flat terrain.

Nesting dates in San Diego County extend from March to June (Unitt 2004) and clutch size is typically 3-4 eggs. This species gleans insects and spiders from low shrubs and on the ground. Its diet also includes seeds in winter, and some green foliage (Zeiner et al. 1990). Territory information on this sparrow not well documented. Weston and Johnston reported densities of from 27-85 individuals per 100 acres in Mono County. Local birds likely use several acres for a breeding territory, but additional focused work is needed on this species.

Threats and Limiting Factors. Bells' sage sparrow is vulnerable to loss, degradation, and fragmentation of coastal sage scrub and chaparral habitat. A region-wide study of Bell's sage sparrow distribution is needed to more conclusively manage the local population.

7.10.2 Conservation Analysis

Presence Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Bell's sage sparrow has been documented from 52 occurrences within the Survey Area; near Lake Skinner (Attachment 1, Figure B-1), Temecula near Lake Skinner (Attachment 1, Figure B-2 and B-3), Encinitas (Attachment 1, Figure B-8), east of Lake Hodges (Attachment 1, Figure B-9), and the Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is known to occur within the PIZ at 10 locations. As it has been observed near the PIZ, it is likely that Bell's sage sparrow may occupy suitable habitat within the PIZ.

Preserve Area

Bell's sage sparrow is known to occur San Miguel HMA (Attachment 1, Figure B-16; State of California 2007c and Merkel and Associates 1997), the Elfin Forest Reserve (Ogden 1995), and at the Crestridge HMA (PSBS 1994).

Conservation and Take Levels. Suitable habitat occupied by the Bells' sage sparrow is conserved at the San Miguel HMA, the Elfin Forest Reserve and the Crestridge HMA.

Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of active nests. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade potential Bell's sage sparrow habitat include fire prevention and management methods, presence of brown-headed cowbirds, and the enhanced presence of predators.

In summary, the preferred habitat for Bell's sage sparrow is Diegan coastal sage scrub and open chaparral. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, coastal sage scrub, sage-scrub montane/trans-montane, and the following subcommunities: coastal sage-chaparral scrub, coastal sage scrub (Diegan), flat-topped buckwheat scrub, ceanothus crassifolius chaparral, chamise chaparral (granitic chamise chaparral), northern mixed chaparral, northern mixed chaparral (granitic), southern mixed chaparral, and southern mixed chaparral (granitic) (see Table B-1B). There are 17,633 acres of these vegetation subcommunities within the PIZ.

Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the Bell's sage sparrow by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.10.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in suitable habitat to avoid the nesting season for upland avian species whenever possible, or ensure that habitat is removed prior to the initiation of the upland avian breeding season. If construction activities must commence during the upland avian breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). Direct take of individuals and destruction of nests within an active territory is not allowed.

7.11 Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*)

USFWS: None

CDFG: None

SDCWA: Covered

Covered by MSCP: Yes

7.11.1 Background

Distribution, Abundance, and Trends. The rufous-crowned sparrow range includes the southwestern U.S. and highland Mexico (National Geographic Society 1987). The southern California subspecies of rufous-crowned sparrow (ssp. *canescens*) is a common resident of scrub habitats of the coastal plain of Southern California and Baja California, Mexico. Southern California rufous-crowned sparrows are locally common in open coastal sage scrub in San Diego County, and they occur throughout the Plan Area wherever suitable habitat occurs in relatively large blocks. Southern California rufous-crowned sparrow habitat also includes open chaparral, often on slopes that are steep, sparsely vegetated, and rocky or recently burned.

Reported egg dates for this species in San Diego County extend from March 17 to June 7 (Unitt 2004); average clutch size for this species is 3-4 eggs. It often nests near rocky outcroppings or other openings in the scrub and chaparral habitat. This sparrow often forages on the ground beneath shrubs, or gleans insects from low-growing shrubs. Diet includes primarily insects and spiders during the breeding season. Territory size in southern California ranges between 0.5 and 3.2 acres, with an average of 2.0 acres (Bent 1968).

Threats and Limiting Factors. The southern California rufous-crowned sparrow is vulnerable to loss, degradation, and fragmentation of coastal sage scrub habitat.

7.11.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are 82 known occurrences of southern California rufous-crowned sparrow within the Survey Area. There are known occurrences of southern California rufous-crowned sparrow within the Survey Area at the following locations: west of Diamond Valley Lake (Attachment 1, Figure B-1), west and south of Lake Skinner (Attachment 1, Figure B-2), north of the San Luis Rey River (Attachment 1,

Figure B-4), east of Vista (Attachment 1, Figure B-5), in San Marcos (Attachment 1, Figure B-6), north of Encinitas (Attachment 1, Figure B-8), near Lake Hodges (Attachment 1, Figure B-9), in Rancho Penasquitos (Attachment 1, Figure B-10), south of Lake Poway (Attachment 1, Figure B-11), south of San Vicente Reservoir (Attachment 1, Figure B-13), a cluster of occurrences around Lake Jennings (Attachment 1, Figure B-13), north of Lake Murray (Attachment 1, Figure B-14), in Lakeside (Attachment 1, Figure B-14), near the Sweetwater Reservoir (Attachment 1, Figure B-15) and the Lower Otoy Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 82 occurrences of southern California rufous-crowned sparrow within the Survey Area, the CNDDDB lists 14 occurrences within the PIZ. Known populations of southern California rufous-crowned sparrow within the PIZ occur at the following locations: near I-15 and the Santa Margarita River (Attachment 1, Figure B-3), east of Vista (Attachment 1, Figure B-5), San Marcos (Attachment 1, Figure B-6), north of Encinitas (Attachment 1, Figure B-8), east of Lake Hodges (Attachment 1, Figure B-9), Rancho Penasquitos (Attachment 1, Figure B-10), south of San Vicente Reservoir (Attachment 1, Figure B-13), and near the Lower Otoy Reservoir (Attachment 1, Figure B-16).

Preserve Area

The southern California rufous-crowned sparrow is abundant at San Miguel HMA (Attachment 1, Figure B-16; Merkel and Associates 1997), common at Rancho Cañada HMA (Attachment 1, Figure B-11; TNC 2006), occurs at Crestridge HMA (PSBS 1994), and the Montaña Mirador property (City of San Diego 2004). It is also expected to occur at the Elfin Forest Reserve due to presence of suitable habitat and proximity to known locations (Attachment 1, Figure B-8).

Conservation and Take Levels. No population data was available for this species within the Plan Area. Suitable habitat for the southern California rufous-crowned sparrow is conserved at the following properties in the Preserve Area: San Miguel HMA, Rancho Cañada HMA, Crestridge HMA, Elfin Forest Reserve, and the Montaña Mirador property.

Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of active nests. The proposed Plan could impact this species though direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade potential habitat for this species include fire prevention and management methods, presence of brown-headed cowbirds, and the enhanced presence of predators.

In summary, the preferred habitat for southern California rufous-crowned sparrow is open coastal sage scrub. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage-scrub and sage scrub montane/trans-montane (see Table B-1B). There are 9,862 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities). The Plan provides 518 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the southern California rufous-crowned sparrows by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.11.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in suitable habitat to avoid the nesting season for upland avian species whenever possible, or ensure that habitat is removed prior to the initiation of the upland avian breeding season. If construction activities must commence during the upland avian breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). Direct take of individuals and destruction of nests within an active territory is not allowed.

7.12 Grasshopper Sparrow (*Ammodramus savannarum*)

USFWS: None

CDFG: None

SDCWA: Covered

Covered by MSCP: No

7.12.1 Background

Distribution, Abundance, and Trends. The grasshopper sparrow breeds and occasionally winters in southern California. San Diego County represents the southern extent of the breeding range along the west coast. There are currently five main breeding areas in San Diego County: Camp Pendleton, Los Peñasquitos Canyon Preserve, Marine Corps Air Station Miramar/Mission Trails Park, Rancho Jamul, and Ramona. There are also scattered colonies in the mountains near Wynola, Lake Henshaw, and Willow Spring (Unitt 2004). Lake Skinner, Diamond Valley Lake, and Murrieta Hot Springs are core areas for this species in Riverside County (RCIP 2003).

The grasshopper sparrow is typically restricted to mesic grasslands, especially those dominated by native bunchgrasses and forbs such as blue-eyed-grass (*Sisyrinchium bellum*). Scattered shrubs are used for singing perches. Because nests are hard to find, data on reproduction are scarce, but it is estimated that egg laying occurs from the second week in April until the end of May (Unitt 2004). Diet consists primarily of insects, particularly grasshoppers.

Threats and Limiting Factors. The grasshopper sparrow is vulnerable to habitat loss resulting from the rapid decline of suitable native grassland breeding habitat in San Diego County. The elimination of most substantial stands of native grasses has forced the grasshopper sparrow to adapt to non-native grassland, which has most likely severely reduced its numbers (Unitt 2004).

Special Considerations. Grasshopper sparrows tend to be found in small breeding groups closely aligned with suitable habitat. Population numbers may vary with rainfall, and may be lower in drought years (Rahn et. al 2008). It can be very difficult to detect nests of this species during surveys, therefore surveys should focus on presence/absence of the species with nests assumed present if the species is present.

7.12.2 Conservation Analysis

Presence within the Plan Area and Preserve Area

Survey area

According to the CNDDDB, there are no known occurrences of grasshopper sparrow within the Survey Area; however, it is likely to be present throughout the Survey Area along the aqueduct system in suitable habitat.

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of grasshopper sparrow within the PIZ.

Preserve Area

The grasshopper sparrow has been observed at the San Miguel HMA (Merkel and Associates 1997).

Conservation and Take Levels. Suitable habitat occupied by the grasshopper sparrows is conserved at the San Miguel HMA (Merkel & Associates 1997). Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of active nests. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Temporary impacts may have marginal impacts to this species, and could potentially improve foraging habitat by clearing dense vegetation. Potential indirect effects that would degrade potential grasshopper sparrow habitat include human disturbance, vehicular activity, and presence of introduced predators.

In summary, the preferred habitat for grasshopper sparrow is mesic grasslands. Based on the preferred habitat, this species could occur in the Plan Area in grasslands and the following subcommunities: alkali wetlands and vernal pools, montane meadow, and San Diego mesa claypan and hardpan vernal pools (see Table B-1B). There are 6,253 acres of this vegetation community and these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 41 acres of potential habitat for this species could be impacted (19 acres by Planned Projects and 22 acres by Future Projects and O&M Activities).

The Plan provides nine acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied

habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the grasshopper sparrow by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.12.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Minimize impacts through timing of work in suitable habitat to avoid the nesting season for this species whenever possible. Clearing of occupied grasshopper sparrow habitat shall be avoided during the upland avian breeding season unless a Wildlife Agency approved nest detection protocol is developed, or ensure that habitat is removed prior to the initiation of the upland avian breeding season. If a nest is detected, minimize impacts through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers).
3. Direct take of individuals and destruction of nests within an active territory is not allowed.
4. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of grasshopper sparrow. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

7.13 Tricolored Blackbird (*Agelaius tricolor*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: Yes

7.13.1 Background

Distribution, Abundance, and Trends. The tricolored blackbird is found throughout California, although populations have declined substantially due to habitat loss, particularly in southern California. The population size in San Diego County is believed to be concentrated in 20-30 colonies comprising a total of 5,000 to 8,000 birds (Unitt 2004). Colonies are concentrated in two main areas: north-central San Diego County (from Dameron Valley and Oak Grove south to Ramona and San Ysabel); and the Campo Plateau (from Potrero to Jacumba). Within these two general areas, colonies have been documented at Dameron Valley, Oak Grove, Sunshine Summitt, Puerta La Cruz, Swan Lake, Warner Ranch, Bonsall, Mesa Grand, Pamo Valley, Santa Ysabel Ranch, Boden Canyon, Ramona, Lindo Lake, Viejas Casino, Tule Lake, Twin Lakes, Campo, and Jacumba (Unitt 2004). Within the Plan Area, the species has repeatedly been sighted at San Luis Rey River, Pilgrim Creek, Buena Vista Lagoon, Batiquitos Lagoon, and San Elijo Lagoon, Kit Carson Park in Escondido, ponds in suburban Bonita, the Otay River Valley, and the Tijuana River Valley (Unitt 2004). Isolated locations in Murrieta are the only records of the tricolored blackbird in the Riverside County portion of the Plan Area, although there are colonies in other parts of Riverside County (RCIP 2003).

While the tricolored blackbird is selective in terms its breeding habitat, it can be found in a wide variety of locations during the non-breeding season, including parking lots, landfills, and residential lawns (Unitt 2004).

The tricolored blackbird breeds colonially in freshwater marsh and riparian scrub habitats, and forms large nomadic flocks in fall and winter. Breeding territories, due to the colonial nature of the colonies, are typically just the immediate vicinity of the nest (approximately 35 square feet) (Orians 1961). Tricolored blackbirds feed in grasslands and agricultural fields adjacent to the nesting colony. Reported egg dates for San Diego County are March 30 to May 26 (Unitt 2004) and clutch size is typically three to four eggs. Diet includes insects, spiders, and seeds, which may comprise a large portion of the fall and winter diet.

Threats and Limiting Factors. The number and size of tricolored blackbird breeding colonies have declined with loss of wetland habitats. This species is also vulnerable to

contamination of wetlands, human disturbance, and massive nest loss due to avian and mammalian predators (Beedy et al. 1991).

Special Considerations. Most San Diego County breeding sites are used on an irregular or inconsistent schedule as a result of this species highly nomadic behavior. Sufficient grassland and agricultural foraging habitat is necessary in the general vicinity of nesting colonies.

7.13.1 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there is 1 known location of tricolored blackbird within the Survey Area, near the Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of tricolored blackbird within the PIZ.

Preserve Area

The tricolored blackbird is known to forage at the San Miguel HMA (Merkel and Associates 1997).

Conservation and Take Levels. Suitable foraging habitat used by the tricolored blackbird is conserved at the San Miguel HMA, suitable breeding habitat is present offsite (Merkel and Associates 1997).

Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential indirect effects would result from restoration activities, encroachment of non-native plant species, and weed abatement, construction noise and degradation of foraging habitat.

In summary, the preferred habitat for tricolored blackbird is in freshwater marsh and riparian scrub. Based on the preferred habitat, this species could occur in the Plan Area

in the following subcommunities: alkali wetlands and vernal pools, San Diego mesa claypan and hardpan vernal pools, open freshwater, arrowweed scrub, mule fat scrub, southern willow scrub, and freshwater meadow and marsh (see Table B-1B). There are 1,830 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 16 acres of potential habitat for this species could be impacted (5 acres by Planned Projects and 11 acres by Future Projects and O&M Activities).

The Plan provides 21 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the tricolored blackbird by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

7.13.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of tricolored blackbird. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once tricolored blackbirds have been mapped in the Preserve Areas, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-

approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with Tables 6-6 and 6-7) with known tricolored blackbird locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
3. Minimize impacts through timing of work in suitable habitat to avoid the nesting season for riparian avian species whenever possible, or ensure that habitat is removed prior to the initiation of the riparian avian breeding season. If construction activities must commence during the riparian avian breeding season, minimize impacts through conducting nest surveys within 300 feet of all proposed activities (see Section 2.3 for the Avian Breeding Season Policy). If active nests are encountered, no Covered Activities shall be implemented within a minimum distance of 100 feet of the nest. A greater setback (up to 300 feet) may be required, as determined by the Environmental Surveyor, based on the site specific considerations, phase of the nesting cycle, and species or other biological considerations (see Section 2.4, Buffers). It should be noted that tricolored blackbirds typically occupy a breeding site for a relatively brief time, with the entire colony moving on after the young have fledged.
4. Direct take of individuals and destruction of active nests is not allowed.
5. Use native plants in wetland restoration efforts. Minimize project-related impacts in grassland foraging habitats in proximity to breeding areas

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8.0 Covered Mammals

8.1 San Diego Black-tailed Jackrabbit (*Lepus californicus bennettii*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

8.1.1 Background

Distribution, Abundance, and Trends. The San Diego black-tailed jackrabbit ranges from near Mount Pinos (at the Kern-Ventura County line) southward and west of the Peninsular Range into northwestern Baja California, Mexico. This subspecies is present in coastal portions of Los Angeles, Riverside, and San Bernardino counties (Hall 1981). In western Riverside County the San Diego black-tailed jackrabbit is widespread but not common. The San Diego black-tailed jackrabbit is one of the subspecies of the most widely distributed hares in the United States.

The San Diego black-tailed jackrabbit occupies many diverse habitats, including open grasslands, sparse vegetation, and agricultural areas. It occurs primarily in arid regions and prefers short-grass areas. It is not typically found in high grass or dense brush. Jackrabbits do not construct burrows or dens. Instead, they use shallow depressions (“forms”) under bushes or shrubs as nesting sites. Nests for young resemble those of adults but are occasionally lined with fur (Leichleitner 1958).

A single female jackrabbit can produce 10 to 18 leverets (young rabbits) in one breeding season (Bronson and Tiemeier 1958, Leichleitner 1959, Swihart 1984). Breeding takes place primarily in late January through August. Jackrabbits are not territorial but may inhabit a definite, overlapping home range of 14 to 18 hectares. Adult survivorship is very low, on the order of 19 to 23 percent per year (Swihart 1984). Most of the population at any given time is composed of juveniles, with less than 30 percent adults (Bronson and Tiemeier 1958, Leichleitner 1959). San Diego black-tailed jackrabbits have been described as generalist herbivores, demonstrating seasonal consumption patterns (Johnson and Anderson 1984). In general, they browse on a large variety of plants, with grasses making up the bulk of their diet during spring and summer. Various forbs and shrubs are taken to some extent during fall and winter.

Threats and Limiting Factors. Threats to the species include loss of habitat fragmentation and isolation of populations due to agriculture and urbanization.

Special Considerations. The black-tailed jackrabbit inhabits open land but requires some shrubs for cover. Typical habitats include early stages of chaparral, open coastal sage scrub, and grasslands near the edges of brush. Grasses and forbs are the rabbit's preferred foods. Chew and Chew (1970) reported a diet of 65 percent shrub browse and 35 percent herbage. Breeding occurs throughout the year, and young are born under shrubs with no special nest structure. Home ranges averaging 45 acres have been recorded in California (Leichleitner 1958). This species exhibits natural fluctuations in population sizes and distributions in relation to reproduction and densities of food resources, which creates difficulty in surveying and censusing jackrabbit populations.

8.1.2 Conservation Analysis

Survey area

According to the CNDDDB, there are 15 known occurrences of San Diego black-tailed jackrabbit within the Survey Area. There are known occurrences of San Diego black-tailed jackrabbit within the Survey Area at the following locations: west of Diamond Valley Lake (Attachment 1, Figure B-1), in Temecula west of Lake Skinner (Attachment 1, Figure B-2), south of Temecula (Attachment 1, Figure B-3), near Lake Hodges (Attachment 1, Figure B-9, in Poway along Los Penasquitos Creek (Attachment 1, Figure B-10), west of the San Vicente Reservoir (Attachment 1, Figure B-13), in Lakeside (Attachment 1, Figure B-13), and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Probable Impact Zone (PIZ)

Of the 15 occurrences of San Diego black-tailed jackrabbit within the Survey Area, the CNDDDB lists 4 occurrences within the PIZ. Known occurrences of San Diego black-tailed jackrabbit within the PIZ occur at the following locations: south of Temecula (Attachment 1, Figure B-3), east of Lake Hodges (Attachment 1, Figure B-9), along Los Penasquitos creek in Poway (Attachment 1, Figure B-10), and near the Lower Otay Reservoir (Attachment 1, Figure B-16).

Preserve Area

The San Diego black-tailed jackrabbit is common to abundant at San Miguel HMA (Merkel and Associates 1997) and also occurs at Crestridge HMA (PSBS 1994).

Conservation and Take Levels. San Diego black-tailed jackrabbit is present at the San Miguel HMA and Crestridge HMA. This species has the potential to occur in suitable habitat at the Elfin Forest Reserve.

Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. Incidental take will result from habitat loss for this species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and Covered Activities. The majority of direct effects would occur as a result of vegetation removal from around large project sites. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from off-road vehicle activity and encroachment of non-native plant species.

In summary, the preferred habitat for San Diego black-tailed jackrabbit is open grasslands, sparse vegetation, and agricultural areas. Based on the preferred habitat, this species could occur in the Plan Area in grasslands and agricultural lands and the alluvial fan scrub subcommunity (see Table B-1B). There are 17,570 acres of these vegetation communities and subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 34 acres of potential habitat for this species could be impacted (14 acres by Planned Projects and 20 acres by Future Projects and O&M Activities).

The Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego black-tailed jackrabbit by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

8.1.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of black-tailed jackrabbit. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be

made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

8.2 Stephens' Kangaroo Rat (*Dipodomys stephensi*)

USFWS: Endangered

CDFG: Threatened

SDCWA: Covered

Covered by MSCP: No

8.2.1 Background

Distribution, Abundance, and Trends. Stephens' kangaroo rat has a very limited southern California range, with populations generally found below 2,000 feet in elevation in western Riverside County and northwestern San Diego County. In western Riverside County, it occurs as far north as the Norco region, then eastward to the foot of the San Jacinto Mountains, with extensive populations near Perris, Hemet, Winchester, the Diamond Valley Reservoir, and Temecula. In San Diego County, the species is known to occur at Camp Pendleton, Fallbrook Naval Weapons Annex, Lake Henshaw, Santa Maria Valley (Ramona), east of Mission San Luis Rey (historically), and at Guejito Ranch. The species could potentially colonize grasslands or agricultural fields in northern Oceanside in areas within close proximity to occupied habitat on Camp Pendleton and the Fallbrook Naval Weapons Station. Suitable habitat consists of relatively level, sparsely vegetated grassland, fallow agricultural land, or open coastal sage scrub. Soils must typically be low in clay content to allow for burrowing.

Stephens' kangaroo rats are capable of extracting liquids from the relatively dry seeds they eat, minimizing the amount of water they need to survive during dry portions of the year. In addition, their specialized kidneys are able to excrete waste without substantial use of liquids. Food is stored within their home territories in small caches, for later retrieval. These nocturnal animals are relatively short-lived, are highly predated upon by animals such as hawks and owls, and may not often survive beyond five to six years of age. They are strongly territorial with one adult per burrow. Adults mate promiscuously and form seasonal pair bonds with reproductive individuals found throughout the year. Breeding for the majority of the population may be triggered by heavy winter rainfall, with most estrous cycles ceasing after a concentration of native plants have dispersed seeds in early summer. Densities of kangaroo rats vary from 4 to 13.6 individuals per acre, with an average home range corresponding to a circle with a 66-foot radius (Price and Kelly 1992).

Threats and Limiting Factors. Available habitat has been greatly reduced and fragmented through urban development and the phasing out of agricultural land uses. Populations readily invade and abandon habitat patches as they successively improve or

decline in quality with changes in vegetation structure. Disturbances that retard vegetation succession by reducing shrub cover and increasing annual plants (e.g., fire or cattle grazing) may improve habitat for this species; however, more severe disturbances such as heavy horse grazing, tilling, or a too frequent fire cycle are detrimental.

Special Considerations. Although this species can disperse more than a kilometer across open habitats (Price and Kelly 1992), urban development and large paved roads are likely dispersal barriers. The Pacific kangaroo rat (*Dipodomys agilis*) is the more common kangaroo rat within sage scrub and chaparral habitat in the region. Generally, the Stephens' kangaroo rat occupies a more disturbed, relatively flat, open terrain. Both species may at times overlap within their habitat niches, and a spatial segregation is apparently maintained partially through inter-specific competition. Additional differences between the two include possibly stronger digging abilities by Stephens' kangaroo rat, a greater ability to withstand water deprivation, a preference for high fat and protein seeds, and a diminished avoidance of more brightly lit and less vegetated areas during their night-time foraging activities (Price et al. 1991). Pacific kangaroo rats have a narrower face than the broader, more blunt-faced Stephens' kangaroo rats. Aside from these cranial differences, the two species are separated by a suite of relatively subtle traits that can make it extremely difficult to visually identify these two animals to species level.

8.2.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Stephens' kangaroo rat is known from 21 locations within the Survey Area. There are known populations of Stephens' kangaroo rat within the Survey Area at the following locations: near Diamond Valley Lake and State Highway 79 (Attachment 1, Figure B-1), north of Long Valley Road, near State Highway 79, Anza Road and Lake Skinner (Attachment 1, Figure B-2), and near Portola Road and Temecula Creek (Attachment 1, Figure B-3).

Probable Impact Zone (PIZ)

Of the 21 occurrences of Stephens' kangaroo rat within the Survey Area, the CNDDDB lists 5 occurrences within the PIZ. Known populations of Stephens' kangaroo rat within the PIZ occur at the following locations: near State Highway 79 (Attachment 1, Figure B-1), north of Long Valley Road and near Lake Skinner (Attachment 1, Figure B-2), and near Temecula Creek (Attachment 1, Figure B-3). Suitable open and disturbed habitat along the aqueducts could be used as migration corridors or habitat for this species, as Stephens' kangaroo rat prefers open habitats.

Preserve Area

This species is not currently known to occur within the Preserve Area.

Conservation and Take Levels. Suitable habitat for the Stephens' kangaroo rat is present along the aqueducts and around facilities in western Riverside County.

Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

In summary, the preferred habitat for Stephens' kangaroo rat is relatively level, sparsely vegetated grassland, fallow agricultural land, or open coastal sage scrub. Based on the preferred habitat, this species could occur in the Plan Area in grasslands and the following subcommunities: general agriculture, bare ground, and disturbed (see Table B-1B). There are 9,690 acres of this vegetation community and these subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 34 acres of potential habitat for this species could be impacted (14 acres by Planned Projects and 20 acres by Future Projects and O&M Activities).

The Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the Stephens' kangaroo rat by allowing for continued breeding, foraging, and sheltering in the Plan Area by conserving contiguous blocks of suitable habitat on which this species has the potential to occur. Given that this species does not occur within the Preserve Area, in the event that a Covered Activity would affect Stephens' kangaroo rat, any impacts to this species would be mitigated through contributions to the MSHCP Preserve, separate acquisitions that build the Preserve, purchase of mitigation credits from an approved mitigation bank, or other equivalent action.

8.2.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If potential burrows may be impacted by Covered Activities in areas of suitable habitat for this species, the area should be trapped by a permitted biologist prior to disturbance.
3. Relocate individuals into adjacent suitable habitat areas or preserves, and/or provide measures to ensure exclusion during construction activities, including trenching. Relocation would be determined and conducted by an Environmental Surveyor in consultation with the Wildlife Agencies.
4. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Stephens' kangaroo rat. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
 - c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

8.3 Los Angeles Pocket Mouse (*Perognathus longimembris brevinasus*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

8.3.1 Background

Distribution, Abundance, and Trends. The Los Angeles pocket mouse is one of nineteen subspecies of pocket mice. The species is a burrow-dwelling, mostly granivorous rodent that is restricted to the arid southwest. Historically, this subspecies occurred on fine, sandy soils along riverine habitats and in sandy grasslands. The range for the Los Angeles pocket mouse is limited to the Los Angeles Basin, from Burbank and San Fernando on the northwest to San Bernardino on the northeast, and Cabazon, Hemet, and Aguanga on the east and southeast (State of California 2006a). However, most of the species' historical habitat in the Los Angeles basin is no longer present, or has been severely modified by broad, concrete-lined flood control channels. The Los Angeles pocket mouse occurs in western Riverside County, where this species is widespread but uncommon. Stable populations are in the San Jacinto-Perris area and from Temecula to Anza, including populations near the main reservoirs.

The Los Angeles pocket mouse is a seed specialist. Its range is likely less than three acres, although focused studies have not been conducted to clarify its habitat requirements. The Los Angeles pocket mouse goes into a state of torpor or modified hibernation in the winter and emerges in March, when food is generally available (Meserve 1976). Peak breeding occurs in May, with an average annual litter of 4.3 (Hall 1946).

Threats and Limiting Factors. Habitat loss and fragmentation are primary contributors to this subspecies' endangerment. Small local population size predisposes this subspecies to a high risk of extirpation due to stochastic events, inbreeding depression, or other factors. Habitat degradation from off-road vehicles, human foot traffic, intrusive artificial lighting, and proliferation of non-native species may also contribute to extirpations. Exotic Argentine ants (*Iridomyrmex humilis*) may adversely affect the species directly (via predation in burrows) or indirectly (via alterations to native plant composition and seed banks) that pocket mice depend upon. Argentine ant populations are closely associated with irrigated landscaping (Suarez et al. 1998).

Special Considerations. Los Angeles pocket mouse populations can fluctuate greatly from year to year in both distribution and abundance, and re-colonization of unoccupied

but contiguous habitat areas should be considered when addressing any permanent impacts. The subspecies is difficult to detect at low population densities. Existing development may preclude dispersal from or between most occupied sites.

8.3.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Los Angeles pocket mouse has been documented from 4 occurrences within the Survey Area; near Lake Skinner (Attachment 1, Figure B-2) and along Temecula Creek in Temecula (Attachment 1, Figure B-3). Suitable open and disturbed habitat along the aqueducts could be used as migration corridors or habitat for this species.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is known to occur within the PIZ at 3 locations. As it has been observed near the PIZ, it is likely that Los Angeles pocket mouse may occupy suitable habitat within the PIZ.

Preserve Area

This species is not expected to occur within the Preserve Area, as they are outside of the range of this species.

Conservation and Take Levels. Suitable habitat for the Los Angeles pocket mouse is present along the aqueducts and around facilities in western Riverside County. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects would result from encroachment of non-native plant species. Any impacts to this species in Riverside County would be mitigated through contributions to the MSHCP Preserve, separate acquisitions that build the Preserve, purchase of mitigation credits from an approved mitigation bank, or other equivalent action.

In summary, the preferred habitat for Los Angeles pocket mouse is fine, sandy soils along riverine habitats and in sandy grasslands. Based on the preferred habitat, this species could occur in the Plan Area in riparian and the following subcommunities: alluvial fan scrub, nonnative grasslands, and freshwater aquatic (see Table B-1B). There

are 5,723 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 47 acres of potential habitat for this species could be impacted (18 acres by Planned Projects and 29 acres by Future Projects and O&M Activities).

Based on the habitat calculations presented in Table B-1A, the Plan provides 21 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan). However, as noted above, the Preserve Area is outside of the range of this species. Therefore, the Plan indicates that where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the Los Angeles pocket mouse by allowing for continued breeding, foraging, and sheltering in the Plan Area by providing contiguous blocks of suitable habitat on which this species has the potential to occur. Given that this species does not occur within the Preserve Area, in the event that a Covered Activity would affect the Los Angeles pocket mouse, any impacts to this species would be mitigated through contributions to the MSHCP Preserve, separate acquisitions that build the Preserve, purchase of mitigation credits from an approved mitigation bank, or other equivalent action.

8.3.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If potential burrows may be impacted by Covered Activities in areas of suitable habitat for this species, the area should be trapped by a permitted biologist prior to disturbance.
3. Relocate individuals into adjacent suitable habitat areas or preserves, and/or provide measures to ensure exclusion during construction activities, including trenching. Relocation would be determined and conducted by an Environmental Surveyor in consultation with the Wildlife Agencies.
4. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Los Angeles pocket mouse. The extent of all newly discovered populations will be mapped

and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.

- b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.
- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

8.4 Dulzura (California) Pocket Mouse (*Chaetodipus californicus femoralis*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

8.4.1 Background

Distribution, Abundance, and Trends. The Dulzura pocket mouse ranges throughout most of San Diego County into northern Baja California, Mexico. It is known from San Diego County in Campo, Dehesa, Dulzura, Santee, Santa Ysabel, Witch Creek, San Felipe Valley, La Puerta Valley, Pala, Rainbow, Ramona, Banner, Palomar Mountain, San Marcos, and Escondido (Bond 1977). It is generally found on chaparral-covered slopes in coastal and montane regions. Their diet consists of seeds, insects, and sometimes green leaves (Phillips et al. 2004).

Threats and Limiting Factors. The main threat to the Dulzura pocket mouse is the loss, degradation, and fragmentation of habitat due to urban development. Like other heteromyid pocket mice, this species is also likely to be limited in distribution within scrub habitats to the areas of sandy loams and other soils conducive to burrow excavation. Use of rodent poisons in adjacent agricultural areas and pastures may impact the Dulzura California pocket mouse. Domestic cats allowed to roam in habitat adjacent to residential areas may also impact this species.

Special Considerations. This species is very similar in appearance to the San Diego Pocket Mouse (*Chaetodipus fallax fallax*) and may occasionally be misidentified in the field, as it tends to occupy similar habitat. Dulzura California pocket mouse will readily colonize and occupy suitable chaparral habitat. Therefore, any monitoring for this species could be habitat-based as opposed to species-based monitoring. If monitoring indicates that habitat quality is being degraded (e.g., by frequent fire or exotic predators), occasional live-trapping studies should be conducted.

8.4.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, the Dulzura pocket mouse has been documented from 9 occurrences within the Survey Area; near the community of Rainbow (Attachment 1,

Figure B-3), near Old Castle Road (Attachment 1, Figure B-5), Escondido (Attachment 1, Figure B-7), Encinitas (Attachment 1, Figure B-8), near the Olivenhain Reservoir (Attachment 1, Figure B-9), the San Vicente Reservoir (Attachment 1, Figure B-11), and Miramar (Attachment 1, Figure B-12).

Probable Impact Zone (PIZ)

According to the CNDDDB, the Dulzura pocket mouse is known to occur within the PIZ at 2 locations: near the Olivenhain Reservoir and near the San Vicente Reservoir.

Preserve Area

According to Table B-1A, the habitat association projections indicate that there is no habitat available in the Preserve Area. As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, in some cases, species are expected to be known to occur based on observations on or near the Preserve Area. The Dulzura pocket mouse is present at San Miguel HMA (Attachment 1, Figure B-16, Merkel and Associates 1997) and the Crestridge HMA (Attachment 1, Figure B-15; State of California 2007c, PSBS 1994). This species is expected to occur in the Elfin Forest Reserve due to the presence of suitable habitat and proximity to known locations.

Conservation and Take Levels. This species is known to occur in the Plan Area and is conserved at the San Miguel HMA, the Elfin Forest Reserve, and Crestridge HMA. Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. Incidental take will result from habitat loss for this species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. The majority of direct effects would occur as a result of vegetation removal from around large project sites. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from off-road vehicle activity and encroachment of non-native plant species.

In summary, the preferred habitat for Dulzura pocket mouse is chaparral-covered slopes. Based on the preferred habitat, this species could occur in the Plan Area in chaparral (see Table B-1B). Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, up to 10 acres of potential habitat for this species could be impacted from Future Activities (see Table B-1A). As discussed in Section 1.2.1, impacts to vegetation communities from Future Projects and O&M are based on known information about Planned Projects and O&M and may not represent the full range of impacts to distinct vegetation communities and subcommunities which provide suitable habitat for Covered Species. This Plan was developed to account for species that could likely be impacted from all Covered Activities during the Permit term. Once project specific information is available, vegetation communities with the preferred habitat for this species may be impacted. Where the existing Preserve Area does not

have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the Dulzura pocket mouse by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

8.4.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If potential burrows may be impacted by Covered Activities in areas of suitable habitat for this species, the area should be trapped by a permitted biologist prior to disturbance.
3. Relocate individuals into adjacent suitable habitat areas or preserves, and/or provide measures to ensure exclusion during construction activities, including trenching. Relocation would be determined and conducted by an Environmental Surveyor in consultation with the Wildlife Agencies.
4. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of Dulzura pocket mouse. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once all locations have been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated at ratios consistent with Tables 6-6 and 6-7 and will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved

restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by doing providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known species locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

8.5 Northwestern San Diego Pocket Mouse (*Chaetodipus fallax fallax*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

8.5.1 Background

Distribution, Abundance, and Trends. The San Diego pocket mouse ranges from Los Angeles County and extreme southern San Bernardino County southward through western Riverside and San Diego counties into west-central Baja California, Mexico. There are two subspecies of the San Diego pocket mouse in California: the coastal subspecies called the northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*); and the pale desert slope subspecies *C. f. pallidus* (Huey 1960). The northwestern San Diego pocket mouse inhabits sparse or disturbed coastal sage scrub, chaparral, or grasslands with sandy soils. On the desert slope these pocket mice are found in habitats with open scrub cover and also along washes. It requires soils suitable for burrows and occurs primarily in areas where the substrate is sandy or gravelly.

The species feeds mainly on seeds. One study reported that this species prefers grass seeds and had a lower preference for the seeds of shrubs and forbs (Meserve 1976). These mice (as is typical for pocket mice) transport seeds in their fur-lined cheek pouches, which they subsequently store in their burrows. San Diego pocket mice studied in the Claremont area of Los Angeles County had territories ranging from 0.5-1.1 acres (MacMillen 1964). Males had larger territories than females.

Threats and Limiting Factors. The primary cause for decline in this species is habitat loss and fragmentation due to agriculture and urban development. Pesticide use also is likely a contributing factor.

8.5.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, the northwestern San Diego pocket mouse has been documented from 13 occurrences within the Survey Area; near Lake Skinner (Attachment 1, Figure B-2), south of State Highway 71 in Temecula (Attachment 1, Figure B-3), near Old Castle Road (Attachment 1, Figure B-5), the Olivenhain Reservoir

(Attachment 1, Figure B-9), near the San Vicente Reservoir (Attachment 1, Figure B-11), and Miramar (Attachment 1, Figure B-12).

Probable Impact Zone (PIZ)

According to the CNDDDB, the northwestern San Diego pocket mouse is known to occur within the PIZ at 4 locations: south of State Highway 71 in Temecula (Attachment 1, Figure B-3), near the Olivenhain Reservoir (Attachment 1, Figure B-9), near the San Vicente Reservoir (Attachment 1, Figure B-11), and Miramar (Attachment 1, Figure B-12).

Preserve Area

This species is known to occur at the Elfin Forest Reserve (Attachment B-1, Figure B-10) and the Crestridge HMA (Attachment 1, Figure B-15; State of California 2007c, PSBS 1994). This species is expected to occur at the Myers property due to proximity to known locations (Attachment 1, Figure B-6; State of California 2007c).

Conservation and Take Levels. This species is known to occur in the Plan Area and is conserved at the Elfin Forest Reserve and Crestridge HMA and is expected to occur at the Myers property.

Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. Incidental take will result from habitat loss for this species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. The majority of direct effects would occur as a result of vegetation removal from around large project sites. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from off-road vehicle activity and encroachment of non-native plant species.

In summary, the preferred habitat for northwestern San Diego pocket mouse is sparse or disturbed coastal sage scrub, chaparral, or grasslands with sandy soils. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, coastal sage-scrub, sage-scrub montane/trans-montane, and nonnative grassland (see Table B-1B). There are 23,167 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 274 acres of potential habitat for this species could be impacted (134 acres by Planned Projects and 140 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the northwestern San Diego

pocket mouse by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

8.5.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If potential burrows may be impacted by Covered Activities in areas of suitable habitat for this species, the area should be trapped by a permitted biologist prior to disturbance.
3. Relocate individuals into adjacent suitable habitat areas or preserves, and/or provide measures to ensure exclusion during construction activities, including trenching. Relocation would be determined and conducted by an Environmental Surveyor in consultation with the Wildlife Agencies.

8.6 Southern Grasshopper Mouse (*Onychomys torridus ramona*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

8.6.1 Background

Distribution, Abundance, and Trends. The southern grasshopper mouse occurs throughout the southwestern U.S. and northwestern Mexico. In southern California, it is confined to inland areas west of the Peninsular Range in San Diego and Riverside counties where it may overlap with the Tulare grasshopper mouse (*O. t. pulcher*) in the mountains. The southern grasshopper mouse is active year-round in grassland, sage scrub, and open chaparral habitats. Areas of friable soils are preferred, as the species frequently digs for prey items.

The southern grasshopper mouse feeds primarily on arthropods, although it may also rarely eat small vertebrates such as salamanders, lizards, and frogs. Seeds and plant material make up a very small portion of its diet. The southern grasshopper mouse nests in adapted burrows of other mammals or digs its own burrow. It may make a distinctive high-pitched call at night; this call may indicate presence of the species when trapping success has been negligible.

This subspecies is highly territorial and, unlike woodrats and pocket mice, this territory may include a male-female pair bond. Breeding is focused from May to July, but may begin as early as January under optimal conditions. Litter size averages four young, with both parents sharing parental duties. Females are reproductive as early as six weeks of age. Life span for these small rodents is approximately three years.

Threats and Limiting Factors. The southern grasshopper mouse is declining due to habitat loss and fragmentation particularly within grasslands and sparsely vegetated sage scrub habitats.

Special Considerations. This carnivorous rodent is rarely encountered during trapping programs, because traps are typically baited with seeds.

8.6.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are no known occurrences of southern grasshopper mouse within the Survey Area. This species may occur near the aqueduct system in areas of open sage scrub, chaparral, or grasslands.

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of southern grasshopper mouse within the PIZ.

Preserve Area

The southern grasshopper mouse may occur on the Preserve Area, but because this species is not caught with seed traps, it has not appeared in trapping programs conducted at these sites

Conservation and Take Levels. Potential habitat (coastal sage scrub, chaparral, grasslands) for the southern grasshopper mouse is present at the San Miguel HMA, Rancho Cañada HMA, and Crestridge HMA.

Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects would result from encroachment of non-native plant species.

In summary, the preferred habitat for southern grasshopper mouse is grassland, sage scrub, and open chaparral habitats. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage-scrub, and the following subcommunities: nonnative grassland, alluvial fan scrub, Riversidean alluvial fan scrub, ceanothus crassifolius chaparral, chamise chaparral (granitic chamise chaparral), northern mixed chaparral, northern mixed chaparral (granitic), scrub oak chaparral, southern mixed chaparral, southern mixed chaparral (granitic), and montane meadow (see Table B-1B). There are 23,181 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 274 acres of potential habitat for this species could be impacted (134 acres by Planned Projects and 140 acres by Future Projects and O&M Activities). The Plan provides 641

acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the southern grasshopper mouse by allowing for continued breeding, foraging, and sheltering in the Plan Area by providing contiguous blocks of suitable habitat on which this species has the potential to occur.

8.6.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If potential burrows may be impacted by Covered Activities in areas of suitable habitat for this species, the area should be trapped by a permitted biologist prior to disturbance.
3. Relocate individuals into adjacent suitable habitat areas or preserves, and/or provide measures to ensure exclusion during construction activities, including trenching. Relocation would be determined and conducted by an Environmental Surveyor in consultation with the Wildlife Agencies.

8.7 San Diego Desert Woodrat (*Neotoma lepida intermedia*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Covered

Covered by MSCP: No

8.7.1 Background

Distribution, Abundance, and Trends. The desert woodrat (*Neotoma lepida*) ranges from Inyo County and north-central Tulare County, California, southward through the Mojave Desert and Colorado Desert – then westward to the coast. It also occurs from Monterey County to San Francisco Bay as well as a disjunct population in eastern Modoc and southeastern Lassen counties. Three subspecies of the desert woodrat exist within San Diego County. The coastal subspecies, the San Diego desert woodrat, has declined somewhat due to habitat encroachment and loss. The San Diego desert woodrat inhabits areas with dense vegetation including habitats such as coastal sage scrub and chaparral, and areas where rock crevices are present. Its small stick nests are often encountered in areas of rocky outcrops in sage scrub and arid chaparral and wedged against the base of larger, shielding shrubs. The composition of the nests may include a diverse spectrum of items, including human-derived trash. This species is included in the group of woodrats sometimes called “pack rats.” Conditions inside the nests can ameliorate ambient temperature by an average of 5 degrees Centigrade, making it cooler in the summer and warmer in the winter (Brown 1968). As a result, a number of other animals may share the nest with this species.

This relatively large rodent species is both nocturnal and a vegetarian. It is active throughout the year. Forage items include prickly pear cactus pads (from which it derives liquids to maintain a water balance), berries and seeds, bark, yucca pods, and other seasonally available semi-succulent vegetation. Desert woodrats are polygamous, with mating usually only for the duration of a single breeding season. Multiple litters (2.7 average young per litter) can occur with breeding from October to May. Females can breed as early as 2-3 months of age. Home ranges in coastal sage scrub are approximately 0.1 to 0.5 acre (Bleich and Schwartz 1975); while home ranges in the desert may be as large as 1.1 acres (Stones and Hayward 1968).

Threats and Limiting Factors. The San Diego desert woodrat is declining due to habitat loss and fragmentation within coastal sage scrub and chaparral habitats due to development.

8.7.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, the San Diego desert woodrat has been documented from 13 occurrences within the Survey Area; near Fallbrook (Attachment 1, Figure B-4), near Old Castle Road (Attachment 1, Figure B-5), Encinitas (Attachment 1, Figure B-8), near the Olivenhain Reservoir (Attachment 1, Figure B-9), Rancho Bernardo (Attachment 1, Figure B-10), Poway (Attachment 1, Figure B-11), Miramar (Attachment 1, Figure B-12), San Vicente Reservoir (Attachment 1, Figure B-13), and near Mission Trails Regional Park (Attachment 1, Figure B-14).

Probable Impact Zone (PIZ)

According to the CNDDDB, the San Diego desert woodrat is known to occur within the PIZ at 6 locations: near the Olivenhain Reservoir (Attachment 1, Figure B-9), San Vicente Reservoir (Attachment 1, Figure B-13), and near Mission Trails Regional Park (Attachment 1, Figure B-14).

Preserve Area

The San Diego desert woodrat is common at San Miguel HMA (Merkel and Associates 1997) and also present at Rancho Cañada HMA (TNC 2006) and the Elfin Forest Reserve (Attachment 1, Figure B-10; State of California 2007c).

Conservation and Take Levels. Suitable habitat occupied by the San Diego woodrat is conserved at the San Miguel HMA, Rancho Cañada HMA, and the Elfin Forest Reserve.

Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. Incidental take will result from habitat loss for this species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. The majority of direct effects would occur as a result of vegetation removal from around large project sites. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from off-road vehicle activity and encroachment of non-native plant species.

In summary, the preferred habitat for San Diego woodrat is coastal sage scrub and chaparral. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coastal sage scrub, coastal sage scrub montane/trans-montane, and the following subcommunities: maritime succulent scrub, Riversidean alluvial fan scrub, and southern coastal bluff scrub (see Table B-1B). There are 18,024 acres of these vegetation communities and subcommunities within the PIZ.

Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 240 acres of potential habitat for this species could be impacted (120 acres by Planned Projects and 120 acres by Future Projects and O&M Activities). The Plan provides 641 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the San Diego desert woodrat by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

8.7.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).
2. If potential burrows may be impacted by Covered Activities in areas of suitable habitat for this species, the area should be trapped by a permitted biologist prior to disturbance.
3. Relocate individuals into adjacent suitable habitat areas or preserves, and/or provide measures to ensure exclusion during construction activities, including trenching. Relocation would be determined and conducted by an Environmental Surveyor in consultation with the Wildlife Agencies.
4. Avoid to the maximum extent possible impacts to San Diego desert woodrat sticknests.
5. For temporary impacts to occupied desert woodrat habitat, incorporate suitable habitat elements, such as rock and brush piles, into the habitat restoration plan.

8.8 Mountain Lion (*Felis concolor*)

USFWS: None

CDFG: Specially Protected by Legislation

SDCWA: Covered

Covered by MSCP: Yes

8.8.1 Background

Distribution, Abundance, and Trends. The mountain lion has a large range throughout much of the U.S., Canada, and Mexico. In California, it occurs as an uncommon but permanent resident. In San Diego and western Riverside counties, mountain lions occur in the mountains and the adjacent brushy hills. The mountain lion is found in nearly all habitats, except xeric regions of the Mojave and Colorado deserts that do not support mule deer populations. It prefers rocky, rugged terrain with dense cover, but are adaptable to various habitat types. It seeks cover in caves, other natural cavities, and thickets for denning. Connective corridors between foraging areas are an essential feature of its habitat as the mountain lion has a large territory.

Female mountain lions are seasonally polyestrous and usually give birth every other year. There is no specific breeding season. Estrus generally lasts about 9 days. Gestation lasts 82 to 96 days. Kittens have been observed virtually every month of the year but may be slightly more common in summer (Robinette et al. 1961, Eaton and Verlander 1977, Nowak and Paradiso 1983, Hoffmeister 1986, Ross and Jalkotzy 1992). The number of young per litter ranges from one to six. Full size and sexual maturity is reached by 2 years, but mountain lions usually do not breed until they have a permanent home range. After dispersing, litter mates may stay together for several months (Russell 1978, Ross and Jalkotzy 1992). Mountain lions mainly feed on mule deer; which make up 60-80 percent of their diet year round (Currier 1983). They will also eat rabbits, hares, rodents, coyotes, and domestic stock. They are solitary animals except for brief periods of courtship and reproduction. They have no fixed den and use temporary shelters located in dense vegetation, rocky crevices, and caves (Currier 1983, Nowak and Paradiso 1983).

Population density is highly dependent on environmental conditions such as prey availability and terrain features, as well as on social factors (Currier 1983, Nowak and Paradiso 1983, Van Dyke et al. 1986). Home ranges vary from 15-35 square miles. There is little overlap in resident adult male territories, but extensive overlap occurs both among resident females and between females and males (Currier 1983, Nowak and Paradiso 1983, Logan et al. 1986).

Threats and Limiting Factors. Threats to the species include loss and fragmentation of habitat, road kills, indiscriminate shootings, and loss of natural prey base. Roadkill mortality is a frequent factor in more urbanized areas (Beier 1993).

8.8.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are no known occurrences of mountain lion within the Survey Area; however it expected to occur where large open areas of native habitat are present.

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of this species within the PIZ, but mountain lion may occupy suitable open habitat within the PIZ.

Preserve Area

The mountain lion is known to occur at San Miguel HMA (Merkel and Associates 1997), and is known from the vicinity and has the potential to occur at Crestridge HMA (PSBS 1994) and Rancho Cañada HMA (TNC 2006).

Conservation and Take Levels. Suitable habitat for the mountain lion is present at the San Miguel HMA, Rancho Cañada HMA, and Crestridge HMA.

Impacts to populations of this species will be avoided or minimized in accordance with the Plan Conditions for Coverage. Incidental take will result from habitat loss for this species. The proposed Plan could impact this species though direct loss of habitat and other indirect effects as a result of disturbance from Covered Activities. The majority of direct effects would occur as a result of vegetation removal from around large project sites. Minor direct effects would occur as a result of Covered Activities. Potential indirect effects would result from off-road vehicle activity and roads and reduction in prey base.

In summary, there is no specific preferred habitat for mountain lion as all natural areas could provide suitable or preferred habitat. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, coniferous forest, grasslands, oak woodlands and forest, coastal sage scrub, coniferous forest, riparian, and the following subcommunities: alluvial fan scrub, maritime succulent scrub, and Riversidean alluvial fan scrub (see Table B-1B). There are 26,042 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 344

acres of potential habitat for this species could be impacted (164 acres by Planned Projects and 180 acres by Future Projects and O&M Activities). The Plan provides 702 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the mountain lion by allowing for continued breeding, foraging and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan's Conditions for Coverage for this species.

8.8.3 Conditions for Coverage

1. Implement general Conditions for Coverage (see Section 2.1).

9.0 Non-Covered Plants

9.1 Rainbow Manzanita (*Arctostaphylos rainbowensis*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: No

9.1.1 Background

Distribution, Abundance, and Trends. This shrub is the dominant manzanita from Pala to Temecula near the Riverside County border, including the community of Rainbow, into the Agua Tibia Wilderness, and westward to the Santa Margarita Mountains. Shrubs have been recorded in the Merriam Mountains, Monserate Mountain on the San Diego side of the San Diego/Riverside County line, as well as east of Slaughterhouse Canyon near the Santa Rosa Plateau in western Riverside County.

Rainbow manzanita is found in dense canopy southern mixed chaparral at six to eight feet in height, principally on gabbro soils. Rocky Cieneba and Las Posas soils occur where dense populations of Rainbow manzanita can be found north of Pala in northern San Diego County and in southern Riverside County.

Threats and Limiting Factors. The primary threats to this species are development and orchard plantings. Additional threats to this species include cumulative habitat loss and degradation, alteration of the natural fire regime, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects. Given its limited distribution, this species could be in danger of being extirpated by repeated fire events.

Special Considerations. Rainbow manzanita is imperiled by continued orchard expansion into the Pala and De Luz regions. This burl-forming species responds well to wildfires at a natural interval and as a copious producer of fruits is a quick colonizer of disturbed habitats. Rainbow manzanita resembles and may be confused with closely-related manzanita species, particularly *A. glauca* and *A. glandulosa*.

9.1.2 Conservation Analysis

Presence within Plan Area and Preserve Area

Survey area

According to the CNDDDB and the SDNHM specimen records, Rainbow manzanita is known from 11 locations within the Survey Area. There are known populations of Rainbow manzanita within the Survey Area at the following locations: north-east of the community of Rainbow (Attachment 1, Figure B-3) and north of Pala Road (Attachment 1, Figure B-4).

Probable Impact Zone (PIZ)

Of the 11 occurrences of Rainbow manzanita within the Survey Area, the CNDDDB lists 2 occurrences within the PIZ. Known populations of Rainbow manzanita within the PIZ occur at the following locations: north of Pala Road (Attachment 1, Figure B-4) and west of the Community of Jesmond Dene (Attachment 1, Figure B-7).

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. There is currently no conservation provided for this species within the Plan Area. Any impacts to this species would be mitigated in accordance with the North County MSCP.

In summary, the preferred habitat for Rainbow manzanita is dense canopy southern mixed chaparral at six to eight feet in height, principally on gabbro soils. Based on the preferred habitat, this species could occur in the Plan Area in southern mixed chaparral (mafic and granitic) (see Table B-1B). Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, no impact to potential habitat for this species should occur. Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Potential direct impacts include permanent loss of

habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Rainbow manzanita in the Plan Area through protection of individuals and suitable habitat through the Plan conditions for coverage for this species and by contributions to regional conservation efforts for the species.

9.1.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Rainbow manzanita locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in

accordance with a Wildlife Agency-approved restoration and monitoring program.

9.2 Wart-stemmed Ceanothus (*Ceanothus verrucosus*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Not Covered

Covered by MSCP: Yes

9.2.1 Background

Distribution, Abundance, and Trends. Wart-stemmed ceanothus is limited in distribution to western San Diego County and Baja California, Mexico (Reiser 2001). In San Diego County, it is found on the immediate coast from Carlsbad south to the U.S.-Mexican border. Sizeable populations are found on Naval Base Point Loma, at Carmel Mountain, on north-facing slopes near the Miramar Landfill and Escondido Creek, in Harmony Grove, and at Torrey Pines. This species is present in San Diego, Olivenhain, Cardiff, Encinitas, Del Mar, Carmel Mountain, Miramar, Escondido, Lake Hodges, and San Dieguito County Park. It also occurs inland towards San Marcos and Lake Hodges.

This species is associated with southern maritime chaparral and southern mixed chaparral. It is typically a dominant shrub within the vegetation community where it occurs. It may be particularly vigorous on north-facing slopes, but can accommodate more xeric aspects (Reiser 2001). Exchequer rocky silt loams and San Miguel-Exchequer rocky silt loams are utilized by the dense populations of this ceanothus in the Mount Whitney (i.e., northern coastal San Diego County) area. Terrace escarpments are the soil type mapped for this shrub at Torrey Pines, while Gaviota fine sand loams are found at the Point Loma populations (Reiser 2001).

Threats and Limiting Factors. The primary threats to this species are canyon land development for orchards and urban infill on coastal canyons. Additional threats to this species include altered fire regimes, cumulative habitat loss and degradation, vehicular traffic and road construction, illegal dumping, invasive exotic plants, and edge effects.

Special Considerations. Wart-stemmed ceanothus is an evergreen shrub. It is a highly fire-adapted species whose fire response is seed germination from a persistent seed bank after exposure to intense heat (e.g., an obligate seeder after fire

9.2.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are eight known populations of wart-stemmed ceanothus within the Survey Area. There are known populations of wart-stemmed ceanothus within the Survey Area at the following locations: north of Escondido Creek in San Marcos (Attachment 1, Figure B-8) and south Lake Hodges (Attachment 1, Figure B-9).

Probable Impact Zone (PIZ)

According to the CNDDDB, there are three known populations of wart-stemmed ceanothus within the PIZ.

Preserve Area

According to Table B-1A, the habitat association projections indicate that there is no habitat available in the Preserve Area. As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, in some cases, species are expected to known to occur based on observations on or near the Preserve Area. This species occurs within the Elfin Forest Reserve (Attachment 1, Figure B-9) and has the potential to occur at the Escondido Creek Uplands.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage.

In summary, wart-stemmed ceanothus occurs in southern maritime chaparral and southern mixed chaparral. Based on the preferred habitat, this species could occur in the Plan Area in southern mixed chaparral (mafic and granitic), southern maritime chaparral, and southern mixed chaparral (see Table B-1B). There are 8,134 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of wart-stemmed ceanothus in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known and has potential to occur and by implementation the Plan conditions for coverage for this species.

9.2.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

9.3 Summer Holly (*Comarostaphylis diversifolia* ssp. *diversifolia*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: No

9.3.1 Background

Distribution, Abundance, and Trends. Summer holly occurs in Orange, Riverside, and San Diego counties, and in Baja California, Mexico (Reiser 2001). In San Diego County, the species is found along the coast from Carlsbad to the U.S.-Mexican border, and in inland locations from the San Marcos Mountains south to Otay Mountain. Most populations of summer holly occur west of I-15 in San Diego County. Large populations are known to occur in and around San Marcos, Mount Whitney, the Merriam Mountains, Rancho Peñasquitos, Escondido Creek north of the San Dieguito Reservoir, Mount Soledad and the eastern portions of San Dieguito County Park, Carlsbad, Del Mar, and west of Santee in Mission Trails Regional Park (Reiser 2001). Isolated shrubs were seen near Otay Mountain, the upper slopes Batiquitos Lagoon, and in Miramar. Other reports include sightings around the Turner Reservoir near Moosa Canyon, Lake Hodges, Carroll Canyon, east of San Dieguito Valley, the Crest Canyon drainage near Del Mar, around San Diego State University, San Elijo Canyon southwest of Harmony Grove, Escondido, and Hidden Meadows. Other reports also include sites west of Rancho Bernardo, San Miguel Mountain; in Orange County near the Seaview Park area of Monarch Summit, and in the Santa Ana Mountains.

Mesic north-facing slopes and rugged, steep drainages in southern mixed chaparral are the preferred habitat of this large, showy shrub. In the larger populations, the surrounding mature chaparral is typically tall, dense, and luxuriant (Reiser 2001).

Threats and Limiting Factors. The primary threat to this subspecies is a general loss of habitat due to residential construction. Additional threats to this subspecies include cumulative habitat degradation, alteration of natural fire regimes, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. This shrub is typically in dense chaparral and may be difficult to see in areas of limited access. Summer holly is a fire-adapted shrub that stump-sprouts from the base of the stem or root-crown after fire or cutting; because of its capacity for resprouting individuals are typically long-lived and populations experience relatively slow

rates of turnover of individuals. It is presumably insect-pollinated and seeds are animal-dispersed, thus adequate conservation for this species must include sufficient habitat to support appropriate pollinators and seed dispersal agents.

9.3.2 Conservation Analysis

Presence within the Plan Area and Preserve Area

Survey area

According to the CNDDDB and the SDNHM specimen records, summer holly is known from 22 locations within the Survey Area. There are known populations of summer holly within the Survey Area at the following locations: near of Gopher Canyon Road, north of Escondido (Attachment 1, Figure B-5), west of San Marcos Lake in San Marcos (Attachment 1, Figure B-6), northwest of the Dixon reservoir (Attachment 1, Figure B-7), south of San Marcos Creek in San Marcos (Attachment 1, Figure B-8), north Olivenhain Reservoir (Attachment 1, Figure B-9), near Lake Hodges (Attachment 1, Figure B-9), north of the San Vicente Reservoir (Attachment 1, Figure B-11), in Kearny Mesa near the San Diego River (Attachment 1, Figure B-12), and north of Lake Murray (Attachment 1, Figure B-14).

Probable Impact Zone (PIZ)

Of the 22 occurrences of summer holly within the Survey Area, the CNDDDB lists 1 occurrence within the PIZ. The population of summer holly within the PIZ is located south of San Marcos Creek in San Marcos.

Preserve Area

According to Table B-1A, the habitat association projections indicate that there is no habitat available in the Preserve Area. As noted on Table B-1A and Section 1.3.3 of this Conservation Analysis, in some cases, species are expected to known to occur based on observations on or near the Preserve Area. This species occurs at the Elfin Forest Reserve (State of California 2007a).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. This species is conserved within the Elfin Forest Reserve.

In summary, preferred habitat for summer holly is mesic north-facing slopes and rugged, steep drainages in southern mixed chaparral. Based on the preferred habitat, this species could occur in the Plan Area in southern mixed chaparral (mafic and granitic) and southern mixed chaparral (see Table B-1B). There are 8,131 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation

communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities for reservoir maintenance. Minor direct impacts would occur as a result of Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of summer holly by conserving contiguous blocks of suitable habitat on which this species is known to occur and providing protection for individuals and habitat through the Plan conditions for coverage for this species.

9.3.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

9.4 Orcutt's Bird's-beak (*Cordylanthus orcuttianus*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Not Covered

Covered by MSCP: Yes

9.4.1 Background

Distribution, Abundance, and Trends. The range of this species includes southern California and northern Baja California, Mexico. Chula Vista lies at the extreme northern end of a primarily Mexican range for this species. There is a limited occurrence of this species in Poggi Canyon in Chula Vista. The major U.S. population is found in and around the Otay River drainage west of I-805. Isolated populations are found on slopes in the northernmost canyon lands of San Ysidro, eastern Chula Vista, east of Otay Mesa, and east of the Lower Otay Reservoir. The Otay River colonies should be considered the only vigorous extant U.S. population, and should be rigidly protected (Reiser 2001).

Seasonally dry drainages and uplands adjacent to riparian habitat is the preferred habitat of Orcutt's bird's-beak. In the Tijuana River Valley it grows in a cobbly ecotone with sage scrub upslope and disturbed broom baccharis and southern willow scrub near the watercourse. Reiff fine sandy loam is mapped at the Rogers Park site. Holocene alluviums and Riverwash are found in occupied habitat on the embankments of the Otay River (Reiser 2001).

Threats and Limiting Factors. Orcutt's bird's-beak is substantially declining within its limited U.S. range. Aside from the Otay River population, all known U.S. sites are presently imperiled by direct development or significant secondary impacts. The rarity of this species appears to be related to its natural distribution. The primary threats to this species are various development projects within the Otay River Valley floodplain. Additional threats to this species include cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, competition with invasive and exotic plants, and edge effects.

Special Considerations. Germination of this annual herb may vary according to rainfall, which makes censusing populations of this species difficult during years of below-average rainfall.

3.15.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

There are no records of Orcutt's bird's-beak within the Survey Area according to the CNDDDB and the SDNHM specimen records.

Probable Impact Zone (PIZ)

There are also no records of Orcutt's bird's-beak within the PIZ according to the CNDDDB and the SDNHM specimen records.

Preserve Area

According to the CNDDDB and the SDNHM specimen records, Orcutt's bird's-beak is not expected to occur within the designated Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage.

In summary, Orcutt's bird's-beak preferred habitat is seasonally dry drainages and uplands adjacent to riparian habitat. Because of the specialized habitat requirements for this species, no suitable habitat was identified based on the data available. This species could occur in suitable areas adjacent to riparian habitat. There are no acres of this vegetation community within the PIZ and Survey Area. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, no potential habitat for this species could be impacted (see Table B-1A). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan is not anticipated to impact this species. However, should it be found within the Plan Area in the future, Plan implementation could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan.

9.4.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).

9.5 Snake Cholla (*Cylindropuntia californica* var. *californica*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: No

9.5.1 Background

Distribution, Abundance, and Trends. Snake cholla is restricted to San Diego County and Baja California, Mexico (Reiser 2001). Scattered cacti are found growing from Florida Canyon in Balboa Park to the Mexican border, south of the Lower Otay camping area, Point Loma, around the Otay Landfill, Poggi Canyon, and in Chula Vista near San Ysidro. Old biological survey reports note sites in and around Otay Mesa, near Glen Abbey Memorial Park in Bonita, and in Telegraph Canyon (Reiser 2001).

Diegan coastal sage scrub on xeric hillsides (usually on south-facing slopes) is the preferred habitat for this prostrate to sub-erect cane-type cactus. Soils include Huerhuero loam in Otay Valley, Gaviota fine sandy loam on Point Loma, and Redding cobbly loam in Balboa Park.

Threats and Limiting Factors. The primary threats to this species are loss of habitat due to residential and military infrastructure expansion (e.g., Point Loma) and habitat fragmentation. Additional threats to this species include cumulative habitat loss and degradation, increased fire frequency and/or intensity, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. This plant is capable of being propagated and rooted from stem segments, and should be strongly considered for use on restoration sites and/or protected lands within its historical range. Conditions required for natural and horticultural establishment are not well understood. This species appears to require naturally open soil primarily occurring in coastal sage scrub. It may be vulnerable to frequent fire.

9.5.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, snake cholla occurs within the Survey Area at 1 location, southwest of Lower Otay Reservoir (Attachment 1, Figure B-16)

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no occurrences of snake cholla within the PIZ.

Preserve Area

According to the CNDDDB and the SDNHM specimen records, snake cholla is not expected to occur within the designated Preserve Area.

Conservation and Take Levels. If this species is found within the Plan Area, populations will be avoided or minimized in accordance with the Narrow Endemic Policy.

In summary, preferred habitat for snake cholla is Diegan coastal sage scrub on xeric hillsides. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage scrub (Diegan) (see Table B-1B). There are 9,054 acres of this vegetation subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 162 acres of potential habitat for this species could be impacted (84 acres by Planned Projects and 78 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan is not anticipated to impact this species. Plan implementation could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Covered Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan.

9.5.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Implement the Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).

9.6 Palmer's Goldenbush (*Ericameria palmeri* ssp. *palmeri*)

USFWS: None

CDFG: None

CNPS List: 2

SDCWA Plan: Not Covered

Covered by MSCP: Yes

9.6.1 Background

Distribution, Abundance, and Trends. Palmer's goldenbush ranges from northern Mexico into central San Diego County. Within San Diego County, there are reports for small populations of this species from Poway, the Otay River floodplain, the base of Carmel Valley east of I-5, a hillside east of the Sequan Gambling Casino, at the San Diego Wild Animal Park, and near Jamacha northwest of Lakeview. This sizeable shrub grows along coastal drainages, in mesic chaparral sites, or rarely in Diegan coastal sage scrub. Occasionally, it occurs as a hillside element (usually inland at higher elevations on north-facing slopes). Las Posas fine sandy loam is mapped for the riparian site at Jamacha Road, while the hillside locale near Sequan Indian Reservation is Vista coarse sandy loam. Seasonally wet/moist locales are strongly preferred.

Threats and Limiting Factors. The primary threats to this species are loss of habitat due to road expansion into peripheral wetland habitat, residential development, and agricultural conversion. The effects of alteration to local hydrology and fire to this species are poorly understood.

Special Considerations. Palmer's goldenbush prefers seasonally mesic sites in coastal drainages in shrubland habitat. On superficial examination it may resemble more common perennial asters, which may result in this species being incorrectly identified in some cases.

This species is highly restricted in the U.S., and more information is needed to adequately understand and conserve this species. Newly found populations should be documented and their genetic diversity noted. Management considerations should include the adequate design of buffers and stabilization of conserved populations within the Plan Area.

9.6.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, Palmer's goldenbush, occurs within the Survey Area at 6 locations. Palmers Goldenbush is found west of Lake Jennings (Attachment 1, Figure B-13) and northeast of the Sweetwater Reservoir (Attachment 1, Figure B-15).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, Palmer's goldenbush occurs at 3 locations within the PIZ.

Preserve Area

This species is not currently known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Any impacts to this species would be mitigated through appropriate restoration or contributions to regional planning efforts.

In summary, the preferred habitat types for Palmer's goldenbush are coastal drainages, in mesic chaparral sites, or rarely in Diegan coastal sage scrub. Based on the preferred habitat, this species could occur in the Plan Area in southern maritime chaparral, coastal sage scrub (Diegan), and freshwater meadow (see Table B-1B). There are 9,069 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 178 acres of potential habitat for this species could be impacted (89 acres by Planned Projects and 79 acres by Future Projects and O&M Activities). The Plan provides one acre of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected contribute to the regional conservation of Palmer's goldenbush by ensuring a

minimum 1:1 conservation ratio of populations within the Plan Area and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan Conditions for coverage for this species.

9.6.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
4. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following (per the Narrow Endemic Policy, the implemented action shall result in minimum 1:1 conservation ratio for this species within the Plan Area):
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known Palmer's goldenbush locations.
 - b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in

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accordance with a Wildlife Agency-approved restoration and monitoring program.

9.7 Mission Canyon Bluecup (*Githopsis diffusa* ssp. *filicaulis*)

USFWS: None

CDFG: None

CNPS List: 3

SDCWA Plan: Not Covered

Covered by MSCP: No

9.7.1 Background

Distribution, Abundance, and Trends. Mission Canyon bluecup is known from western Riverside County, San Diego County, and into Baja California, Mexico. Historically, Mission Canyon bluecup occurs in Harbison Canyon, on Featherstone Creek near Barona, El Cajon Mountain, Silverwood Wildlife Sanctuary, and at Murphy Canyon. Mission Canyon bluecup is a difficult to find species. Isolated, sandy openings in chaparral are the typical habitat for this cryptic annual. Visalia sandy loam is mapped at the Moosa Canyon site. Mission Canyon bluecup is found growing near Highway 79, in the Cuyamaca Mountains where the chaparral gives way to conifers, and in a minor tributary of Moosa Canyon (Reiser 1994).

Threats and Limiting Factors. The threats to this species include cumulative habitat loss and degradation, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. The status of the Mission Canyon bluecup in San Diego County is presumed stable (Reiser 1994). This species is extremely hard to locate due to its cryptic nature and can be quite fragile, as it appears to have a short flowering period, with the plant withering soon in warm weather. Surveying for this species outside of its brief spring flowering season is not recommended, and would be extraordinarily difficult given the ephemeral nature of the plant.

9.7.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there is one known population of Mission Canyon bluecup within the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of Mission Canyon bluecup within the PIZ and none are expected to occur.

Preserve Area

This species is known to occur within the Crestridge Ecological Reserve (Rahn et al. 2008).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. This species has the potential to occur within the Plan Area and is known to occur within the Water Authority Preserve Area.

In summary, Mission Canyon bluecup prefers isolated, sandy openings in chaparral. Based on the preferred habitat, this species could occur in the Plan Area in chaparral and chaparral montane/trans-montane (see Table B-1B). There are 8,163 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). The Plan provides 123 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the Mission Canyon bluecup in the Plan Area by conserving contiguous blocks of suitable habitat on which this species is known or has the potential to occur. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

9.7.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to

obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).

2. Implement general Conditions for Coverage (see Section 2.1).

9.8 Orcutt's Hazardia (*Hazardia orcuttii*)

USFWS: Candidate for Listing

CDFG: Threatened

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: No

9.8.1 Background

Distribution, Abundance, and Trends. Orcutt's hazardia is known only from San Diego County and Baja California, Mexico (Reiser 2001). Although once described as fairly common in open habitats along coastal plains from Colonet to Tijuana in Baja California, Mexico, only one occurrence in Mexico has been confirmed since 1975. The only known extant occurrence in the U.S. of this species is in Encinitas, California, primarily within the Manchester Conservation Area (MCA) managed by Center for Natural Lands Management (USFWS 2004). The single U.S. known site harbors open chaparral with chamise as the habitat for this species. Soils are mapped as loamy alluvial land of the Huerhuero complex.

Threats and Limiting Factors. The primary threats to this species are residential expansion and peripheral lot clearance in Encinitas. Additional threats to this species include cumulative habitat degradation, unauthorized trespass, invasive and exotic plants, altered fire regime, and edge effects.

Special Considerations. Orcutt's hazardia is presumably fire-adapted, although the particular fire response mechanism is unknown. Flowers are insect-pollinated and seeds are presumably animal-dispersed. Effective conservation of this species should include development of a fire management plans for all conserved populations to promote biological goals (e.g., regeneration) while protecting individual plants and habitat from frequent or high- intensity fires and fire suppression activities.

9.8.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are no known populations of Orcutt's hazardia within the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of Orcutt's hazardia within the PIZ.

Preserve Area

This species is not currently known or expected to occur on the Preserve Area.

Conservation and Take Levels. Should this species be found within the Plan Area, populations will be avoided or minimized in accordance with the Narrow Endemic Policy.

In summary, the preferred habitat type for Orcutt's hazardia is open chaparral with chamise. Based on the preferred habitat, this species could occur in the Plan Area in chamise chaparral (granitic chamise chaparral) (see Table B-1B). There are 28 acres of this vegetation subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 28 acres of potential habitat for this species could be impacted (13 acres by Planned Projects and 15 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan is not anticipated to impact this species. However, should it be found within the Plan Area in the future, Plan implementation could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan.

9.8.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to

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obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).

2. Implement general Conditions for Coverage (see Section 2.1).

9.9 Heart-leaved Pitcher Sage (*Lepechinia cardiophylla*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: Yes

9.9.1 Background

Distribution, Abundance, and Trends. Heart-leaved pitcher sage ranges from the Santa Ana Mountains in Orange and Riverside counties, San Diego County, and the coastal mountains of northern Baja California. Reported San Diego County locales include the region surrounding Iron Mountain near Ramona (Reiser 2001). Orange County sites include Claymine Canyon, Bald Peak, Upper Maybe Canyon in the Santa Ana Mountains, the headwaters of Coal Canyon, Sierra Peak, Bald Peak, near East Fork Canyon, near Santiago Peak, on Trabuco Peak, southeast of Beeks Place, on Horsethief Trail, and various points on Pleasants Peak (Reiser 2001). Heart-leaved pitcher sage is still relatively stable within its foothill and montane habitat in the Santa Ana Mountains. It is also apparently stable on Iron Mountain in San Diego County.

Chaparral and cismontane woodland are both utilized by this broad-leaved shrub, although it may also occur in closed-clone coniferous forest at higher elevations. Iron Mountain has primarily Friant rocky fine sandy loams and is covered in a relatively dense, mature chaparral. In Baja California, Mexico, this shrub was found in a low-growing and xeric chamise chaparral on volcanic derived soils. Exchequer soils are reported for Orange County with associated, locally rare species that may include knobcone pine (*Pinus attenuata*), Tecate cypress (*Cupressus forbesii*), or California-lilac (*Ceanothus* spp.) dominated chaparral.

Threats and Limiting Factors. The primary threats to this species are repetitive fires on the few peaks it is known to occur. Development in the Santa Ana Mountains region is currently less of a threat due to construction activities being limited to the lower flanks of the mountain and to several minor dirt roads. Additional threats to this species include cumulative habitat degradation, invasive and exotic plants, and edge effects. Heart-leaved pitcher sage is also being replaced by Gander's pitcher sage (*Lepechinia ganderi*) in southwestern San Diego County.

Special Considerations. Effective conservation of this species should include development of a fire management plans for all conserved populations to promote

biological goals (e.g., regeneration) while protecting individual plants and habitat from frequent or high-intensity fires and fire suppression activities.

9.9.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are three populations of heart-leaved pitcher sage within the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of heart-leaved pitcher sage within the PIZ.

Preserve Area

This species is not currently known or expected to occur on the Preserve Area.

Conservation and Take Levels. If this species is found within the Plan Area, populations will be avoided or minimized in accordance with the Plan conditions for coverage.

In summary, heart-leaved pitcher sage prefers chaparral and cismontane woodland, although it may also occur in closed-clone coniferous forest. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/transmontane, and the following subcommunities: black oak forest, black oak woodland, coast live oak forest, coast live oak woodland, and engelmann oak forest (dense engelmann oak woodland) (see Table B-1B). There are 8,936 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 94 acres of potential habitat for this species could be impacted (42 acres by Planned Projects and 52 acres by Future Projects and O&M Activities). The Plan provides 130 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan is not anticipated to impact this species. However, should it be found within the Plan Area in the future, Plan implementation could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas

and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan.

9.9.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

9.10 Little Mousetail (*Myosurus minimus ssp. apus*)

USFWS: None

CDFG: None

CNPS List: 3

SDCWA Plan: Not Covered

Covered by MSCP: No

9.10.1 Background

Distribution, Abundance, and Trends. Little mousetail has a relatively widespread distribution, occurring in Butte, Colusa, Solano, Contra Costa, Alameda, Stanislaus, Kern, Riverside, San Bernardino, and San Diego counties, as well as in Oregon and Baja California, Mexico (Reiser 2001). The vernal pools north of Peñasquitos Canyon possess a limited population of little mousetail. Other populations are known to occur in the vernal pools or on their periphery in the Otay Mesa region (including the Upper and Lower Otay Lakes and Reservoirs), on Camp Pendleton, Cottonwood Creek and Tecate Creek in Marron Valley, Carlsbad, Ramona, Tierra Santa, and in Hemet and March Air Force Base in western Riverside County. Other reports from Riverside County are for Hartford Springs County Park, pools on Mesa de Burro, and pools from Mesa de Colorado on the Santa Rosa Plateau.

This cryptic species is mainly restricted to the deeper portions of vernal pool basins, sprouting immediately after the surface water has evaporated. The stature of plants and population densities of mousetail change dramatically from wet to dry years. Soils are mapped as Huerhuero loam for both little mousetail sites near Dillon Road in the southwestern portion of the county, and for Stewart Mesa in the northwestern portion of the county. Bosanko clays are reported for a site in the Gavilan Hills of Riverside County.

Threats and Limiting Factors. The primary current threat to this species is loss of vernal pool habitat. Additional threats to this species include cumulative habitat degradation, changes in hydrologic conditions, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Little mousetail is a small, tufted annual that may experience yearly fluctuations in population size. It is declining throughout its limited southern California range. Little mousetail relies on animal vectors for pollination and, possibly, seed dispersal. In addition, plants have specific hydrological requirements. Therefore, effective conservation of this species must include sufficient habitat to maintain an

appropriate fauna and must manage the vernal pool watershed in a manner that maintains both the hydrological regime and water quality.

9.10.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there is one known population of little mousetail within the Survey Area. The known population of little mousetail within the Survey Area is at the following location: south of Lower Otay Reservoir (Attachment 1, Figure B16).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of little mousetail within the PIZ.

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy and the Vernal Pool Protection Policy. Incidental take may occur if this species inhabits road ruts on the rights-of-way near vernal pools. At current, no impacts to this species are anticipated.

In summary, little mousetail prefers deeper portions of vernal pool basins. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). There are no acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, no potential habitat for this species could be impacted (see Table B-1A). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Should this species be found within the Plan Area, implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future

Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of little mousetail in the Plan Area by maintaining a minimum 1:1 conservation ratio of populations and/or by contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species. Effective conservation of this species must also include management of the watershed to maintain hydrological conditions that support vernal pools and other ephemeral wetlands.

9.10.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
4. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
5. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following (per the Narrow Endemic Policy, the implemented action shall result in minimum 1:1 conservation ratio for this species within the Plan Area):
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known little mousetail.

- b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
 - c. Propagate for reintroduction and/or introduction, salvage, and/or relocate species into biologically suitable habitat within the Plan Area in accordance with a Wildlife Agency-approved restoration and monitoring program.
6. Where impacts to vernal pools supporting little mousetail occur, mitigation should include salvage of seed and/or corms to be included in any suitable vernal pool restoration.
7. For unavoidable impacts, prepare a mitigation plan to re-establish populations at minimum 1:1 conservation ratio of the population.

9.11 Prostrate Navarretia (*Navarretia prostrata*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: No

9.11.1 Background

Distribution, Abundance, and Trends. Prostrate navarretia occurs in San Diego, Los Angeles, Riverside, Merced, Monterey, San Bernardino, and Orange counties. This small annual is rare in vernal pools near Highway 52 in northern city of San Diego. Prostrate navarretia is locally common in the larger vernal pools on Mesa de Colorado on the Santa Rosa Plateau of western Riverside County, and is reported from several locales in low-lying areas along the San Jacinto River floodplain between Lakeview and Perris. A population was recently reported from Fairview Regional Park near Costa Mesa in Orange County (Reiser 2001).

This species is primarily restricted to vernal pools, but also may occur in alkaline grasslands where appropriate hydrological conditions are present. On Kearny Mesa it grows at mid levels within the deeper pools, to the basin bottoms of the shallower pools. Within the larger vernal pools on the Santa Rosa Plateau, it is sometimes a dominant plant of the basins (Reiser 2001).

Threats and Limiting Factors. The primary threat to this species is general loss of vernal pool habitat to urban development and associated edge effects (including alterations in the watershed that may reduce the source and/or quality of water and encourage invasion of habitat by upland plant species) (MHCP 2003). Additional threats to this species include cumulative habitat degradation, off-road vehicle use, and invasive plants.

Special Considerations. Prostrate navarretia is an annual that may not bloom, or may bloom in very limited numbers, in drought years. There is potential for this species to be confused with spreading navarretia.

9.11.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are no known populations of prostrate navarretia within the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of prostrate navarretia within the PIZ.

Preserve Area

This species is currently not known or expected to occur within the Preserve Area.

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Narrow Endemic Policy. Vernal pool impacts will be avoided and minimized in accordance with the Vernal Pool Protection Policy.

In summary, prostrate navarretia is primarily restricted to vernal pools, but also may occur in alkaline grasslands. Based on the preferred habitat, this species could occur in the Plan Area in the following wetland subcommunities: alkalai wetlands and vernal pools, San Diego mesa claypan and hardpan vernal pools, and vernal lakes (see Table B-1B). There are 34 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, less than one acre of potential habitat for this species could be impacted (see Table B-1A). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct temporary habitat disturbance and other indirect impacts as a result of disturbance from O&M Activities. Impacts from new construction projects are not proposed to impact this species, as the majority of vernal pool complexes are avoided by design considerations. The majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of prostrate navarretia in the Plan Area by maintaining a minimum 1:1 conservation ratio of populations and/or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species. Effective conservation of this species must also include management of the watershed to maintain hydrological conditions that support vernal pools and other ephemeral wetlands.

9.11.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Implement Narrow Endemic Policy (see Section 6.5.1.6 of the Plan).
4. Implement Vernal Pool Protection Policy (see Section 6.7.3 of the Plan).
5. Establish a minimum habitat buffer of 100 feet when feasible around populations to support the natural suite of pollinators, unless a biologically appropriate mitigation approach is agreed to with the Wildlife Agencies at the time of project-specific environmental review.
6. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat⁷. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, they may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known prostrate navarretia locations.

- b. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, or contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.
7. Focused surveys for this species are conducted by the Environmental Surveyor for detection prior to any proposed impacts (e.g., during CEQA review). As this species is an annual herb, surveys for prostrate navarretia shall be conducted during its blooming period (April-July) to ensure proper identification.

9.12 Gander's Ragwort (*Packera ganderi*)

USFWS: None

CDFG: Rare

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: No

9.12.1 Background

Distribution, Abundance, and Trends. The range of this species consists of the southwestern part of Riverside County and the foothills of western San Diego County. This ragwort is a localized endemic, which is seen growing beneath chamise in a rich leaf litter on Lawson Peak, and near the summit of Sequan Peak. A population occurs east of Highway 16, directly south of the Riverside County line extending into Riverside County. It is also reported at the head of two adjacent canyons near Tecate Peak, south of the Riverside County line, El Cajon Mountain, Black Mountain/Lusardi, McGinty Mountain, Barber Mountain Road, and near Iron Mountain.

Gander's ragwort usually grows in the understory of mature mixed or chamise chaparral, or in open areas of recently burned chaparral, and is restricted to sites with gabbro soils. Las Posas stony fine sandy loam is mapped for the Lawson and Sequan Peak sites, as well as the population near the Riverside County border near Agua Tibia Mountains.

Threats and Limiting Factors. The primary threats to this species are loss of suitable habitat due to rural residential construction, and clearance of large peripheral areas to deter wild fires. Additional threats to this species include cumulative habitat degradation, trampling, vehicular traffic and road construction, illegal dumping, invasive and exotic plants, and edge effects.

Special Considerations. Gander's ragwort populations are considered stable in San Diego and Riverside counties (Reiser 2001). Rarity of the plant is closely allied with its restriction to uncommon metavolcanic and gabbroic soil types. Studies are needed to determine the role of wildfire management and/or prescribed burning with respect to establishment and reproduction in populations of Gander's ragwort. Its habit of growing in the understory of mature, mixed chaparral may cause it to be overlooked.

9.12.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, Gander's ragwort is expected to occur within the Survey Area at 1 location.

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, Gander's ragwort is not expected to occur within the PIZ.

Preserve Area

According to the CNDDDB and the SDNHM specimen records, Gander's ragwort is not expected to occur within the designated Preserve Area.

Conservation and Take Levels. If this species is found within the Plan Area, populations will be avoided or minimized in accordance with the Plan conditions for coverage.

In summary, Gander's ragwort prefers mixed or chamise chaparral, or open areas of recently burned chaparral, and is restricted to sites with gabbro soils. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: chamise chaparral (granitic chamise chaparral), northern mixed chaparral, northern mixed chaparral (granitic), southern mixed chaparral, and southern mixed chaparral (granitic) (see Table B-1B). There are 8,159 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 78 acres of potential habitat for this species could be impacted (36 acres by Planned Projects and 42 acres by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan is not anticipated to impact this species. However, should it be found within the Plan Area in the future, implementation could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and

Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. No conservation is currently provided for this species from implementation of the Plan.

9.12.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

9.13 Engelmann Oak (*Quercus engelmannii*)

USFWS: None

CDFG: None

CNPS List: 4

SDCWA Plan: Not Covered

Covered by MSCP: No

9.13.1 Background

Distribution, Abundance, and Trends. Engelmann oak occurs in Los Angeles, Orange, Riverside, and San Diego counties; on Santa Catalina Island (one tree potentially introduced); and in Baja California, Mexico (Reiser 2001). Engelmann oak occurs on Camp Pendleton, the Santa Margarita Mountains, Guejito Ranch, Rancho Cuca, near Mesa Grande, and in the vicinity of Alpine, Pamo Valley, Dulzura, Escondido, Japatul Valley, the Pala Mesa area, Lee Valley, eastern Ramona, and south of Bonsall and the San Luis Rey River. Isolated trees and small copses occur in the north-coastal San Diego County area of Encinitas and Rancho Santa Fe. Often these trees show some introgression with Nuttall's scrub oak (*Quercus dumosa*), and apparent hybrids with this species are often common nearby. This species is also reported from Buckman Springs, Rancho Bernardo, Banner, Lost Valley, San Felipe, and the Vulcan Mountains. Reports for Orange County are from Casper's Regional Park and Rancho Mission Viejo, and for the Santa Rosa Plateau in western Riverside County (Reiser 2001).

Engelmann oak occurs in canyons and on open slopes in foothill and coastal regions, where it is associated with Engelmann oak woodland, chaparral, and grassland. Larger oaks sometimes occur in vast savannah grasslands such as at Guejito (Fallbrook sandy loam), Ballena (Las Posas fine sandy loam), and near Santa Ysabel and Mesa Grande (Holland stony fine sandy loam, Crouch rocky coarse sandy loam). In the foothills, the Engelmann oak may also occur as a shrubby element within the chaparral. Typically in such a situation, the understory is relatively dense and the small oaks (even mature oaks in this habitat usually remain stunted) are concentrated on the periphery of watercourses or mesic slope aspects. Along larger creeks, live oak (*Quercus agrifolia*) usually predominates.

Threats and Limiting Factors. The primary threat to this species is loss of seedlings due to cattle and deer grazing. Additional threats include cumulative habitat loss and degradation, invasive and exotic plants, and edge effects.

Special Considerations. Engelmann oak is a deciduous tree. Engelmann oak populations in southern California are still relatively abundant and stable (Reiser 2001).

Oak trees should be avoided as mature trees take years to replace. This species is known to hybridize with other species of *Quercus*, making identification in some cases difficult.

9.13.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the SDNHM specimen records, there are three known populations of Engelmann oak within the Survey Area.

Probable Impact Zone (PIZ)

According to the SDNHM specimen records, there is one known population of Engelmann oak within the PIZ.

Preserve Area

Engelmann oak is present in low density in the coast live oak woodland along San Vicente Creek at the Rancho Cañada HMA (TNC 2006) and is known to occur within the Elfin Forest Reserve (Ogden 1995).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. This species is conserved at the Rancho Cañada HMA and the Elfin Forest Reserve.

In summary, Engelmann oak prefers canyons and open slopes in foothill and coastal regions associated with Engelmann oak woodland, chaparral, and grassland. Based on the preferred habitat, this species could occur in the Plan Area in the following subcommunities: Engelmann oak forest (dense Engelmann oak woodland), Engelmann oak woodland (open Engelmann oak woodland), and mixed oak woodland (see Table B-1B). There are two acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, this area could be impacted by Planned and Future Activities (see Table B-1A). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Given the species specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of Engelmann oak by conserving contiguous blocks of suitable habitat on which this species is known and has the potential to occur or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

9.13.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

9.14 San Miguel Savory (*Satureja chandleri*)

USFWS: None

CDFG: None

CNPS List: 1B

SDCWA Plan: Not Covered

Covered by MSCP: Yes

9.14.1 Background

Distribution, Abundance, and Trends. San Miguel savory occurs in Orange County, Riverside County, San Diego County, and Baja California, Mexico. San Miguel savory is known to occur at the upper elevations of San Miguel Mountain, the San Vicente Reservoir, the Barona area, Sandia Creek, McGinty Mountain, Otay Mountain, and surrounding areas of the Otay Reservoirs. An old biological survey report notes a site from east of the Santa Margarita Ecological Reserve near the Riverside County line, and in Jamul Mountains; from Orange County at Hot Springs Canyon in the vicinity of Murrieta; in Riverside County near Hemet (a site needing additional confirmation) and on Mesa de Burro on the Santa Rosa Plateau (Reiser 2001).

This small herbaceous shrub is found in chaparral and oak woodland, and may be restricted to gabbroic or metavolcanic derived soils. On McGinty Peak the soils are mapped as Las Posas stony fine sandy loam. San Miguel-Exchequer rocky silt loam is found on San Miguel Mountain. In mesic, shaded locations on the latter site, San Miguel savory becomes tall and slender. On nearby xeric slopes, it is typically stunted. Open, chamise-dominated slopes seem to be a preferred microhabitat in San Diego County and northern Baja California, Mexico, while Santa Ana Mountain reports note more mesic situations.

Threats and Limiting Factors. The primary threats to this species are orchard development, rural home construction, and lot clearance to deter fire damage. Additional threats to this species include cumulative habitat degradation, invasive and exotic plants, and edge effects.

Special Considerations. San Diego County populations of San Miguel savory are considered stable (Reiser 2001); however, it is restricted to regionally uncommon metavolcanic and gabbro soils.

9.14.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB and the SDNHM specimen records, there are three known populations of San Miguel savory within the Survey Area. There are known populations of San Miguel savory within the Survey Area at the following locations: northeast of San Vicente Reservoir (Attachment 1, Figure B-11).

Probable Impact Zone (PIZ)

According to the CNDDDB and the SDNHM specimen records, there are no known populations of San Miguel savory within the PIZ.

Preserve Area

This species is not currently known to occur on the Preserve Area; however, it has the potential to occur within San Miguel HMA and in the Rancho Cañada HMA due to the presence of suitable habitat and nearby locations (Merkel 2004; State of California 2007b; SDNHM 2008; Attachment 1, Figure B-15).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan conditions for coverage. This species has the potential to occur within the Preserve Area.

In summary, San Miguel savory prefers chaparral and oak woodland, and may be restricted to gabbroic or metavolcanic derived soils. Based on the preferred habitat, this species could occur in the Plan Area in chaparral, chaparral montane/trans-montane, oak woodland and forest, and the following subcommunities: northern mixed chaparral (mafic) and southern mixed chaparral (mafic) (see Table B-1B). There are 9,312 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 135 acres of potential habitat for this species could be impacted (62 acres by Planned Projects and 73 acres by Future Projects and O&M Activities). The Plan provides 130 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. Implementation of the Water Authority Plan could impact this species through direct loss of habitat and other indirect impacts as a result of disturbance from Planned and Future Projects and O&M Activities. Given the species specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct impacts include permanent loss of habitat due to project construction and temporary loss of habitat due to staging for construction areas

and Covered Activities. Potential indirect impacts would result from encroachment of non-native plant species.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of San Miguel savory in the Plan Area by conserving contiguous blocks of suitable habitat on which this species has the potential to occur or contributing funds to other regional conservation efforts or species specific management programs. In addition, protection for individuals and habitat is provided by the Plan conditions for coverage for this species.

9.14.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Prior to any impacts to this species, the Water Authority shall implement (with concurrence from the Wildlife Agencies) one of the following:
 - a. Survey the Preserve Area to determine presence of San Miguel savory. The extent of all newly discovered populations will be mapped and an estimate of the number of individuals in each population will be made. Once San Miguel savory has been mapped in the Preserve Area, the occupied habitat may be used as mitigation credits for proposed impacts to the species. All impacts to this species will be mitigated with occupied habitat credits.
 - b. Acquire habitat, or mitigation credits within an existing Wildlife Agency-approved mitigation bank, with known species occurrences or the potential to support the species in suitable habitat¹. Suitable habitat should have enhancement or restoration potential, be biologically viable for the species' persistence, and be associated with a Wildlife Agency-approved restoration program. Such habitat must be added to the Plan's Preserve Area and/or otherwise managed and monitored in perpetuity consistent with this Plan. If the Water Authority chooses this mitigation option, it may comply by providing habitat based mitigation (consistent with ratios provided in Tables 6-6 and 6-7) with known San Miguel savory locations.

- c. Develop a biologically superior conservation alternative for the species within appropriate locations within the Plan Area, including, but not limited to, restoration and/or enhancement of habitat, contribution of funds to other regional conservation efforts or species-specific management programs. Restoration or enhancement sites shall be managed and monitored in perpetuity consistent with this Plan.

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10.0 Non-Covered Reptiles

10.1 Two-striped Gartersnake (*Thamnophis hammondi*)

USFWS: None

CDFG: Species of Special Concern

SDCWA Plan: Not Covered

Covered by MSCP: No

10.1.1 Background

Distribution, Abundance, and Trends. The two-striped gartersnake is found from the southeastern slope of the Pacific Coast Range and the San Joaquin Valley, south into Baja California, Mexico. It is also found on Santa Catalina Island. This active, diurnal snake is reported from a variety of locales in the foothills ringing the western basin of Riverside County, south into the coastal plains and foothills of San Diego County.

These highly-aquatic snakes are found in the vicinity of creeks, rivers, vernal pools, and freshwater marshes. They are occasionally found in stock ponds, and in the spring frequent vernal pools and adjacent mesic areas (C. Reiser, pers. obs.). Peripheral habitats can include arid chaparral, sage scrub, and woodlands; but there is usually at least a seasonal source of water nearby.

Two-striped gartersnakes hibernate during the winter, but may occasionally be out foraging when warmer winter temperatures prevail. Prey items include fish, fish eggs, tadpoles, small mammals, and earthworms. Two-striped gartersnakes mate in March and bear from 1 to 25 live young in late summer (Jennings and Hayes 1994).

Threats and Limiting Factors. Once common in southern California; at present, this gartersnake is declining due to wetland habitat disturbance/loss. The two-striped gartersnake is reportedly no longer present in approximately 40 percent of its historic range, and is now only common in eastern San Diego County (Jennings and Hayes 1994). The reasons for this species' decline may vary depending upon region, but include the following: habitat loss to urban development and flood control projects; habitat modification due to grazing; loss of preferred prey including a decline in native amphibian species; predation by bullfrogs, non-native fish, and feral pigs; and death from off-road vehicles and related human activities. The presence of bullfrogs in breeding habitat is also a threat to this species.

10.1.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, two-striped gartersnake is known from 7 occurrences within the Survey Area. There are known locations of two-striped gartersnake within the Survey Area at the following locales: along the Santa Margarita River, west of Temecula (Attachment 1, B-3), on San Marcos Creek, north of Encinitas (Attachment 1, B-8), east of Miramar (Attachment 1, B-12), and near the Lower Otay Reservoir (Attachment 1, B-16).

Probable Impact Zone (PIZ)

The CNDDDB lists 3 occurrences of two-striped gartersnake within the PIZ, in Rancho Peñasquitos, north of the Montaña Mirador property (Attachment 1, B-10).

Preserve Area

The two-striped gartersnake is known to occur at San Miguel HMA (Merkel and Associates 1997) and the Myers property (EDAW 2004) and has a high potential to occur at Rancho Cañada HMA (TNC 2006), the Elfin Forest Reserve (Ogden 1995), and the Tijuana River Valley HMA (Attachment 1, Figure B-18; State of California 2007c).

Conservation and Take Levels. Impacts to populations of this species will be avoided or minimized in accordance with the Vernal Pool Protection Policy and the Plan Conditions for Coverage. There are no population estimates for this species within the Plan Area; no surveys have been conducted to date. Suitable habitat for the two-striped gartersnake is present at San Miguel HMA, the Myers property, Rancho Cañada HMA, the Elfin Forest Reserve, and the Tijuana River Valley HMA.

In summary, two-striped garter snake prefers creeks, rivers, vernal pools, and freshwater marshes. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage-scrub, sage-scrub montane/trans-montane, riparian, wetland, and the following subcommunities: freshwater meadow or march (see Table B-1B). There are 10,976 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 219 acres of potential habitat for this species could be impacted (109 acres by Planned Projects and 110 acres by Future Projects and O&M Activities). The Plan provides 565 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Potential Impacts to the Species. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned

and Future Projects and O&M Activities within riparian areas, including, but not limited to, stream crossings for Arizona crossings and access roads, and draindowns. Given the species-specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects in riparian habitat include permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. No new construction projects are proposed within vernal pool habitat in the Plan Area, the majority of direct and indirect impacts would be temporary in nature resulting from Covered Activities. Potential indirect effects would result from restoration activities, alteration of hydrology, encroachment of non-native plant species, and weed abatement.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of two-striped gartersnake in the Plan Area by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving contiguous blocks of suitable habitat on which this species is known to occur. In addition, protection for individuals and habitat is provided by the Plan Conditions for Coverage for this species.

10.1.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. Implement general Conditions for Coverage (see Section 2.1).
2. Maintain adequate rocky, downed woody, and other organic debris in riparian areas.
3. If work must be done in occupied two-striped gartersnake habitat, snakes would be moved from the construction site by an Environmental Surveyor to the closest safe, suitable habitat in the area. Exclusionary fences may be used to keep snakes out of construction areas. These fences would be placed and monitored daily.
4. Bullfrogs observed during pre-activity surveys that prey upon or displace two-striped gartersnake would be removed from suitable habitat areas, if possible.

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11.0 Non-Covered Birds

11.1 California Brown Pelican (*Pelecanus occidentalis californicus*)

USFWS: Endangered

CDFG: Endangered, California Fully Protected

SDCWA: Not Covered

Covered by MSCP: No

11.1.1 Background

Distribution, Abundance, and Trends. The California brown pelican occurs along the Pacific coast from British Columbia south to Mexico. California brown pelicans are common in northern California from June to November. Late in November, birds migrate to breeding colonies on Anacapa Island, which is the only nesting site within the U.S., and the Los Coronados Islands in Baja California, Mexico. Beginning in mid-May, California brown pelicans disperse along the entire California coast, including southern California.

The California brown pelican is usually restricted to open ocean, coastal strand, harbors, bays, and estuaries. Within the Plan Area, pelicans forage uncommonly at several coastal lakes including at the Sweetwater Reservoir. However, most pelican activity is concentrated along the immediate Pacific coastline in areas generally outside of Plan Area. During the breeding season, California brown pelicans spend the majority of their time within 12 miles of the nest (Briggs et al. 1981), while throughout the rest of the year they may wander much greater distances.

The California brown pelican forages primarily during early morning, late afternoon, or when the tide is high. Its diet consists almost entirely of fish and crustaceans. It dives for fish swimming near the surface. Clutch size is typically two or three eggs, and young are tended by both parents.

Threats and Limiting Factors. The local California brown pelican population has experienced substantial fluctuations over the last century. The population had severely declined by the late 1960s due to the widespread use of dichloro-diphenyl-trichloroethane (DDT) pesticide. The population has subsequently recovered significantly in since with the banning of this pesticide in the U.S. California brown pelicans are vulnerable to oil spills, competition with anchovy fisheries (anchovy is a primary pelican

food species), and human disturbance at roosting sites (Zeiner et al. 1990). These issues are not anticipated within the Plan Area.

Special Considerations. Roost areas need to have minimal human disturbance. Toxicity testing to check for bioaccumulation of toxins may be needed if significant population declines are detected.

11.1.2 Conservation Analysis

Presence within Plan Area and HMA.

Survey area

This species is not known to occur within the Survey Area. The brown pelican is expected to occur only in the vicinity of the Encinitas Power Plant in Carlsbad. Existing Water Authority facilities within the Plan Area are outside of the coastal range of this species.

Probable Impact Zone (PIZ)

This species is not known or expected to occur within the PIZ.

Preserve Area

This species is not known or expected to occur on the Preserve Area.

Conservation and Take Levels. This species is not known or expected to occur on the Preserve Area. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Narrow Endemic Policy. There will be no direct take of brown pelicans or brown pelican nests. No direct impact to coastal habitat for this species is anticipated.

In summary, the preferred habitat for California brown pelican is open ocean, coastal strand, harbors, bays, and estuaries. Based on the preferred habitat, this species could occur in the Plan Area in aquatic freshwater, aquatic marine, and the following subcommunities: open beach, southern foredunes, saltpan/mudflats, and southern coastal salt marsh (see Table B-1B). There are 1,450 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, two acres of potential habitat for this species could be impacted (see Table B-1A). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring

additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the California brown pelican by allowing for continued foraging and sheltering in the Plan Area by providing protection for individuals, nests, and habitat as described by the Plan's Conditions for Coverage.

11.1.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

11.2 White-tailed Kite (*Elanus leucurus*)

USFWS: None

CDFG: California Fully Protected

SDCWA: Not Covered

Covered by MSCP: No

11.2.1 Background

Distribution, Abundance, and Trends. White-tailed kites have a breeding range throughout California, Mexico, and Central America as far south as Panama. Other smaller breeding populations have been found in southwest Washington, west Oregon, south Texas, and south Florida. Kites typically forage in broad open fields and grasslands, often in the vicinity of their roosting and nesting sites in nearby riparian and oak woodlands. They are generally found in the lower foothills and valleys and along the southern California coast, but occasionally are seen in the mountains and in irrigated areas of the desert (e.g., Imperial Valley). The white-tailed kite has seen substantial population fluctuations in southern California over the last 120 years. It was so uncommon in the region between 1892 and 1920 (a period of active egg collection) that not a single definite record of a breeding kite is noted locally. Stephens considered it almost extirpated from San Diego County in 1919 (Unitt 2004). More recently, it has been regularly observed hunting in larger tracts of non-native grasslands and in sparsely vegetated inland valleys. Additionally, it is uncommon for the white-tailed kite to nest in the region. It is still regularly observed hover-hunting over agricultural or fallow fields on Otay Mesa and in the Tijuana River Valley, and over ranch-lands in the foothills such as in Ramona, Pamo Valley, Carlsbad, and interior Camp Pendleton. There are no known significant breeding or roosting populations within the Plan Area in Riverside County (RCIP 2003).

This species preys primarily on voles and small rodents. Home range for this raptor may be smaller than most of the other resident raptors; a foraging area of 1.9 miles square is reported from one study (Warner and Rudd 1975). When breeding, its hunting range may extend as little as a half mile from the nest site (Hawbecker 1942). Nests are generally situated in densely canopied trees. Kites have an average clutch of 4 to 5 eggs within the months of January to July (Unitt 2004). Large accumulations of kites (i.e., 20 to 50) are uncommonly found in communal winter roosts in single trees.

Threats and Limiting Factors. This species nests in riparian woodland, oak groves, and orchards and forages in grasslands, disturbed areas, and agricultural lands. Urbanization of these habitats is the primary threat to the kite in San Diego County. Drying of the climate, reduction in the vole population, and the loss of nesting trees may also be a threat (Rahn et al. 2008).

Species Considerations. Site fidelity is low for this species; therefore, specifying exact nest sites in one or a few years is an overly limited view of the species breeding distribution. Species distribution in San Diego County is sparse and should not be restricted to known nesting sites and given that the species is not formally listed, CNDDDB records for this species are expected to be incomplete (Rahn et al. 2008).

11.2.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, white-tailed kite has been documented from 2 locations: east of Carlsbad (Attachment 1, B-6) and southwest of Lake Skinner (Attachment 1, B-16). In addition, this species has been observed within the Survey Area nesting in eucalyptus trees near the Second Aqueduct at Twin Oaks Valley Road (D. Mayer, pers. com., 2008). This species is expected to forage and breed within the Survey Area where it occurs adjacent to suitable riparian habitat.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known to occur within the PIZ. As it has been observed adjacent to the PIZ, it is likely that white-tailed kite may occupy suitable habitat within the PIZ.

Preserve Area

The white-tailed kite has been observed at the San Miguel HMA (Merkel and Associates 1997) and the Rancho Cañada HMA (TNC 2006) and is known to occur at the Elfin Forest Reserve (Ogden 1995).

Conservation and Take Levels. Suitable habitat for the white-tailed kite is present at within the Preserve Area at San Miguel HMA, Rancho Cañada HMA, and the Elfin Forest Reserve. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage.

The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within riparian and grassland habitat, including, but not limited to, construction and use of Arizona crossings and access roads, and draindowns. Given the species-specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential

indirect effects would result from restoration activities, encroachment of non-native plant species, and weed abatement, construction noise and degradation of foraging habitat.

In summary, the preferred habitat for white-tailed kite is broad open fields and grasslands, often in the vicinity of their roosting and nesting sites in nearby riparian and oak woodland. Based on the preferred habitat, this species could occur in the Plan Area in coniferous forest, grasslands, oak woodland and forest, and the following subcommunity: general agriculture (see Table B-1B). There are 9,075 acres of these vegetation communities and subcommunity within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 49 acres of potential habitat for this species could be impacted (19 acres by Planned Projects and 30 acres by Future Projects and O&M Activities). The Plan provides 16 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the white-tailed kite in the Plan Area by allowing for the continued breeding, foraging, and sheltering by conserving large, contiguous blocks of suitable habitat on which the species is known to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

11.2.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Restrict human activities within an appropriate buffer distance for this species around occupied nesting sites during the raptor breeding season (see Section 2.3 for Avian Breeding Season Policy).
 - a. Direct take of individuals and destruction of nests within an active territory is not allowed.

11.3 Northern Harrier (*Circus cyaneus*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Not Covered

Covered by MSCP: Yes

11.3.1 Background

Distribution, Abundance, and Trends. The northern harrier breeds in Canada and most of the U.S., but is somewhat nomadic with respect to breeding locations. It winters southward into Central America. San Diego County is at the southwestern limit of this species' breeding range. Post-breeding harriers from the north augment the resident population during winter (Unitt 2004). Documented northern harrier breeding locations are sparse within the Plan Area, though foraging observations are frequent and widespread in lagoons and more extensive blocks of undeveloped coastal lands. Potential breeding and foraging habitat for the harrier includes marshes, grasslands, agricultural fields, and open Diegan coastal sage scrub. Suitable marsh and grassland habitats occur adjacent to Camp Pendleton, agriculture fields are present in San Luis Rey River valley, and relatively open terrain occurs in the Tijuana River and Otay River valleys. Additionally, the lagoons along the coast are considered critical areas. In Riverside County, the northern harrier is known from several locations, including the Lake Skinner-Diamond Valley area (RCIP 2003).

Recorded egg dates for the harrier in San Diego County are April 5 to May 11 and clutch size averages five eggs. While females incubate, males provide food. Displaying pairs (indicating courting behaviors) have been observed in mid-February (Unitt 2004). The northern harrier's diet includes numerous small mammals (e.g., voles), birds, and reptiles, with many prey items captured using a distinctive low-flying foraging behavior that relies on surprise. In one Wisconsin study relying on radio-collared birds, the breeding home range of tagged pairs was approximately 2,200 acres (Hamerstrom and Wilde 1973).

Threats and Limiting Factors. The northern harrier is disappearing as a breeding resident from the coastal lowlands of San Diego and Riverside counties due to alteration of nesting and foraging habitats, detrimental agricultural activity during the breeding season, and reproductive failure due to human disturbance at nest sites, predation, and environmental contaminants (Zeiner et al. 1990).

Special Considerations. Northern harrier nests are built on the ground, often on raised mounds of dirt or clumps of vegetation. Human disturbance of nest sites should be minimized.

11.3.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, northern harrier has been documented from 2 locations; south of Lake Skinner (Attachment 1, B-2). In addition, the northern harrier is expected to occur throughout the Survey Area in suitable open foraging habitat.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known to occur within the PIZ. As it has been observed adjacent to the PIZ, it is likely that northern harrier may occupy suitable habitat within the PIZ.

Preserve Area

Breeding has been confirmed in the San Diego NWR adjacent to the Sweetwater Reservoir (J. Martin, USFWS, pers. comm. 2007). The northern harrier was commonly observed in low numbers at the San Miguel HMA, suggesting that local breeding occurs there (Merkel and Associates 1997).

Conservation and Take Levels. The northern harrier is known to occur at the San Miguel HMA. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of northern harrier individuals or northern harrier nests.

The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities within upland areas. Given the species specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects include permanent loss of habitat due to project construction and temporary loss of habitat due to alteration of hydrologic flow of surface water and to staging for construction areas and Covered Activities. Potential indirect effects would result from human disturbance at nest sites, reductions in the water available to marshlands, introduction of pesticides or other contaminants in known breeding habitat, and facilitating the presence of introduced predators into such areas.

In summary, the preferred habitat for northern harrier is marshes, grasslands, agricultural fields, and open Diegan coastal sage scrub. There are 17,435 acres of these vegetation community and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 202 acres of potential habitat for this species could be impacted (102 acres by Planned Projects and 100 acres by Future Projects and O&M Activities as shown in Table B-1A).

The Plan provides nine acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to allow for continued breeding, foraging, and sheltering by northern harriers in the Plan Area by providing large, contiguous blocks of mitigation lands on which the northern harrier is known to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

11.3.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Restrict human activities within an appropriate buffer distance for this species around occupied nesting sites during the raptor breeding season (see Section 2.3 for Avian Breeding Season Policy).
4. Direct take of individuals and destruction of nests within an active territory is not allowed.

11.4 Golden Eagle (*Aquila chrysaetos*)

USFWS: Bald Eagle Protection Act

CDFG: Species of Special Concern; Fully Protected

SDCWA: Not Covered

Covered by MSCP: Yes

11.4.1 Background

Distribution, Abundance, and Trends. Golden eagles are distributed throughout western North America, eastern Canada, and the northeastern U.S., and are year-round residents in San Diego County. Active nesting pairs occur within the Plan Area near Gregory Mountain, eastern San Pasqual Valley, San Vicente Reservoir, Barona, Whale Peak, and San Miguel Mountain. Historically this species was widespread near the coast, presently golden eagle observations are only scattered throughout the Plan Area. There are currently only four known nest sites west of I-15: three in Camp Pendleton and one at Lake Hodges (Unitt 2004).

Golden eagles forage in extensive areas of open sage scrub, grasslands, and recently burned chaparral. Suitable foraging habitat within the Plan Area includes vast expanses of foothill habitat and grasslands in Ramona and the Otay River valley. The diet of golden eagles includes a predominance of rabbits and other mid-sized to small mammals; it occasionally eats carrion. Foraging territory sizes vary substantially throughout the western U.S., ranging from nine square miles in Utah to 48 square miles in northern California (Smith and Murphy 1973). Golden eagles nest on cliffs and in large trees capable of supporting a large nesting platform. Egg dates for San Diego County are February 2 to late April, with a mean date of March 4 (Unitt 2004).

Threats and Limiting Factors. Historically, the greatest threat to golden eagles has been loss of foraging habitat. Other threats include human disturbance at active nest sites, shooting, agriculture, secondary rodenticide poisoning by eating poisoned prey, and electrocution on power poles (Unitt 2004). Recreational rock climbing and secondary poisoning as a result of rodent control baiting are also known impacts to golden eagles.

Special Considerations. Eagles have high fidelity to previously used nest sites, but typically have several alternative nest sites within their territory; therefore, although any one nest may not be active at any given time, it may still be an important component of an active territory. This species requires extensive areas of potential foraging habitat. The size of the home range for this species is related to prey density and availability, and openness of terrain, but ranges from 36 to 48 square miles in California (Dixon 1937; Smith and Murphy 1973). Human disturbance of nest sites should be avoided.

11.4.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are 2 known occurrences of golden eagle within the Survey Area: near the community of Pala (Attachment 1, B-4). Additionally, it is likely to forage throughout the Survey Area along the aqueduct system in suitable habitat.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known to occur within the PIZ. It is likely, however, that golden eagle may forage in suitable habitat within the PIZ.

Preserve Area

Historically, golden eagles nested at the former San Miguel Ranch (Merkel and Associates 1997) and are presumed to still be nesting on Mt. Miguel (Rahn et al. 2008). This species has also been observed foraging at the Crestridge HMA (PSBS 1994) and has the potential to occur at the Elfin Forest Reserve (Ogden 1995).

Conservation and Take Levels. Suitable foraging habitat for the golden eagle is present at two mitigation banks: San Miguel HMA, Crestridge HMA, and the Elfin Forest Reserve. No population data for this species within the Survey Area is currently available. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Given the species-specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects include construction noise and degradation of foraging habitat.

In summary, the preferred habitat for golden eagle is extensive areas of open sage scrub, grasslands, and recently burned chaparral. Based on the preferred habitat, this species could occur in the Plan Area in coastal sage-scrub and grasslands (see Table B-1B). There are 16,070 acres of these vegetation communities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 195 acres of potential habitat for this species could be impacted (97 acres by Planned Projects and 98 acres by Future Projects and O&M Activities). The Plan provides 526 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the golden eagle by allowing for continued foraging and sheltering in the Plan Area and conserving large, contiguous blocks of suitable habitat on which the species is known or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

11.4.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Restrict human activities within an appropriate buffer distance around occupied nesting sites during the raptor breeding season (see Section 2.3 for Avian Breeding Season Policy).
4. Direct take of individuals and destruction of nests within an active territory is not allowed.

11.5 Bald Eagle (*Haliaeetus leucocephalus*)

USFWS: De-Listed, Bald Eagle Protection Act

CDFG: Endangered, Fully Protected

SDCWA: Not Covered

Covered by MSCP: Yes

11.5.1 Background

Distribution, Abundance, and Trends. Bald eagles were historically abundant in aquatic habitats throughout North America from Canada and Alaska, south to the Pacific States and Florida. Present breeding distribution is probably similar to historic breeding range, with major changes in the twentieth century such as the loss and gain of breeding habitat (Buehler 2000). In the west, extensive breeding populations are known from northern Oregon, California, and Washington. The majority of the bald eagle's wintering range occurs along major river systems in Oregon and California, the Pacific Northwest, Chesapeake Bay, and Klamath Basin (Millsap 1986). The bald eagle is a rare annual winter visitor to mountain lakes in San Diego County, particularly near Lake Henshaw where nesting was documented in 2004 (Unitt 2004; Rahn et al. 2008). Throughout its range, the species has shown tremendous growth since the onset of reintroduction programs, a ban on eagle hunting, and especially the ban of DDT in the 1970s.

The diet of bald eagles includes a predominance of live fish, although the species is known to use carrion of fish, birds, and mammals. Prey is obtained by direct capture, scavenging, and taking food from other species. For live prey capture, eagles soar to locate a food item and swoop down to capture the prey with one or both feet. Foraging territory sizes vary depending on availability of prey items.

Threats and Limiting Factors. The decline in the number of bald eagles has been attributed to habitat destruction and DDT poisoning. The successful management of the habitat and reduction in the use of such harmful pesticides as DDT have allowed for an increase in bald eagle numbers. Additional threats include shooting, human disturbance at nest sites, loss of nest trees, loss of open water due to human activities, power line electrocution, and reproductive failure from DDT poisoning (Anderson and Hickey 1970; Buehler et al. 1992). The U.S. Fish and Wildlife Service has delisted the bald eagle due to the recent increase in their numbers (USFWS 2007d).

Special Considerations. Bald eagles have high fidelity to previously used nest sites, but typically have several alternative nest sites within their territory. Additionally, because bald eagles are known to take small mammals or scavenge on carrion when available, the potential for secondary poisoning should be considered.

11.5.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there are 2 known occurrences of bald eagle within the Survey Area: west of Lake Skinner (Attachment 1, B-2). Other reservoirs within the Plan Area may attract this species in winter. Additionally, it is likely to forage throughout the Survey Area along the aqueduct system in suitable habitat.

Probable Impact Zone (PIZ)

According to the CNDDDB, there are no known occurrences of the bald eagle in the PIZ.

Preserve Area

Bald eagles are not expected to occur in the Preserve Area.

Conservation and Take Levels. No population data for this species within the Survey Area is currently available. Potential foraging habitat for the bald eagle is present at the Water Authority reservoirs; however, no foraging habitat is present within Preserve Areas. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects include construction noise and degradation of foraging habitat.

In summary, the preferred habitat for bald eagle in San Diego County is mountain lakes. Based on the preferred habitat, this species could occur in the Plan Area in open freshwater (see Table B-1B). There are 1,450 acres of this vegetation community within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 2 acres of potential habitat for this species could be impacted (1 acre by Planned Projects and 1 acre by Future Projects and O&M Activities). Where the existing Preserve Area does not have sufficient credits of suitable and/or occupied habitat, the Water Authority would obtain the necessary credits or additional habitat to satisfy the vegetation community (and Covered Species) obligations by one of the following methods: obtaining credits from an approved conservation/wetland bank, acquiring additional habitat acreage to add to a Preserve Area, or providing a biologically superior alternative that is acceptable to the Wildlife Agencies.

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the bald eagle by allowing for continued foraging and sheltering in the Plan Area and conserving large, contiguous blocks of suitable habitat on which the species is known or has the potential to forage by providing water bodies as winter foraging habitat. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

11.5.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).

11.6 Cooper's Hawk (*Accipiter cooperii*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Not Covered

Covered by MSCP: Yes

11.6.1 Background

Distribution, Abundance, and Trends. The Cooper's hawk is distributed throughout much of the U.S. from southern Canada to northern Mexico. Breeding pairs now use suburban exotic woodlands on an increasing basis as foraging habitat, but historically required undisturbed well-wooded native habitat for nesting. Moderate to substantial numbers of Cooper's hawks are resident within coastal slope drainages throughout the Plan Area (Unitt 2004). In addition, some winter migrants move into the region from late September and depart by April (Unitt 2004).

Nests are typically in deciduous trees and conifers, but may also be found in oaks, eucalyptus, and avocados. Size of home ranges may vary substantially in different regions of the country and within different woodland habitats. In one study (Craighead and Craighead 1956), these included areas as small as 18 acres and as large as 1,312 acres. Males will defend an area approximately 1,000 feet around a potential nest site (Jackman and Scott 1975). Reported egg dates for San Diego County are late March to mid-June, although laying may occur as early as the end of January (Unitt 2004). Clutch size is usually four to five. This hawk often feeds on songbirds, and its presence may suppress other avian activities throughout a local area.

Threats and Limiting Factors. Habitat loss due to urban construction, pesticide contamination, and human disturbance at the nest site limit this species' population sizes. In urban areas, collisions with windows are also a significant source of mortality (Unitt 2004).

Special Considerations. The historical sensitivity of this species in San Diego County has been substantially overstated as evidenced by recent San Diego County bird atlas information (Unitt 2004), indicating the species is breeding at many locations and using exotic urban woodlands for nesting and hunting.

11.6.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, there is 1 known occurrences of the Cooper's hawk within the Survey Area.

According to the CNDDDB, there are no known occurrences of the Cooper's hawk within the PIZ.

Preserve Area

The Cooper's hawk has been observed at San Miguel HMA (Merkel and Associates 1997), Rancho Cañada HMA (TNC 2006), Crestridge HMA (PSBS 1994), and the Montaña Mirador property (City of San Diego 2004).

Conservation and Take Levels. No population data within the Survey Area is available. Suitable habitat for the Cooper's hawk is present and conserved at four properties within the Preserve Area: San Miguel HMA, Rancho Cañada HMA, Crestridge HMA, and the Montaña Mirador property. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Management. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Given the species-specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects include construction noise and tree trimming activities.

In summary, the preferred habitat for Cooper's hawk is undisturbed well-wooded native habitat. Based on the preferred habitat, this species could occur in the Plan Area in oak woodland and forest, exotic landscapes, and the following communities: southern interior cypress forest, torrey pine forest, and tamarisk scrub (see Table B-1B). There are 993 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 16 acres of potential habitat for this species could be impacted (6 acres by Planned Projects and 10 acres by Future Projects and O&M Activities). The Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the Cooper's hawk by allowing for

continued foraging and sheltering in the Plan Area and conserving large, contiguous blocks of suitable habitat on which the species is known or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

11.6.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Restrict human activities within an appropriate buffer distance around occupied nesting sites during the raptor breeding season (see Section 2.3 for Avian Breeding Season Policy).
4. Direct take of individuals and destruction of nests within an active territory is not allowed.

11.7 American Peregrine Falcon (*Falco peregrinus anatum*)

USFWS: Formerly Endangered, Now Delisted

CDFG: Endangered, Fully Protected

SDCWA: Not Covered

Covered by MSCP: Yes

11.7.1 Background

Distribution, Abundance, and Trends. The peregrine falcon can be found year-round in most of the western U.S. (National Geographic Society 1987). The peregrine falcon is most often seen as a rare fall and winter and casual spring visitor in San Diego County. Peregrine falcons occur most often in coastal areas, although they are sometimes found away from the coast, particularly near lakes. Breeding pairs have been detected in San Diego Bay, National City, Point Loma, Ysidora Gorge along the Santa Margarita River, and downtown on a ledge at the U.S. Grant Hotel (Unitt 2004). Falcons have been detected in and adjacent to the Plan Area, including Batiquitos Lagoon, Lake Hodges, San Pasqual Valley, San Diego Bay, and Otay Valley (Unitt 2004).

In 1981, researchers estimated the breeding population in California to be 39 pairs. Breeding and fledging is from early March to late August, with typical clutches consisting of three to seven eggs (State of California 2006a). Nesting sites are typically located on high cliffs, in trees, or on man-made structures. The same nest site may be used for many years. Peregrine falcons forage on a variety of birds including pigeons, ducks, grebes, coots, sandpipers, other raptors, and songbirds. They will also forage on small mammals, fish, and insects. The decline of the peregrine falcon is attributed to widespread use of the pesticide DDT, which caused the birds to lay eggs too thin to withstand incubation. DDT was banned in the early 1970s and a recovery program for the species began soon after.

Threats and Limiting Factors. Historically, bioaccumulation of pesticides resulted in eggshell thinning and significant population declines in this species during the middle of the last century. Reduction or banning of the harmful pesticides has significantly reduced this threat, and the American peregrine falcon is continuing to recover from the effects of pesticide contamination (Wootton and Bell 1992). Disturbance of nest sites by humans continues to be a threat to this subspecies, and collisions with utility wires may also be a repetitive problem.

Special Considerations. American peregrine falcons frequently nest on cliff faces, but have also adapted to nest on building ledges, towers, and similar tall structures. The abundance in urban areas of prey items, such as rock dove, has no doubt promoted

potential nesting in urban areas (e.g., the Coronado Bridge). American peregrine falcons are susceptible to the effects of bioaccumulation of toxins due to their high trophic position, and the fact they prey almost exclusively on birds. Many of their prey species are neo-tropical migrants that frequently carry bio-toxins acquired while wintering in Latin America. Bioaccumulation of DDT was a primary cause of historical population declines.

11.7.2 Conservation Analysis

Presence within Plan Area and Preserve Area.

Survey area

According to the CNDDDB, the peregrine falcon is known to occur at 1 location within the Survey Area.

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known or expected to occur within the PIZ.

Preserve Area

The peregrine falcon is known to occur at the San Miguel HMA (Merkel and Associates 1997).

Conservation and Take Levels. No population data within the Survey Area is available. Suitable foraging habitat will be conserved for this species at the San Miguel HMA. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Conditions for Coverage. There will be no direct take of peregrine falcon individuals or nests. Covered Activities could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Given the species-specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects include construction noise and degradation of foraging habitat.

In summary, the preferred habitat for American peregrine falcon is in areas with high cliffs, trees, or man-made structures. Based on the preferred habitat, this species could occur in the Plan Area in coniferous forest, oak woodland and forest, and the following communities: nonnative grasslands and general agriculture (see Table B-1B). There are 8,057 acres of these vegetation subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 49 acres of potential habitat for this species could be impacted (19 acres by Planned

Projects and 30 acres by Future Projects and O&M Activities). The Plan provides eight acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the American peregrine falcon by allowing for continued foraging and sheltering in the Plan Area and conserving large, contiguous blocks of suitable habitat on which the species is known or has the potential to forage by providing water bodies as winter foraging habitat. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

11.7.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Restrict human activities within an appropriate buffer distance around occupied nesting sites during the raptor breeding season (see Section 2.3 for Avian Breeding Season Policy).
4. Direct take of individuals and destruction of nests within an active territory is not allowed.

11.8 Long-eared Owl (*Asio otus*)

USFWS: None

CDFG: Species of Special Concern

SDCWA: Not Covered

Covered by MSCP: No

11.8.1 Background

Distribution, Abundance, and Trends. The North American range of the long-eared owl extends throughout southern Canada and southward across the U.S. into northern Mexico. The species is a rare resident of San Diego County woodlands and riparian forests. Nesting long-eared owls have been documented at Sycamore Canyon, Guajome Lake, and in the Tijuana River Valley, among other sites in San Diego County, and likely occur at a few sites in Camp Pendleton (Unitt 2004). Breeding was previously recorded sporadically at Tamarisk Grove in the Anza-Borrego Desert.

Long-eared owls forage primarily in open fields, fallow agricultural areas, and open rangeland. Preferred prey includes small mammals, such as pocket mice and kangaroo rates, small bird species, and to a lesser degree insects, amphibians and reptiles (Lewis 2005). Long-eared owls nest in abandoned nests of other species, including raptors and American crows, or in debris piles in willow and oak trees. Egg dates are from February 7 to May 4, with fledging between April 28 and June 10 (Unitt 2004).

Threats and Limiting Factors. Primary threats to this species include loss of nesting and foraging habitat, human disturbance of nest sites, light pollution, and competition with corvids for nest sites or nest predation by corvids (Bloom 1994). The county population would not be considered significant to the genetic makeup of the North American subspecies, but its rapid decrease in the face of equally rapid urbanization within the region is cause for concern. The species' site fidelity in the Plan Area is unclear and the efficacy of efforts to conserve and restore this species are unknown (Rahn et al. 2008).

Species Considerations. The long-eared owl is restricted to densely vegetated woodlands, generally mature riparian habitat or oak groves. Competition with great horned owls coupled with habitat degradation and human disturbance may play a role in the decline of this species. Like other owls, the species does not build a nest, but uses pre-built, unoccupied nests. Historically, many nests used by this species were built by the now extirpated Swainson's hawk (*Buteo swainsonii*) (Bloom 1994). The owl is now dependent on other raptors and corvids (e.g., common raven) for nest construction. The use of corvid nests has presented specific problems for this species. If ravens return to a nest when long-eared owls have preoccupied it, the owls may be harassed into giving up the nest, or their eggs or young may be preyed upon. The current rise in population of

corvids (i.e., crows and ravens) may have a significant effect on long-eared owl productivity (Bloom 1994).

The current distribution of this species is not well known. Long-eared owls are difficult to comprehensively survey and known nest sites may not be used consistently from year to year.

11.8.2 Conservation Analysis

Presence within the Plan Area and Preserve Area.

Survey area

According to the CNDDDB, the long-eared owl is not known to occur within the Survey Area. There are, however, historic nesting records of long-eared owls in the Survey Area adjacent to the aqueduct system, including Lakeside, Escondido, Sweetwater Reservoir, and the San Luis Rey River (Bloom 1994).

Probable Impact Zone (PIZ)

According to the CNDDDB, this species is not known or expected to occur within the PIZ.

Preserve Area

The long-eared owl has potential to occur at Rancho Cañada HMA due to the presence of suitable habitat and proximity to known locations on adjacent contiguous habitat (Haas 2007). The Tijuana River Valley HMA and San Luis Rey River HMA may provide suitable habitat; however, human disturbance may preclude owls from using the Tijuana River Valley (i.e., border patrol activities and border fence lighting) (Rahn et al. 2008).

Conservation and Take Levels. No population data within the Survey Area is available. There will be no direct take of long-eared owl individuals or nests. Potential habitat for the long-eared owl is present at the Rancho Cañada HMA and adjacent contiguous riparian and oak woodland habitat. Impacts to populations of this species will be avoided or minimized if identified within the Plan Area in accordance with the Plan Management. The proposed Plan could impact this species through direct loss of habitat and other indirect effects as a result of disturbance from Planned and Future Projects and O&M Activities. Given the species-specific management measures outlined in this Plan, impacts to this species are expected to be low. Potential direct effects include permanent loss of foraging habitat due to project construction and temporary loss of habitat due to staging for construction areas and Covered Activities. Potential indirect effects that would degrade long-eared owl habitat or disturb breeding activities include rodent poisoning programs, management for other sensitive species, human disturbance, vehicular activity, and presence of introduced predators.

In summary, the preferred habitat for long-eared owl is woodlands and riparian forests. Based on the preferred habitat, this species could occur in the Plan Area in coniferous forest, oak woodland and forest, riparian, and the following subcommunities: southern interior cypress forest, black oak forest, black oak woodland, coast live oak forest, coast live oak woodland, Engelmann oak forest (dense Engelmann oak woodland), Engelmann oak woodland (open Engelmann oak woodland), nonnative grasslands, general agriculture, and eucalyptus/non-native woodland (see Table B-1B). There are 9,007 acres of these vegetation communities and subcommunities within the PIZ. Based on the impacts to vegetation communities from Covered Activities estimated to occur within the PIZ, 92 acres of potential habitat for this species could be impacted (40 acres by Planned Projects and 52 acres by Future Projects and O&M Activities). The Plan provides 33 acres of available habitat in the existing Preserve Area that may be used as mitigation for impacts to this species (see Table 6-8 in the Plan).

Effects on Population Viability and Species Recovery. Implementation of the Plan is expected to contribute to the regional conservation of the long-eared owl by allowing for continued breeding, foraging, and sheltering in the Plan Area and conserving large, contiguous blocks of mitigation lands on which this species is known to occur or has the potential to occur. In addition, protection for individuals, nests, and habitat is provided by the Plan's Conditions for Coverage for this species.

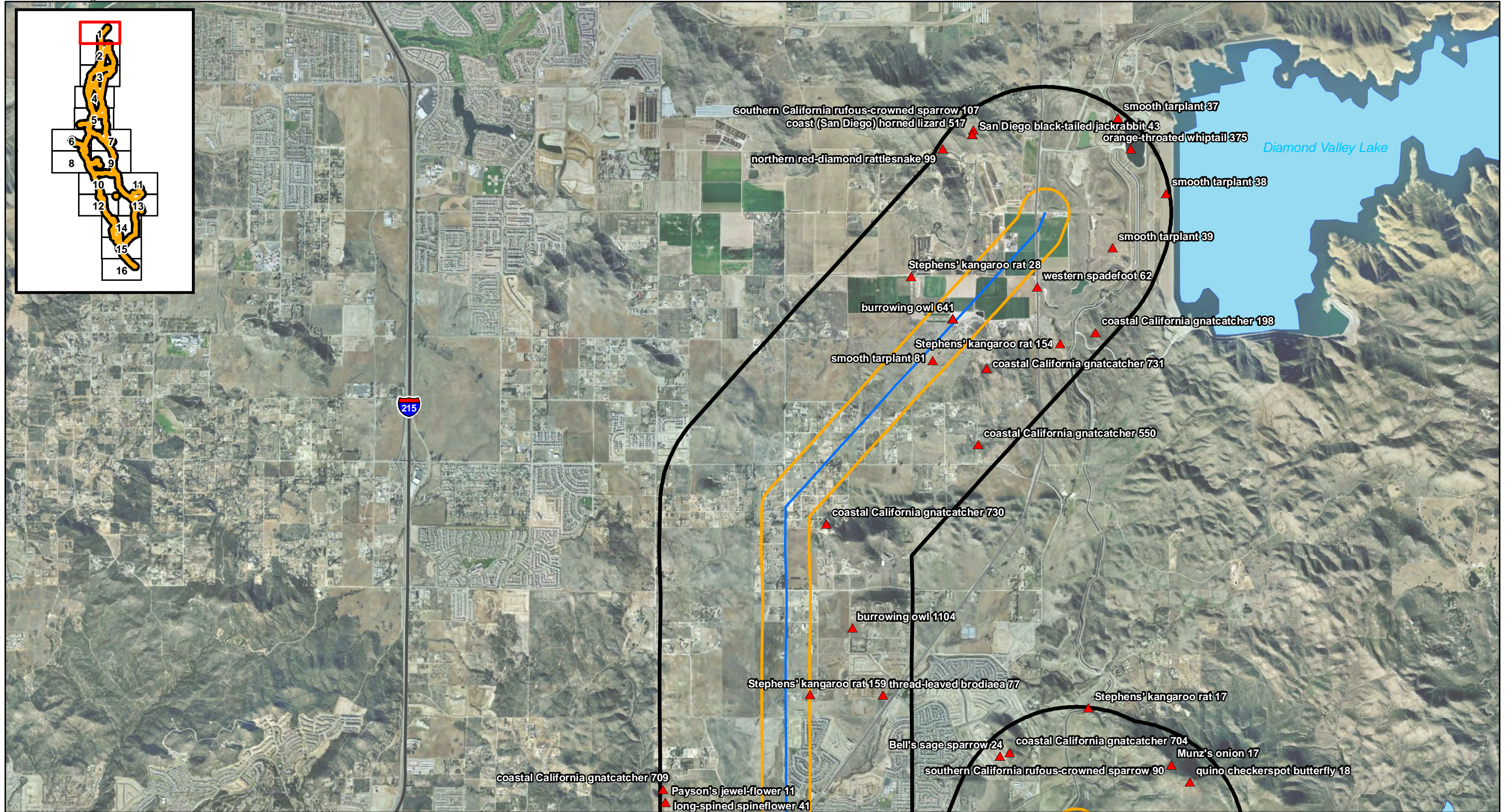
11.8.3 Conditions for Coverage

The following conditions would apply if this species is elevated to a Covered Species:

1. If a Covered Activity is proposed that would impact this species, the Water Authority would initiate a Major Amendment (see Section 8.3.1 of the Plan) to obtain coverage by implementing one or more of the conservation options outlined in Plan (see Section 6.2.2 of the Plan).
2. Implement general Conditions for Coverage (see Section 2.1).
3. Restrict human activities within an appropriate buffer distance around occupied nesting sites during the raptor breeding season (see Section 2.3 for Avian Breeding Season Policy).
4. Direct take of individuals and destruction of nests within an active territory is not allowed.

ATTACHMENTS

ATTACHMENT B-1



- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- CNDDB

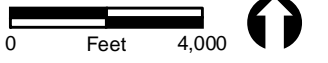
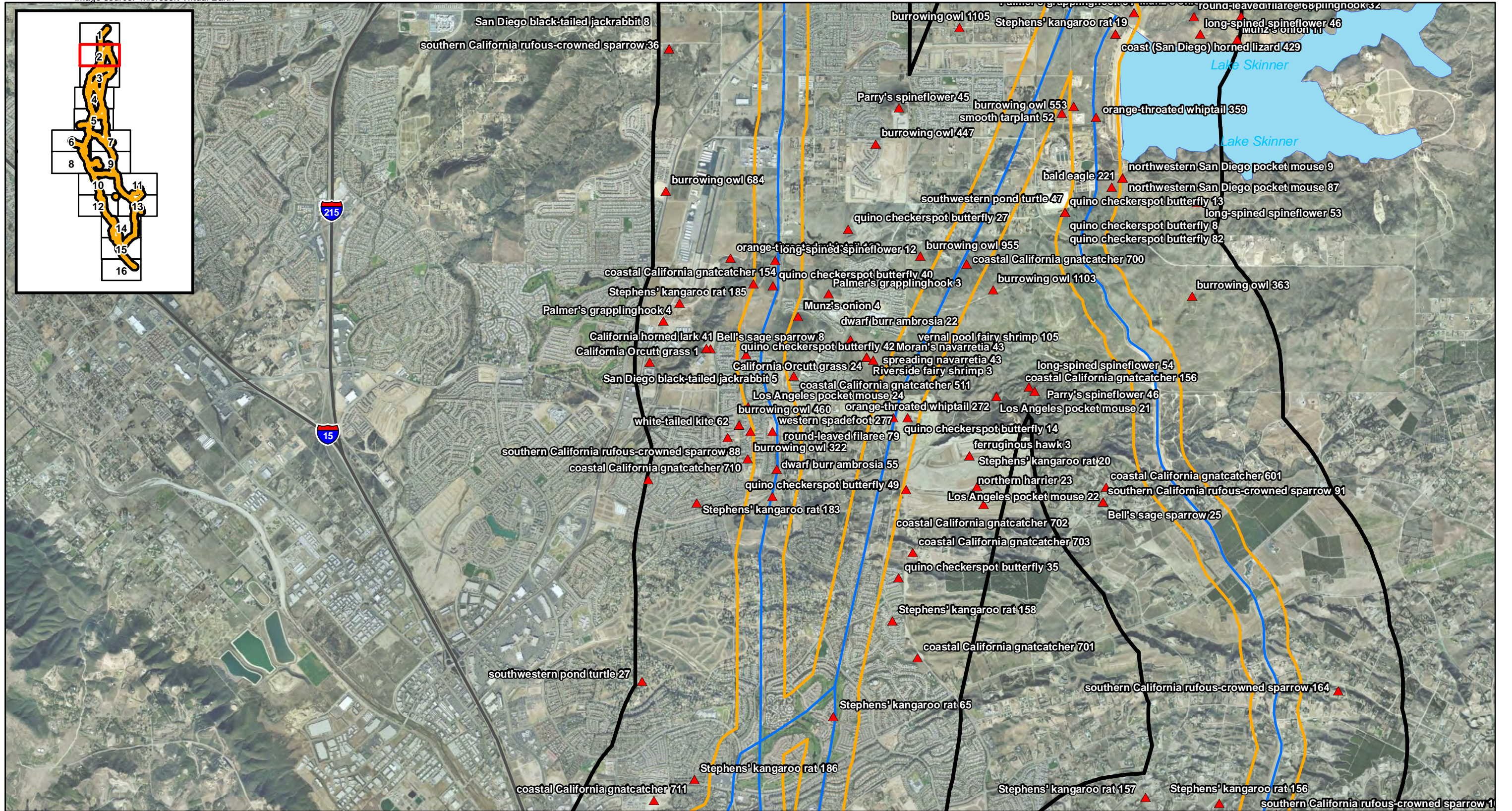






Figure B-1



-  Survey Area
-  Probable Impact Zone
-  Existing and Planned Aqueducts and Pipelines
-  CNDDB

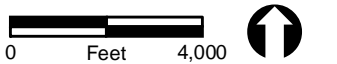
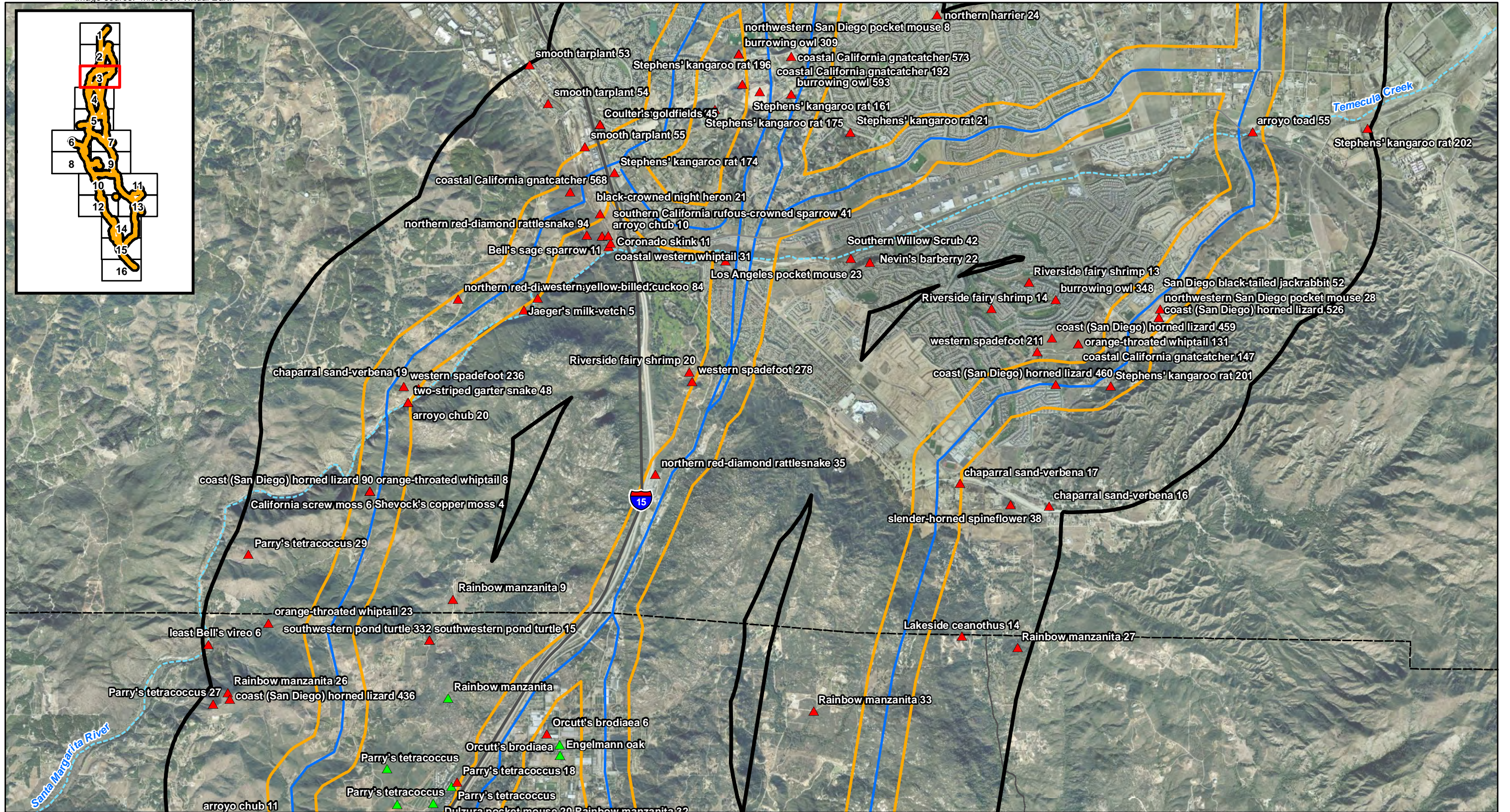


Figure B-2



-  Survey Area
-  Probable Impact Zone
-  Existing and Planned Aqueducts and Pipelines
-  CNDDB
-  SDNHM Plant Specimen Records Feb08

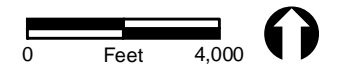
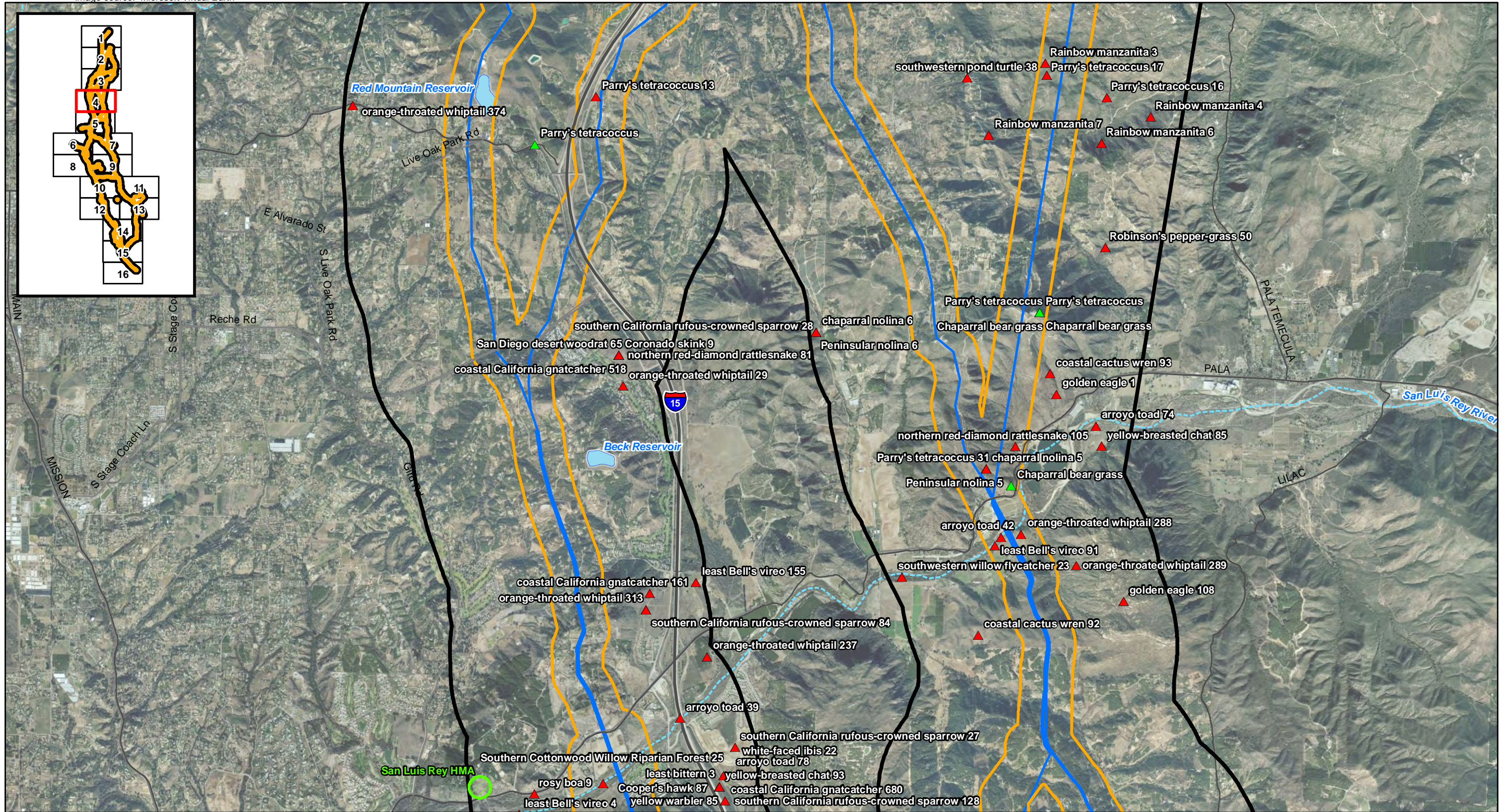


Figure B-3



- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- HMA
- ▲ CNDDB
- ▲ SDNHM Plant Specimen Records Feb08

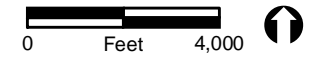
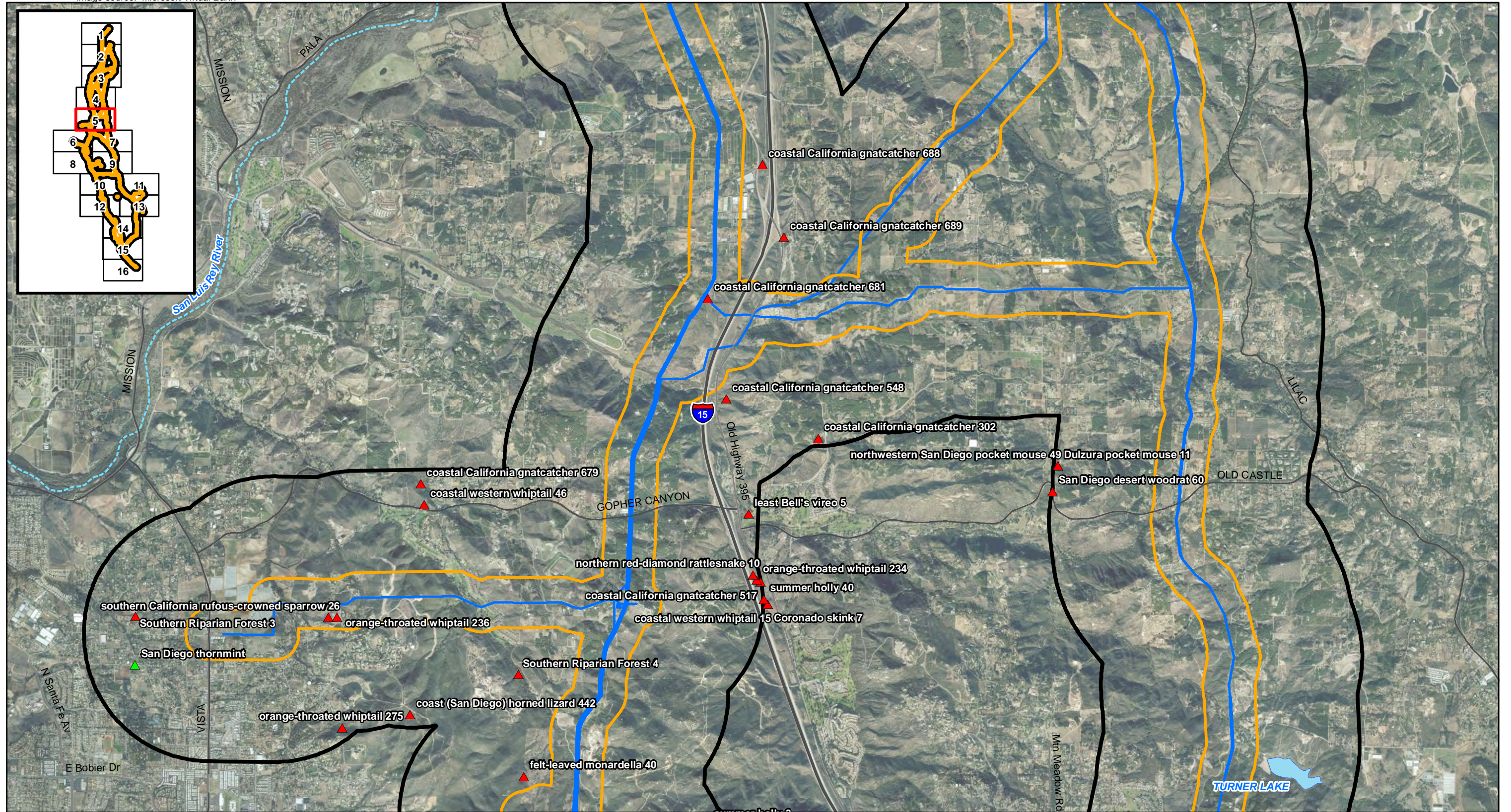
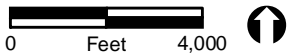
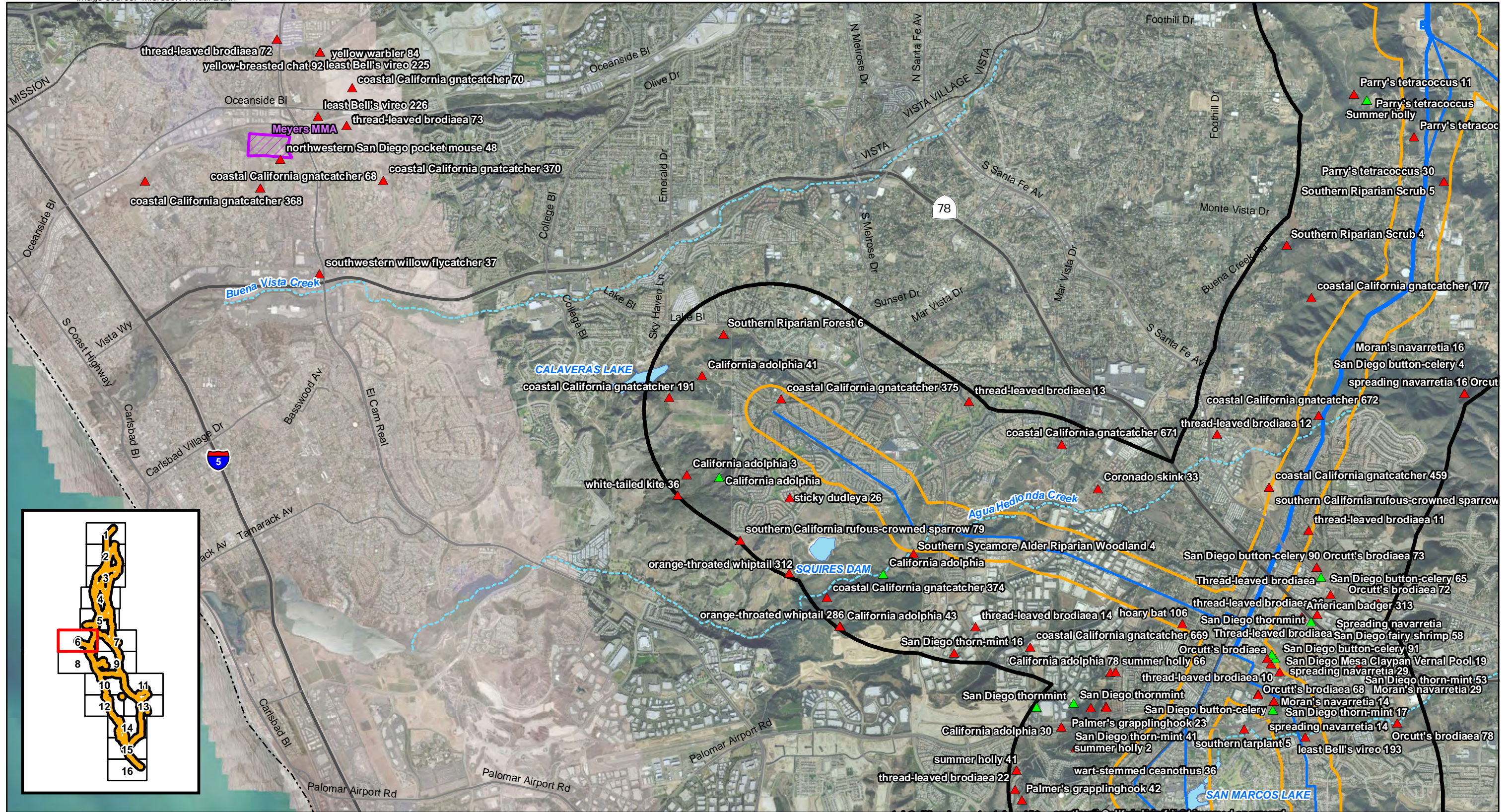


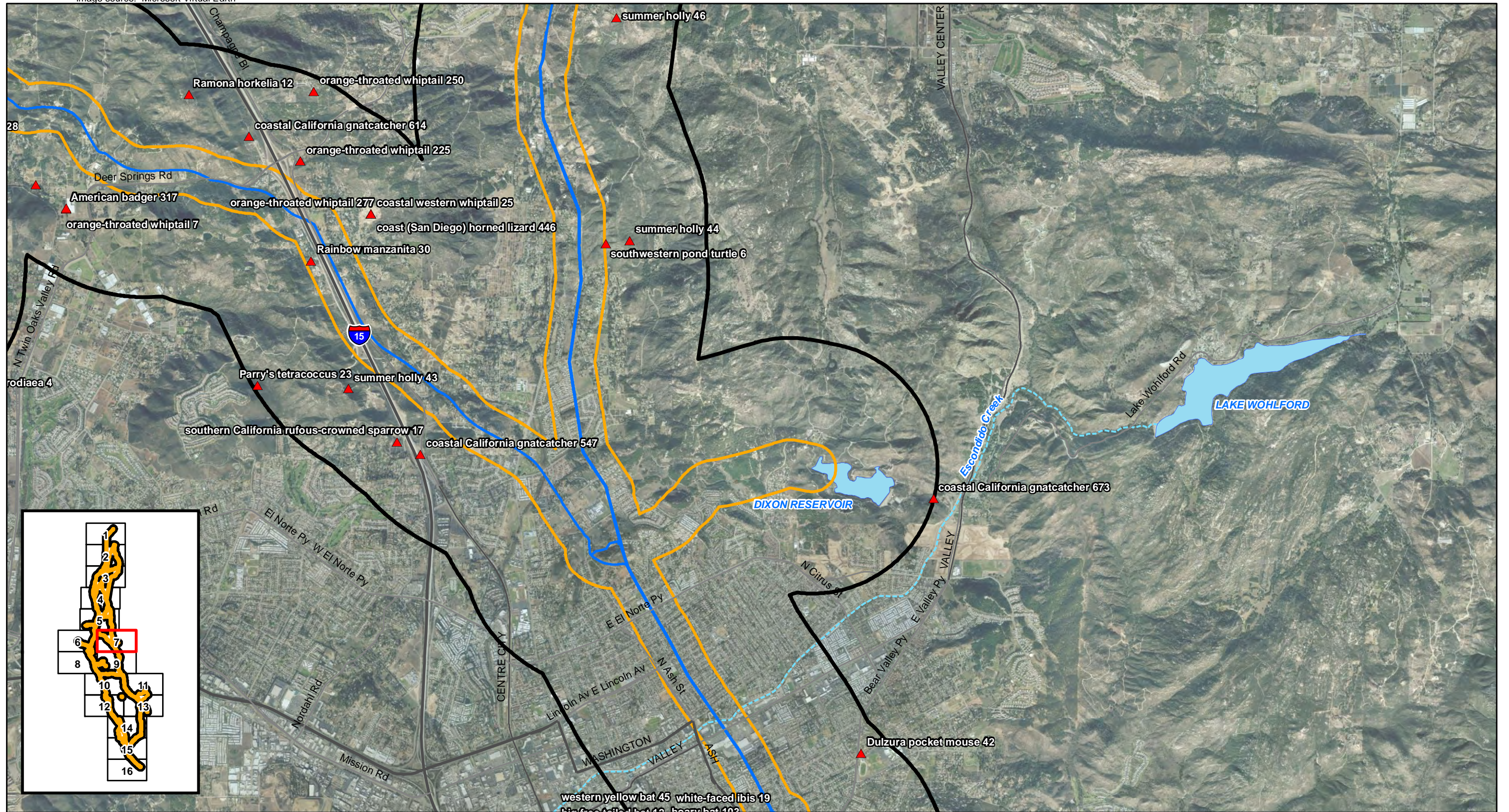
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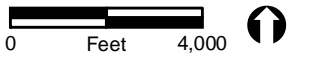


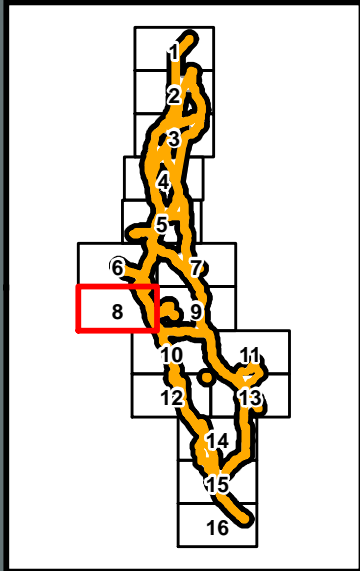
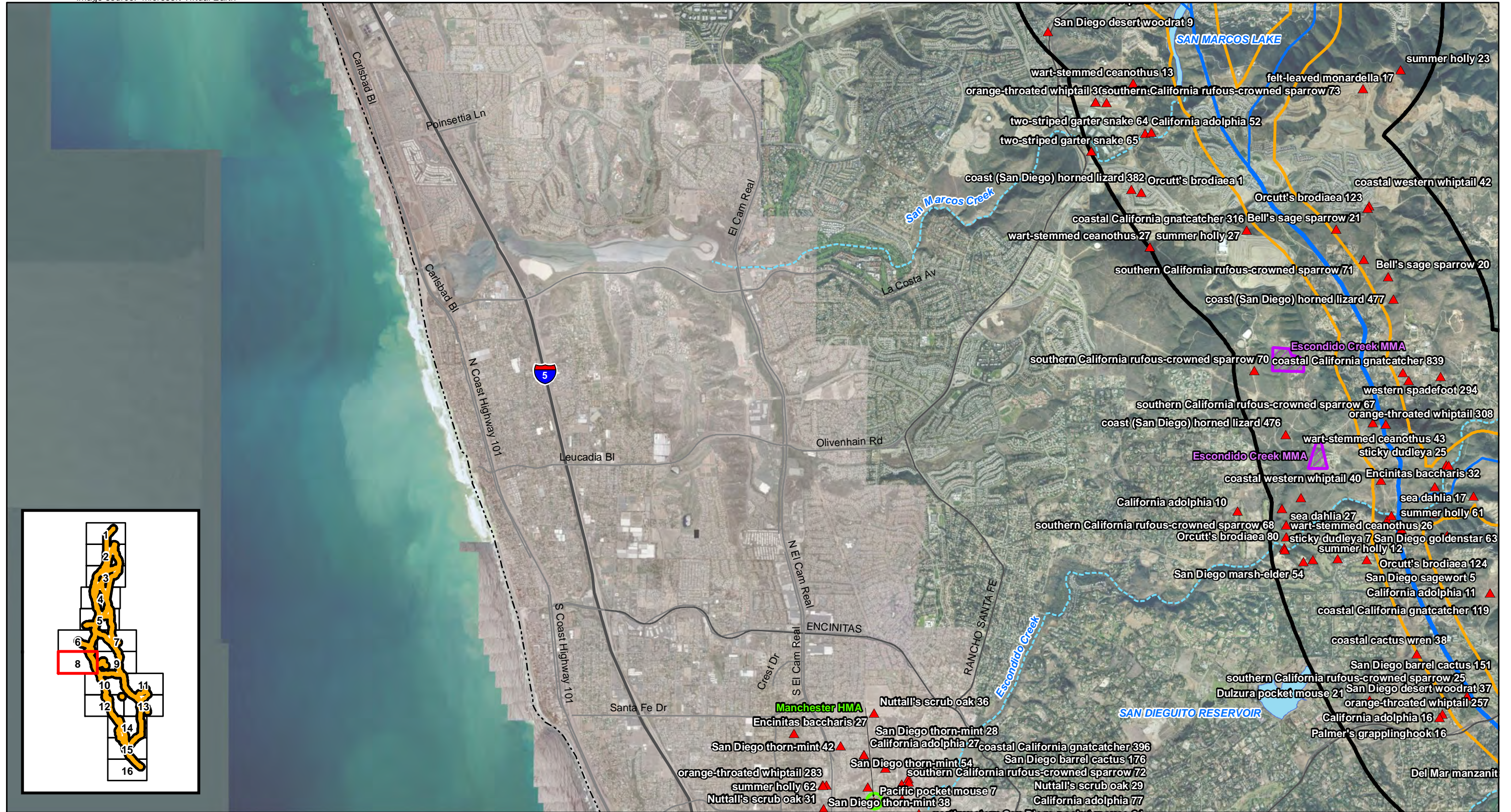
- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- MMA
- CNDDB
- SDNHM Plant Specimen Records Feb08

Figure B-6



- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- ▲ CNDDB





- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- HMA
- MMA
- CNDDB
- SDNHM Plant Specimen Records Feb08

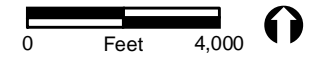
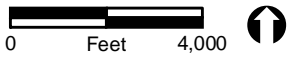
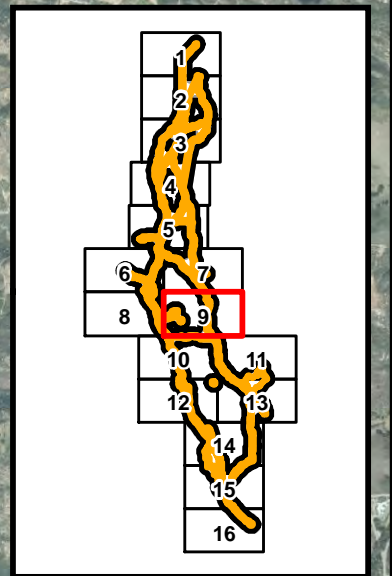
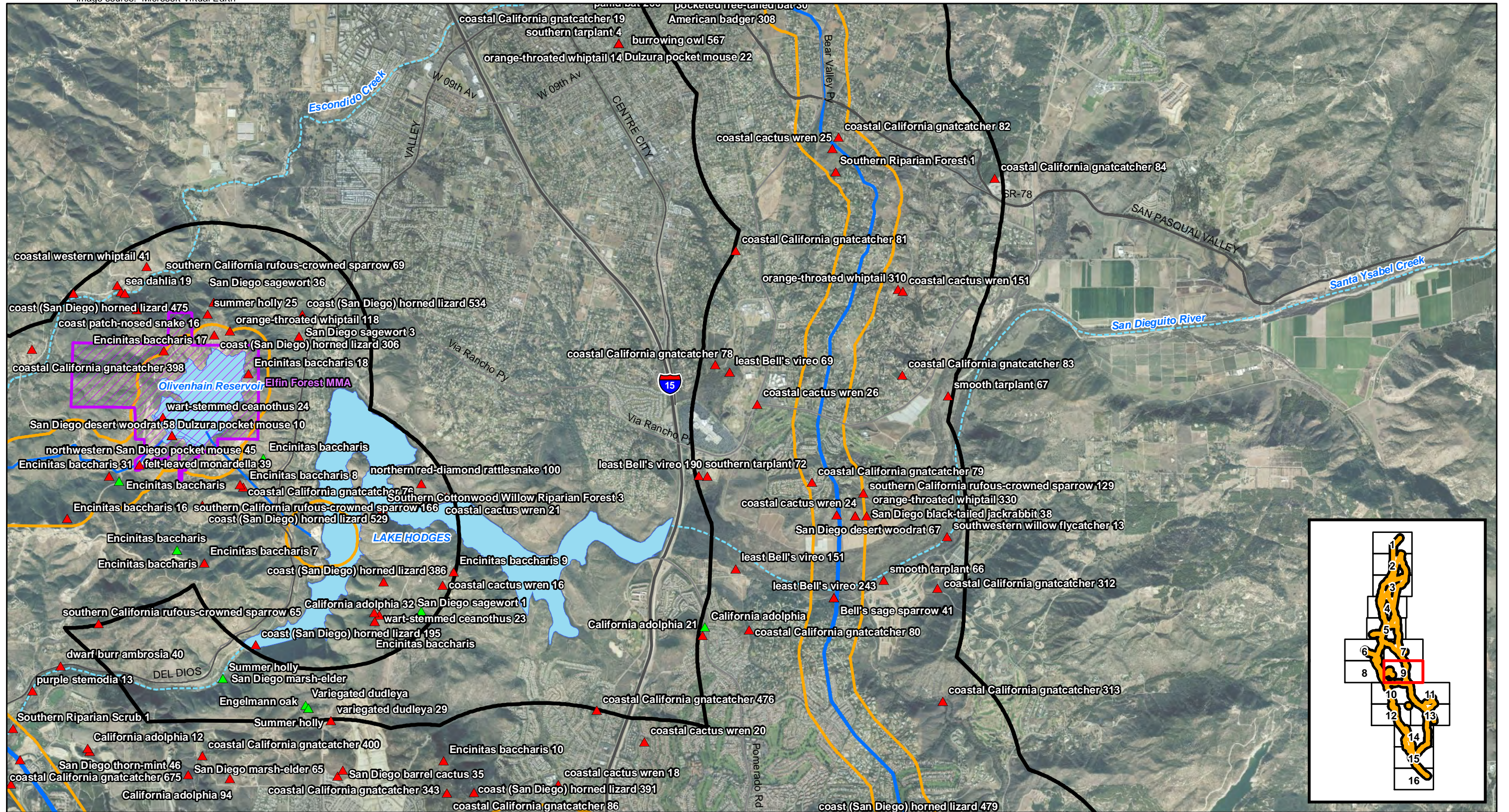
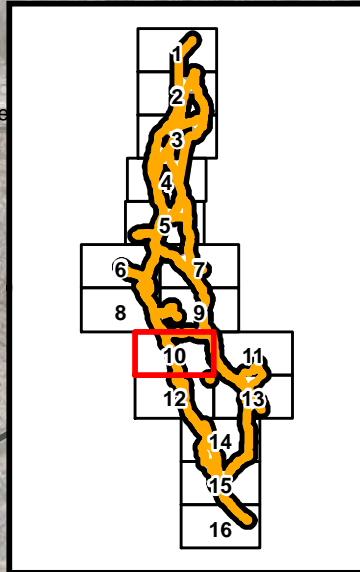
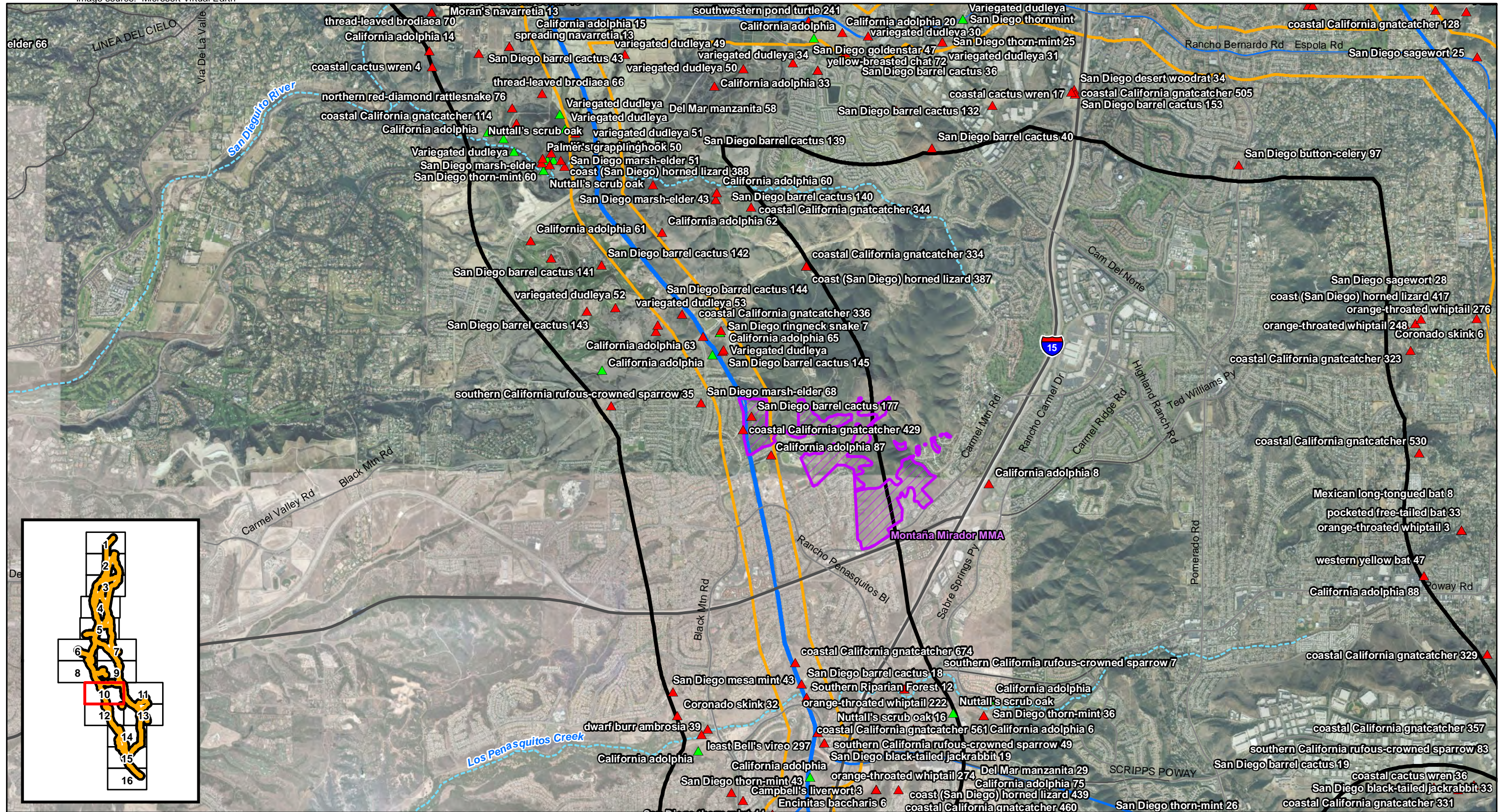


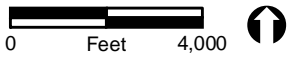
Figure B-8

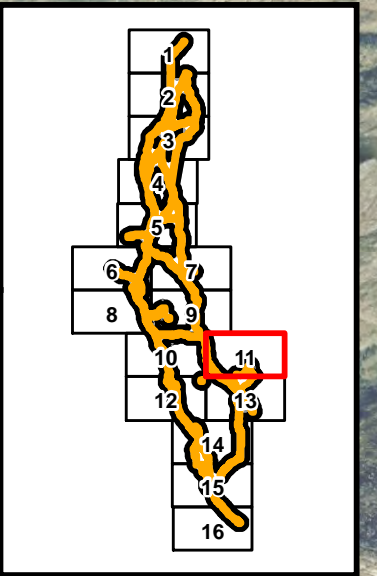
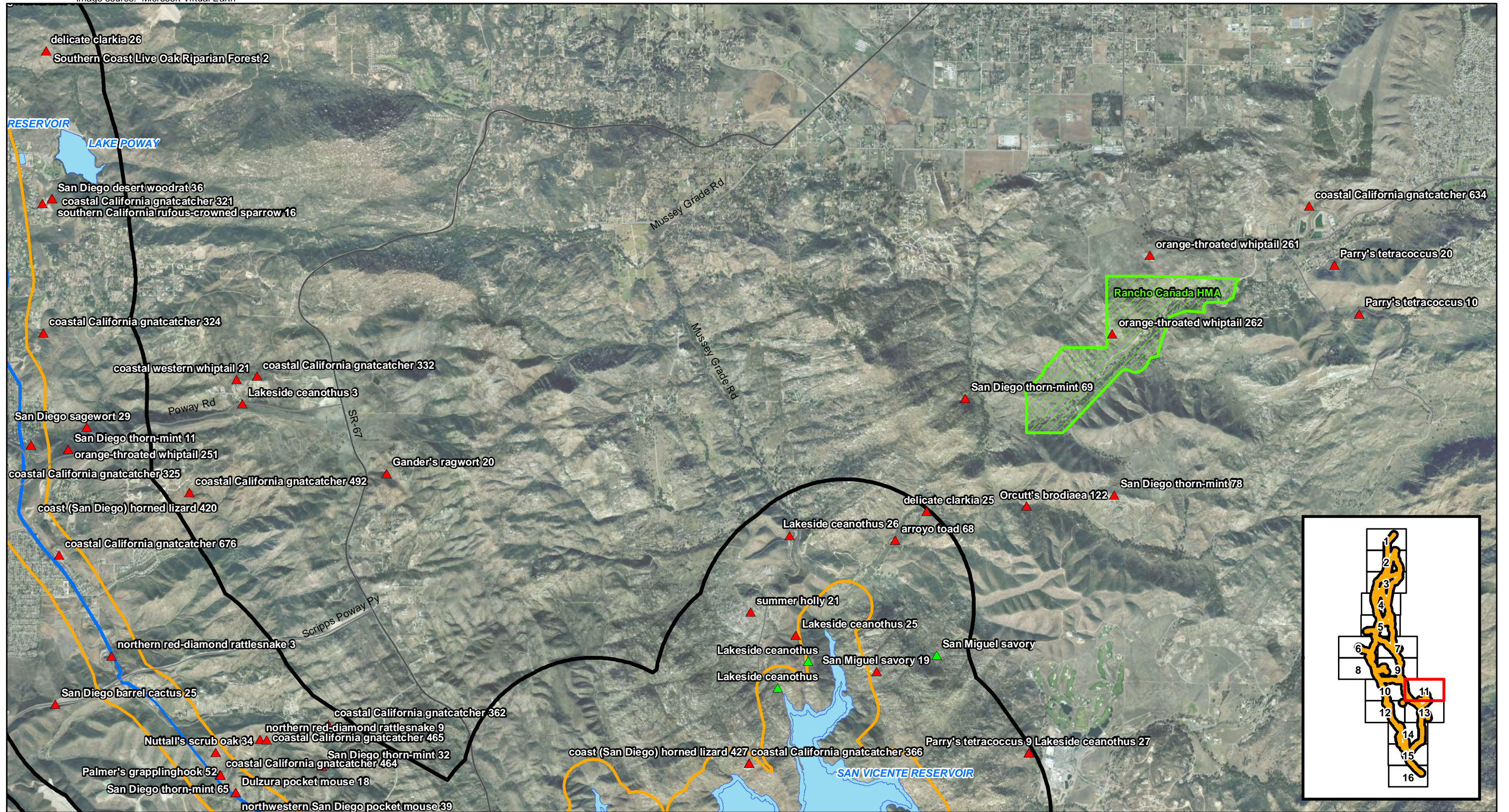


- Survey Area
- Probable Impact Zone
- MMA
- CNDDDB
- SDNHM Plant Specimen Records Feb08
- Existing and Planned Aqueducts and Pipelines

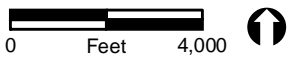


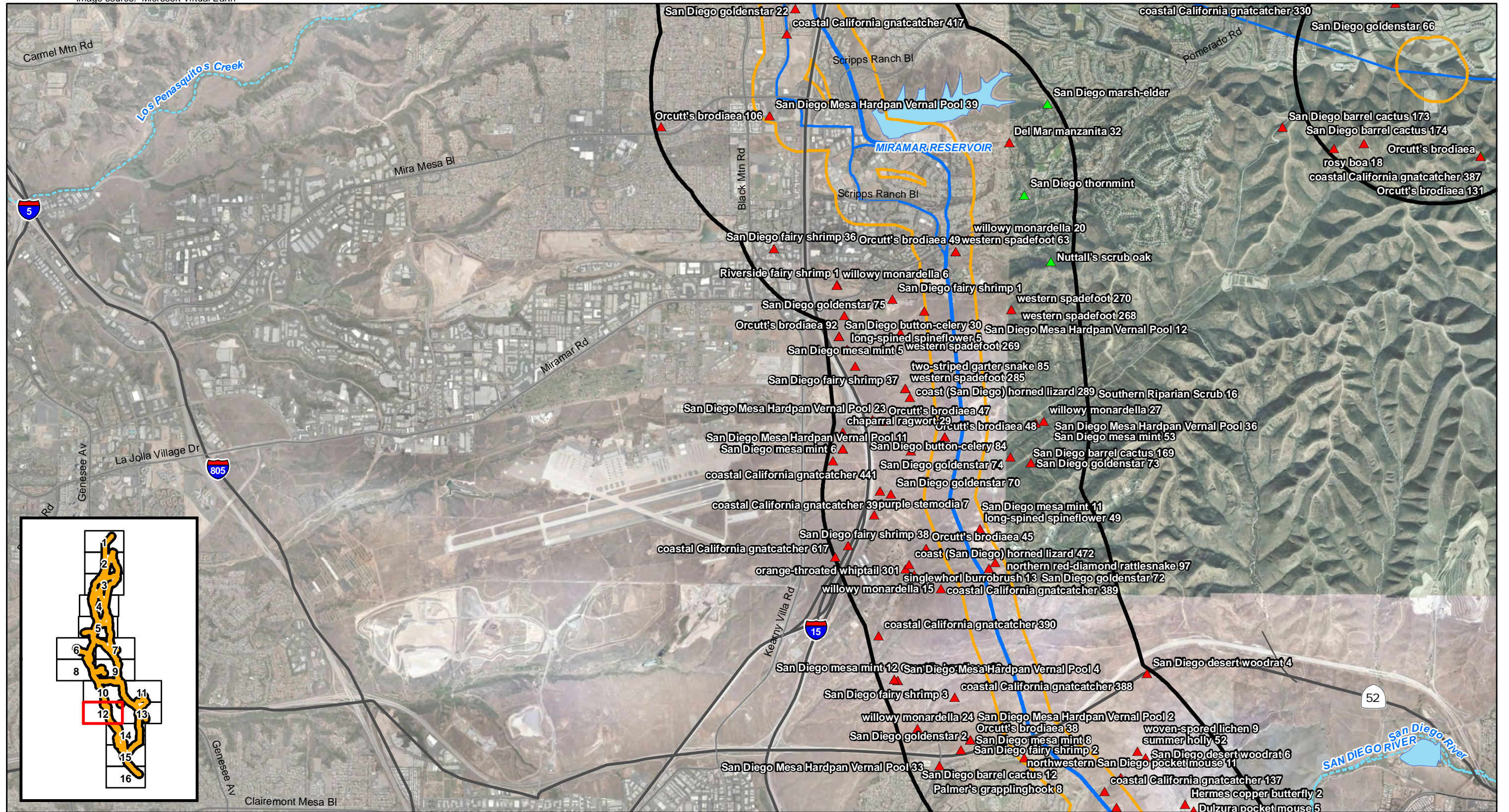
- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- MMA
- CNDDDB
- SDNHM Plant Specimen Records Feb08





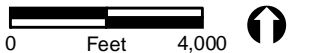
- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- HMA
- ▲ CNDDDB
- ▲ SDNHM Plant Specimen Records Feb08

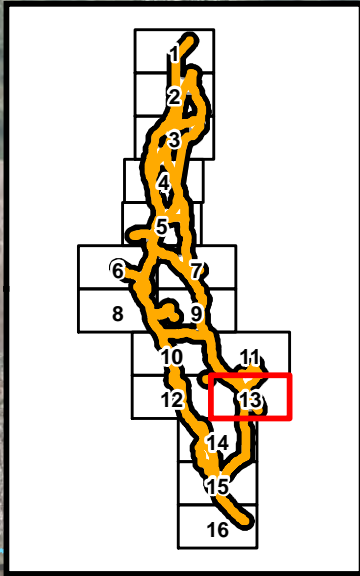
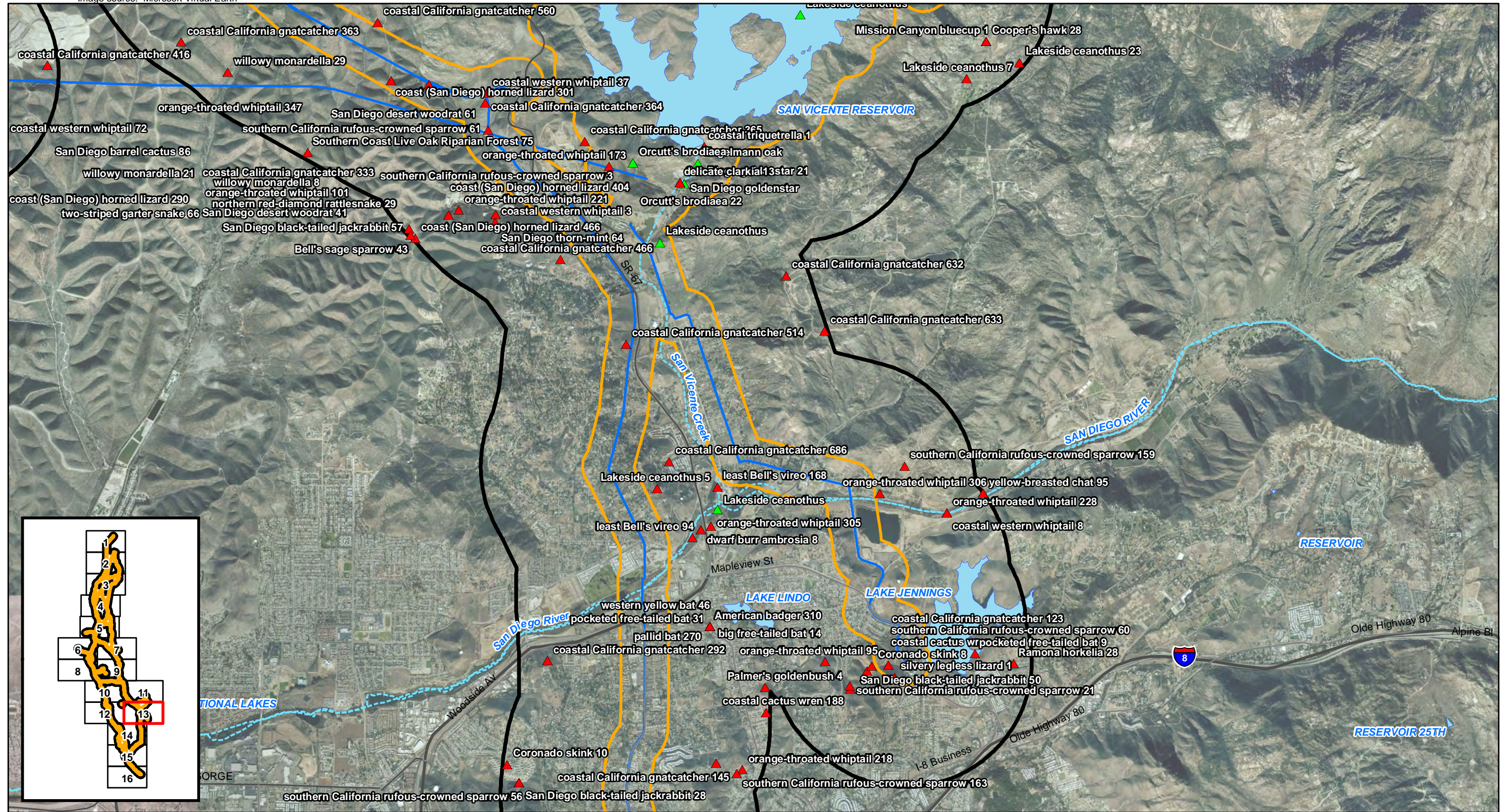




- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines

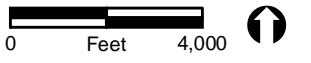
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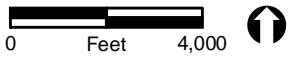
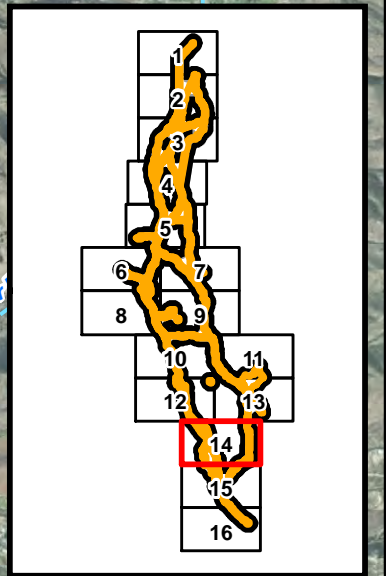
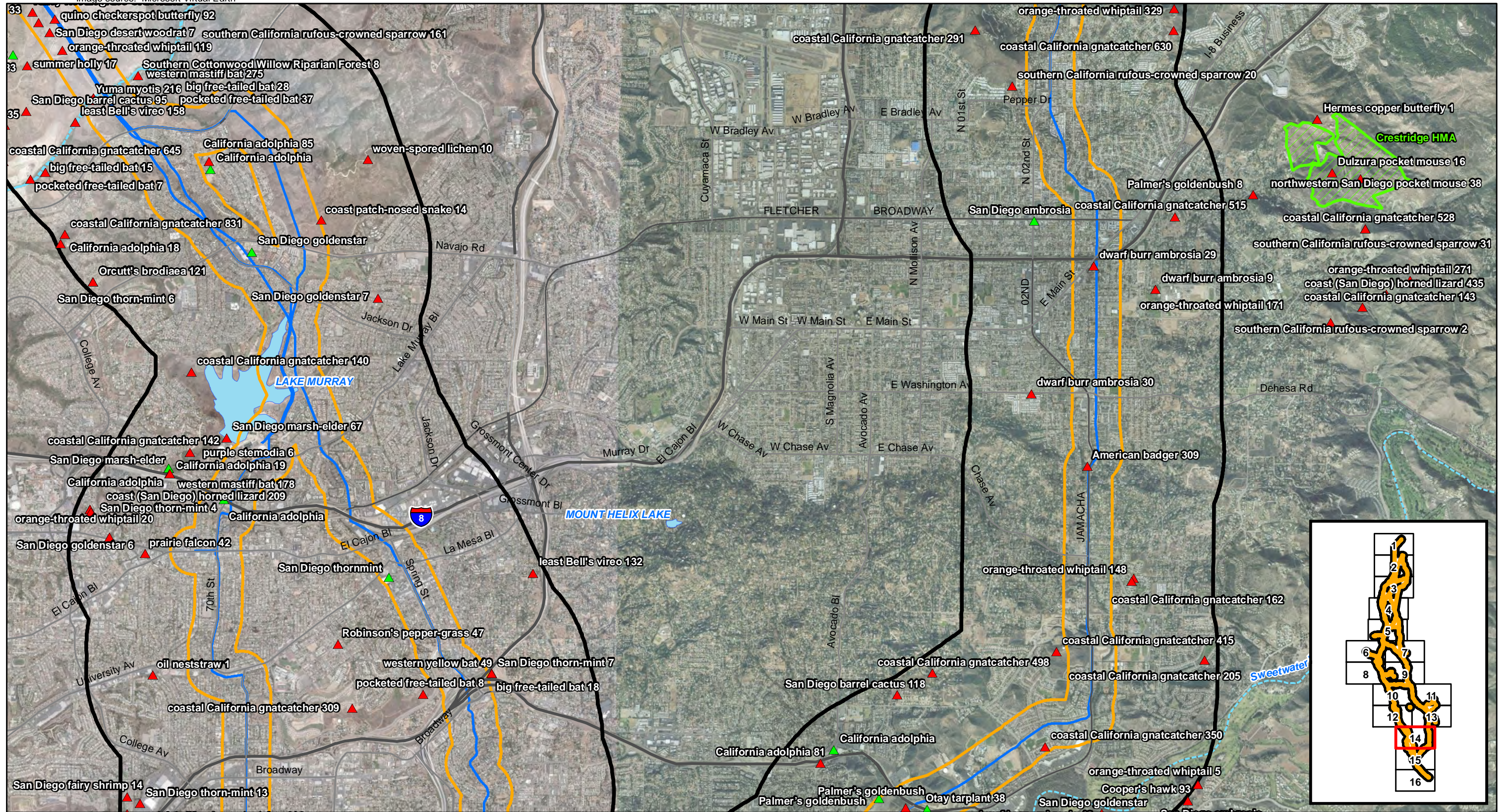




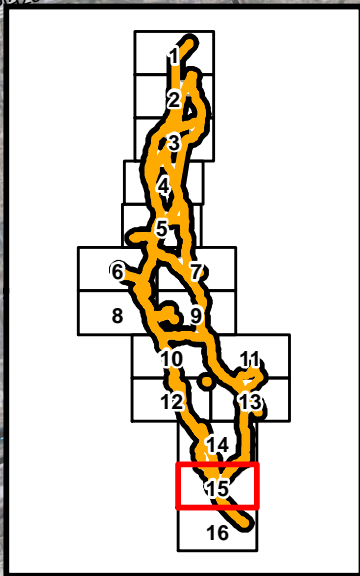
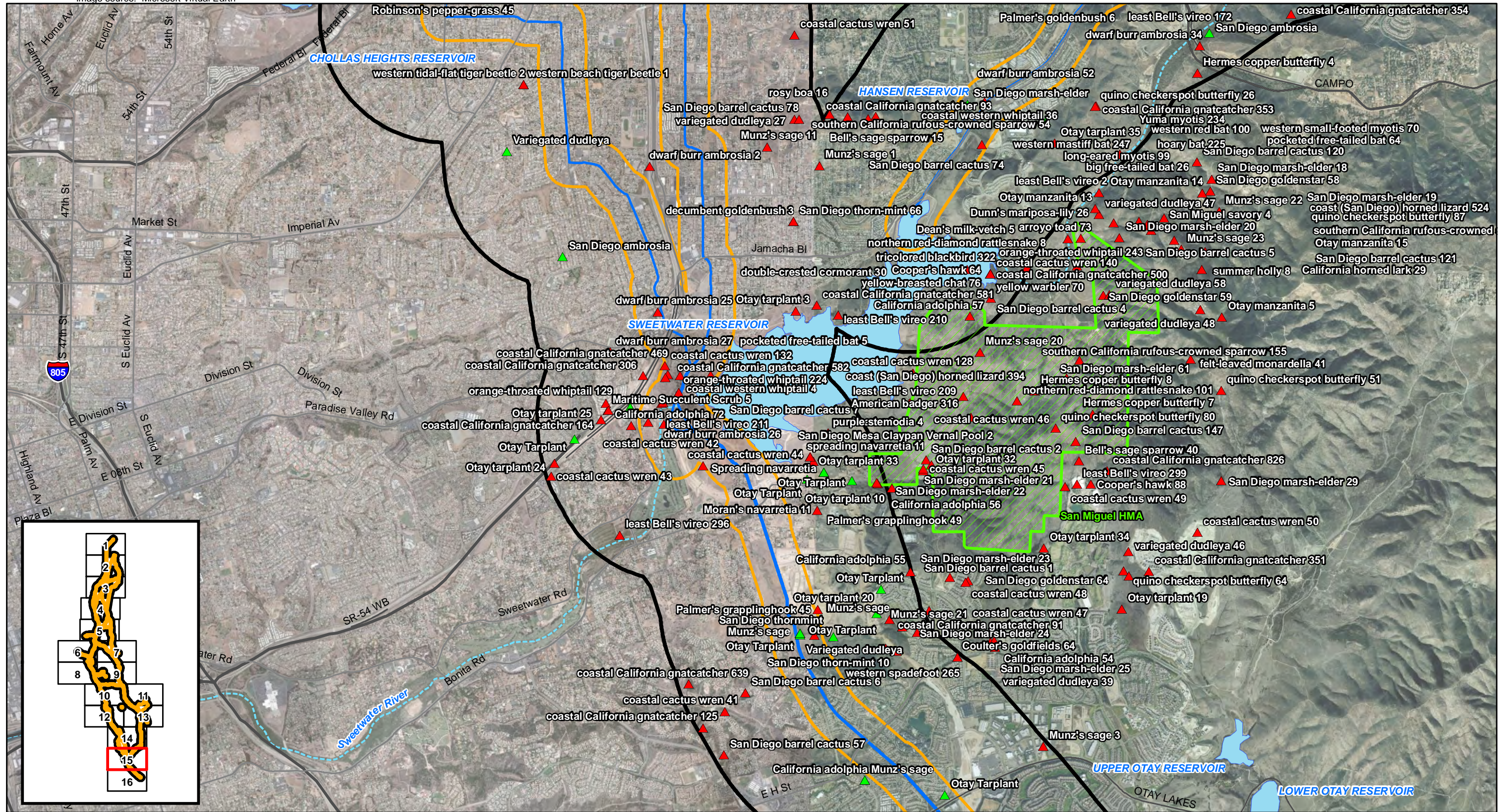
- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines

- ▲ CNDDB
- ▲ SDNHM Plant Specimen Records Feb08

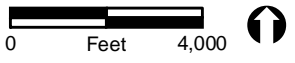




- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- HMA
- ▲ CNDDDB
- ▲ SDNHM Plant Specimen Records Feb08



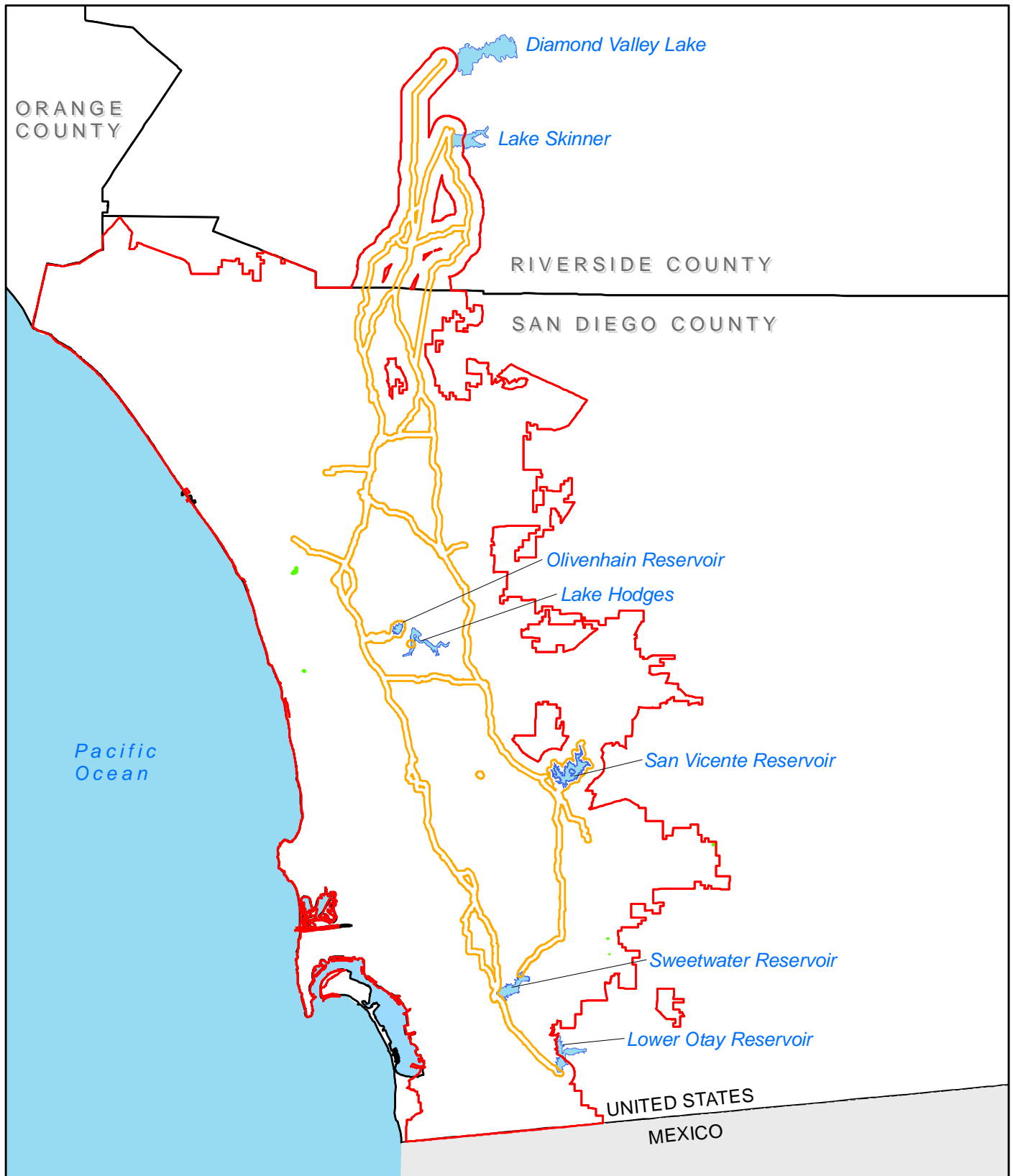
- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- HMA
- ▲ CNDDB
- ▲ SDNHM Plant Specimen Records Feb08





- Survey Area
- Probable Impact Zone
- Existing and Planned Aqueducts and Pipelines
- HMA
- ▲ CNDDB
- ▲ SDNHM Plant Specimen Records Feb08



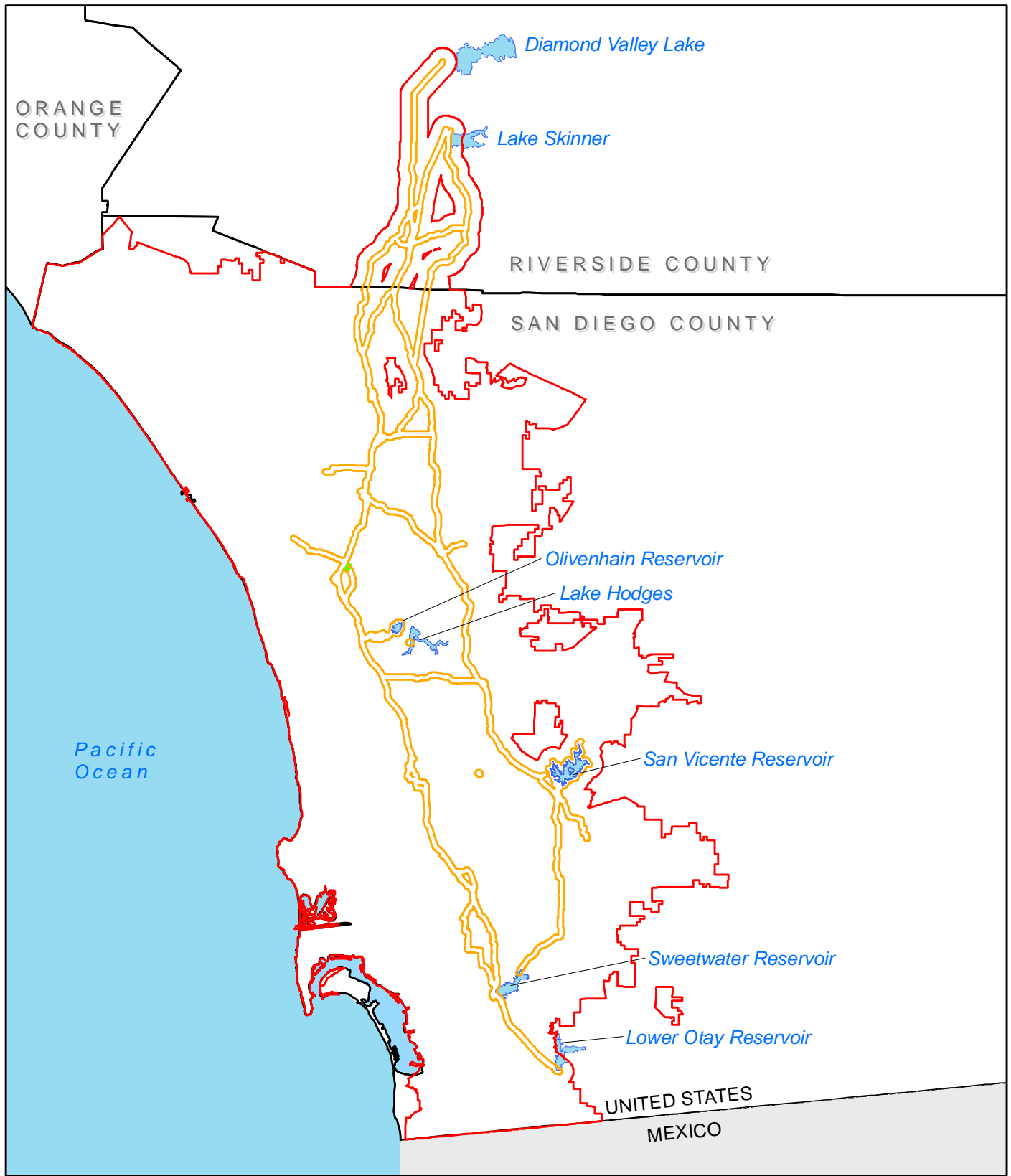


- Probable Impact Zone
- NCCP/HCP Plan Area
- San Diego Thorn-mint (*Acanthomintha ilicifolia*) Final Critical Habitat



FIGURE B-17

Final Critical Habitat for San Diego Thorn-mint within NCCP/HCP Plan Area

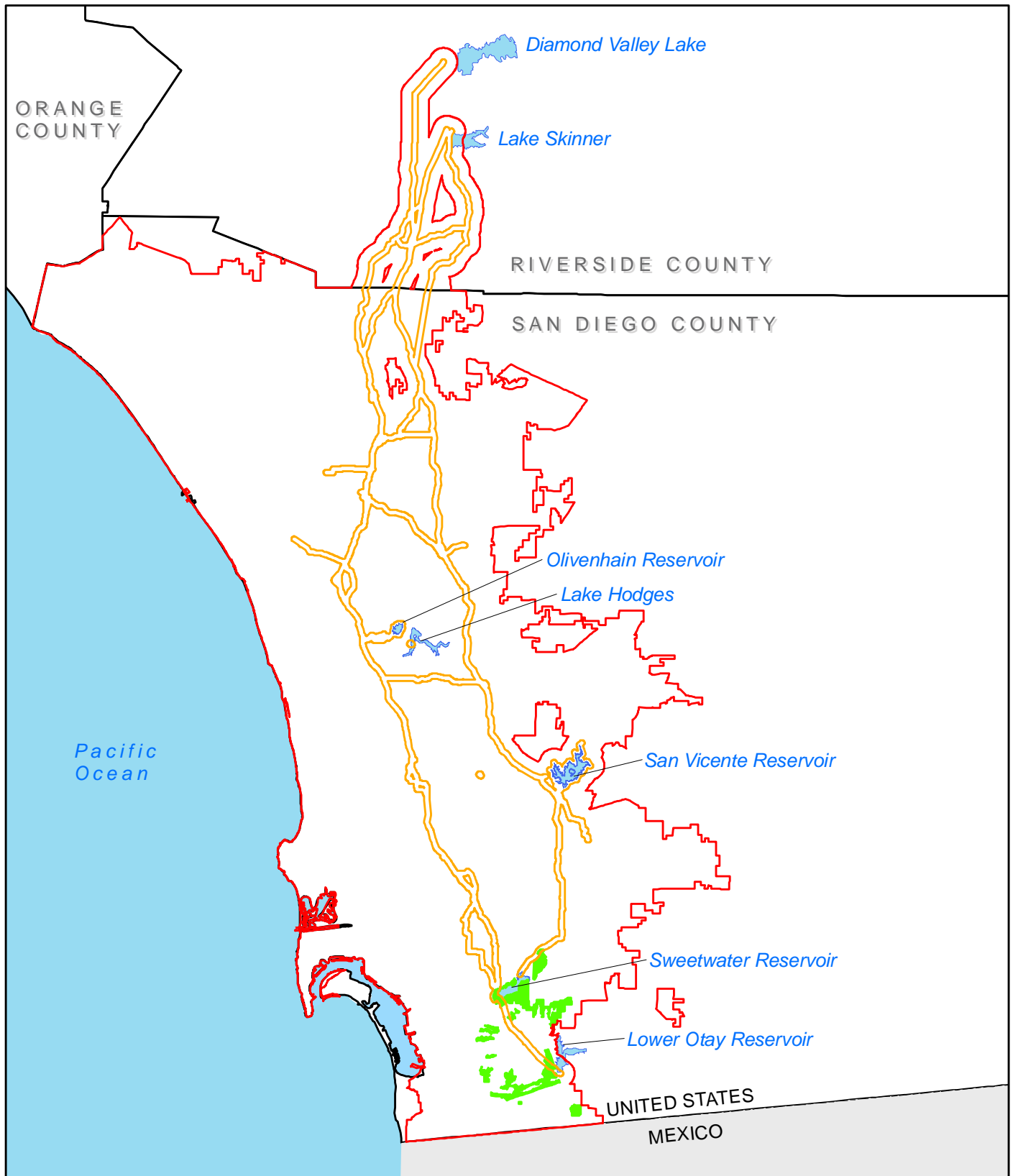


- Probable Impact Zone
- NCCP/HCP Plan Area
- Thread-leaved Brodiaea (*Brodiaea filifolia*) Final Critical Habitat



FIGURE B-18

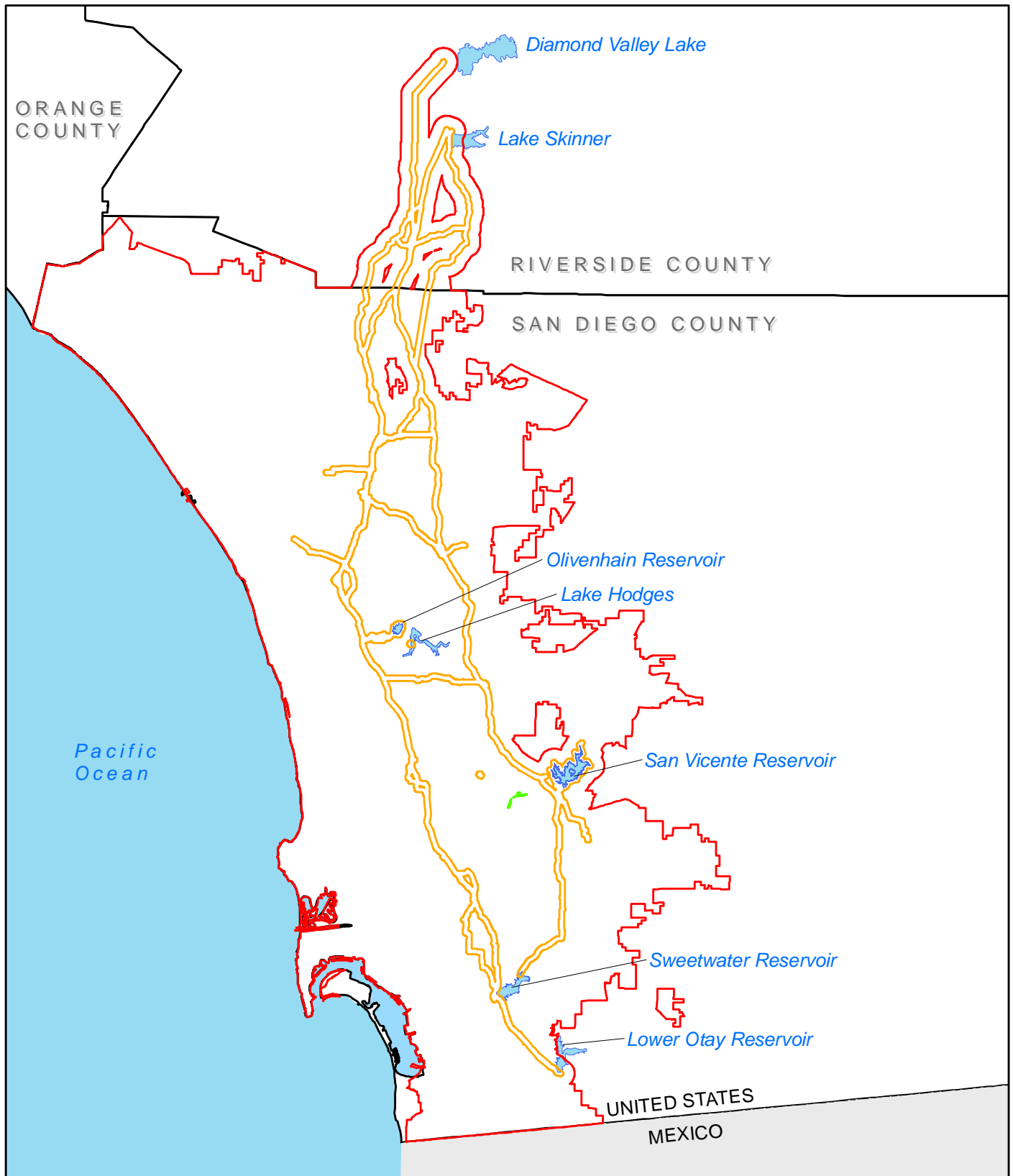
Final Critical Habitat for Thread-leaved Brodiaea within NCCP/HCP Plan Area



- Probable Impact Zone
- NCCP/HCP Plan Area
- Otay Tarplant (*Deinandra conjugens*) Final Critical Habitat



FIGURE B-19
Final Critical Habitat for Otay Tarplant within NCCP/HCP Plan Area



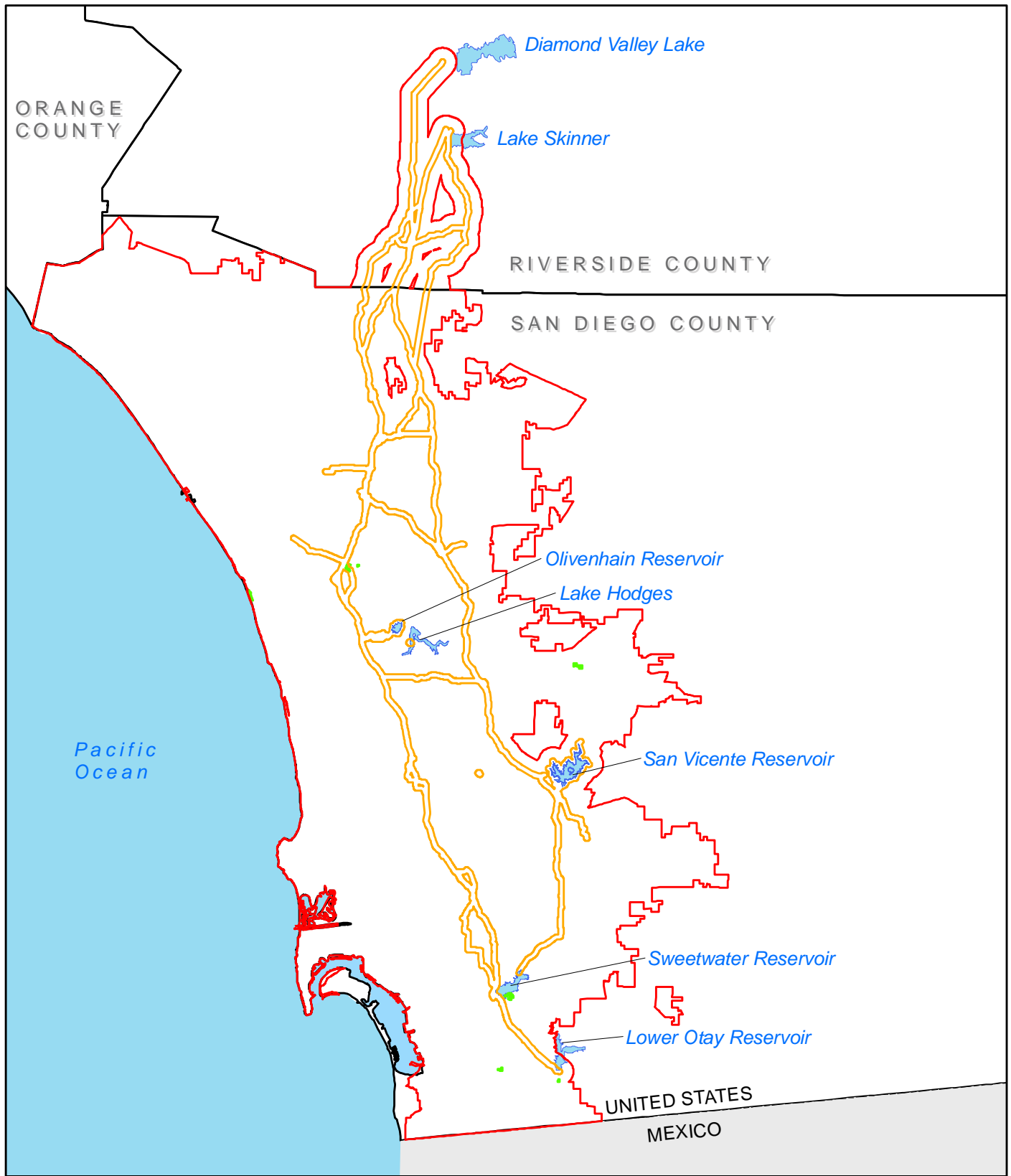
Probable Impact Zone
 NCCP/HCP Plan Area

Willowy Monardella
 (*Monardella viminea*)
 Final Critical Habitat



FIGURE B-20

Final Critical Habitat for Willowy
 Monardella within NCCP/HCP Plan Area

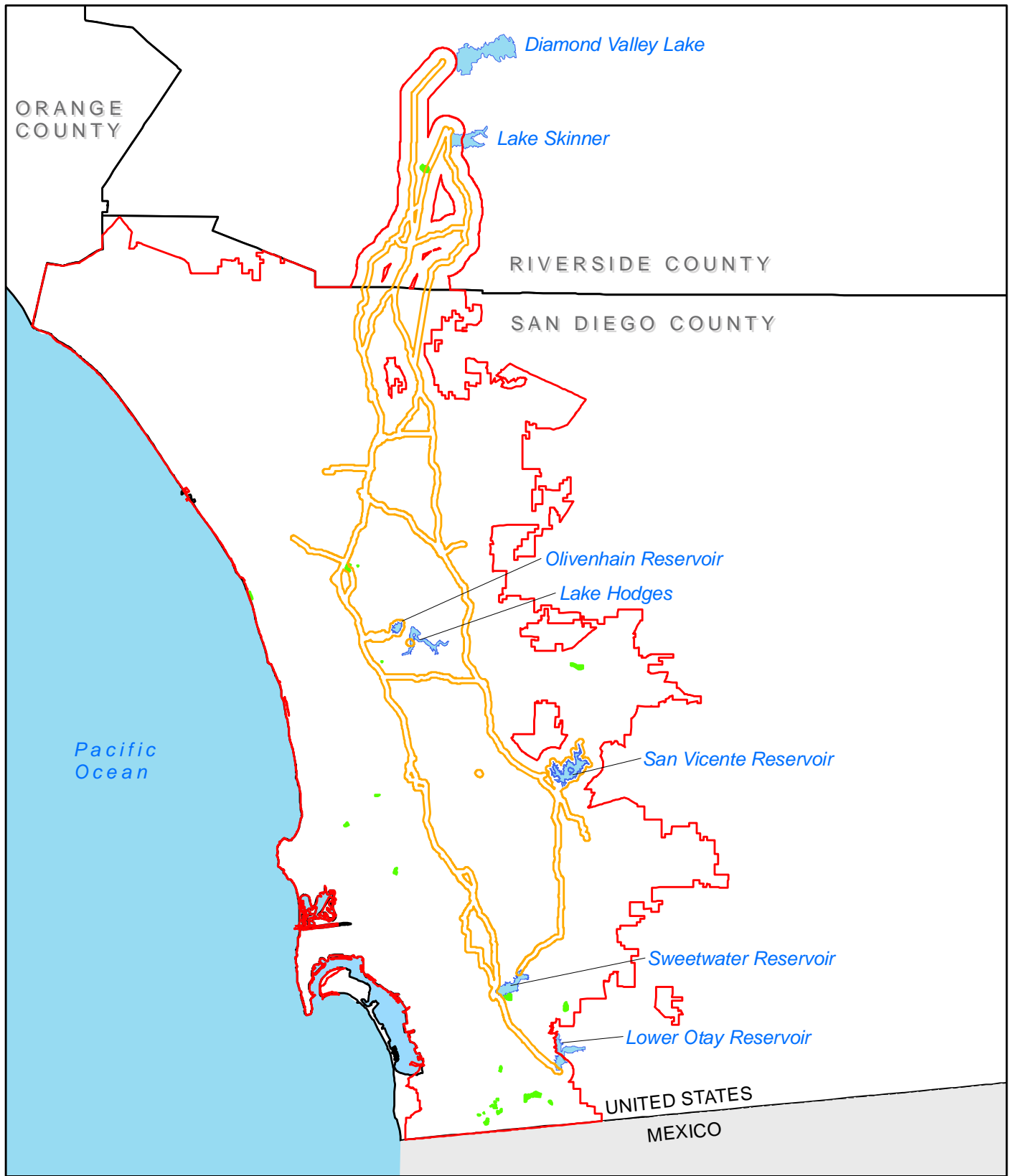


- Probable Impact Zone
- NCCP/HCP Plan Area
- Spreading *Navarretia* (*Navarretia fossalis*) Final Critical Habitat



FIGURE B-21a

Final Critical Habitat for Spreading *Navarretia* within NCCP/HCP Plan Area

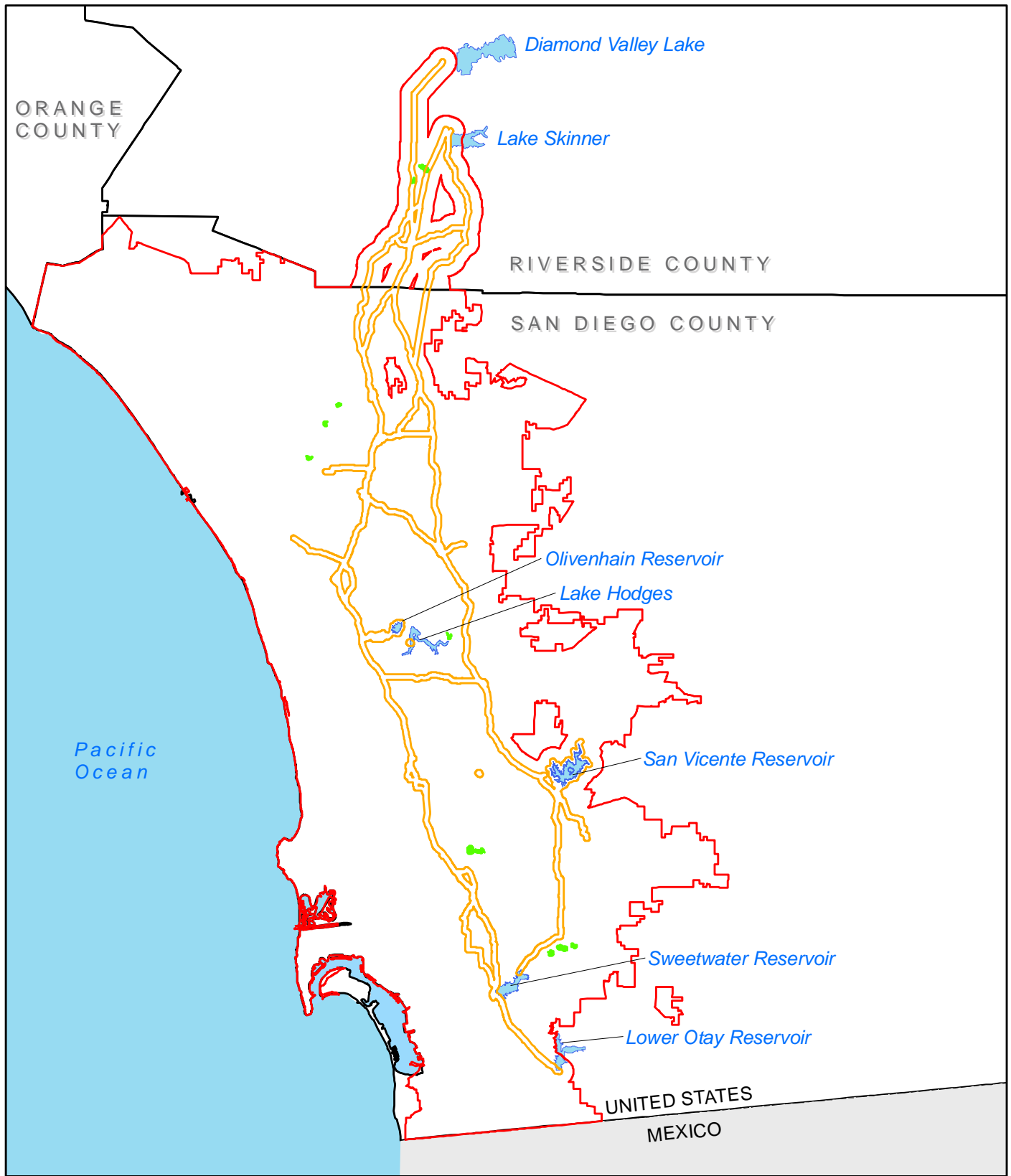


- Probable Impact Zone
- NCCP/HCP Plan Area
- Spreading Navarretia (*Navarretia fossalis*) Re-Proposed Critical Habitat



FIGURE B-21b

Re-Proposed Critical Habitat for Spreading Navarretia within NCCP/HCP Plan Area

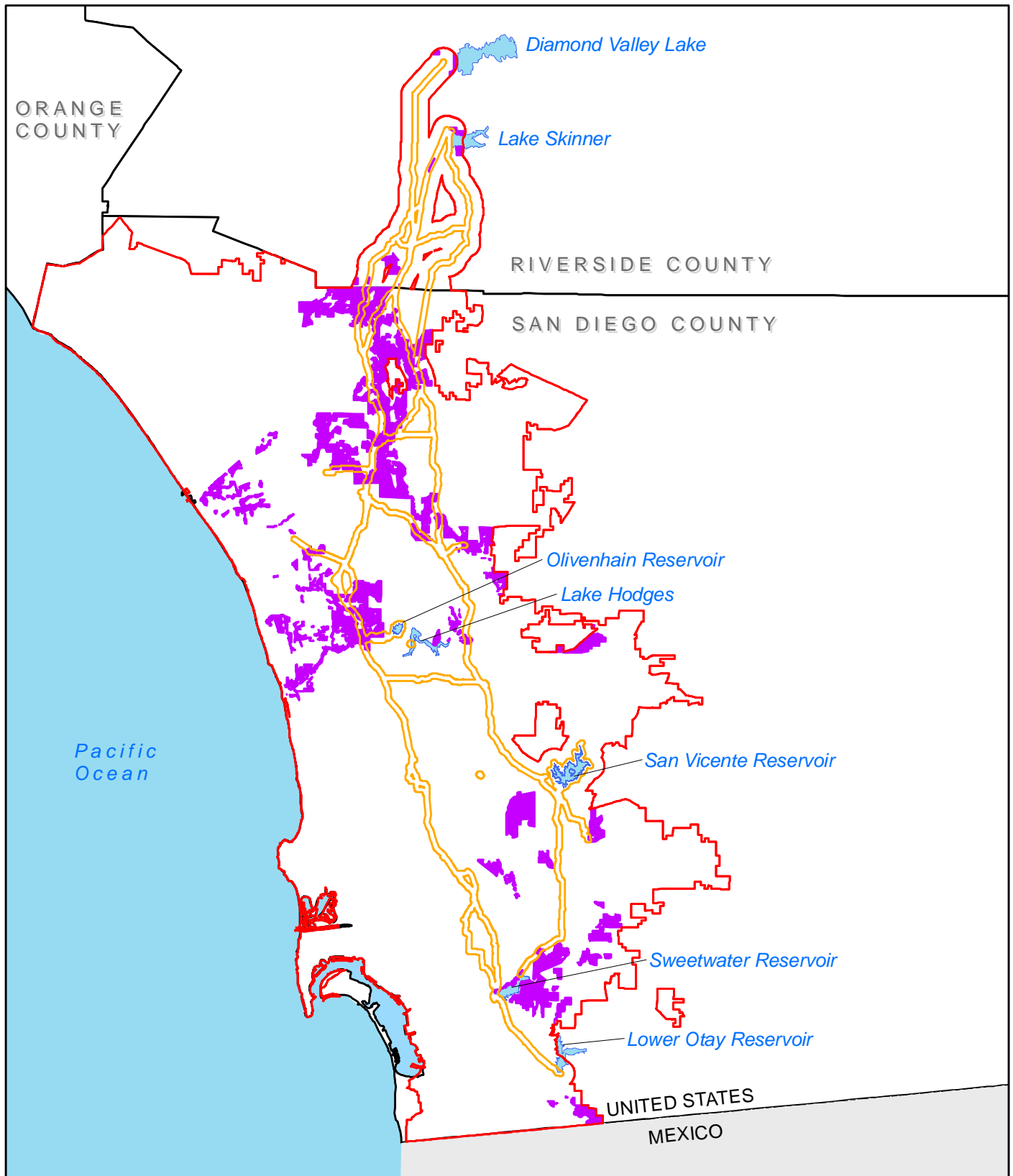


- Probable Impact Zone
- NCCP/HCP Plan Area
- San Diego Ambrosia (*Ambrosia pumila*) Proposed Critical Habitat



FIGURE B-22

Proposed Critical Habitat for San Diego Ambrosia within NCCP/HCP Plan Area

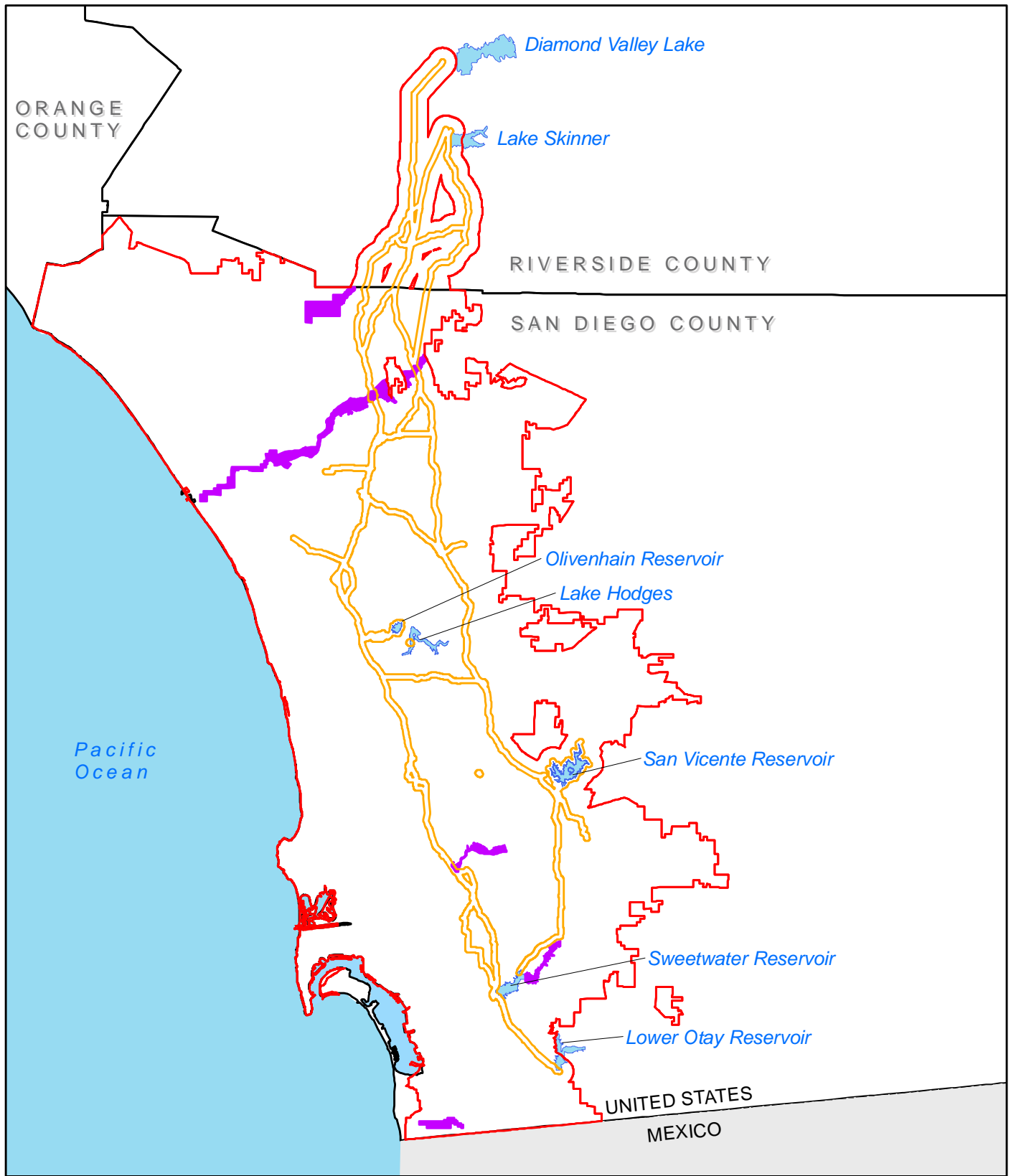


- Probable Impact Zone
- NCCP/HCP Plan Area
- Coastal California gnatcatcher (*Polioptila californica californica*) Final Critical Habitat



FIGURE B-23

Final Critical Habitat for Coastal California Gnatcatcher within NCCP/HCP Plan Area

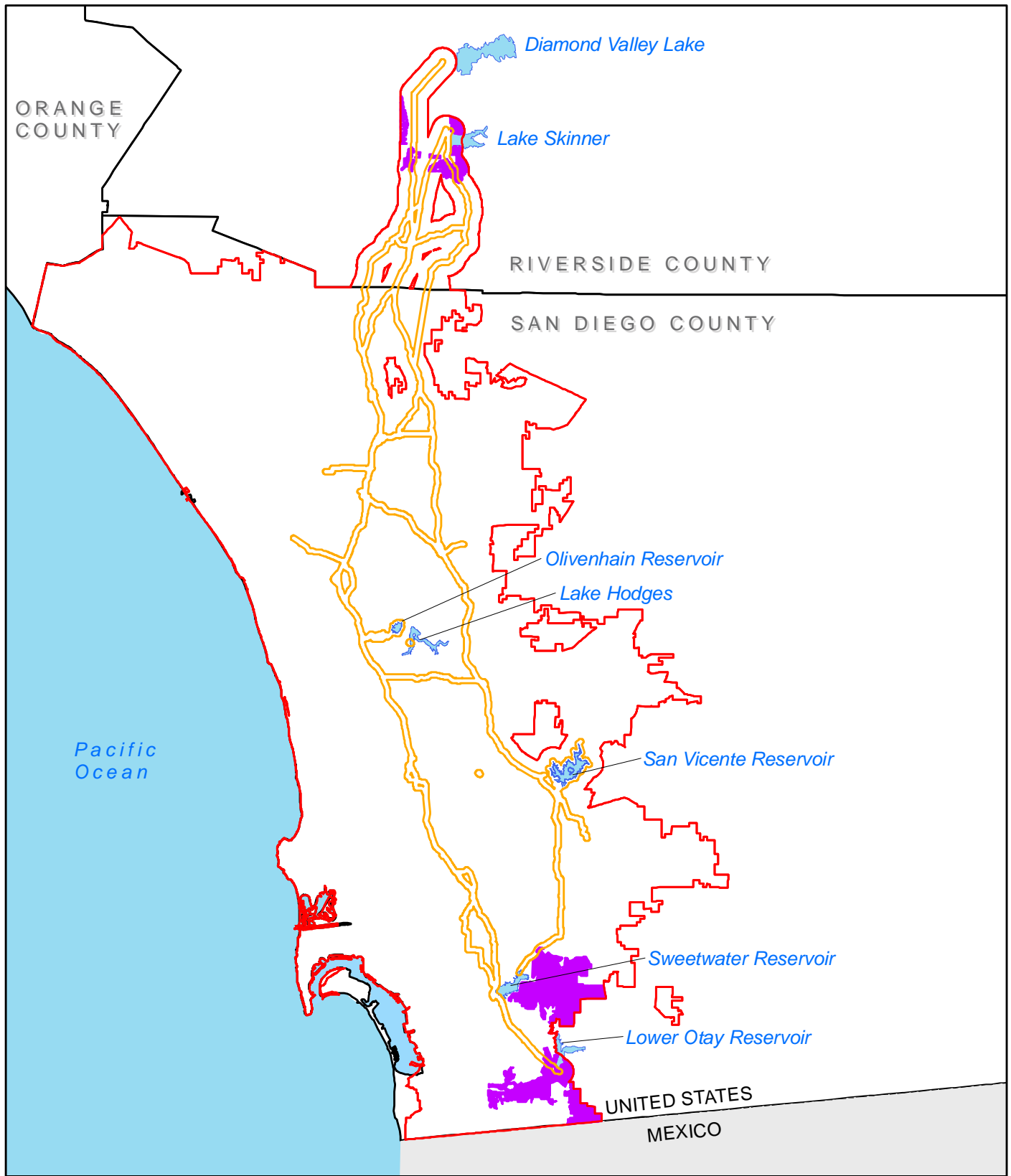


- Probable Impact Zone
- NCCP/HCP Plan Area
- Least Bell's Vireo (*Vireo bellii pusillus*) Final Critical Habitat



FIGURE B-24

Final Critical Habitat for Least Bell's Vireo within NCCP/HCP Plan Area

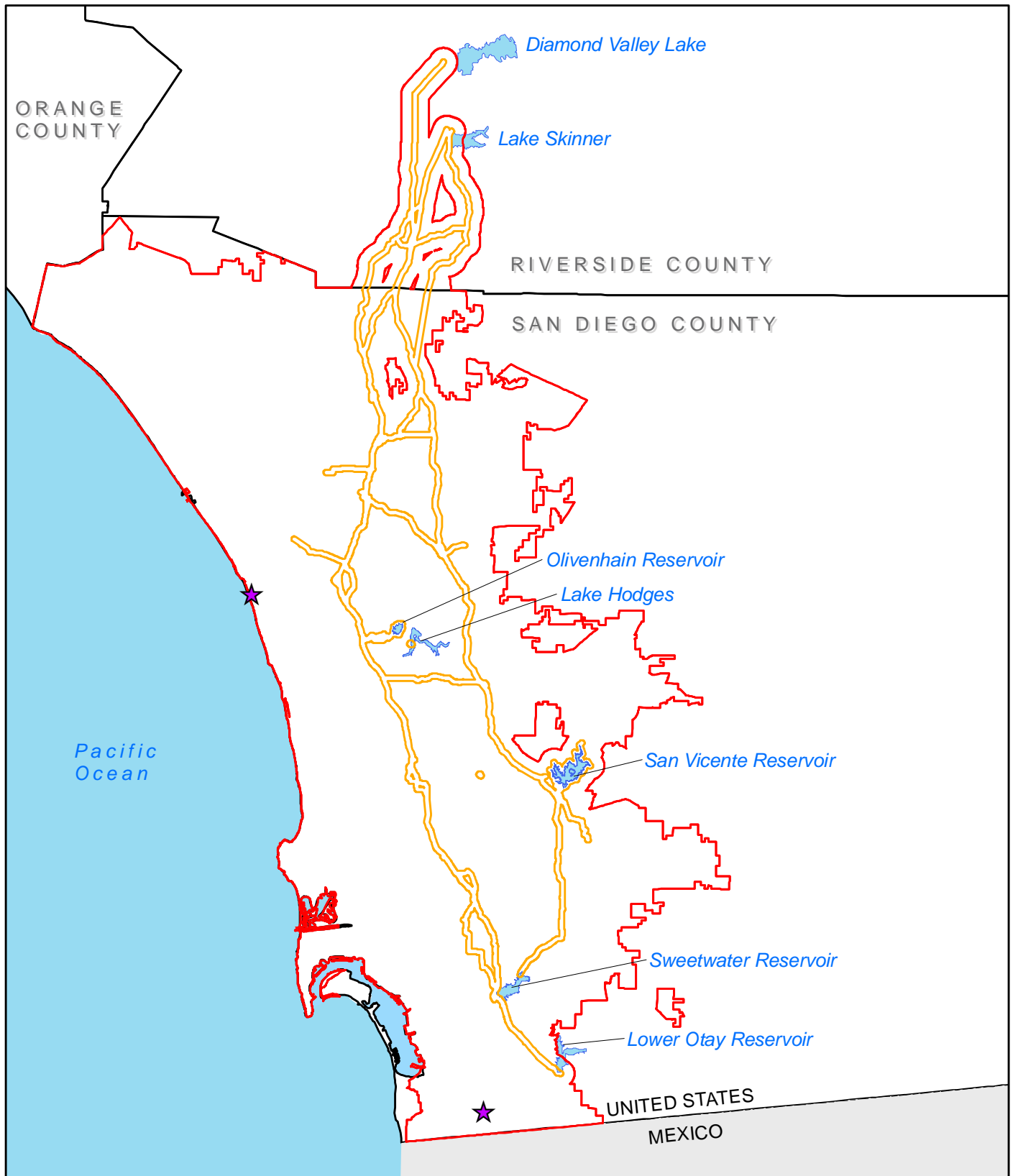


- Probable Impact Zone
- NCCP/HCP Plan Area
- Quino Checkerspot Butterfly (*Euphydryas editha quino*) Final Critical Habitat



FIGURE B-25

Final Critical Habitat for Quino Checkerspot Butterfly within NCCP/HCP Plan Area



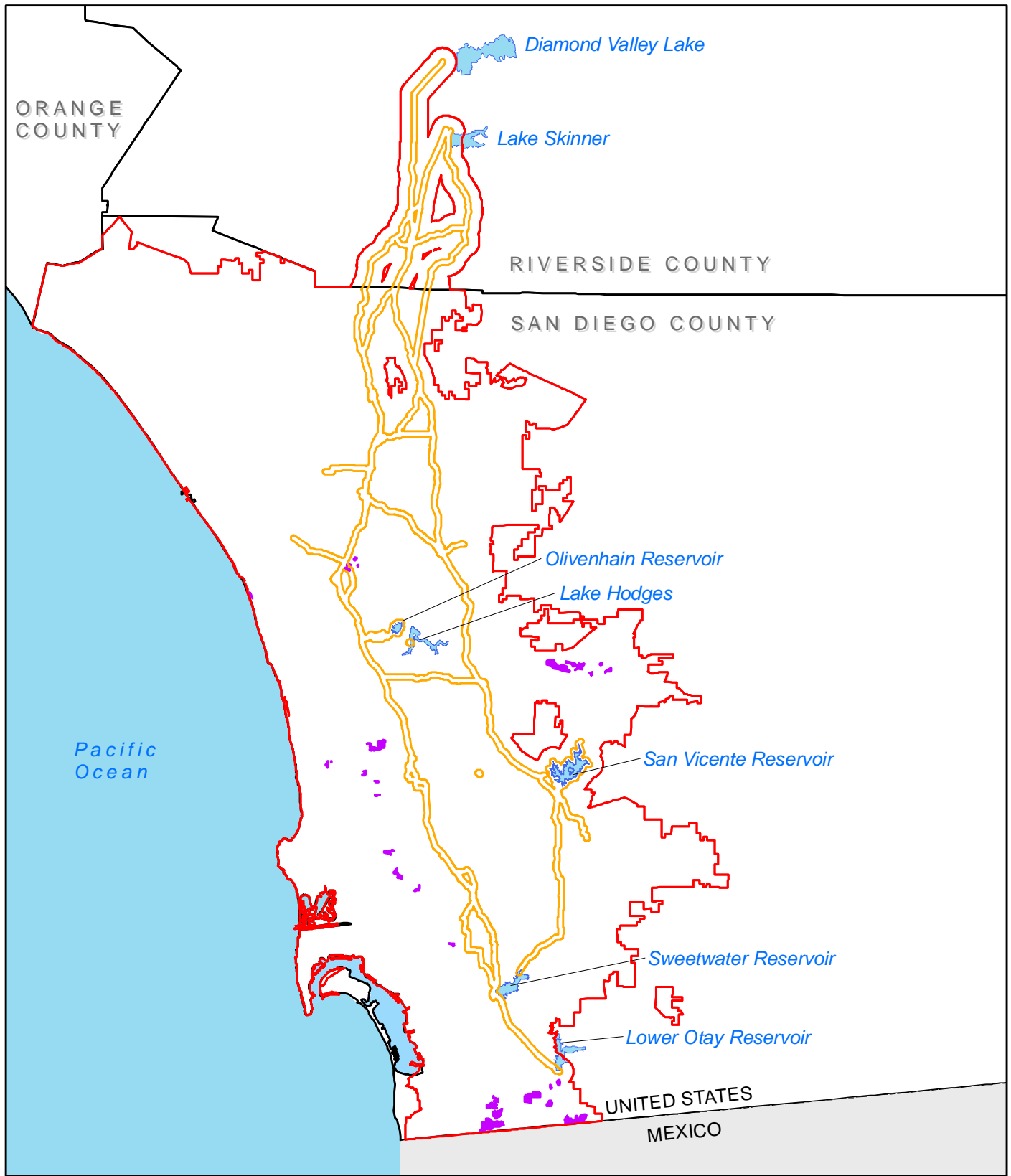
- Probable Impact Zone
- NCCP/HCP Plan Area

★ Riverside Fairy Shrimp
(*Streptocephalus woottoni*)
Final Critical Habitat



FIGURE B-26

Final Critical Habitat for Riverside
Fairy Shrimp within NCCP/HCP Plan Area



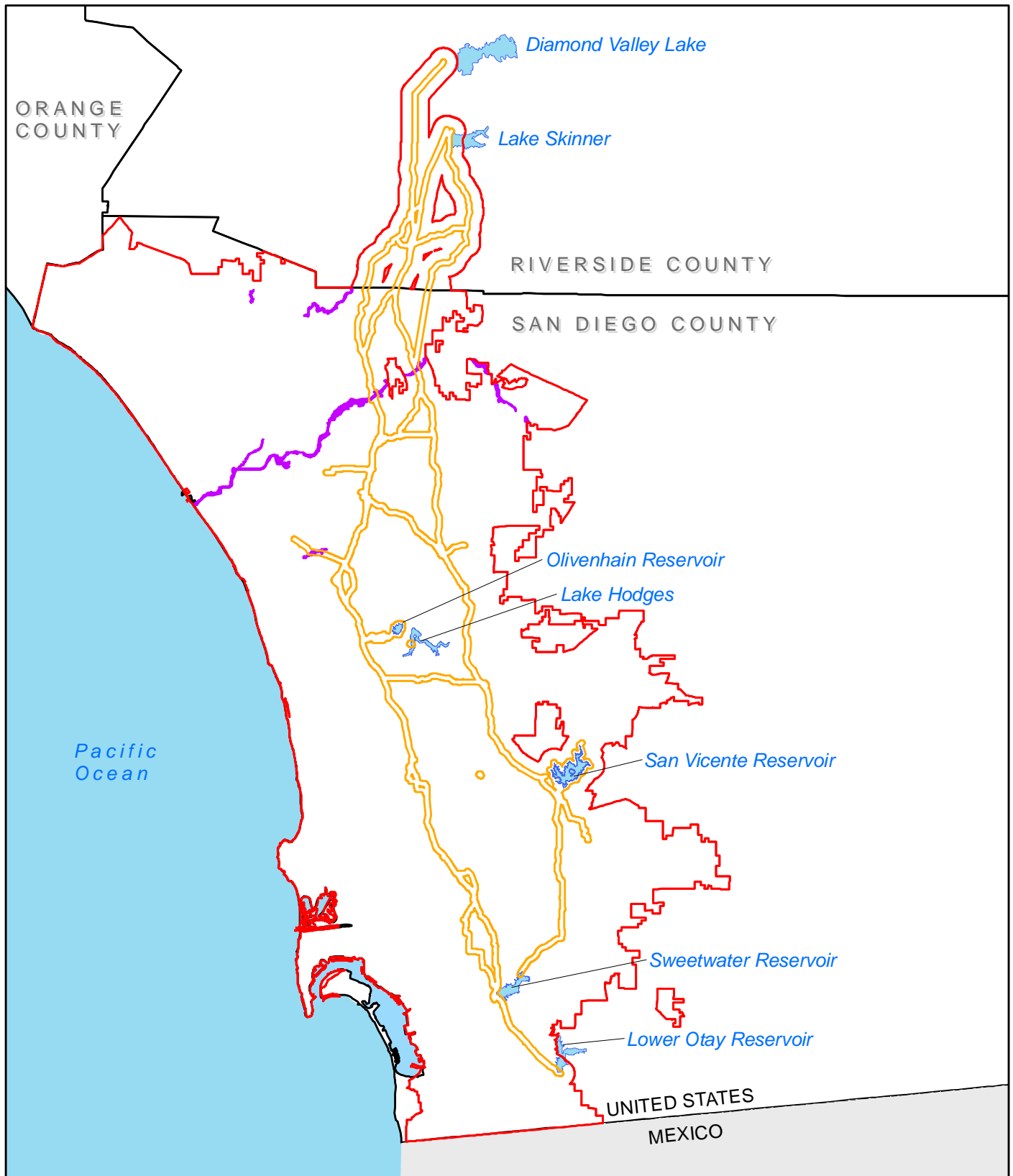
Probable Impact Zone
 NCCP/HCP Plan Area

San Diego Fairy Shrimp
(Branchinecta sandiegonensis)
 Final Critical Habitat



FIGURE B-27

Final Critical Habitat for San Diego Fairy Shrimp within NCCP/HCP Plan Area



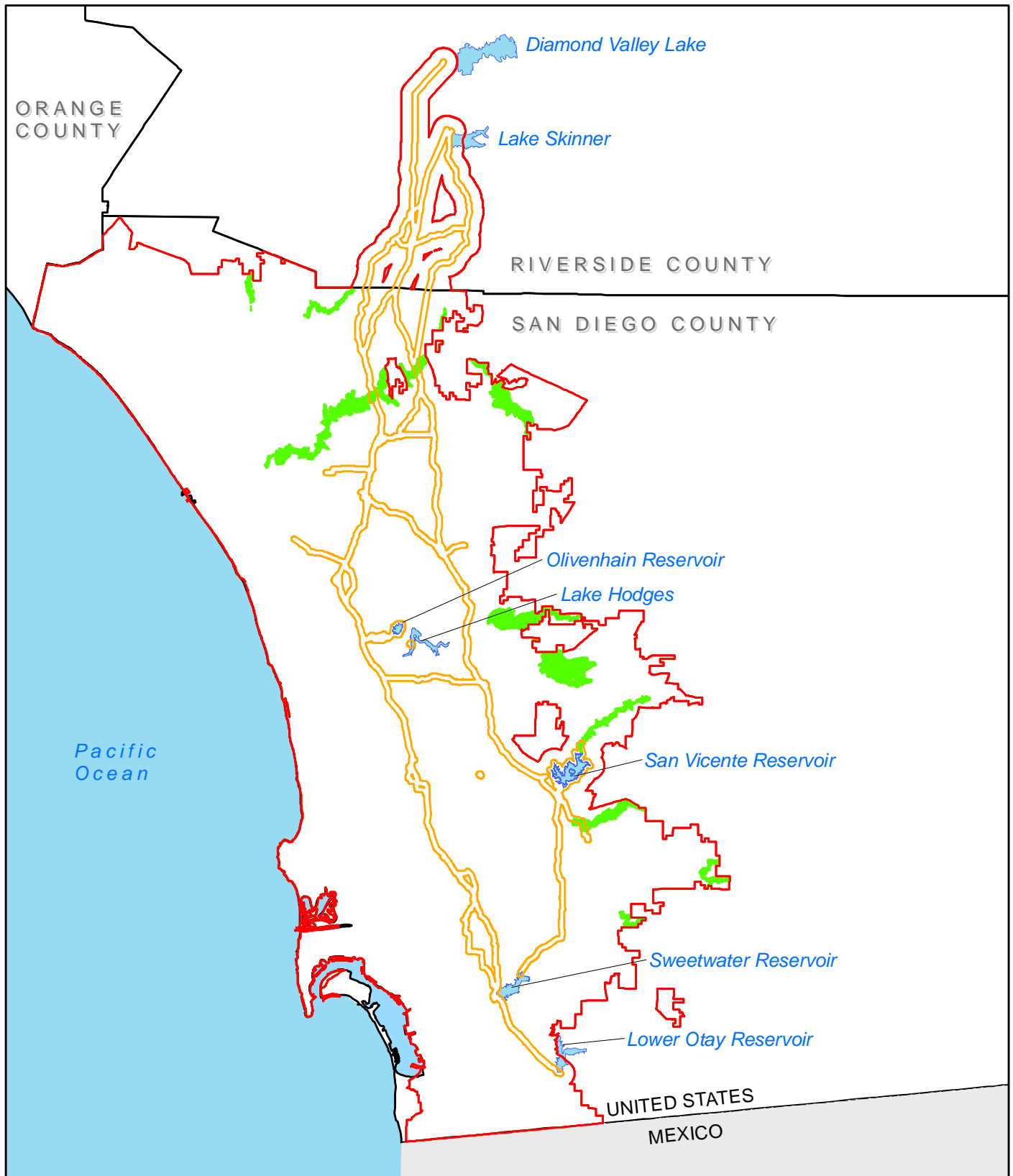
Probable Impact Zone
 NCCP/HCP Plan Area

Southwestern Willow Flycatcher
(Empidonax traillii extimus)
 Final Critical Habitat



FIGURE B-28

Final Critical Habitat for Southwestern Willow Flycatcher within NCCP/HCP Plan Area



- Probable Impact Zone
- NCCP/HCP Plan Area
- Arroyo Toad (*Anaxyrus californicus*)
Re-Proposed Critical Habitat 2009



FIGURE B-29

Re-Proposed Critical Habitat for
Arroyo Toad within NCCP/HCP Plan Area

ATTACHMENT B-2

**San Diego County Water Authority
NCCP/HCP**

Report of Independent Science Advisors

Prepared for

San Diego County Water Authority
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Prepared by

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David Faulkner
Dr. Mary Ann Hawke
Dr. Bradford Hollingsworth
Philip Unitt

Facilitated by

Jones & Stokes:
Dr. David Zippin
Kailash Mozumder

January 2008

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1.0 Introduction

1.1 Background

The State of California's Natural Community Conservation Planning Act (NCCP Act) requires a process for including independent scientific review and input (California Fish and Game Code Section 2810(b)(5)). This process ensures that the NCCP is thoroughly reviewed and that a rigorous external assessment is provided that recommends the best available science. The Federal Habitat Conservation Planning process has guidelines for similar input.

The purpose of such input is to help plan participants incorporate the best available science into a plan, and help the California Department of Fish and Game (CDFG) make sound findings regarding the plan's adequacy in, for example, conserving covered species and natural communities. The NCCP Act specifically requires that the independent scientific input:

- recommend scientifically sound conservation strategies for species and natural communities proposed to be covered by the plan;
- recommend a set of reserve design principles that addresses the needs of species, landscape, ecosystems, and ecological processes in the planning area proposed to be addressed by the plan;
- recommend management principles and conservation goals that can be used in developing a framework for the monitoring and adaptive management component of the plan; and
- identify data gaps and uncertainties so that risk factors can be evaluated.

Note that most of the terminology used in these descriptions is not defined in the NCCP Act. Therefore, many plans define terms operationally for themselves (see Section 2.2.1 below for definitions).

Findings that CDFG must make at the end of the process to approve an NCCP and issue a permit are relevant to the charge of the Science Advisors. Information provided by our panel can help CDFG to make these findings. According to Section 2820(a) of the Fish and Game Code, CDFG must determine that:

- the plan integrates adaptive management strategies that are periodically evaluated and modified based on the information from the monitoring program and other sources, which will assist in providing for the conservation of covered species and ecosystems within the plan area;
- the plan provides for the protection of habitat, natural communities, and species diversity on a landscape or ecosystem level through the creation and long-term management of

habitat reserves or other measures that provide equivalent conservation of covered species appropriate for land, aquatic, and marine habitats within the plan area; and

- the development of reserve systems and conservation measures in the plan area provides, as needed for the conservation of species, all of the following:
 - conserving, restoring, and managing representative natural and semi-natural landscapes to maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity;
 - establishing one or more reserves of other measures that provide equivalent conservation of covered species within the plan area and linkages between them and adjacent habitat areas outside the plan area;
 - protecting and maintaining habitat areas that are large enough to support sustainable populations of covered species;
 - incorporating a range of environmental gradients (such as slope, elevation, aspect, and coastal or inland characteristics) and high habitat diversity to provide for shifting species distributions due to changed circumstances; and
 - sustaining the effective movement and interchange of organisms between habitat areas in a manner that maintains the ecological integrity of the habitat areas within the plan area.

Independent scientific input has become a regular part of all NCCPs prepared in California. To date, there have been at least 14 independent scientific reviews of NCCPs¹.

The San Diego County Water Authority NCCP/HCP

The San Diego County Water Authority (Water Authority) is preparing a combined NCCP and HCP (the Plan) to provide long-term “take” authorization for its capital projects, ongoing operations, and maintenance activities. The Plan is a stand-alone subregional NCCP within the coastal sage scrub region of Southern California. The Water Authority Plan is designed to be compatible with other subregional NCCPs through which it passes, including the San Diego Multiple Species Conservation Program (MSCP) and the San Diego Multiple Habitat Conservation Plan (MHCP). Both of these plans are exempt from the current NCCP Act’s new requirements, including independent scientific review (Section 2810(b)(5)(A) through (D))². The document reviewed by the Science Advisors was the September 2007 administrative draft Plan (San Diego County Water Authority 2007).

The Water Authority Plan is subject to the requirements of the current NCCP Act, with several exceptions. Section 2830(f)(2) narrows the scope of the independent scientific input, stating that the Water Authority must include independent scientific input:

¹ Most of these reports can be found at www.dfg.ca.gov/habcon/nccp/science.html.

² The 2002 NCCP Act expanded and completely replaced the original 1991 NCCP Act. Plans exempt from the new Act follow the requirements of the 1991 Act, as amended.

...in a manner that focuses on the covered species that are proposed for take authorization and that are not otherwise covered in the San Diego Multiple Species Conservation Program or the San Diego Multiple Habitat Conservation Program. The scientific input required by this paragraph shall be based on the best and most current scientific data generally available, and shall assure that documentation for coverage of all species is equal or greater than the San Diego Multiple Habitat Conservation Program.

Following this requirement, 33 out of 94 species are not covered by either the MSCP or the MHCP. Another 8 vernal pool species were added for consideration by the Science Advisors, bringing the total to 41. The vernal pool species were added in light of a recent court ruling that invalidated the City of San Diego's federal MSCP permit for vernal pool species. These 41 species are listed in Table 1.

Table 1. Species Proposed for Coverage by the Water Authority Plan Reviewed by the Science Advisors

Scientific Name*	Common Name
Plants	
<i>Adolphia californica</i>	California adolphia
<i>Allium munzi</i> ¹	Munz's onion
<i>Arctostaphylos rainbowensis</i>	Rainbow manzanita
<i>Centromadia parryi</i> ssp. <i>australis</i>	Southern tarplant
<i>Centromadia pungens</i> ssp. <i>laevis</i> ¹	Smooth tarplant
<i>Githopsis diffusa</i> ssp. <i>filicaulis</i>	Mission Canyon bluecup
<i>Navarretia prostrata</i> ¹	Prostrate navarretia
<i>Nolina cismontane</i>	Chaparral bear-grass
<i>Packera ganderi</i>	Gander's ragwort
<i>Salvia munzii</i>	Munz's sage
Invertebrates	
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly
<i>Lycaena hermes</i>	Hermes copper
Fish	
<i>Gila orcutti</i>	Arroyo chub
Reptiles	
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink
<i>Coleonyx variegates abbotii</i>	San Diego banded gecko
<i>Charina trivirgata roseofusca</i>	Coastal rosy boa
<i>Diadophis punctatus similis</i>	San Diego ringneck snake
<i>Thamnophis hammondi</i>	Two-striped garter snake
<i>Crotalus ruber ruber</i>	Northern red diamond rattlesnake
<i>Eumeces skiltonianus interparietalis</i>	Coronado skink
Birds	
<i>Elanus leucurus</i>	White-tailed kite
<i>Accipiter striatus</i>	Sharp-shinned hawk
<i>Buteo lineatus</i>	Red-shouldered hawk
<i>Falco mexicanus</i>	Prairie falcon
<i>Asio otis</i>	Long-eared owl
<i>Lanius ludovicianus</i>	Loggerhead shrike

Scientific Name*	Common Name
<i>Eremophila alpestris californica</i>	California horned lark
<i>Dendroica petechia brewsteri</i>	Yellow warbler
<i>Ammodramus savannarum</i>	Grasshopper sparrow
Mammals	
<i>Perognathus longimembris brevinasus</i>	Los Angeles little pocket mouse
<i>Chaetodipus californicus femoralis</i>	Dulzura pocket mouse
<i>Onychomys torridus ramona</i>	Southern grasshopper mouse
<i>Neotoma lepida intermedia</i>	San Diego woodrat
MCSP Vernal Pool Covered Species	
<i>Eryngium aristulatum var. parishii</i>	San Diego button celery
<i>Navarretia fossalis</i>	Spreading navarretia
<i>Orcuttia californica</i>	California orcutt grass
<i>Pogoyne abramsii</i>	San Diego mesa mint
<i>Pogoyne nudiuscula</i>	Otay Mesa mint
<i>Branchinecta sandiegonensis</i>	San Diego fairy shrimp
<i>Streptocephalus woottoni</i>	Riverside fairy shrimp
<i>Athene cunicularia</i>	Burrowing owl

* Scientific names taken from Administrative Draft NCCP/HCP. Revisions to some of these names are recommended in this report.

¹ Covered in the Western Riverside County Multiple Species Conservation Plan (MSHCP)

1.2 The Science Advisory Process

Science Advisor Selection

Jones & Stokes was hired by the Water Authority to assemble and facilitate a panel of independent scientists to meet the requirements of the NCCP Act. Jones & Stokes compiled a list of 67 potential candidates, drawn from recommendations by CDFG, the U.S. Fish and Wildlife Service (USFWS), the Water Authority, RECON Environmental, Inc. (RECON, the Water Authority's Plan consultant), previous science advisory panels for NCCPs in Southern California, and professional networks of Jones & Stokes staff. The panel members were selected based on the following criteria:

- expertise in one or more of the species groups in Table 1;
- successful experience with previous NCCP science advisory panels;
- local expertise in ecology and conservation biology; and
- availability to participate in the science advisor workshop and produce a report on the schedule outlined by the Water Authority.

The five members selected to participate in this panel each met all of the four criteria. The selection also guaranteed that expertise for all species groups was represented (Appendix A presents biographies of each panel member). Dr. Matt Rahn was selected to chair the panel, and provided additional support to Jones & Stokes in compiling the report and soliciting additional input from the advisors following the workshop.

Science Advisor Meeting

In preparation for the panel meeting, a conference call was held with the advisors on November 5, 2007, to provide an orientation to the project, review the charge of the panel, and finalize the agenda for the panel meeting. Background material was provided to the advisors at this time: the Plan, general guidance from CDFG on the science advisory process for NCCPs (CDFG 2002), and a preliminary guidance memo from Jones & Stokes on the science advisory process with preliminary questions for the advisors to address. This memo was revised following the conference call and is included as Appendix D.

The Science Advisors agreed that primary responsibility for the species groups would be as follows:

- Plants—Dr. Mary Ann Hawke
- Birds—Phil Unitt
- Reptiles and Amphibians—Dr. Brad Hollingsworth
- Invertebrates and Fish—Dave Faulkner
- Mammals—Dr. Matt Rahn

A meeting of the Independent Science Advisory Panel (Science Panel) was held on November 19th, 2007 (See final agenda in Appendix C)³. This meeting was facilitated by scientists and NCCP experts from Jones & Stokes, who outlined procedures for engaging and formalizing the science advisors in the review process. This meeting also included a representative from the Water Authority, consultants preparing the Plan (RECON), and staff from CDFG and USFWS. The Water Authority and RECON presented overviews of the Plan and provided the Science Panel members an opportunity to ask questions. The advisory committee then met in closed session to review and discuss the Plan. A follow-up conference call was held on November 26 to coordinate preparation of the final report.

The Independent Science Advisory Panel's report is provided herein, as mandated for the Water Authority Plan. This review and discussion is being provided to assist the agencies in making sound findings that the Plan can adequately cover and conserve the covered species and natural communities. As described above, the Science Advisors focused on 41 of the 94 proposed covered species (Table 1). Given the unique nature of this particular Plan, the science advisors focused their review on addressing the scope of the Plan, the conservation strategy, species-specific review, and adaptive management and monitoring. Additional comments and questions from the Science Panel are also provided herein. The organization of this report follows these major topics.

³ Dr. Hollingsworth did not participate in the November 19 meeting.

2.0 Scope of the Plan

2.1 Covered Species

2.1.1 Covered Species Selection

2.1.1.1 Sources and Rationale for Inclusion

The Plan's original list of potential covered species contained more than 180 species, based on a number of factors. One of the original methods used to draw up the list was to include all species found in overlapping plans—the Western Riverside County Multiple Species Conservation Plan, the San Diego South County Multiple Species Conservation Program, the draft North County Multiple Species Conservation Program, and the North County Multiple Habitat Conservation Program. In addition to pulling from these other plans, all species that were determined to have the ability to occur and be mitigated for within the four conservation banks were included. The final method used was to include all species from the California Natural Diversity Database (CNDDDB) that were found within a one-mile buffer of the proposed impact area.

The Science Panel recommends that specific criteria be described in the Plan to justify the selection process for covered species. Criteria that seem to fit the current list, as well as the process used by RECON includes:

- species occurs within Water Authority right-of-way or is very likely to occur;
- species is listed by the state or federal wildlife agencies or is likely to be listed during the permit term;
- covered activities are likely to impact the species; and
- Water Authority can provide adequate conservation, management, and monitoring for the species (this presumes there is enough information known about the species to do so).

In its current form this Plan proposes 94 covered species, 41 of which would be evaluated by the Science Panel. This subset (Table 1) contains species that are not covered by the surrounding plans or are species for which additional information has been requested. All proposed covered plants and invertebrates appear to meet the criteria outlined above and should remain as covered species. Coverage of species in other groups is discussed below.

Plants

Justification for Seeking Coverage

There are 10 covered plant species under review by the Science Advisors and five MSCP covered species: *Adolphia californica*, *Allium munzii*, *Arctostaphylos rainbowensis*, *Centromadia*

parryi ssp. *australis*, *Centromadia pungens* ssp. *laevis*, *Githopsis diffusa* ssp. *filicaulis*, *Navarretia prostrata*, *Nolina cismontane*, *Packera ganderi*, *Salvia munzii*, *Eryngium aristulatum* var. *parishii*, *Navarretia fossalis*, *Orcuttia californica*, *Pogogyne abramsii*, and *Pogogyne nudiuscula*.

The San Diego Natural History Museum's (SDNHM) Botany Department can provide additional information about the documented locations of each of these species to help support their inclusion in the Plan.

Also, note the name change in *Opuntia californica* var. *californica* (Tables 6-1 and 6-2 of the Plan); this species has been transferred to the genus *Cylindropuntia*.

The following plants should be considered for coverage in the Plan and evaluated against the four criteria suggested above:

- *Brodiaea santarosae* is a new species described by Chester et al. (2007) that occurs in southwest Riverside County. The species is mentioned as occurring along pipelines, so it would be worth confirming the documented locations to ensure that it is not a consideration in the northernmost part of the Plan area.
- *Eryngium pendletonensis*, *Mondardella stoneana*, and *Ceanothus otayensis* (which used to be included with *Ceanothus crassifolius*) are other "new" species that possibly could be found near the Water Authority lands and should be considered.
- Cacti may be more of a concern as a result of recent fires (particularly *Cylindropuntia californica* var. *californica*) because they do not recover well from fire. If the recent fires destroyed populations of cactus then their current occurrence and distribution may not be well known.

Existing Data on Covered Species

The use of point localities from the San Diego County Plant Atlas and SDNHM herbarium databases would add important information to the conservation analysis. The Plant Atlas database includes 30,000 point locations for plant specimens collected in the past five years, and the herbarium database includes a similar set of data for historic plant collections. Inclusion of these data would help the Water Authority understand which species occur on their lands and in the mitigation banks they have chosen. These data would also help confirm and/or refine the information in Table 6-2 of the Plan (particularly elevations, habitat types, and blooming periods, all of which are typically included in plant specimen records). Data from CNDDDB is not verified and includes observation data which can potentially contain errors. The plants submitted to the Plant Atlas are all verified by the Curator of Botany and represent physical specimens collected from the site.

Ecological Profiles of Covered Species

Mission Canyon bluecup (*Githopsis diffusa* ssp. *filicaulis*)

Additional locations are now known for this species, besides those mentioned in the write-up in Appendix B of the Plan. The Curator of Botany at the SDNHM has collected and documented this species on Crestridge Ecological Reserve.

Prostrate navarretia *Navarretia prostrata*

Appendix B states that “a herbarium specimen examined is from the Miramar area” but does not specify which herbarium, nor does it give an accession number for the specimen.

Gander's ragwort *Packera ganderi*

New locations are also known for this species besides those mentioned in Appendix B (e.g., Potrero Park). It is included as “endemic or near endemic” in the 4th edition *Checklist of Vascular Plants of San Diego County* by Rebman & Simpson (2006).

Herpetofauna

Justification for Seeking Coverage

There are a total of 12 amphibian and reptile species included in the Plan. Six are not reviewed here, but have merit for their inclusion in the NCCP (western spadefoot, arroyo toad, Southern Pacific pond turtle, Belding’s orange-throated whiptail, coastal whiptail, and San Diego horned lizard) due to their listed status or their designation as a special concern species. Only the Coastal Whiptail lacks these designations, but its inclusion is merited due to the continued reduction of available habitat.

The remaining six species, reviewed here, have merit for inclusion within the Plan. Three of the six species reviewed (two-striped gartersnake, northern red diamond rattlesnake, and Coronado skink) are designated as special concern species. The remaining three (San Diego banded gecko, coastal rosy boa, and San Diego ring-necked snake), while not covered by either a listed or designation status, are species that have had substantial reductions in available habitat. These species are therefore warranted as covered species in the Plan.

Three species not included in the Plan, but likely to have distributions within the core Plan area, are the south coast garter snake, silvery legless lizard, and coast patch-nosed snake. Each is designated as a special concern species, but is excluded from the Plan. These excluded species have spotty collecting and reporting data, and less is known about their overall habitat requirements. They are less commonly seen but share similar characteristics in their apparent population declines. The Science Panel recommends that these species be considered for coverage in the Plan.

Existing Data on Covered Species

The Plan relies heavily on distribution information from the CNDDDB, which is neither complete nor accurate for many of the species covered. As a result, the number of records within the Plan's focal area is biased towards those species most often recorded in the CNDDDB. Another issue with the CNDDDB data is its reliability, as the records are difficult to track back to their source (often based on visual identifications). As a result, the Plan's maps greatly underestimate the occurrence of species within the covered area.

A number of additional data sources are available. The first is information from museum records, which have the advantage of being linked to their source material. Museum voucher specimens reveal that there are additional records for all six of the species under review that provide localities not covered by the data used to construct the maps. For instance, museum voucher specimens of *Diadophis punctatus* are present from Sweetwater Reservoir (CNDDDB Map 16). Museum voucher specimens are also available for *Crotalus ruber* and *Thamnophis hammondi* for this area. This same exercise shows the presence of the species within the core conservation areas of the Plan is more extensive than what is reported from the CNDDDB.

Mapping of the species outside the Plan's area indicates that these species occur throughout many cismontane habitats (coastal sage scrub, chaparral, riparian corridors, grassland, and oak woodlands) and have a high likelihood of occurring within the core conservation areas. With incorporation of additional information, it would be expected that sampling error would be further minimized. The Science Panel recommends that maps show the distributions of species outside the Plan area to put them into geographical context.

Such museum information is freely available to any user through a number of online search engines. For the herpetological community, the most convenient is the distributed information from HerpNet, a community of 52 institutions with data from over 5.5 million specimens worldwide. This includes the SDNHM's data, which has the greatest number of specimen records relevant to this Plan. The Department of Herpetology (SDNHM) has assigned latitude and longitude information to each museum voucher specimen using the point-radius method of geo-referencing, which includes spatial error estimates.

Another source of herpetological data comes from the United States Geological Survey (USGS), Biological Resource Division. The USGS should be consulted for additional information that would be useful in developing this Plan, including many of their agency reports.

Overall, maps in the Plan are fairly crude given current GIS capabilities. There are no indicators on the maps to distinguish between types of information. Did all the data come from the CNDDDB? If not, then the location points should be coded to indicate their data source. And, some data sources may include breeding information, population size estimates, and the type of observation. If so, these should be indicated.

Species accounts for reptiles and amphibians should include a discussion of mapped localities, in addition to the localities drawn from the literature (mostly Glaser 1970 and Klauber 1934).

Ecological Profiles of Covered Species

Literature citations from the Plan's Appendix B species accounts for reptiles and amphibians seem inadequate for the information presented. As a result, the accounts appear more authoritative than they really are and it is difficult to impossible to verify some of the biological claims. With that said, they generally portray the animal's biology accurately. (Suggested edits to these accounts have been provided separately to the Water Authority.) Species accounts for reptiles and amphibians should use standard citation formats and explicit statements concerning the source of the information, including those from personal communications and unpublished data. For the latter two, the source and date should be indicated. Although returning to the source data is usually the best policy, sometimes more general citations provide a conservative description of biological information. It is sometimes desirable to describe range-wide information for the species when specific information is not available for the region under consideration (see the use of Zweifel 1952). Therefore, the Science Panel recommends that Stebbins (2003) be consulted.

Generally, the Plan's species accounts for reptiles and amphibians are inconsistent. For example, in chapter 6 (page 6-8), the Plan states that the amphibian and reptile nomenclature follows Crother (2001) and Crother et al. (2003). However, the nomenclature does not appear to follow these authorities (as detailed in Tables 2 and 3).

Table 2. Common Names for Reptiles and Amphibians Covered by the Plan

NCCP/HCP	Crother (2001), Crother et al. (2003)
Western spadefoot toad	Western spadefoot
Arroyo toad	Correct
Southwestern pond turtle	Southern Pacific pond turtle
Coronado skink	correct
Belding's orange-throated Whiptail	correct
Coastal western whiptail	Coastal whiptail
San Diego banded gecko	correct
San Diego horned lizard	Coast horned lizard
Coastal rosy boa	correct
San Diego ringneck snake	San Diego ring-necked snake
Two-striped Garter Snake	Two-striped gartersnake
Northern red-diamond rattlesnake*	Red diamond rattlesnake

*Subspecies not recognized by Grismer et al. (1994)

Table 3. Scientific Names for Reptiles and Amphibians Covered by the Plan

NCCP/HCP	Crother (2001), Crother et al. (2003)
<i>Spea [=Scaphiopus] hammondii</i>	<i>Spea hammondii</i>
<i>Bufo californicus</i>	correct
<i>Emys [=Clemmys] marmorata pallida</i>	<i>Actinemys marmorata pallida</i>
<i>Eumeces skiltonianus interparietalis</i>	correct
<i>Aspidoscelis hyperythrus beldingi</i>	<i>Aspidoscelis hyperythra beldingi</i>
<i>Cnemidophorus tigris multiscutatus</i>	<i>Aspidoscelis tigris stejnegeri</i>
<i>Coleonyx variegates abbotti</i>	correct
<i>Phrynosoma coronatum blainvillii</i>	<i>Phrynosoma coronatum</i>
<i>Charina trivirgata roseofusca</i>	<i>Lichanura trivirgata roseofusca</i>
<i>Diadophis punctatus similis</i>	correct
<i>Thamnophis hammondii</i>	correct
<i>Crotalus ruber ruber</i>	<i>Crotalus ruber</i> *

*Subspecies not recognized by Grismer et al. (1994)

Birds

Justification for Seeking Coverage

White-tailed kite (*Elanus leucurus*)

This species occurs in the study area and shows evidence of decline in San Diego County since the early 1980s. Factors likely responsible for the decline are continuing, and the Plan could contribute to recovery, or at least stem the decline; therefore, coverage is justified.

Sharp-shinned hawk (*Accipiter striatus*)

The species occurs in the study area (as an uncommon winter visitor only), shows no evidence of significant change in numbers through history, uses urban areas as freely as natural habitat, and the Plan will have no effect on its numbers. Therefore, there is little or no chance of listing the sharp-shinned hawk, and coverage is not justified. The sharp-shinned hawk is no longer listed by the CDFG as a species of special concern, there being no concrete evidence for population decline.

Prairie falcon (*Falco mexicanus*)

This species is not on CDFG's current list of species of special concern (contrary to what is stated in the Plan). The species currently occurs in the Plan area (areas actually affected by the Water Authority's activity or infrastructure) as a rare migrant or winter visitor only. It may have bred in very small numbers in the past (one nest site known at Fortuna Mountain in 1980 is now abandoned). The Plan is unlikely to have any effect on the species numbers, given that the cliffs where the species nests or might nest are not likely to be affected by Water Authority activities or infrastructure, and foraging habitat would not be affected significantly either. The Water Authority should consider dropping this species from coverage or providing more rationale for why impacts are expected to occur.

Burrowing owl (*Athene cunicularia*)

This species currently occurs in the Plan area, if the report of a colony along an aqueduct in Riverside County is correct, as well as at Sweetwater Reservoir as the result of experiments at reintroduction. It was once widespread in the area but has suffered almost complete population collapse in coastal Southern California. The lack of records within the project area likely reflects their absence from the right-of-way. They are unlikely to colonize the right-of-way on their own due to declining populations regionally. There are also very limited or no opportunities to contribute to the recovery of the species at the three conservation banks. The Plan could have a positive effect on the species, if it includes experiments at restoration or provides habitat in which attempts at restoration would be appropriate (rights-of-way along aqueducts would be appropriate). However, the outcomes of such experiments are uncertain. The Water Authority should reconsider whether coverage for this is warranted given the lack of impacts and challenges in providing meaningful conservation to contribute to species recovery.

Long-eared owl (*Asio otus*)

The species probably occurs in the Plan area, although in very low numbers. It was once far more numerous in the Plan area and is now recognized as a species of special concern by CDFG. It is very unlikely that the long-eared owl would become federally listed because it has a transcontinental distribution. State listing is also unlikely. Based on information in the Plan, impacts on this species are unlikely within the right-of-way. The Water Authority should consider dropping this species from coverage or provide more rationale for why impacts are expected to occur. The species is highly dispersive, so the Plan area may be on too small a scale for conservation at that level to be effective. Its conservation biology in California is too poorly known for appropriate means of conservation to be proposed. Therefore, the justification for covering the long-eared owl under this Plan is marginal.

Loggerhead shrike (*Lanius ludovicianus*)

The species occurs in the Plan area, in low density and discontinuously. The loggerhead shrike was once far more numerous in the Plan area and is now recognized as a species of special concern by CDFG so it could be listed at state level, although listing at the federal level is very unlikely. The scale of the Plan area and mitigation sites is adequate for realistic conservation efforts for this species. The Rancho Cañada and San Miguel mitigation sites, possibly the Crestridge site, are relevant to the loggerhead shrike. Therefore coverage under this Plan is justified as long as the conservation strategy contributes to the recovery of the species (per NCCP standards).

California horned lark (*Eremophila alpestris actia*)

The subspecies occurs discontinuously in the Plan area. It was once far more common, being called the commonest bird in Escondido in 1906. It has declined greatly, and was listed by the CDFG as a species of special concern in 1992. However, it is not on CDFG's latest in-press list

(and is not up to date in the Plan). The scale of the Plan area and mitigation sites is adequate for conservation efforts. Rancho Cañada and San Miguel are likely suitable mitigation sites. Also, onsite conservation along rights-of-way is appropriate for this species. Listing of California horned lark during the permit term is unlikely, but coverage under this Plan is justified. Note that the subspecies name should be corrected.

Yellow warbler (*Dendroica petechia*)

The yellow warbler occurs as a breeding species within the Plan area where mature riparian woodland crosses it. It has declined as a result of habitat loss combined with cowbird parasitism and is recognized as a species of special concern by CDFG. San Diego County is one of the primary centers for the yellow warbler in California. The scale of the Plan area and mitigation sites is adequate for conservation efforts. Listing of yellow warbler is possible only at the state level but will depend on whether the cowbird trapping programs directed at the least Bell's vireo can be maintained (yellow warbler has benefited greatly from these trapping programs). For now, coverage under this Plan is justified.

Grasshopper sparrow (*Ammodramus savannarum*)

The grasshopper sparrow occurs discontinuously within the Plan area. Much of its former range in Southern California has been urbanized, and the grasshopper sparrow is recognized as a species of special concern by CDFG. Listing of grasshopper sparrow is only possible at the state level during the permit term. The scale of the Plan area and mitigation sites is adequate for conservation efforts. Therefore, coverage under this Plan is justified.

Existing Data on Covered Species

White-tailed kite

Data from the *San Diego County Bird Atlas* (Unitt 2004 [“the Atlas”]), is sufficient to address the general status and provide a rough population estimate in the area. The species' site fidelity is low so specifying exact nest sites over a short period of time provides only a limited view of the species' breeding distribution. Its occurrence in Riverside County is likely but is not known in detail. Knowledge of distribution in San Diego County is rather sparse, but its distribution should not be restricted to known nest sites. Other relevant sources of data include Wildlife Research Institute reports. CNDDDB records, if any, of this species are undoubtedly very incomplete, as they are expected to be for any species not formally listed as threatened or endangered.

Sharp-shinned hawk

Data from the Atlas and annual Christmas bird counts are only sufficient to evaluate the general status of this species in the area, but not its numbers.

Prairie falcon

Based on the Atlas, the species does not currently breed in the study area. The closest sightings during breeding season are Pala–Temecula Road (Highway S16) and El Cajon Mountain. Nesting sites recorded in the Atlas are probably thorough but not exhaustive. Nesting in Riverside County within the study area is unlikely (no cliffs). The Wildlife Research Institute may have better data.

Burrowing owl

Based on the Atlas, the species is extirpated from the San Diego County portion of the study area, but the Plan mentions a colony in the Riverside County Portion of the Plan area. This is an important observation: more details of what was actually observed, numbers, exact location, and exact dates should be provided. Reported occurrence at the San Miguel mitigation site is vague: is the implication that a single bird was observed on only one occasion correct?

Long-eared owl

The listing of sites in San Diego County in the Plan is not exhaustive (worded so the question of exhaustiveness is unclear). Even after discovery of additional sites during field work for the Atlas, it is likely that the list of known sites is still far from exhaustive. The species' site fidelity in this region is also unclear; it may be low. The efficacy of efforts to conserve and restore this species is unknown.

Loggerhead shrike

The species' distribution within the Plan area is known in moderate detail, as a result of the Atlas. Its occurrence in the Riverside County portion of the Plan area is likely but not known in any detail. The Plan states that there are no CNDDDB records of the Loggerhead Shrike in the Plan area but does not say whether that database actually compiles data on the species on the California mainland.

Horned lark

The species' distribution within the Plan area is known in moderate detail, as a result of the Atlas. The Atlas results show the species near the rights-of-way in San Pasqual Valley, Miramar, and possibly elsewhere; a more detailed overlay is appropriate. Occurrence in the Riverside County portion of the Plan area is likely but not known in detail.

Yellow warbler

The species' distribution within the Plan area is known in good but not exhaustive detail as a result of the Atlas. The Plan mentions that the Yellow Warbler is known from the Rancho Cañada mitigation site without saying whether it is as a breeding bird or as a migrant; this distinction is critical for the yellow warbler, which occurs in the Plan area commonly as a migrant

as well as locally as a breeding species. Besides the sites listed in the Plan, breeding yellow warblers also occur along the San Dieguito and San Diego rivers near where these cross the rights-of-way.

Grasshopper sparrow

The species' distribution within the Plan area is known in good but not exhaustive detail as a result of the Atlas. It is not clear from the Plan whether the sites of the "core areas" for the species in Riverside County are part of the Plan area. The Plan states that "there are CNDDDB records of grasshopper sparrows near the rights-of-way or other facilities," but if so they are not plotted on the maps provided.

Ecological Profiles on Covered Species

White-tailed kite

The summary of this species' range in the Plan has many errors. See edits to the ecological profiles of birds in a separate file provided to the Water Authority, their consultants, and the wildlife agencies.

Sharp-shinned hawk

The sharp-shinned hawk has no preference for native versus landscaped habitats during the winter.

Prairie falcon

The Plan should say "This species is a rare breeding resident in *inland* [not coastal, as it says now] San Diego and Riverside counties."

Burrowing owl

The summary should refer to http://www.albionenvironmental.com/inside_proceedings.pdf for possibly relevant additional information. The burrowing owl is suffering decline range-wide, and the problem needs to be addressed in a range-wide context. Actions taken on the scale of this Plan alone may be on too narrow a scale to be effective. There may be factors beyond those listed in the Plan contributing to bad population dynamics.

Long-eared owl

It's not clear why the Plan says for the long-eared owl that "county population would not be considered significant to the genetic makeup of this North American subspecies." Some other organisms on the list of covered species also have a wide distribution outside the Plan area. Oak groves as well as riparian woodland should be listed as the species' habitat (they are currently more frequently used in the Plan area than riparian woodland).

Loggerhead shrike

The loggerhead shrike's distribution may shift with fire, the birds moving to exploit intermediate successional stages. Partly recovered scrub or chaparral (with considerable open ground remaining but some shrubs grown large enough for nest sites) is favorable to the shrike. Because a patchwork of disturbed open ground is favorable, disturbed rights-of-way along aqueducts may offer suitable habitat.

Horned lark

In the statement of the subspecies' range, the Plan failed to mention that *Eremophila alpestris actia* ranges as a breeding bird well south in northwestern Baja California. The statement that numbers of horned larks in Southern California are significantly augmented in winter by migrants of other subspecies is probably no longer true, if it ever was (see Patten et al. 2003). The account for this species should emphasize that it is susceptible to range reduction and habitat loss through habitat fragmentation (like many ground-nesting birds) but that it also readily colonizes disturbed habitat and burned areas. Conservation focused solely on conserving natural habitats is incomplete with respect to the horned lark.

Yellow warbler

The recovery of the yellow warbler in San Diego County appears to be linked to the maintenance of riparian woodland and widespread cowbird trapping. Prolonged drought, groundwater pumping, and preventing water from reaching natural stream courses could all eliminate riparian woodland and reverse the yellow warbler's recovery. With respect to the Rancho Cañada mitigation site, the Plan misleadingly says that it includes "associated upland habitats that could be used by this species"; in the Plan area breeding yellow warblers are exclusively riparian, frequenting the canopies of mature trees and not using upland habitats to any significant extent.

Grasshopper sparrow

The grasshopper sparrow is notoriously irregular in abundance and local distribution from year to year. At least some of this irregularity appears linked to cycles of rain and drought, the birds being more numerous or at least more conspicuous after wet years and few or inconspicuous following prolonged drought.

Mammals

Justification for Seeking Coverage

Los Angeles little pocket mouse (*Perognathus longimembris brevinasus*)

Little information about the pocket mouse is available regionally, or within the actual Planning area. However, suitable habitat within the Plan area likely exists. Many biologists believe that this subspecies is in serious decline within western Riverside County, which suggests that coverage is warranted.

Dulzura pocket mouse (*Chaetodipus californicus femoralis*)

The distribution of the Dulzura pocket mouse is relatively wide, and the species does occur within the Plan area. Experts consider this species to be at risk, but it is difficult to quantify the potential for this species to become seriously threatened in the future; however, continued habitat loss, degradation, and fragmentation will continue imperiling this species. Coverage for this species is well justified.

Southern grasshopper mouse (*Onychomys torridus ramona*)

The southern grasshopper mouse has been a very difficult species to assess and monitor; it is not typically captured using standard small-mammal trapping protocols, and non-lethal methods and monitoring are technically challenging and expensive. However, this species has been documented within the Plan area. Before coverage can be granted, appropriate assessment protocols should be developed. Given the difficulty in assessing this species, its listing may be unlikely during the permit term. Due to the lack of data on occurrences and conservation needs, the Science Panel recommends that this species not be covered in the Plan.

San Diego woodrat (*Neotoma lepida intermedia*)

This species is wide ranging, and is known from the Plan area and the proposed mitigation lands. As with all of the small mammals proposed for coverage, the San Diego woodrat is similarly susceptible to habitat loss, degradation, and fragmentation. However, given its habitat requirements and natural history, this species is also very susceptible to the impacts from fire. As a species of special concern in California, there is a potential for future listing, suggesting that coverage is warranted.

Existing Data on Covered Species

The Science Panel recommends that additional sources of data be consulted, particularly the *San Diego Mammal Atlas* (in press; Mammal Atlas). While not yet in publication, a considerable amount of information has been collected for many of the covered species, and wildlife-habitat associations have also been generated.

Ecological Profiles on Covered Species

The profiles generated for these species closely follow many of the profiles provided in other regional conservation Plan efforts. However, as regional information increases, it would be useful to consult the biologists working on the San Diego Mammal Atlas for more regionally specific information.

Other Species

Justification for Seeking Coverage

All five species of invertebrates have extensive justification for inclusion in this report. The three fairy shrimp species are all federally listed as threatened or endangered, and have been designated with critical habitats. The vernal pools that they are associated with are also protected. Of the two butterfly species, the Quino checkerspot is federally listed with designated critical habitat. Hermes copper is not currently listed, but a proposal for listing was reviewed by the USFWS last year and denied. Following the 2007 fire season, the known populations have been greatly impacted and the proposal to list the species will undoubtedly be resubmitted. The County of San Diego has been interested in this species for a number of years. Its inclusion in the Plan is justified. Additionally, the dunn skipper should be included in this document. There are no other species of invertebrates that have any formal listing that would be impacted by projects related to the Water Authority at this time.

The other species reviewed was the arroyo chub (fish) that occurs in many of the fresh water streams in San Diego and Riverside Counties. The species is often an indicator of changes in water quality in fresh water streams and is listed by the CDFG as a species of special concern. Inclusion in the Plan is justified because of the pipeline routes that do impact possible habitat.

For these species, the justification for coverage is more than adequate, with the exception of Hermes copper butterfly (according to the USFWS). However, there are adequate data within the impact area of this project for this species.

Existing Data on Covered Species

For all species addressed (including the dunn skipper), there is adequate data available on distribution, biology, and impacts that affect populations. A number of these species, such as the Quino checkerspot, are monitored yearly by the USFWS. A recent Master's thesis on Hermes copper by Dan Marcelack contains a list of all known occurrences of this species. The baseline inventory prepared for the MSHCP in Riverside County may provide additional occurrences in Riverside County for all of the covered species. The USFWS Riverside office is the lead agency for this inventory.

Ecological Profiles on Covered Species

The habitat requirements for each of these species are documented. A weakness is that the various preserves available as possible mitigation areas have not been assessed for suitability for all of the species, except Quino and perhaps Hermes. The impact of recent fires has been significant in some of these locations and will need to be reassessed, especially in northern San Diego County.

2.1.1.2 Options for Levels of Coverage

In seeking coverage for a species there are several options available, some of which fall short of a take permit under the federal ESA and state NCCP Act. The Water Authority may wish to consider reduced levels of coverage for species that do not meet all of the criteria outlined above. including:

- **ESA and state coverage** under Section 2081 of the Fish and Game Code. This is available now for state-listed species only. However, species could be addressed to enable a 2081 permit application in the future in the event that a species is state listed during the permit term.
- **ESA coverage only.** This would apply to species not currently state listed, and would provide federal coverage using a mitigation standard and remove the need to contribute to species recovery.
- **“CEQA species.”** No take permit would be issued because the species is not listed and is unlikely to become listed in the permit term, but the conservation measures could address CEQA requirements to reduce impacts to a level below significance. This could streamline CEQA compliance for future Water Authority projects.
- **Conditional coverage.** Coverage provided later in the permit term once thresholds for data standards or other thresholds are met, allowing an easy or automatic coverage without going through a time-consuming formal permit amendment process (e.g., this approach was used for some species in the Clark County, Nevada MSHCP). Conditional coverage only works if the thresholds are defined very clearly.

2.2 Natural Communities and Ecosystems

2.2.1 NCCP Definitions and Data

The NCCP Act uses several important ecological terms that relate to the findings that CDFG must make at the end of the planning process in order to issue permits. These terms are undefined in the NCCP Act. To ensure that they are addressed in the Water Authority NCCP, we recommend that they be defined for the Plan. Suggested definitions for these terms are:

- **Ecosystem function**—The sum total of processes operating at the ecosystem level, such as the cycling of matter, energy, and nutrients (Mooney et al. 1995). Ecosystem functions include such biological and physical processes as dispersal, predation, pollination, decomposition, nutrient cycling, and energy fluctuations.
- **Biological Diversity (or Biodiversity)**—The variety of organisms considered at all levels, from genetic variants of a single species through arrays of species to arrays of genera, families, and higher taxonomic levels; includes the variety of natural communities and ecosystems (Lincoln et al. 1998).
- **Ecological integrity**—Ecosystems have *ecological integrity* when their native components are intact, including abiotic components, biodiversity, and ecosystem processes.
- **Environmental gradient**—A shift in physical and ecological parameters across a landscape, such as changes in topography, climate, land cover types, or natural communities.
- **Natural community**—A collection of species that co-occur in the same habitat or area and interact through trophic and spatial relationships. Communities are typically characterized by reference to one or more dominant species (Lincoln et al. 1998).

In order to demonstrate that these ecological features are adequately addressed, we recommend that the Plan describe how these features will be conserved within the proposed conservation sites.

2.3 Stressors and Threats

Stressors and threats come from two sources: 1) impacts from covered activities (e.g., direct disturbance, effects on hydrology and geomorphology, use of chemicals); and 2) larger-scale stressors such as fire, introduction of exotic species, or other human activities. Because there is so much edge within the rights-of-way, stressors such as invasive species will be of particular concern for managing the species on site.

It is critically important to identify and prioritize the stressors and threats in the study area for each of the covered species, and the proposed monitoring must include the stressors and threats. When major stressors are identified, clear connections are provided to the benefits of the proposed management commitments and minimization or mitigation, with clear links back to goals and objectives.

The Science Panel recommends that conceptual models be developed to help identify and prioritize these stressors and threats. It is also important to clearly define areas of uncertainty in the magnitude of the impacts and the potential species' response. Ideally, conceptual models would be developed up front, but these could also be set forth later in the process as an early step in implementation. Conceptual models could be simple and tie the stressors and threats to the biological goals and objectives, and could be limited to the factors over which the permittee has control.

Stressors should be quantified and trends identified when data are available, characterizing impacts on ecosystem, habitat, and species. At minimum, it is important to provide a qualitative assessment of stressors that can be integrated into a long-term monitoring program; stressors can then be understood as they relate to particular covered species. A matrix linking the stressors with the covered species would be very helpful and would allow illustration of the number of stressors affecting a species and the particular stressors that affect the most number of species. As an example, a matrix ranking stressors as 0 = no effect, 1 = low effect, 3 = moderate effect, 5 = high effect could be used for both the covered species and the natural communities within the Planning area.

3.0 Conservation Strategy

3.1 Guiding Conservation Principles for Plan Development

The conservation plan, as outlined in Chapter 6 of the Plan, works to avoid, minimize, and mitigate the potential impacts that permitted activities may have on the covered species and/or natural communities. The Plan describes the conservation strategy and the process by which implementation occurs. This process includes onsite avoidance and minimization, along with on- and off-site mitigation and restoration.

The need to protect the listed species and to mitigate for incidental “take” of protected species or impact on critical habitat is addressed for all the proposed species. This topic will need to be addressed again in relationship to newly acquired reserves such as Manchester, San Luis Rey River Site, and Rancho Cañada. Habitat assessment for each potentially impacted species for mitigation on these properties would have to be done at the time the impacts occur and not just at some earlier date because of the possibility for the site to change over time as a result of fires, nearby construction, or other factors. Monitoring of these mitigation sites must be ongoing for each anticipated impact.

3.2 Biological Goals and Objectives

The first step in any conservation program involves the development of goals and objectives. Goals should express a clear statement of the information and value provided by the program. Goals should be simple and clearly defined—not open to interpretation. Goals and objectives should have realistic temporal and spatial scales—readily measured or assessed through monitoring.

Many HCPs have developed hierarchical goals, ensuring that high-priority goals are clearly linked to more specific objectives. Where possible, the proposed goals should be designed in rigorous, quantitative terms that help suggest potential indicators to measure in order to assess long-term success. Overall, goals should provide a clear description for what the conservation or management program is supposed to do, with the monitoring data clearly informing whether or not goals are being met.

Objectives must be defined and directly linked to the goals. In essence, monitoring objectives are supposed to support the goals, providing information for decision-makers. Objectives should describe desired outcomes, focusing on what actually needs to be measured.

It is recommended that all goals from the Plan be synthesized into a single section or table at the beginning of the Conservation Strategy chapter. There are several goals already stated in

the Plan, such as the preservation of wildlife connectivity within the Water Authority right-of-way. Objectives could be developed beneath this goal, and others. For example:

- Goal 1: Preserve and maintain connectivity across the landscape to enable covered and other native species to move freely through Water Authority right-of-way. (Another goal regarding connectivity could be developed for the mitigation sites. The Plan could better demonstrate how these mitigation areas maintain and enhance connectivity in the landscape using additional figures.)
 - Objective 1.1. Restore native habitat on Water Authority right-of-way to, when feasible, enhance wildlife movement.
 - Objective 1.2. Minimize the spread of exotic species to maintain native habitat that will provide connectivity.

The Science Panel further recommends that goals and objectives be developed for groups of species with similar habitat requirements (e.g., riparian species, vernal pool species). Also, the Science Panel recommends that the Plan work toward developing species goals and objectives that are tied to the feasibility of contributing to recovery and the ability to measure a quantitative response. For example, for very rare or threatened species the objective for the species should be to enhance the population in such a way as to be able to clearly demonstrate a contribution toward recovery and for which the Water Authority can affect and measure a population increase (e.g., Munz's onion, prostrate navarretia, vernal pool shrimp, Hermes copper). For more wide-ranging species for which Water Authority conservation actions will not greatly affect the population, the goal should be to maintain or enhance suitable habitat (e.g., Quino checkerspot, grasshopper sparrow, San Diego woodrat).

A no-net-loss standard is implied in the Plan as a biological goal or objective for many (or all?) of the covered species. It is unclear whether this standard applies to species habitat, populations, or individuals. This should be clarified for the biological goals. The units should vary by species depending on what makes the most sense biologically and whether data are available to inform the biological goals.

A no-net-loss standard does not meet the NCCP requirement of contribution to recovery, which means that a net benefit is provided for the species. The Water Authority may be able to demonstrate contribution to recovery for the species that occur on the mitigation sites if those populations are larger and more viable than the populations on the pipeline easements. However, for those species that rely on restoration for their conservation, a no-net-loss standard requires successful restoration or creation of habitat or species populations. Biological goals that rely on restoration should be limited to the species and habitats where there is a high degree of confidence of success.

The Science Panel is uncertain whether it is compatible with Water Authority operations to enhance populations of the covered species within their right-of-way. Increasing populations of covered species will create potentially more mitigation requirements and more constraints on covered activities. Some enhancement activities may need to occur off-site to avoid this conflict. There may also be issues with species expanding outside the right-of-way onto adjacent private

land. The Science Panel recommends that additional detail be provided to demonstrate the compatibility of onsite population enhancement and covered activities.

3.3 Feasibility of Restoration

The conservation strategy relies on the success of onsite habitat restoration as the primary conservation action for many covered species. The Plan should demonstrate through citations or examples of successful projects whether restoration of habitat is likely to work. To address the risk that restoration may not work, and the temporal loss of habitat, the Water Authority should consider mitigating off-site in addition to onsite restoration.

The Plan addresses species-specific needs of each covered species but needs to include this in relationship to each of the potential mitigation sites. Restoration may not be possible for some areas simply because it is the wrong plant community. Mitigation might be best if two independent sites were obtained and monitored rather than depending on a single location. Augmentation of a habitat might often be a better approach than restoration in order to support populations of the impacted species.

The Advisors recommend that onsite restoration should be the first priority when the right-of-way has relatively high biological value, but not when it has low value. Sites with high biological value are likely to be within a larger matrix of high priorities for conservation in the regional HCPs and NCCPs:

- MSCP and MHCP = Core Habitat and Linkages (Note that the legend should be corrected in Figure 4-3 of the Plan)
- Western Riverside County MSHCP = Criteria Cells
- 15 linkages identified by the South Coast Wildlands project in the South Coast Ecoregion (planning for all 15 linkages was recently completed; data are available on line)

3.4 Conservation Evaluation of the Covered Species

A primary focus in the Plan is for the conservation of vegetation types as habitat for the covered species. This approach is warranted for a multi-species HCP and NCCP. To implement this approach, the Plan relies on the application of mitigation ratios that vary by vegetation type (Tables 6-5 and 6-6).

A mitigation ratio is not identified for several vegetation types, but the rationale for this is unclear. The Science Panel recommends a ratio of at least 1:1 mitigation for impacts to southern mixed chaparral and nonnative grassland for all impact categories because these communities support several covered species. If the Plan is taking a habitat-based approach to mitigation, it needs to offset impacts on these habitats to adequately mitigate for species impacts.

To demonstrate contribution to recovery for the suite of species in coastal sage scrub, we also recommend mitigating at 2:1 for permanent impacts outside preserves (the same as inside preserves). Coastal sage scrub that occurs outside designated preserves may contain high-quality habitat for many of the covered species.

We caution that saltpan mitigation at 2:1 may not be feasible given the extreme rarity of this vegetation type. It is unclear from Table 5-2 whether there are any impacts to this vegetation type, so perhaps this is not an issue.

It is unclear why mitigation ratios are identified for vegetation types for which there are no impacts. Are these mitigation ratios established in the event of impacts from emergency activities or pipeline ruptures? If so, this should be clarified. Mitigation ratios are not needed for vegetation types with no impacts.

It is appropriate to mitigate impacts to multiple species based on habitat or vegetation types. However, the document needs to make a clearer connection between the vegetation types and the covered species to ensure that the habitat-based approach will adequately conserve the covered species. A simple matrix linking the species and the vegetation types would be a helpful addition. Some species will require more description if they require specific habitat elements such as host plants or soil types within a particular vegetation type.

Proposals in the Plan for the conservation of the covered species that warranted coverage (see discussion above) are, for the most part, adequate. However, the Science Panel offers the comments in the subsections below on the adequacy of conservation for specific species. Species recommended to be dropped from coverage in the Plan are not discussed.

Plants

The overall conservation strategy for covered plant species relies on “avoidance of all major plant populations, narrow endemic species, and critical locations in Water Authority ROW” and/or “conservation within habitat conservation banks.” The management actions for plants included in Appendix B of the Plan are generally applicable “best management practices” that are reasonable to apply to all covered species; however, there are not many species-specific management actions provided (see p. 6-42, which states “Species specific management actions will be implemented as necessary to enhance or protect habitat quality and increase population size”).

Appendix B does not seem to include species-specific information about “enhancing declining populations, restoring damaged habitat, and establishing seed banks.” Is there a plan to collect seed or propagate plants from covered species to use in restoration? How would seed banks be established (what is the seed source)? Pre-activity surveys are a good idea, but with some plant species (i.e., annuals) it is not going to help if the surveys are done at the wrong time of year and populations or seed banks are physically disturbed because they are not readily apparent. Some of the covered species (such as *Githopsis diffusa*) are cryptic species that are difficult to

find, and the Environmental Surveyor would need to be sufficiently skilled in locating such species. Collections at the SDNHM are available for examination by appointment, and would help with identification.

On p. 6-34 under the heading “Erosion Control at Construction Sites” the Plan states that nonnative cover crop species such as *Plantago insularis* may be used in areas or slopes prone to high levels of erosion. The Science Panel does not recommend using nonnatives for erosion control (and *P. insularis* is not documented as occurring in San Diego County).

Rainbow Manzanita

Appendix B of the Plan does not mention fire as a threat or consideration. It is not known what the effect would be of fire (particularly frequent fire) on this species. Because of its limited distribution, it could be in danger of being wiped out by repeated fire events. Also, it will not occur in the habitat conservation banks, so care must be taken to avoid loss of this species.

Smooth Tarplant

The management actions mention conserving “80% of populations within project footprint,” yet this appears to be the only plant species for which a target percentage is specified. Why is that?

Chaparral bear-grass

Appendix B does not mention fire as a threat or consideration.

Munz’s sage

Appendix B does not mention fire as a threat or consideration. While Appendix B states that the species is relatively common in northern Baja California, it must be remembered that there has been substantial human disturbance in recent years along the border region, so it is not prudent to count on a reservoir of such border species in Baja California.

Herpetofauna

For the six amphibians and reptiles evaluated, the Plan relies heavily on the offset of mitigation lands as the key conservation measure. While it is probable that these species occur in the mitigation properties, it is difficult to evaluate this claim because the boundaries of the three properties (Rancho Cañada, San Miguel, and Crestridge) were not detailed in this report (Appendix I not included). Most of the claims for the presence of species are made from anecdotal accounts. There is no discussion of the threat of habitat conversion due to the spread of invasive plants, nor the direct problem of predation by exotic species such as the bullfrog. This is likely a severe problem with the two-striped gartersnake, as well as, the Southern Pacific pond turtle, arroyo toad, and western spadefoot (especially juveniles or tadpoles of these

species). Water quality is a concern for the two-striped gartersnake, pond turtle, and arroyo toad (especially their tadpoles). Chytrid fungus is an additional concern for the two frog species.

Birds

White-tailed kite

Threats include urbanization of grassland needed for foraging, drying of the climate, reducing the population of voles (the species' primary prey), and killing off trees where the birds nest (and possibly the proliferation of crows and ravens, kleptoparasites of the kite).

Prairie falcon

Restoration or augmentation would be dependent on reintroductions (as done with the Peregrine falcon), not on manipulation of habitat, provided that adequate nest sites and foraging habitat are available. Threats include human disturbance near nest sites, urbanization of grassland, and prolonged drought that can suppress the abundance of prey below the level needed to support the species.

Burrowing owl

Because this species has suffered population collapse over such a wide area, deliberate restoration as well as conservation of adequate habitat is likely needed for long-term survival. Techniques for restoration are still experimental. Threats include habitat fragmentation (probably mediated through road kill) and increase of predators facilitated by the planting of trees and erecting of artificial structures in the owl's habitat. A major question remaining is the extent of conserved habitat in which restoration has a chance of being effective. Conservation of the remaining colony near Temecula may entail conservation of habitat beyond that controlled by the Water Authority. What kinds of maintenance and/or development does the water authority plan for this site?

Long-eared owl

Precise factors responsible for this species' decline are not well known. Human disturbance, light pollution, and the proliferation of crows and ravens may all be contributing factors, and experimentation is likely necessary before effective conservation and restoration measures can be proposed. Threats include habitat loss, human disturbance, light pollution, and the proliferation of ravens and crows. Other factors yet unknown may also be important. The Tijuana River valley mitigation site may be appropriate on the basis of habitat but not on the basis of human disturbance and light pollution. Because the species is now so rare in Southern California, its population density is low and the birds are lacking from most apparently suitable habitat. Because the species is highly dispersive, conservation probably needs to be addressed at a scale broader than the water authority's Plan. Is there any biological basis for specifying a radius of 300 feet for avoidance of disturbance around nests? Citations? Nests of the long-

eared owl are very inconspicuous; they could easily be overlooked without considerable effort at a search.

Loggerhead shrike

The relative contribution of habitat loss, habitat fragmentation, or other factors leading to the decline of the loggerhead shrike is not well understood. Like the burrowing owl, the shrike appears to be suffering adverse population dynamics on a broad scale, perhaps too broad for a relatively narrow plan like that for the Water Authority to address in isolation. Threats include habitat loss and fragmentation, possibly pesticide poisoning, and likely other broad-scale factors still not identified. Because the shrike readily uses disturbed open ground, onsite mitigation is appropriate for this species, if Water Authority rights-of-way are embedded in other semi-open habitat. Rights-of-way that are regularly disturbed could offer habitat usable for the shrike, provided that scattered shrubs or small trees suitable for nesting are nearby. Planting of a few dense-foliaged, preferably spiny shrubs would be a habitat enhancement possibly beneficial to the shrike. Controlled burning is a management technique that could probably be used for the shrike's benefit (and evaluated with follow-up monitoring)

Horned lark

Because, like other ground-nesting birds, the horned lark clearly suffers from habitat fragmentation, the size of fragments still useful to the species over the long term needs to be identified. Threats include habitat loss and fragmentation through urbanization. The horned lark responds positively to disturbance, using bare ground with only scattered weedy vegetation. Therefore maintenance of rights-of-way could benefit this species incidentally, much as the firebreaks on ridge tops on Miramar are horned lark habitat. Also, the horned lark responds positively to fire, using burned areas before the recovering vegetation becomes too dense. The horned lark avoids steep slopes, using flat to gently sloping terrain. The suitability of the mitigation sites needs to be considered in this context; the Plan does not describe the topography of any of these sites. The Plan states that "a 50-foot to 100-foot buffer around active nests should be maintained if work must be done during the nesting season in habitat occupied by this species. An Environmental Surveyor will monitor if work will be done near an active nest." Also, "Destruction of active nests is not allowed." However, horned lark nests, though placed on the ground, are very difficult to find. The birds typically slip away from them when an intruder is more than 50 to 100 feet away, depending on the topography.

Yellow warbler

The yellow warbler has benefited from the trapping of brown-headed cowbirds intended for the benefit of the least Bell's vireo. Reduction of this trapping has been proposed in an effort to wean the victim species off this intensive method of management. If trapping is reduced, the effect of the reduction on species other than least Bell's vireo, such as the yellow warbler, needs to be assessed. Furthermore, the effect of trapping on the cowbirds themselves is not well known: what level of trapping and what density of traps is needed to maintain an acceptably low

level of parasitism over how large an area? Threats include habitat loss through urbanization, over pumping of ground water, prevention of water from reaching natural stream courses, and prolonged drought (also, replacing native riparian woodland with invasive plants (especially *Arundo donax*) and cowbird parasitism). Maintenance of stream flows through at least the early part of the summer is critical to the survival of the yellow warbler (and other riparian birds). The Water Authority's activities should allow for this. By locking all water up in reservoirs and pumping the water table down, the water authority could affect the yellow warbler (and other riparian birds) negatively even if no riparian habitat is deliberately removed.

Grasshopper sparrow

The grasshopper sparrow's habitat plasticity under various rainfall regimes is still unclear. The species uses grassland, but the sparrow's definition of grassland is more flexible than that of vegetation ecologists defining vegetation communities. How great a density of shrubs does the sparrow tolerate, and how does this density vary from wet years to dry years? Similarly, to what extent, in Southern California, does the grasshopper sparrow use grassland lacking any native component, and how does this use vary from wet years to dry years? The grasshopper sparrow's fire ecology in Southern California is not well known. Fire may enhance native grasses or exotic ones according to various factors. Controlled burning could be a useful management strategy, but this needs basic investigation. Threats include urbanization of grassland, invasion of exotic weeds, and prolonged drought. The grasshopper sparrow was excluded from the metropolitan San Diego MSCP because of the lack of adequate conservation of grassland. Therefore, the Water Authority's Plan cannot rely on this previous plan to claim coverage of the grasshopper sparrow. The Plan states that "a 50-foot to 100-foot buffer around active nests should be maintained if work must be done during the nesting season in habitat occupied by this species" and "destruction of active nests is not allowed." However, nests of the grasshopper sparrow are among the most difficult of all bird nests to find. It will be very easy for someone to claim "there's no nest" when there really is one. Have techniques for restoration of native grassland on disturbed soil been developed? If so, citations for the techniques to be followed are needed.

Mammals

For mammal species, the proposed generalized minimization, avoidance, and mitigation measures are appropriate.

Los Angeles little pocket mouse

The distribution of this species is largely within the Los Angeles Basin, but populations are known from western Riverside County. The Plan states that O&M operations may impact up to 10 acres per year of potentially suitable habitat, and incidental take may occur. The proposed minimization and mitigation for onsite impacts are appropriate and reasonable. However, off-site mitigation in San Diego County is likely not a suitable option because the proposed mitigation

banks will likely not contain the species or suitable habitat. Off-site mitigation in Riverside County should be included in the conservation strategy.

Dulzura pocket mouse

Direct and indirect impacts on the species may occur due to habitat loss, degradation, and fragmentation.

Southern grasshopper mouse

The main threats to this species include habitat loss and fragmentation, particularly in grassland and sparsely vegetated sage scrub habitats.

If this species is covered, more species-specific minimization and mitigation measures are necessary, particularly given the unique nature of this small mammal. However, these actions may be difficult to develop given the limited information and understanding that exists for this species.

San Diego woodrat

The proposed on- and off-site mitigation and minimization measures are appropriate for this species.

Other Species

Proposals in the Plan are, for the most part, adequate for the covered invertebrates and fish. However, continual habitat monitoring needs to be implemented for these taxa. In some cases, habitat may need to be prepared in advance of possible impacts. Each covered species needs to be defined by at least the minimum environmental requirements to support a population. Using Quino checkerspot as an example, the property would need to contain mesas or south facing slopes, opening in the chaparral, soil crusts, at least two primary larval host plants, harvester ant colonies, adult nectar sources, and available hilltops. Additional enhancement would also be beneficial but would not necessarily be required. This approach should be taken for each species in relationship to its known and historic range.

3.5 Protection of Ecosystem Processes and Critical Linkages/Connectivity

The Plan acknowledges the importance of protecting critical landscape linkages and maintaining habitat connectivity. The reality is, however, that the creation or protection of linkages to maintain contact with other species' populations may have passed. It may also be that the best connectivity between populations may be along the aqueduct or pipeline route, and not near some of the mitigation banks. For insects, there is often adult dispersal during years of high population densities that help to establish satellite colonies. This is especially true of Quino checkerspot. Dispersal distance may be five miles or farther. Disjunct populations can therefore maintain some gene flow in widely separated locations.

However, with Hermes copper, they would rarely be expected to disperse more than 50–100 yards in a single season. The butterfly also tends to follow the habitat containing its larval host plant. Populations behaving this way can fragment easily and recolonization may take years. If there are additional barriers to dispersal, the insect is unlikely to establish even if the habitat is again suitable.

For each species of plant or animal in an ecosystem, gene flow is necessary to maintain the integrity of the species. For animals that can fly, movement is easier compared to those that can only walk or crawl. Highways, fenced and concrete-lined drainages, construction projects, or the transformation of natural habitat into artificial parklands can restrict the free flow of animals. Seed distribution in plants, other than wind aided, can be reduced by physical barriers. Wildlife corridors for dispersal can be looked at as movement from east to west and from north to south. However, it can also include ridge lines, food sources, water, light exposure, cover, and other factors.

Most of the mitigation sites are already isolated to some extent. The existing aqueduct routes are adjacent to major highway, flood control channels, housing developments, agriculture, and airports. Successful mitigation may require not only suitable habitat but the relocation of species impacted by future projects. Monitoring of introduced colonies or individuals is needed to assess results. This is an issue that still needs to be addressed for each covered species as it relates to the mitigation ratios.

3.6 Evaluation of the Seven Tenets of Reserve Design

As part of the typical scientific review process, advisors are asked to review the tenets of reserve design and how they have been applied in the particular HCP/NCCP. In this unique case, the project area is linear, and the proposed mitigation areas are, for the most part, already established. Therefore, there is no clear opportunity to review whether the Plan adequately addresses the tenets of reserve design.

The Science Panel recommends that the Plan provide more details on the conservation values of the three established conservation areas (Rancho Cañada, San Miguel, and Crestridge) and the in-process banks (San Luis Rey River, Manchester, and Tijuana River Valley), as well as how they are expected to support the covered species and meet the tenets of reserve design. Factors that should be evaluated include the contribution of these sites to the regional conservation strategies of the MSCP and MHCP and their connectivity to other protected areas.

3.7 Evaluation of Mitigation Areas

For the proposed covered species, it is not clear, or demonstrated, that the proposed avoidance, minimization, or mitigation measures contribute to recovery for these species. An analysis follows of the ability of the proposed conservation areas to adequately conserve the evaluated covered species.

Plants

Two of the covered plant species under this review are *Allium munzii* and *Arctostaphylos rainbowensis*. These plant species are only known from very specific geographic areas and therefore cannot be expected to occur in conservation areas located elsewhere. *Allium munzii* has not been documented in San Diego County (it is known from western Riverside County) and has low probability of occurring in any of the proposed banks. Similarly, *Arctostaphylos rainbowensis*—which is represented by 11 specimen occurrences in the Plant Atlas/Herbarium database (all located in northwest San Diego County along the border with Riverside County)—is unlikely to occur in any of the banks. There is a similar concern for *Centromadia parryi* ssp. *australis*.

Rainbow Manzanita

It is not known what the effect would be of fire (particularly frequent fire) on this species. Because of its limited distribution, it could be in danger of being wiped out by repeated fire events. Also, it will not occur in the habitat conservation banks, so care must be taken to avoid loss of this species.

Smooth Tarplant

The management actions mention conserving “80% of populations within project footprint,” yet this appears to be the only plant species for which a target percentage is specified. Why is that?

Herpetofauna

Management activities include pre-activity surveys and minimization plans to limit degradation of habitat, and in the case of the two-striped gartersnake, exclusion fencing. General surveys should be expanded to include the mitigation properties (Rancho Cañada, San Miguel, and

Crestridge) to ensure the presence of these species, in addition to their continued persistence on these lands. In addition, exotic species eradication should be included in the management strategy. This is especially important because the Plan's area includes major reservoirs that often serve as the source populations to the spread of exotic species, such as the bullfrog (eradication of exotic turtle species would also serve the Southern Pacific pond turtle). Maintaining and improving water quality of reservoirs and streams is recommended. Sampling for the presence or absence of chytrid fungus should be included for the two frog species.

Red diamond rattlesnakes are important members of the natural landscape and serve as both predator and prey. As mid-level species in the natural community, this large-bodied snake can serve as an indicator species for the overall health of the Plan area. Surveys should be undertaken to evaluate the health of this species in the mitigation areas, as its presence would indicate healthy predator-prey populations.

Birds

Burrowing owl

The Plan recommends considering "translocation of individuals to currently unoccupied, suitable habitats through the creation of artificial burrows." Is there unoccupied suitable habitat on Water Authority land? Proven successful techniques for translocation need to be cited, or how experiments will be conducted and their efficacy will be tested need to be specified. Are sites of translocation ones that can be sustained indefinitely, entailing maintenance of ground squirrel colonies? Otherwise sites may become overgrown and no longer suitable. Any translocation will require indefinite monitoring.

Long-eared owl

The Plan mentions mitigation sites (San Miguel and Crestridge) lacking habitat appropriate to the long-eared owl; these should be deleted. Figures for total acreage of natural habitats are not very relevant to the long-eared owl; figures for woodlands alone are needed.

Loggerhead shrike

The Plan states that "the total suitable habitat on these [mitigation] banks is approximately 866 acres" without saying how suitable habitat is defined. It also states "Impacts to potential native habitat from CIP projects is estimated at approximately 133 acres and O&M operation may impact up to 22 acres per year of native habitats." Because disturbance of the Water Authority's rights-of-way, etc., may actually be favorable to the shrike by keeping the habitat open, these figures are an oversimplification.

San Luis Rey River site

This site is impossible to evaluate without more details of the habitats included and whether they are contiguous to other conserved habitats. The site is probably relevant to the yellow warbler (under the assumption that it contains mature riparian woodland), possibly relevant to the white-tailed kite and long-eared owl, probably not relevant to the horned lark, and almost surely irrelevant to the prairie falcon, burrowing owl, loggerhead shrike, and grasshopper sparrow.

Manchester site

The small size of this site makes it of slight value to relatively large, mobile animals like birds. It may be relevant in a minor way to the horned lark and white-tailed kite, the latter for foraging only, not nesting. It is not relevant to the prairie falcon, burrowing owl, long-eared owl, loggerhead shrike, yellow warbler, or grasshopper sparrow.

Rancho Cañada site

This site is almost certainly relevant to the white-tailed kite and grasshopper sparrow. It is probably relevant to the loggerhead shrike and horned lark, though the numbers of those species on the site, if they occur there, are likely to be very low. It is possibly relevant to the burrowing owl (if there were an effort at restoration), long-eared owl, and yellow warbler. It is not relevant to the prairie falcon, which would likely use the site only as occasional foraging habitat.

Crestridge site

This site may be relevant to the loggerhead shrike, though if that species occurs there the numbers are very low. It is likely relevant to the horned lark only for a few years following fires and only if the topography is not too steep. It would be relevant to the burrowing owl only as a restoration site and only if the habitat remained relatively open. Lacking trees, it is not relevant to the white-tailed kite, long-eared owl, and yellow warbler; and, lacking grassland, it is not relevant to the grasshopper sparrow. It is too small to offer significant foraging habitat to the prairie falcon.

San Miguel site

This area of extensive sage scrub and grassland is relevant to the grasshopper sparrow and probably relevant to the loggerhead shrike. It is possibly relevant to the horned lark (especially following the Harris Fire) and burrowing owl (lying near the restoration site at Sweetwater Reservoir). Lacking trees, it is not relevant to the long-eared owl or yellow warbler. It is relevant to the white-tailed kite and prairie falcon as foraging but not as nesting habitat.

Tijuana River Valley site

This site is definitely relevant to the white-tailed kite and yellow warbler and possibly to the horned lark, loggerhead shrike, and burrowing owl, depending on how the site is managed for riparian woodland versus open habitat. It is not relevant to the prairie falcon or grasshopper sparrow. It could be relevant to the long-eared owl if human disturbance can be minimized (not likely in the Tijuana River Valley).

Mammals

Los Angeles little pocket mouse

The proposed minimization and mitigation for onsite impacts is appropriate and reasonable. However, off-site mitigation is likely not a suitable option, since the proposed mitigation banks will likely not contain the species or suitable habitat.

Dulzura pocket mouse

Considerable amounts of suitable habitat occur within the Plan area. Fortunately, suitable off-site habitat exists at the proposed mitigation areas. The proposed on- and off-site minimization and mitigation actions for this species are appropriate.

Southern grasshopper mouse

It is not clear from the Plan whether the proposed mitigation sites will provide adequate habitat for this species.

San Diego woodrat

The proposed on- and off-site mitigation and minimization measures are appropriate for this species.

Other Species

It is not clear whether the mitigation sites will be suitable for these species. For example, it would be of no benefit to Quino checkerspot to conserve suitable habitat in the Tijuana River Valley, Manchester, or San Luis Rey River since these areas likely do not support these species. However, Rancho Cañada might be appropriate since it is within the known historic range of the insect.

4.0 Adaptive Management

4.1 Fundamental Principles

Adaptive management is considered a key component in conservation planning and monitoring. Adaptive management allows us to employ an iterative learning process, where the principles of experimental design guide our decisions. Unfortunately, the definition and application of adaptive management vary from rigorous and specific to poorly defined and vague. The most concise definition states that it "consists of managing according to a plan by which decisions are made and modified as a function of what is known and learned about the system, including information about the effect of previous management actions" (Parma 1998). Beyond these generalizations, the requirements and implementation of adaptive management are necessarily vague, mainly because the implementation and design must be flexible enough to adapt to any situation. Adaptive management is largely intended to deal with the uncertainty inherent in natural systems, allowing for flexibility in conservation planning and implementation. Adaptive management requires a long-term commitment to monitoring and the ability to modify plans based on results. Considerable resources have to be devoted to the design and implementation of adaptive management and monitoring programs to ensure the long-term success of any HCP/NCCP.

To ensure the conservation of the covered species within rights-of-way, active adaptive management may be necessary in some cases. For example, vernal pool plants will require active management to prevent encroachment by exotic species and sedimentation of the pools. In order to receive credit for onsite mitigation, active management would need to be required on Water Authority rights-of-way. The Water Authority needs to ensure that active management is compatible with the easement terms on all private lands where active management may be necessary to maintain the covered species.

The conservation lands should, at a minimum, follow the umbrella management and monitoring program for the regional NCCPs to ensure consistency and minimum standards.

4.2 Collaboration with USFWS and CDFG

At the Science Advisor meeting, the Advisors were informed that Rancho Cañada and Crestridge mitigation sites are owned and managed by either CDFG or the USFWS. The Water Authority needs to ensure that USFWS and CDFG are able to manage and monitor the mitigation sites according to the terms of the Plan. They should adapt existing or future management plans to incorporate the management needs of the Plan. The Water Authority suggested at the meeting that some portions of the sites would be managed and monitored to different standards than the PLAN. This may be very challenging when it comes to analyzing data and developing standard protocols for management. Coordinated management and monitoring is essential to detecting long-term status and trends. To aid implementation and

consistency an overarching management plan that is in line with the requirements of the terms included in the Plan should be formulated.

4.3 Monitoring

Two distinct types of monitoring occur in HCPs and NCCPs. *Compliance monitoring* is basically an accounting system, tracking how and when management actions, environmental requirements, and permitted activities are implemented. The purpose of this type of monitoring is to ensure compliance with permit requirements. The second type is *effectiveness monitoring*, which determines the effects of development and management activities on the covered species and ecosystems. The Science Panel recommends that the Plan clearly describe compliance monitoring versus effectiveness monitoring.

Many contributions to the literature recommend several essential steps in the monitoring process (e.g., USFWS 1996, Gibbs et al. 1999, Mulder et al. 1999, Noon 2003). The creation of a monitoring plan often follows a step-down approach. While this is theoretically appealing, collective experience with monitoring design indicates the process includes feedback loops with simultaneous and complementary activities at multiple steps. Figure 1 below (adapted from Rahn 2005) summarizes the major components and structure of effectiveness monitoring programs, incorporating the guidance provided by the Services, ecological literature, and the examples of HCPs. Ultimately, the development of most monitoring plans will require individualized application of these steps based on a plan's questions, needs, and resources. The Science Panel recommends that clearly articulated sections of the monitoring program be developed to ensure long-term viability and accountability.

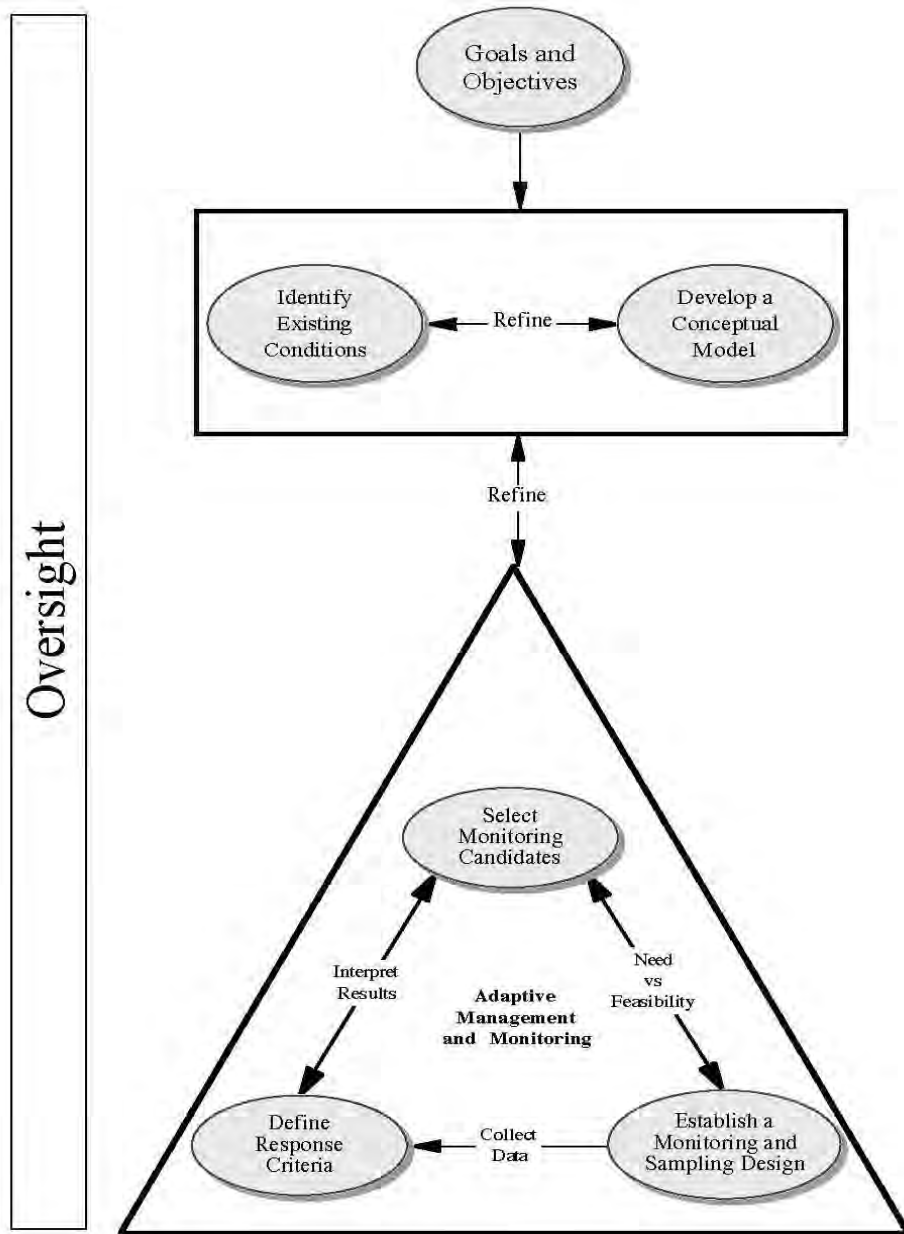


Figure 1. A step-down model is provided, describing the basic components of a monitoring plan for a habitat conservation plan. The first step is to establish the goals and objectives. This is followed by establishing existing conditions which informs the development of a conceptual model. These two can be conducted in concert to help refine one another and improve understanding. Following this, an adaptive management/monitoring framework guides the rest of the process. Monitoring candidates are selected, which in turn helps establish the monitoring design. A feedback loop exists between the two, where cost and feasibility are weighed against the prioritized list of monitoring candidates and needs. Once the protocols are selected, data collection begins, and response criteria are established (based on the goals and objectives). As the monitoring program proceeds, data are analyzed, and the results are used to inform the adaptive management process. The data collected can be used to refine and improve the understanding of the system and conceptual models. Finally, oversight plays a significant role throughout the development of a monitoring program and during its implementation.

4.4 Responses to Changed/Unforeseen Circumstances

Catastrophic declines in populations occur, whether caused by natural phenomena or anthropogenic calamities, yet upfront planning for these situations is rare in natural resource management. Two paradigms for maintaining biodiversity exist in conservation biology. One focuses on creating large reserves using principles derived from island biogeography, metapopulation theory, and species-area relationships. This paradigm is useful when creating reserves (especially in the context of MSHCPs), but has little bearing on management once the reserve is in place. The other paradigm focuses on single species and the roll of random stochastic events and catastrophes on population dynamics and extinction rates. This paradigm often focuses on developing detailed management strategies for specific species, including population viability analyses. While not entirely mutually exclusive, long-term biodiversity conservation requires the integration of these two paradigms. This integration becomes particularly important for both minimizing the probability and the severity of large-scale catastrophes. It also helps in the development of effective post-catastrophe responses for individual species of interest. We cannot overstate the importance of upfront planning and emergency response in conservation programs.

The linear nature of the planning area complicates conservation planning. It is therefore important to address how the permittee and agencies will respond to changes in the future. These large-scale impacts may include fire, climate change, etc. Several of these issues are briefly discussed below. However, broader investigation of other large-scale impacts may be important to ensure adequate conservation planning to occur.

4.4.1 Catastrophic Fire

Catastrophic fires may lead to potential cumulative impacts due to larger mosquito populations and West Nile virus (e.g., indirect impacts to covered bird species). The frequency, intensity, and often anthropogenic nature of fires may be worth addressing.

4.4.2 Climate Change

It may be worth considering (or modeling) how covered species will respond to the predicted effects of climate change, such as vegetation shifts in coastal sage scrub. It may be important to document whether the reserves are linked to other conservation areas in an altitudinal and latitudinal gradient to allow for shifting species distributions or vegetation shift, and how they would fit into a larger regional network of open space in response to climate change. It may be necessary to consider directing some of the monitoring effort to detection of long-term trends that might be related to climate change.

4.4.3 Pipeline Ruptures

The construction method chosen should be the one with the least impacts to the covered species and native vegetation types. The Science Panel recommends developing a post-disaster response plan to ensure that these responses are coordinated with other agencies and are appropriate for the habitat and species in the conservation areas. Lessons could be incorporated from the recent pipeline rupture through Mission Trails Regional Preserve.

4.4.4 Disease/Viruses

Impacts from diseases and viruses are varied and complicated. Catastrophic declines may occur and could likely be addressed by the conservation plan.

Of concern would be spraying or chemical control in rights-of-way or preserve lands for any perceived pest problems. Localized pest control inside of buildings or other structures will have minimum impact on the overall environment. There should be a record of each chemical application. This applies to both insect and weed control (nonnative). Application techniques and control approaches should be established before the need arises. In many instances, physical removal of pests, interception traps, biological control agents, or barriers can be used before chemical spraying is considered. Impacts on nontarget organisms, and indirect effects caused by run-off, need to be addressed.

4.4.5 Invasive Species

It is estimated that up to 46% of the nation's endangered species have been listed under the ESA due exclusively or in part to impacts from invasive species. Despite this, the treatment of nonnative species in HCPs is typically a secondary consideration in many conservation and management programs. This may be partially due to the inherent difficulty in proving that nonnative species have caused species extinctions or listings under the ESA. In light of the pervasive impacts of invasive species, it is safe to assume that many conservation programs will experience some level of invasion during the permit duration, causing direct or indirect impacts on the covered species and their habitats.

It is possible to anticipate that many of the activities permitted under an HCP/NCCP can either directly or indirectly lead to increased invasion and impacts on covered species. For some species there is an obvious link; for others there is insufficient data or understanding to support this claim. Ultimately, permittees do not need to be forced to include an invasive species management plan in an HCP, unless there is a possibility that invasives are or will be an issue. Ideally, the Services and permittees would invoke the precautionary principle, especially for large-scale, multi-species plans. Clearly articulated requirements and frameworks for invasive species management and control are the next necessary step in improving the planning process.

5.0 Literature Cited

PLEASE REFERENCE THIS DOCUMENT AS FOLLOWS:

Rahn, M., D. Faulkner, M. A. Hawke, B. Hollingsworth, and P. Unitt. 2008. Report of Independent Science Advisors: San Diego County Water Authority NCCP/HCP. Unpublished, 55 pp.

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Attachment A:
Biographies of Advisors

Matt Rahn, Ph.D.

Dr. Matt Rahn is currently employed as the Executive Director for the SDSU Field Stations Program. Dr. Rahn has a broad background in field biology and the conservation of wildlife throughout various ecosystems. He has experience in the design of wildlife, habitat, and ecosystem monitoring programs, with an emphasis on the identification of invasive species, the impacts on threatened or endangered species, and the development of appropriate management and mitigation programs.

He has participated in various habitat and vegetation restoration programs, sensitive species relocation, wetland restoration, and habitat enhancement projects. He developed restoration monitoring programs to assess cover and diversity, plant survival, herbivory, and studies of wildlife use using a variety of GIS and statistical analysis methods.

In addition to his expertise in conservation biology, Dr. Rahn conducted research in collaboration with environmental lawyers and ecologists on the design, implementation, and evaluation of multi-species habitat conservation plans. He supports various conservation biology groups through his knowledge of various state and federal environmental laws, having spent two years studying and working in collaboration with faculty at the UC Davis School of Law, evaluating the Endangered Species Act and various aspects of conservation planning including the selection of covered species, the implications of invasive species, monitoring, and disaster planning.

David K. Faulkner, MS

David Faulkner was the Head of the Entomology Department at the San Diego Natural History Museum for 25 years and currently serves there as a research associate. His research interests include the biogeography of butterflies in Southern California and Baja California, Mexico, and the systematics of the insect order Neuroptera. He has extensive collecting experience in Southern California and northwestern Mexico and is currently self-employed; working on invertebrate conservation issues and forensic entomology for numerous agencies in California and the western United States.

Mary Ann Hawke, Ph.D.

Dr. Mary Ann Hawke is Director of the San Diego County Plant Atlas project at the San Diego Natural History Museum (SDNHM) which is training volunteer parobotanists to scientifically document the county's floristic diversity by collecting field data and voucher plant specimens across the county. She earned a Ph.D. in 1994 from the University of Western Ontario in Canada and is certified as a Senior Ecologist by the Ecological Society of America.

A decade of work in environmental consulting and as a scientific project director at the University of Washington (and most recently at the SDNHM) has provided experience with project management, rare plant and vegetation field surveys, biological monitoring, natural resource management plans, wetland delineation, database development and management, stakeholder participation, and environmental laws and permitting. Dr. Hawke is co-Principal Investigator of grants from the Institute of Museum and Library Services, and from the Systematic Biology Program of the National Science Foundation.

Trained as a plant ecologist and environmental educator, Dr. Hawke's research focuses on assessing ecological health in arid lands. Her interests include lichens and biological soil crusts, soil/microbe/plant interactions, and the fire ecology of Southern California.

Bradford Hollingsworth, Ph.D.

Dr. Hollingsworth oversees amphibian and reptile research at the San Diego Natural History Museum and curates the collection of over 73,000 individually catalogued specimens, which date back to 1891. Dr. Hollingsworth specializes in the morphological and molecular systematics of amphibians and reptiles from Southern California and Baja California. He studies the evolutionary history of isolated populations, which include species restricted to oases, mountaintops, and islands in both the Pacific Ocean and Gulf of California. He received his doctorate in 1999 from Loma Linda University and earned Bachelor's and Master's degrees from San Diego State University. Dr. Hollingsworth is on the Board of Governors for the largest and oldest herpetological professional group, the American Society for Ichthyologists and Herpetologists. He has had a lifelong interest in natural history and teaches the course "The World of Animals" at San Diego State University. His favorite pastime is the photography of amphibians and reptiles in the wild.

Philip Unitt

Philip Unitt has served as collection manager for the Department of Birds and Mammals at the San Diego Natural History Museum since 1988 and curator since 2005. His expertise includes the distribution, status, identification, subspecies, and conservation of the birds of California and Baja California. He has written over 30 scientific papers and reports, including the seminal paper on the Southwestern Willow Flycatcher, (*Empidonax traillii extimus*), and taxonomic

analyses of the Marsh Wren and Brown Creeper, with descriptions of one new subspecies of each. From 1997 to 2002 he organized the *San Diego County Bird Atlas*, a project that involved directing the work of over 300 volunteers and analyzing a database of nearly 400,000 records; the result was published in 2004. Current studies include the effects on birds of San Diego County's large-scale firestorms. Since 1986 Phil has served as the editor of *Western Birds*, the regional journal of ornithology for western North America. Since 1979 he has served as a consultant for various public agencies and private firms. Projects include surveying for a variety of endangered species, population monitoring, and serving on the technical advisory committee to the California Department of Fish and Game for revision of its list of bird species of special concern. That revision, including six species accounts written by Unitt, is being published in early 2008.

Attachment B:

Initial Questions Addressed by the Science Advisors



Jones & Stokes

Memorandum

Date: November 16, 2007

To: San Diego County Water Authority NCCP/HCP Science Advisors:
Dave Faulkner, Forensic Entomology Services
Mary Ann Hawke, San Diego Natural History Museum
Matt Rahn, San Diego State University
Phil Unitt, San Diego Natural History Museum

cc: San Diego County Water Authority, California Department of Fish and Game,
U.S. Fish and Wildlife Service, RECON

From: David Zippin, Science Advisor Facilitator

Subject: **Science Advisor Charge and Questions**

First, I want to thank the Science Advisors for participating in this important effort to provide the San Diego County Water Authority (Water Authority) with expertise to improve their habitat conservation plan (HCP) and natural community conservation plan (NCCP). This memo will provide you with an overview of the panel's charge and a list of initial questions that the panel will be addressing in the review process.

Regulatory Background

The NCCP Act requires that all NCCPs include a process for the inclusion of independent scientific input (California Fish and Game Code Section 2810(b)(5)). The purpose of this input is to assist the plan participants in incorporating the best available science into the plan. The input also helps the California Department of Fish and Game (CDFG) make sound findings that the plan adequately conserves the covered species and natural communities, among others. The NCCP Act specifically requires that the independent scientific input:

- Recommend scientifically sound conservation strategies for species and natural communities proposed to be covered by the plan.
- Recommend a set of reserve design principles that addresses the needs of species, landscape, ecosystems, and ecological processes in the planning area proposed to be addressed by the plan.
- Recommend management principles and conservation goals that can be used in developing a framework for the monitoring and adaptive management component of the plan.

- Identify data gaps and uncertainties so that risk factors can be evaluated.

Findings that CDFG must make at the end of the process to approve an NCCP and issue a permit are relevant to the charge of the Science Advisors. Information provided by our panel can help CDFG to make these findings. According to Section 2820(a) of the Fish and Game Code, CDFG must determine that:

- The plan integrates adaptive management strategies that are periodically evaluated and modified based on the information from the monitoring program and other sources, which will assist in providing for the conservation of covered species and ecosystems within the plan area.
- The plan provides for the protection of habitat, natural communities, and species diversity on a landscape or ecosystem level through the creation and long-term management of habitat reserves or other measures that provide equivalent conservation of covered species appropriate for land, aquatic, and marine habitats within the plan area.
- The development of reserve systems and conservation measures in the plan area provides, as needed for the conservation of species, all of the following:
 - Conserving, restoring, and managing representative natural and seminatural landscapes to maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity.
 - Establishing one or more reserves or other measures that provide equivalent conservation of covered species within the plan area and linkages between them and adjacent habitat areas outside the plan area.
 - Protecting and maintaining habitat areas that are large enough to support sustainable populations of covered species.
 - Incorporating a range of environmental gradients (such as slope, elevation, aspect, and coastal or inland characteristics) and high habitat diversity to provide for shifting species distributions due to changed circumstances.
 - Sustaining the effective movement and interchange of organisms between habitat areas in a manner that maintains the ecological integrity of the habitat areas within the plan area.

Note that few of the terms listed above are defined in the NCCP Act. Therefore, many plans define the terms operationally for themselves.

Independent scientific input has become a regular part of all NCCPs prepared in California. To date, there have been at least 14 independent scientific reviews of NCCPs¹. You may wish to consult some of these previous reports for examples of the types of information provided by Science Advisors.

Background on the Plan

The Water Authority has been preparing an NCCP/HCP for their water operations and capital projects for the last several years. The Water Authority plans to release a public draft of the plan by April 2008. In order to meet that deadline, the Water Authority must complete a key requirement of the NCCP Act by conducting an independent scientific review of the plan.

The Water Authority NCCP/HCP is a stand-alone Subregional NCCP within the coastal sage scrub region of Southern California. The Water Authority NCCP/HCP is designed to be compatible with other Subregional NCCPs through which it passes, including the San Diego Multiple Species Conservation Program (MSCP) and the San Diego Multiple Habitat Conservation Plan (MHCP). Both of these plans are exempt from the current NCCP Act's new requirements, which includes independent scientific review (Section 2810(b)(5)(A) through (D))². The Water Authority NCCP/HCP is subject to the requirements NCCP Act, with several exceptions. Section 2830(f)(1) exempts the Water Authority NCCP from the preparation of a Planning Agreement. Section 2830(f)(2) narrows the scope of the independent scientific input. This section says that the Water Authority must include independent scientific input consistent with the process described on page 1 this memo and

“...in a manner that focuses on the covered species that are proposed for take authorization and that are not otherwise covered in the San Diego Multiple Species Conservation Program or the San Diego Multiple Habitat Conservation Program. The scientific input required by this paragraph shall be based on the best and most current scientific data generally available, and shall assure that documentation for coverage of all species is equal or greater than the San Diego Multiple Habitat Conservation Program.”

Following this requirement, 33 species out of the 94 species covered species are not covered by either the MSCP or the MHCP (Exhibit A). An additional 8 species have been added to the list for the Science Advisors to consider, bringing the total to 41 species.

It will be important to keep in mind throughout the review the scope of the covered activities proposed by the Water Authority. For example, the Water Authority operates along 286 miles of pipeline and aqueduct corridors that encompass approximately 3,000 acres. Of this land, the Water Authority owns only approximately 10%; the rest are easements that allow the Authority to maintain its facilities on private land. Further, the amount of disturbance estimated from the

¹ See www.dfg.ca.gov/habcon/nccp/science.html for most of these reports.

² The 2002 NCCP Act expanded and completely replaced the original 1991 NCCP Act. Plans exempt from the new Act follow the requirements of the 1991 Act, as amended.

covered activities is estimated to be relatively small: 133 acres of native vegetation from permanent impacts and 27 acres per year from operations and maintenance.

More background and details on the Water Authority NCCP/HCP will be provided to the Advisors on the morning of the workshop by RECON, the NCCP/HCP lead consultant.

Science Advisor Charge

The role of the Science Advisors in an NCCP is to provide review and comment on the science used in the plan including data, analytical methods, biological goals and principles, and conclusions drawn from these data and analyses. The review is not intended to validate or ratify the plan, but rather to provide guidance and recommendations to strengthen the plan's scientific underpinnings.

While the NCCP Act provides specific topics on which Science Advisors should comment (see list on page 1), the scope of the review should not be limited to these topics. The Science Advisors are free to bring up new questions or comments that are relevant to the scientific basis of the plan. Below is a draft list of questions that the Science Advisors will initially address. This list of questions was developed based on consultation with the Water Authority, their lead NCCP/HCP consultant (RECON), CDFG, and the Science Advisors. Jones & Stokes staff also provided input after reviewing the current draft NCCP/HCP and consulting other Science Advisory process reports. The questions are organized into three broad topic areas:

1. The scope of the plan and use of existing data
2. Conservation design and analysis
3. Adaptive management and monitoring

Initial Questions for Science Advisors

Scope of the Plan and Use of Existing Data

1. Does the list of covered species under review by the Science Advisors contain species for which enough information is known to evaluate impacts, develop conservation actions, and conduct monitoring? Are the covered species on the list well justified?
2. Are there any new or pending taxonomic revisions that would affect the list of covered species under review by the Science Advisors?
3. Are there any species not under review by the Science Advisors and not otherwise covered by the Water Authority NCCP that should be considered for coverage?

4. Do the biological data and maps prepared to date adequately compile, interpret, and present existing information to support the conservation strategy? Are there other sources (data, published papers, technical reports) that should be incorporated into the plan and considered in the conservation strategy?
5. Are there significant data gaps or uncertainties for the covered species under review that should guide how reserve design, management, or monitoring is conducted during implementation? What are the greatest sources of risk as a result of these data uncertainties and gaps?
6. Are the terms in the NCCP Act such as ecosystem function, ecological integrity, and biological diversity adequately defined for the purposes of the plan?

Conservation Design and Analysis

7. Does the Plan use the existing data appropriately to develop the reserve design and other components of the conservation strategy? Are the methods used to develop the conservation strategy based on sound principles and analytical tools? Does the analysis adequately consider the data gaps and data uncertainties?
8. Does the conservation strategy address species-specific needs and adequately conserve the covered species under review?
9. Are the threats and stressors for the species and habitats identified and/or prioritized?
10. Does the conservation strategy conserve natural communities, environmental gradients, and ecosystem processes necessary to sustain biological diversity given the limitations of the permit area and the linear nature of the impacts?
11. Does the plan address any issues related to invasive species, and the potential impacts on the covered species?
12. Based on your knowledge of the area, does the plan adequately support protection of specific areas critical to the success of the conservation strategy such as biological “hot spots”, crucial linkages, rare natural communities, species occurrences, or other unique and important landscape features?
13. Is the conservation strategy for the Subregional Plan consistent with the conservation principles of the NCCP/HCP, including the following tenets of reserve design:
 - Conserve target species throughout the planning area
 - Larger reserves are better
 - Keep reserve areas close

- Keep reserves contiguous
 - Link reserve with corridors
 - Reserves should be diverse
 - Protect reserves from encroachment and invasion of non-native species
14. Does the conservation strategy include management actions on Water Authority lands sufficient to maintain sustainable populations of the covered species under review? Is the guidance provided on the conduct of these management actions sufficient to provide reserve managers with enough direction to carry out these actions effectively?

Adaptive Management and Monitoring

15. Is the monitoring and adaptive management approach adequate for Water Authority lands? (This approach is generally described in this plan but described in detail in the interim Crestridge Management Area/Ecological Reserve Management Plan and San Miguel Management Plan.)
16. Does the monitoring and adaptive management plan include a process that will appropriately incorporate scientific information into plan implementation?
17. What are the most important data gaps or data uncertainties that should be addressed in the adaptive management process?
18. Are there examples of monitoring programs or protocols that could be used in implementation to properly design the monitoring protocols for the covered species under review? What additional guidance on monitoring should be included in the plan to ensure that monitoring the covered species under review is effective?
19. Does the plan clearly identify the goals and objectives for the monitoring program?
20. Are the “existing conditions” provided within the plan, or is a framework in place for the development of a baseline inventory of the planning area?
21. Has the plan provided a basis for understanding the system (e.g., conceptual models) for how management and conservation actions relate to the covered species and adaptive management program?
22. Are there specific hypotheses related to conservation actions, management, or the covered species?

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23. Is there a mechanism in place that will establish “trigger-points” to initiate adaptive management responses in the future?
24. Does the adaptive management program address catastrophic events (eg. fire, disease, etc).
25. Is there a clear link between the implementation of the monitoring and adaptive management program and an oversight committee?

These are the questions that, at a minimum, will be addressed at the Science Advisors workshop on November 19. Additional questions may arise in the meantime or be raised at the workshop by the Water Authority, the wildlife agencies, RECON, or the advisors themselves. As the workshop facilitator, I look forward to working with each of you to fulfill the panel’s charge and help to improve the Water Authority NCCP/HCP.

If you have any questions about this task, please contact me at (408) 434-2244 ext. 2209 or Kailash Mozumder at (858) 578-8964.

Attachment C:
Workshop Agenda

Science Advisors Workshop
San Diego County Water Authority NCCP/HCP

November 19, 2007
8:30 am – 5:00 pm

Hilton San Diego Airport/Harbor Island
1960 Harbor Island Drive
San Diego, California 92101

Meeting Objectives: Provide independent scientific input on the scientific basis of the administrative draft San Diego County Water Authority NCCP/HCP and address the questions posed to the Science Advisors.

Meeting Outcomes: Produce the following three lists that can be incorporated into the Meeting Summary and used to help produce the Final Report: 1) Preliminary Recommendations 2) Outstanding questions, 3) Information Needs. Also, establish schedule and assignments for completing the Final Report.

SESSION 1 – Advisors, Consultants, Wildlife Agencies, Water Authority

8:30 – 9:00 Attendees sign-in
Coffee/continental breakfast
9:00-9:10 Welcome and introductions (Jones & Stokes)
9:10-9:15 Opening remarks (Water Authority)
9:15-9:20 Wildlife Agency comments (CDFG, USFWS)
9:20-9:45 Overview of scientific input process (Jones & Stokes)
9:45-10:45 Overview of Plan (RECON)
10:45-11:00 Break
10:45-12:00 Q&A of NCCP/HCP consultant
12:00 END SESSION 1

SESSION 2 – SCIENCE ADVISORS AND FACILITATORS ONLY

12:00-12:30 Lunch and break
12:30-1:00 Brainstorm key issues and prioritize afternoon session
1:00-2:15 Review methods used by consultants (data, analysis)
2:15-2:30 Break
2:30-3:15 Species and activities covered under the Plan - Data analysis and gaps
3:15–4:15 Conservation guidelines analysis, reserve design, adaptive management, practices, and monitoring
4:15–4:45 Final report: Review draft outline of final report; assign writing tasks
4:45–5:00 Review action items, schedule post-workshop conference call
5:00 END SESSION 2

ATTACHMENT B-3

ATTACHMENT B-3
DAPTF FIELDWORK CODE OF PRACTICE

Code of Practice

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse clean items with sterilized (e.g., boiled or treated) water before leaving each study site.
2. Boots, nets, traps, etc., should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.
3. In remote locations, clean all equipment as described above (or with a bleach solution) upon return to the land or "base camp." Elsewhere, when washing machine facilities are available, remove nets from piles and wash with bleach on a "delicates" cycle, contained in a protective mesh laundry bag.
4. When working at sites with known or suspected disease problems, or when sampling population of rare or isolated species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately at the end of each field day.
5. When amphibians are collected, ensure separation of animals from different sites and take great care to avoid indirect contact between them (e.g., via handling, reuse of containers) or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.
6. Examine collected amphibians for the presence of disease and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.
7. Used cleaning materials (liquids, etc.) should be disposed of safely and, if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

For further information on this Code, or on the DAPTF, contact:

John Wilkinson
Biology Department
The Open University
Walton Hall
Milton Keynes, MK7 6AA
United Kingdom
Email: DAPTF@open.ac.uk
Fax: +44 (0) 1908-654167

Appendix C

Water Authority Covered Projects Descriptions

This Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP or Plan) is designed to provide a comprehensive conservation plan in exchange for the ability to conduct necessary construction, operation and maintenance (O&M), and rights-of-way activities to meet the mission of the San Diego County Water Authority (Water Authority). This Plan requires the Water Authority to identify the activities that are part of the implementation of Water Authority projects and the Plan. These Covered Activities require approval and permitting by the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG), collectively referred to as the Wildlife Agencies.

Appendix C provides a summary of Covered Projects in this Plan. Covered Projects include Existing Projects (i.e., projects that have already been approved/permited by the Wildlife Agencies) and Planned Projects (i.e., known projects that have not been approved/permited by the Wildlife Agencies). Existing and Planned Projects involve both existing and new facilities, but are distinguished based on whether or not permits have been issued. In many cases, the text indicates those facilities that would require expansion or modification and those that would require new construction.

The Capital Improvement Program (CIP) is the primary mechanism for identifying and funding facility construction and expansion and O&M activities necessary for the Water Authority to meet their mission. The Water Authority prioritizes projects for a wide range of facilities that store, treat, and distribute water throughout the region. Existing and Planned Projects in the current CIP proposed as Covered Activities under this Plan are discussed below. In most cases, Existing Projects will be implemented under existing permits and approvals. Although existing and known CIP projects are identified in this Plan, many required or will require independent environmental review.

Figures provided for CIP projects are based on those in the Water Authority's Regional Water Facilities Master Plan (Master Plan). Not all projects have figures available at this time. In some cases, a CIP involves a relatively minor project (i.e., new valves and connections to existing facilities) and is expected to occur at or near existing facilities in disturbed or developed areas. In addition, facility designs and project footprints are not available for all projects. Project locations identified on figures may be approximate, as site constraints (i.e. elevation, location of biological resources, proximity to existing infrastructure, etc.) will influence final site locations and project design. In the case of pipeline relining projects, impacts will occur at portal locations and not along the entire pipeline alignment; however, these locations have not yet been determined.

Reported or projected impacts to biological resources within the Plan Area as a result of the CIP projects are in accordance with state and federal regulations and reported in this Appendix if information from preliminary site planning or environmental documentation is available. Since surveys for biological resources have not been conducted for all CIP projects, potential impacts have not been determined for all projects. Where a project footprint is available, Covered Species locations for the vicinity of a project indicate the type of species that could occur. Data sources for species occurrence points include the California Natural Diversity Data Base (2008) and the San Diego Natural History Museum (2008).

1.0 Flow Control Facilities

1.1 Construction and Expansion of Facilities

1.1.1 San Diego 12 Expansion

Planned Project

Improving water treatment capacity in the Water Authority's service area has been identified as a significant near-term need in the Master Plan (November 2003). Expansion of the San Diego 12 Flow Control Facility (FCF) will increase the supply of untreated water to the City of San Diego's Alvarado Water Treatment Plant (WTP), which is being expanded from its current 150 million gallon per day (mgd) capacity to a future 200 mgd capacity (Figure C-1). The San Diego 12 Expansion increases the untreated water supply to the plant, which is necessary in order for the full production capacity to be reached. Planning efforts for this project are contingent on the City of San Diego's schedule for the Alvarado WTP expansion and its capital expenditures.

The San Diego 12 FCF expansion would be constructed adjacent to the existing Alvarado WTP south of Lake Murray in the City of La Mesa. The expansion area is highly disturbed, and no native vegetation is present within the project footprint. Remnant patches of coastal sage scrub habitat are present to the east and west of the property (Water Authority and PSBS 2003a). No impacts to sensitive plant or wildlife species are expected to occur.

1.1.2 San Diego 24/25/26 Expansion

Planned Project

The new San Diego 24/25/26 FCF will replace the existing San Diego 5A/5B/5C FCF as the source of untreated water supply to the Miramar WTP, which is being upgraded. The

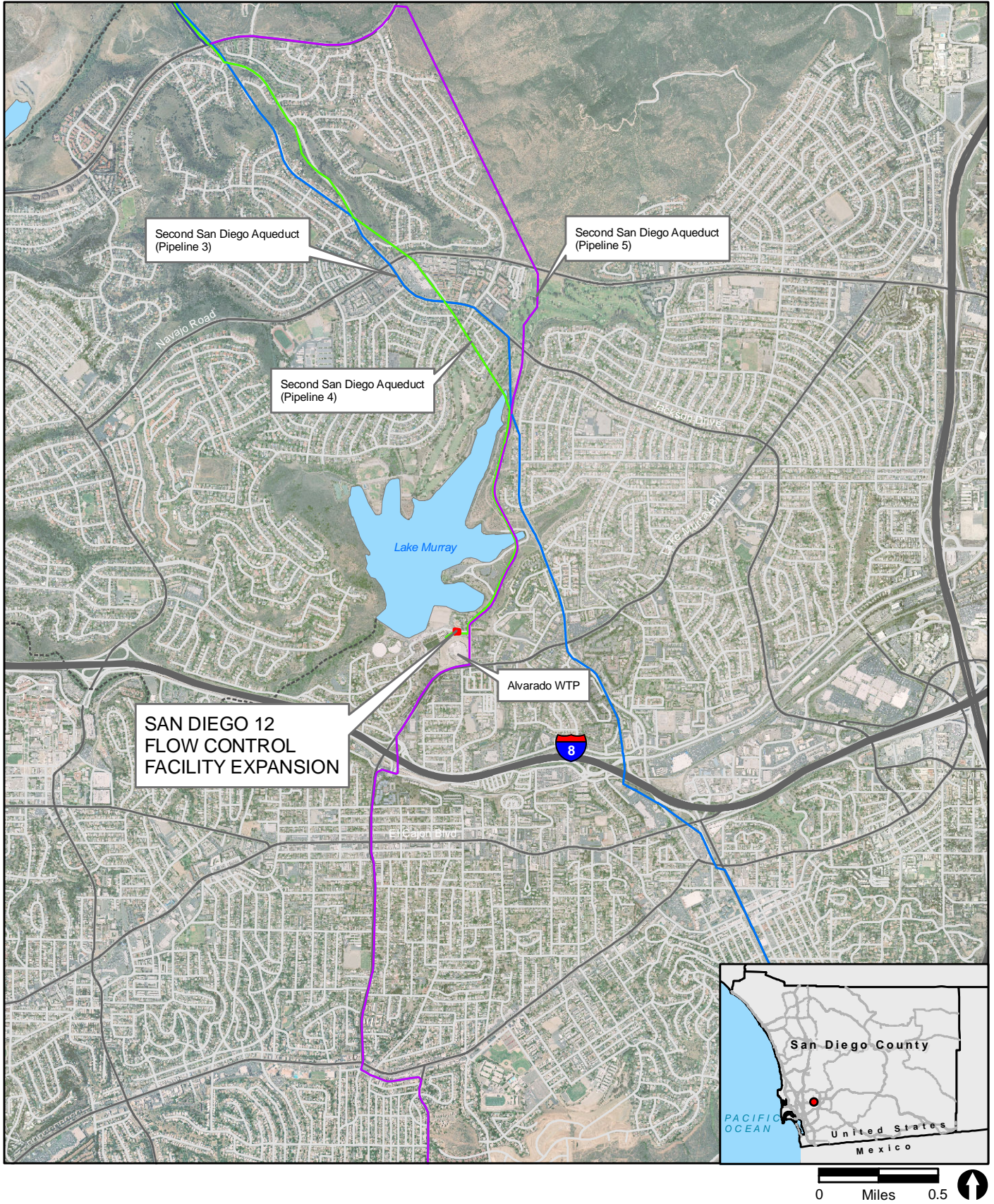


FIGURE C-1

Project Location for
San Diego 12 Flow Control Facility Expansion

new FCF would provide increased untreated water supply capability to match the expanded water treatment capacity of the Miramar WTP (Figure C-2).

The 24/25/26 FCF will be located adjacent to the existing 5A/5B/5C FCF. The project site is within a suburban setting south of the Miramar Reservoir. A small urban stormwater detention pond is located south of the existing FCF, and is utilized by localized waterfowl species, such as mallards (*Anas platyrhynchos platyrhynchos*) (Water Authority and PSBS 2003b). Given that the project area is located in an urban setting, no impacts to native habitats or sensitive species are expected. The project is located within a recreational area; however, no designated open space or preserve land will be impacted.

2.0 System Regulatory Storage

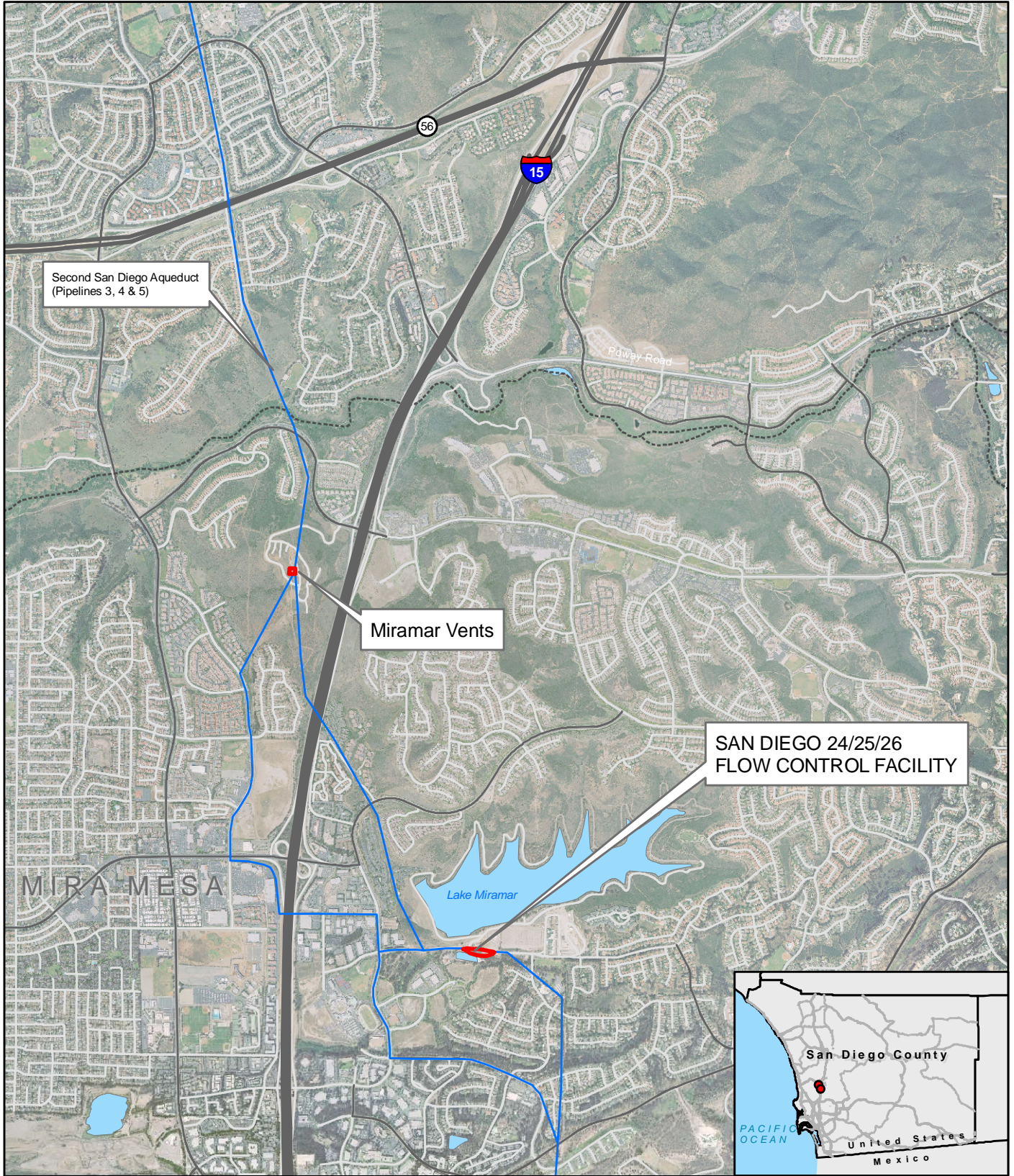
2.1 Construction of New Facilities

Additional storage, both of treated and untreated water, is necessary for the Water Authority to maintain delivery of its reliable water supply. The intent of System Regulatory Storage is to increase the efficiency of the existing conveyance system. The Master Plan outlined some example storage facilities: the Hubbard Hill Flow Regulatory Structure (FRS), the North County Distribution Pipeline FRS, and the Slaughterhouse Terminal Reservoir projects, which are detailed below. These projects represent a sample of examples that fulfill the System Regulatory Storage requirement; however their specific implementation is not guaranteed.

2.1.1 Hubbard Hill FRS

Planned Project

The proposed Hubbard Hill FRS consists of a 3 to 5 million gallon (mg) flow regulatory reservoir tank located in Escondido at the terminus of the treated water sections of Pipelines 1 and 2 of the First Aqueduct. The FRS would be constructed either completely above ground or partially buried. This project would correct two recurring problems at this location: the loss of treated water to the untreated water system downstream, and spills at the current terminal facility following the rejection of water by an upstream user (Figure C-3).




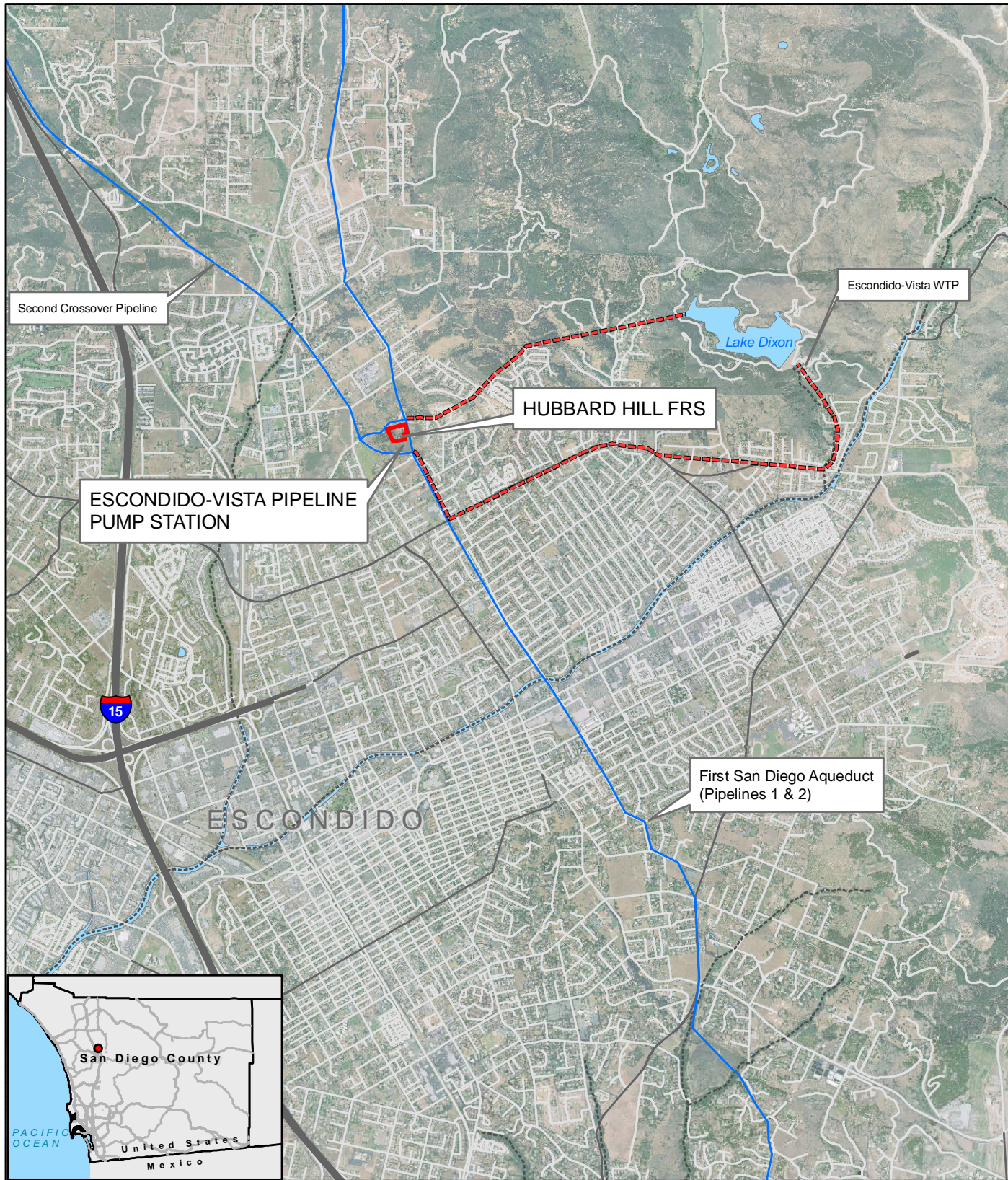
 Existing Aqueducts and Pipelines

FIGURE C-2

Project Location for
San Diego 24/25/26 Flow Control Facility





-  Existing Aqueducts and Pipelines
-  Proposed Pipelines

FIGURE C-3

Project Location for Hubbard Hill FRS

The study area for Hubbard Hill FRS is approximately 5.5 acres and is largely undeveloped and supports remnants of fragmented coastal sage scrub habitat. The north-facing slope contains some portions of agricultural orchards; a large percentage of the south-facing slope is undeveloped due to the extreme slope that supports non-native grassland habitat. The project site is underlain by Las Posas soils derived from gabbroic and metavolcanic formations. The construction of this project may impact coastal sage scrub habitat and non-native grassland habitat. The following plant species are recorded in the project area: summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*) and southern tarplant (*Centromadia parryi* ssp. *australis*). The following wildlife species are recorded in the project area: southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), coastal California gnatcatcher (*Polioptila californica californica*), Belding's orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), and western burrowing owl (*Athene cunicularia hypugaea*). Based on the presence of sensitive habitat and suitable substrate, impacts to sensitive plant and wildlife species may occur. The project will not impact any designated open space areas (Water Authority and PSBS 2003b).

2.1.2 North County Distribution Pipeline Flow Regulatory Structure

Planned Project

North County Distribution Pipeline Flow Regulatory Structure (NCDP-FRS) project will increase operational flexibility and reliability for the Water Authority's treated water delivery system. There is an existing one million gallon (mg) facility located adjacent to the Weese WTP. The existing facility provides insufficient storage to regulate demands along the NCDP, as well as the variable output of the Weese WTP. The NCDP-FRS project consists of a five mg flow regulatory structure to augment the existing tank.

The preliminary project site is approximately 4.75 acres in the unincorporated community of Bonsall, a rural residential and agricultural area. The project site would be located on the west side of the Second Aqueduct adjacent to the existing Weese WTP and would be the easterly terminus of the NCDP as shown on Figure C-4. The area surrounding the Weese WTP is highly disturbed due to pre-existing agricultural uses. However, plant species and wildlife species do occur in the vicinity of the projects. These include plants such as summer holly and felt-leaved monardella (*Monardella hypoleuca* ssp. *lanata*), and wildlife species such as coastal California gnatcatcher, least Bell's vireo (*Vireo belli pusillus*), southern California rufous-crowned sparrow, Coronado skink (*Eumeces skiltonianus interparietalis*), coastal (western) whiptail (*Aspidoscelis tigris stejnegeri*), Belding's orange-throated whiptail, coast (San Diego horned) lizard (*Phrynosoma coronatum blainvillii*), and (northern) red diamond rattlesnake (*Crotalus ruber ruber*). Non-native grasslands present in the area could be impacted. Auld clay soils are the predominant soil type in the project area. However, given the disturbed nature of the



FIGURE C-4

Project Location for
North County Distribution Pipeline FRS

site, it is not expected to support a high diversity of native plant or wildlife species (Water Authority and PSBS 2003a).

2.1.3 Slaughterhouse Terminal Reservoir Tank

Planned Project

The proposed Slaughterhouse Terminal Reservoir consists of a 10 mg flow regulatory structure (reservoir tank) located near San Vicente Reservoir at the terminus of the untreated water sections of Pipelines 1 and 2. The FRS would be constructed either as an above ground or partially buried structure. These pipelines provide untreated water to Ramona Municipal Water District, city of Poway, Helix Water District (and thus to Otay Water District, Lakeside Water District and Padre Dam Municipal Water District), city of San Diego with the San Vicente Reservoir being the terminus of Pipelines 1 and 2. From this location, flows are controlled and directed to the FCF for San Diego, Helix, and/or the La Mesa–Sweetwater Extension (LMSE) Pipeline (Figure C-5).

The study area for this project is approximately 11.8 acres located in largely undeveloped Slaughterhouse Canyon. The tank will be located in an area that supports coastal sage scrub, chaparral, and non-native grassland habitat (Water Authority and PSBS 2003a). Runoff from the project site will drain into the Slaughterhouse Canyon creek, an intermittent tributary to San Vicente Creek. Olivenhain soils are the predominant soil type in the area. Plant species recorded in the project vicinity include: San Diego thorn-mint (*Acanthomintha ilicifolia*), summer holly, Nuttall's scrub oak (*Quercus dumosa*), San Miguel savory (*Satureja chandleri*), San Diego goldenstar (*Muilla clevelandii*), Orcutt's brodiaea (*Brodiaea orcuttii*), Engelmann oak (*Quercus engelmannii*), Mission Canyon bluecup (*Githopsis diffusa* ssp. *filicaulis*), willowy monardella (*Monardella viminea*), and Lakeside ceanothus (*Ceanothus cyaneus*). Wildlife species in the project area include coastal California gnatcatcher, southern California rufous-crowned sparrow, Bell's sage sparrow (*Amphispiza belli belli*), Cooper's hawk (*Accipiter cooperii*), San Diego woodrat (*Neotoma lepida intermedia*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), Dulzura pocket mouse (*Chaetodipus californicus femoralis*), coastal (western) whiptail, Belding's orange-throated whiptail, (northern) red diamond rattlesnake, and coast (San Diego horned) lizard. Based on the presence of sensitive habitat and suitable substrate, impacts to sensitive plant and wildlife species may occur. The project is area is located within private property and will not impact San Vicente Reservoir city parkland (Water Authority and PSBS 2003a).





-  Project Boundary
-  Existing Aqueducts and Pipelines

FIGURE C-5
Project Location for Slaughterhouse Terminal Reservoir and San Vicente Dam Raise

2.1.4 Terminal Structure Modifications

Planned Project

The existing Terminal Structure was constructed in 1964. After the addition of the Escondido No. 3 Service Connection in 1976, major modifications to the Terminal Structure were required to accommodate a higher hydraulic grade line for gravity flow at Escondido No. 3 Service Connection. As demand increased, the Terminal Structure began to experience damaging cavitations and associated vibration under many flow conditions. As a result, isolation valves and throttling valves must periodically be replaced. A preliminary investigation report recommended alternatives for modifications to the piping, valves, and system operation that would allow the facility to withstand the high-pressure differential and deliver the necessary flows across a wide range of upstream and downstream pressures. In June 1997, the Board approved the addition of the Terminal Structure Modifications to the CIP. A Notice of Exemption for the project was filed on January 25, 2001.

3.0 Pipeline Facilities

3.1 New Pipelines

3.1.1 Second Crossover Pipeline

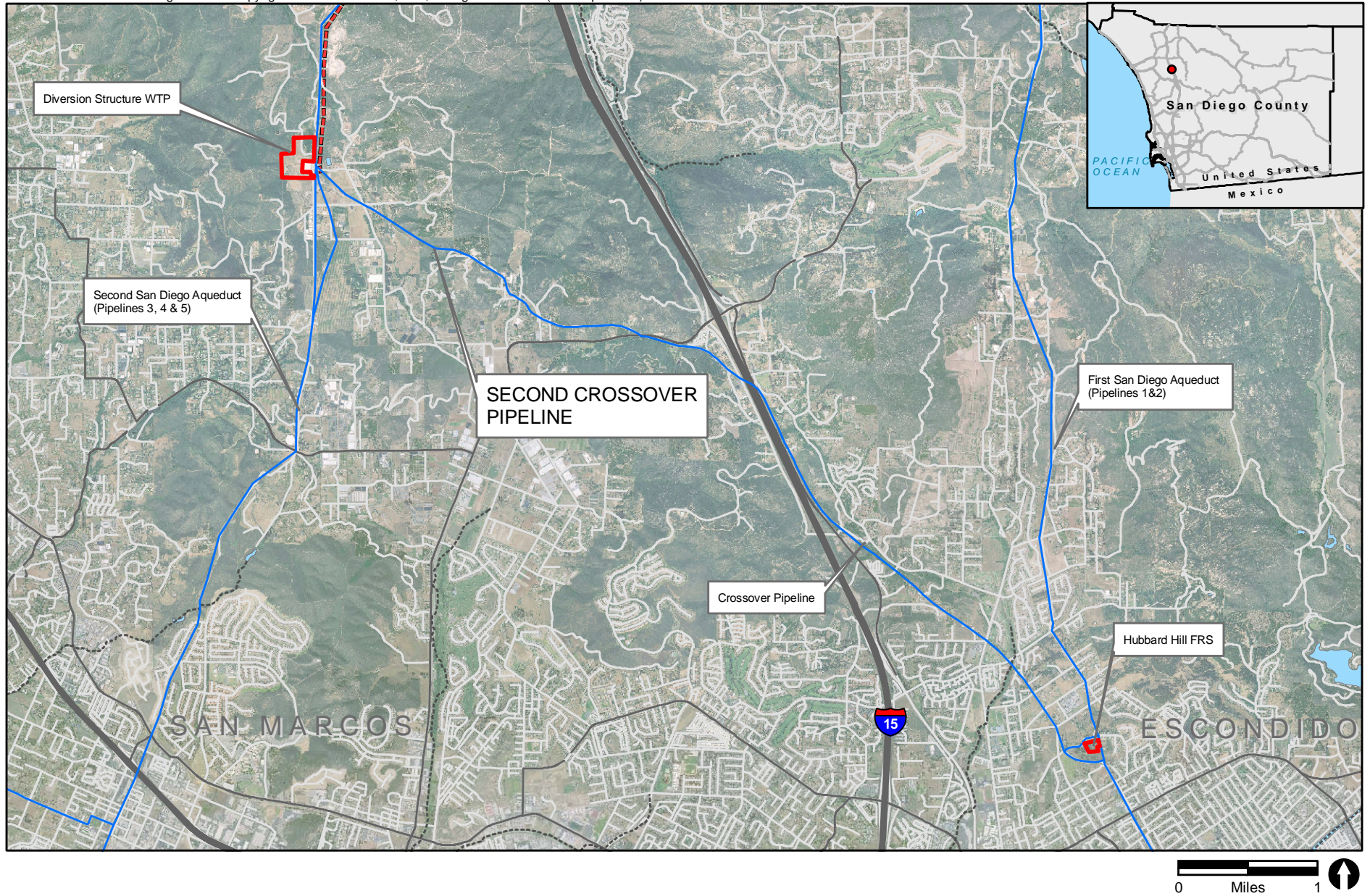
Planned Project

The Second Crossover Pipeline project involves construction of a new untreated water pipeline approximately 52,000 feet long, with a diameter of approximately 96 inches, and with a capacity of 330 cubic feet per second (cfs). The Second Crossover Pipeline alignment would generally follow the existing Crossover Pipeline alignment, where possible; however, exact routes will be identified and evaluated during site-specific CEQA analysis (Figure C-6).

The existing Crossover Pipeline supplies untreated water to the Escondido–Vista WTP, and through the First Aqueduct to the following agencies: Ramona Municipal Water District, City of Poway, Helix Water District (and thus Padre Dam and Otay), the City of San Diego, and potentially Sweetwater Authority. The existing pipeline was designed for 130 cfs, but modifications at the Twin Oaks Valley FRS have allowed as much as 200 cfs through the line.

The Second Crossover Pipeline project is proposed to be located along the existing crossover pipeline alignment in Twin Oaks Valley, crossing under Interstate 15 (I-15) at

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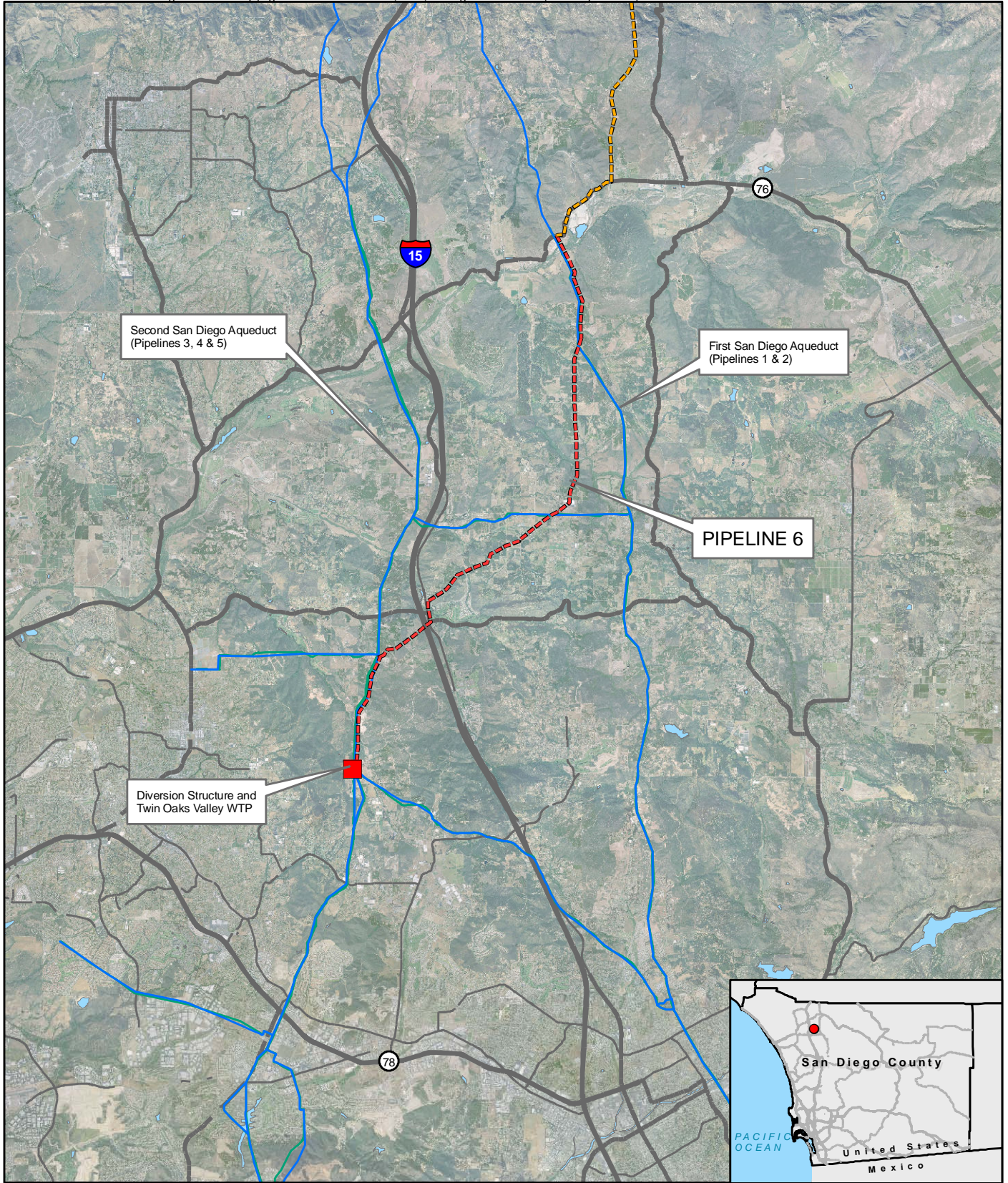



 Existing Aqueducts and Pipelines

FIGURE C-6
Project Location for
Second Crossover Pipeline



-  Existing Aqueducts and Pipelines
-  Pipeline 6 (Water Authority EIR Alignment)
-  Pipeline 6 (MWD EIR Tunnel)

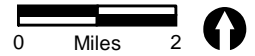


FIGURE C-7
Project Location for Pipeline 6

Deer Springs Road and continuing west through the Merriam Mountains to the Hubbard Hill FRS in Escondido. Land uses along the route include rural residential, agriculture, and open space (SANDAG 1997). The topography in Twin Oaks Valley ranges from the valley bottom to rural hillsides and prominent ridgelines. Habitat present within the project area includes coastal sage scrub, chaparral, oak woodland, riparian forest, and non-native grassland. Soil types present within the project area include Ramon-Placentia, Fallbrook-Vista, Las Posas, and Cieneba-Fallbrook associations (U.S. Department of Agriculture 1973). Based on the presence of sensitive habitat and substrate, impacts to sensitive plant and wildlife species may occur. Plant species recorded in the project area include summer holly, Parry's tetracoccus (*Tetracoccus dioicus*), felt-leaved monardella, thread-leaved brodiaea (*Brodiaea filifolia*), San Diego thorn-mint, Orcutt's brodiaea, rainbow manzanita (*Arctostaphylos rainbowensis*), San Diego button-celery (*Eryngium aristulatum* var. *parishii*), and spreading navarretia (*Navarretia fossalis*). Wildlife species recorded in the area include coastal California gnatcatcher, southern California rufous-crowned sparrow, coastal (western) whiptail, Belding's orange-throated whiptail, coast (San Diego horned) lizard, and southern pacific (southwestern) pond turtle (*Actinemys marmorata pallida*). The project will not impact any designated open space areas (Water Authority and PSBS 2003a).

3.1.2 Pipeline 6

Existing Project

As discussed in the introduction to this Appendix, Existing Projects will be implemented under existing permits and approvals. Pipeline 6 is an existing project that was approved and partially mitigated in the early 1990s. Its alignment is currently being reevaluated jointly by the Water Authority and the Southern California Metropolitan Water District of Southern California (MWD). As the current planning for Pipeline 6 proceeds, if the proposed alignment for Pipeline 6 is changed, the new alignment would undergo further environmental review and require coverage under this Plan. Per the Plan, appropriate mitigation will be debited from an established HMA. Additionally, this project would require coverage by the Plan if Covered Species are determined to be affected by the project. The San Diego Pipeline 6 Project Final Environmental Impact Report (Water Authority 1993) identifies coast live oak, Diegan sage scrub, Riversidian sage scrub, southern mixed chaparral, and riparian vegetation communities being affected by the project. It is anticipated that these same communities, and possibly non-native grasslands, could be affected if modifications are made to the existing alignment, or the selection of an alternate alignment. The approved Pipeline 6 project consists of approximately 31 miles of 108-inch diameter pipeline extending from Lake Skinner to the Twin Oaks Valley Diversion Structure/WTP (Figure C-6).

To date, MWD has constructed a portion of the northern segment of Pipeline 6 consisting of approximately seven miles of ten-foot diameter pipe. The pipeline starts at

the Lake Skinner outlet conduit near Borel Road and terminates in the south near the northeast corner of the intersection of De Portola Road and Anza Road in Riverside County. A joint MWD/Water Authority feasibility study has commenced to re-evaluate the remaining segments of the previously approved Pipeline 6 alignment, and to consider other alignments. Based on preliminary information compiled for a feasibility study to reevaluate Pipeline 6 and its alignment, a realigned Pipeline 6 would be within the PIZ or the Survey Area, and may affect 12.35 acres of riparian woodland, 1.77 acres of coast live oak woodlands, 20.08 acres of southern mixed chaparral, 53.30 acre of Diegan sage scrub, and 5.76 acres of non-native grasslands, and approximately 130.47 acres of agricultural lands, disturbed habitats, and developed areas not subject to mitigation per the Plan. Based on the information available, it is not know what percent of the impacts to sensitive vegetation communities would be temporary. However, for potential impact assessment purposes, it is assumed all impacts are permanent, and the preliminary impact information has been incorporated into the Plan's impact assessment Table 5-3 and Table 6-8.

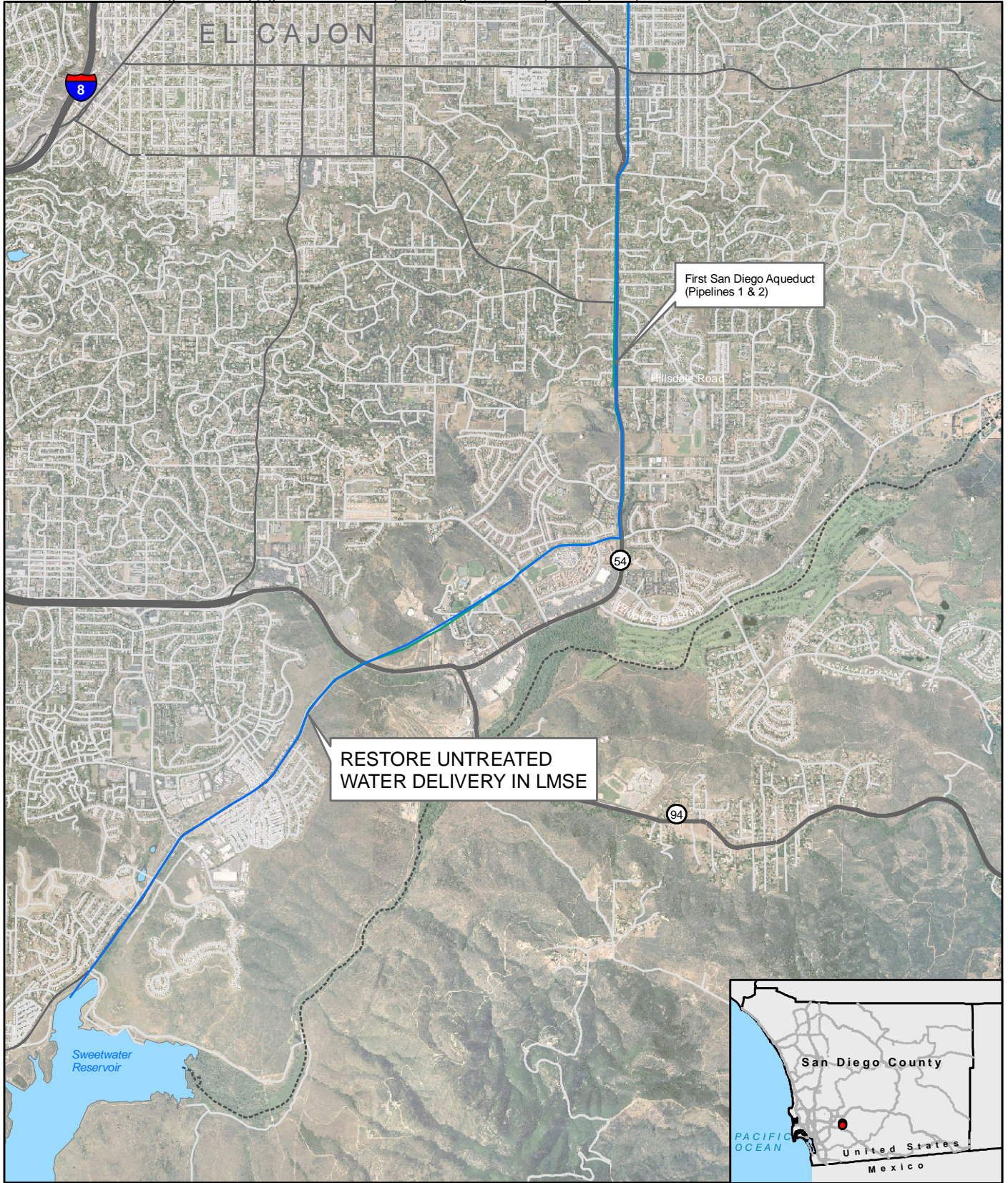
It is anticipated that MWD will construct the northern section of the pipeline, and the Water Authority will construct the southerly section of Pipeline 6, with a possible hand off point north of the San Luis Rey River, which would result in the Water Authority constructing approximately 12 miles of pipeline. The project will increase the Water Authority's capability to import up to 370 mgd of untreated water. This Plan is to cover the entire Pipeline 6 project, regardless of which water agency (i.e., MWD or Water Authority) has issued a construction contract for a particular segment of Pipeline 6 installation.


3.2 Pipeline Conversions

3.2.1 Restore Untreated Water Delivery in LMSE

Planned Project

This project involves the conversion of the LMSE Pipeline from treated water service to untreated water service, to provide delivery to Sweetwater Reservoir for storage and/or augmentation of their local supply. This project can only be implemented after completion of a new treated water pipeline from Otay Water District's 14 FCF to Otay Water District Regulatory Reservoir; this project is pending approval by Otay Water District. At present, the 72-inch-diameter LMSE Pipeline delivers treated water from the Levy WTP to the Otay Water District with a further connection to the Sweetwater Authority (Figure C-8).



 Existing Aqueducts and Pipelines

The completion of this project is dependent on the construction of the new pipeline the Otay FCF 14 to Regulatory Reservoir pipeline project by Otay Water District. The project area is located in an urban setting and is not expected to impact native habitats or sensitive species. No impacts to designated open space are anticipated by this project.

3.2.2 Ramona Reservoir Bypass

Planned Project

This project consists of a pressure reducing station and connecting pipeline to bypass existing facilities and convey water stored in Lake Ramona to the First Aqueduct. The Water Authority considers the Ramona Reservoir Bypass to be a small project since it requires only new valves and short pipeline lengths to bypass a facility.

3.2.3 Convert Pipeline 3 to Untreated From Crossover to Miramar

Planned Project

At present, Pipelines 3 and 4 carry treated water from the Twin Oaks Valley Diversion Structure south to the Miramar vents and Pipeline 5 carries untreated water. As upgraded Member Water Agencies' WTP capacity comes on line in future years, there will be less demand for direct treated water service and more demand for untreated water service to the plants. The conversion of Pipeline 3 from treated to untreated service will balance Water Authority delivery capacity with these demand shifts. This is also a relatively minor project that requires only new valves and short pipeline lengths to switch from treated to non-treated water.

3.3 Long-Term Replacement/Relining of Pre-stressed Concrete Cylinder Pipes

Existing Project

Although the Long-term Replacement/Relining of the Pre-stressed Concrete Cylinder Pipes (PCCP) is an Existing Project, the existing permits only allow activity outside the breeding season of the coastal California gnatcatcher. If the Water Authority is able to work within the terms and conditions of the existing permit, the project will be implemented as permitted. However, if the Water Authority determines that work during the breeding season is necessary in order to ensure efficient operation and functioning, the project would require coverage under this Plan for indirect to effects to gnatcatcher (e.g., noise, dust, construction traffic). Additionally, this project would require coverage by the Plan if Covered Species are determined to be affected by the project.

Initially, there was 82.5 miles of PCCP within the Water Authority's water transmission system, with 64 mile associated with Pipelines 3 and 4. These pipes were constructed at various times between 1958 and 1982. In the early 1980s, the Water Authority began experiencing PCCP failures in the Sweetwater area and relined 26,426 linear feet of Pipeline 3. Between 1990 and 1993, there were four separate repairs of PCCP in Water Authority pipelines. In 1993, the Board approved the Replacement/Relining of Existing PCCP to facilitate repairs and relining of PCCP as they are needed, and as identified in the pipeline condition assessment being performed as part of the Aqueduct Protection Program. To date, approximately 23.5 miles of Pipelines 3 and 4 have been relined. It is expected that all the Water Authority's remaining PCCP in Pipelines 3 and 4 (i.e., approximately 40.5 miles) will need to be replaced or relined with steel pipe over the next 18-year period. There is 18.5 miles of PCCP associated with Pipeline 5 and the Crossover Pipeline. Budgeting for relining or replacing these latter two pipelines has not yet occurred, but it is foreseeable that they will require relining or replacement based on facility specific requirements.

Relining appears to be the more efficient means of addressing most PCCP degradation. Long-term replacement/relining of the PCCP projects currently in active construction or planned are described in the table below. Sixteen relining projects are to be implemented over the next 18 years throughout the length of the Second Aqueduct, and two relining projects implemented in the Crossover Pipeline right of way.

Direct impacts to relative to coastal sage scrub and gnatcatcher within the Second Aqueduct rights-of-way (Pipelines 3, 4, and 5) have been mitigated off-site by the purchase of Crestridge HMA, and the debiting of mitigation credits from there as required by earlier projects (BO 1-6-93-F-28). When planning new projects, if the Water Authority determines there are sensitive vegetation communities within the Second Aqueduct that have not yet been mitigated off-site (e.g., chaparral), the Water Authority would provide off-site mitigation for these impacted communities, with the expectation it would not have to mitigate off-site in the future for activities in the same area. Off-site mitigation would be in the form of debiting mitigation credits from a HMA.

Previous estimates of annual maintenance impacts included impacts associated with the repair and maintenance of failing PCCP along the Second Aqueduct. The elevation of this activity from an O&M action to a CIP project (Replacement/Relining of Existing PCCP Pipelines) is anticipated to curtail the maintenance, urgent repairs, and emergency repair needs of the system. It should be noted that while new facilities built under this Plan are also anticipated to have maintenance requirements, these maintenance activities are anticipated to be fully mitigated at the time of construction and would not incur additional impacts requiring off-site mitigation measures.

3.3.1 Pipeline Relining

Pipelines 3 and 4 are in parallel alignment in the Second Aqueduct for approximately 30 miles, and contained 64 miles of PCCP. To date, 23.5 miles of Pipeline 3 and Pipeline 4 have been relined. Pipeline 5, also located in the Second Aqueduct, and the Crossover pipeline connecting the First and Second Aqueducts located north of the city of Escondido have an additional 18.5 miles of PCCP.

Historically, Pipeline Relining within the Second Aqueduct has been permitted through BO 1-6-93-F-28 and Habitat Loss Permits (HLP) issued by either the city or County of San Diego. BO 1-6-93-F-28 covers gnatcatcher, but limits work periods to outside of the species' nesting period. For those relining projects with construction schedules encroaching into the gnatcatcher's nesting period, HLPs have been used to authorize indirect construction noise impacts. As discussed above, if the Water Authority determines that it is necessary for relining work periods to encroach into the gnatcatchers' nesting period, or the project impacts other Covered Species, the project would require coverage under this Plan. Direct impacts from project implementation would occur in the area around each portal. Due to the long-term schedule for this project, exact portal locations for the entire pipeline have not been determined.

Planned Project

The Pipeline 3 and 4 Reline Project from Miramar Hill to State Route 52 (SR-52) (Project Nos. R0217 and R0293) consist of 69- to 93-inch collapsed steel liners installed in approximately 44,000 linear feet of existing concrete pipe within Pipelines 3 and 4. Access to the pipelines would occur from 23 proposed access portal locations. Although most of the work would be conducted within the Water Authority's existing rights of way, impacts to sensitive habitat outside of the right of way have been tentatively identified as 2.1 acres of Diegan coastal sage scrub, 0.1 acre of Chamise chaparral, and 0.3 acre of non-native grasslands. Covered species observed within or adjacent to the project area are: Orcutt's brodiaea, Nuttall's scrub oak, gnatcatcher, California horned lark (*Eremophila alpestris*), southern California Rufous-crowned sparrow, grasshopper sparrow (*Ammodramus savannarum*), and San Diego black-tailed jackrabbit. The project is anticipated to commence construction in 2011 and be completed in 2013, and would require coverage under the Plan.

The other relining pipeline projects identified in the PCCP Relining Approved Budget Current Schedule table below have not advanced enough in the planning process for the development of a project description or collection of biological resource data. However, it is anticipated that the projects will occur within the existing rights of ways, and entirely within the PIZ.

**TABLE C-1
PCCP RELINING APPROVED BUDGET CURRENT SCHEDULE¹**

Project Number	Description	Construction Fiscal Year
R0217 ²	P3 & P4 Miramar Hill to Scripps Ranch	2012
R0274 ²	P4 SR-52 to Jackson Dr X-over	2013
R0293	P3 Scripps Ranch to SR-52	2014
R0209	P3 - Lake Murray to Spring Street	2015
R0214	P3 – Spring Street to Sweetwater	2016
R0211	P3 - Sweetwater to Eastlake	2017
R0212	P3 - Eastlake to Lower Otay	2018
R0275	P4 - Jackson Dr X-over to Lake Murray	2019
R0266	P4 - 2367+00 to 2566+15	2026
R0270	P4 - 2235+80 to 2367+00	2026
R0268	P4 - MWD Delivery to 2235+80	2027
R0273	P4 - 2566+15 to Diversion Structure	2027
<u>Possible Future Projects (not yet budgeted)</u>		
R0277	Crossover - Station 210+00 to 1 st Aqueduct	2021
R0276	Crossover - 2nd Aqueduct to Station 210+00	2022
R0278	P5 - Station 2060+85 to Station 2258+75	2024
R0279	P5 – Station 2258+75 to Station 2445+79	2024
R0280	P5 - Station 2445+79 to Station 2640+47	2025

¹ Budget as of January 28, 2009.

² Indicates priority project.

The Pipeline 3 Relining from SR-52 to Lake Murray to Spring Street segment is planned for construction from July 2015 through June 2016. This segment begins at the south side of SR-52 and traverses south along the Water Authority's Second Aqueduct, where it ends at Lake Murray in the city of San Diego. This project will reline approximately 24,000 feet of existing 69-inch diameter PCCP. Construction is scheduled to begin in July 2008 and will be completed in June 2010. This project is being covered under the auspices of the City of San Diego MSCP.

The Pipeline 3 Relining from Lake Murray to State Route 94 (SR-94) segment is planned for construction from July 2010 and will be completed in June 2011. This segment would begin at Lake Murray in the city of San Diego and traverses south along the Water Authority's Second Aqueduct. Portions of the alignment are located within city of La Mesa streets and end at Spring Street, near State Route 94. This project will reline approximately 14,000 feet of existing 69-inch diameter PCCP. Construction is scheduled to begin in July 2010 and will be completed in June 2011.

The Pipeline 3 Relining from Eastlake (city of Chula Vista) to Lower Otay segment is planned for construction from July 2018 and will be completed in June 2019. This segment begins at Proctor Valley Road in the city of Chula Vista and traverses south

along the Water Authority's Second Aqueduct. Portions of the alignment are located within city of Chula Vista streets and end at Lower Otay Reservoir in the city of Chula Vista. This project will reline approximately 10,000 feet of existing 69-inch diameter PCCP.

4.0 Pump Stations

4.1 Construction of New Facilities

4.1.1 San Diego 17 Pump Station

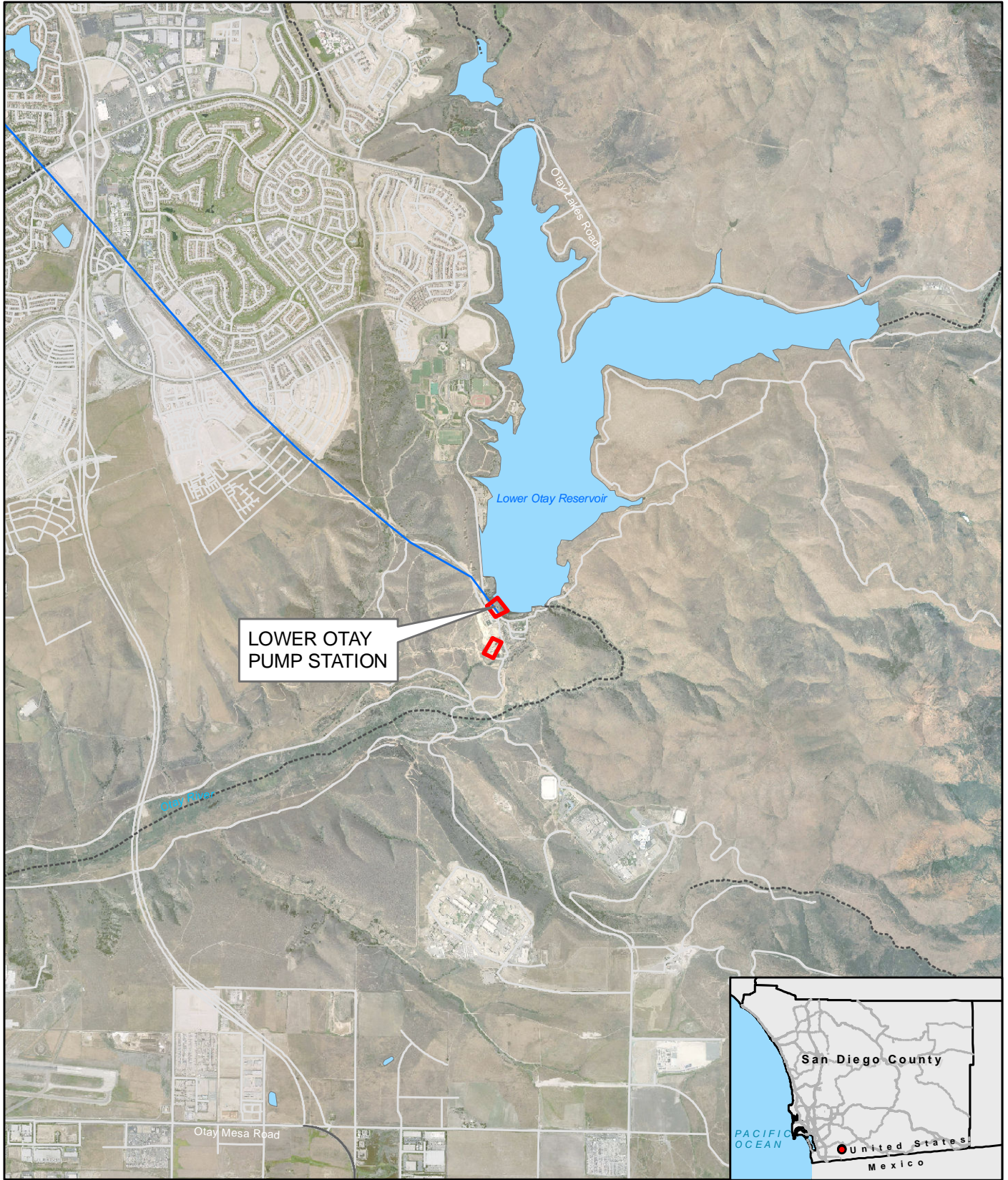
Planned Project

In May 1994, the Water Authority approved San Diego 17 Flow Control/Pressure Facility as part of an initial agreement with the City of San Diego to upsize a portion of the La Mesa/Lemon Grove pipeline from 96 inches to 108 inches in diameter. The facility will pump up to 155 cfs of treated water from the City's Alvarado WTP into the La Mesa/Lemon Grove Pipeline. The City will have up to 93 cfs pumping capacity to deliver water to the San Diego 18 FCF. The Water Authority is proposing to have up to 62 cfs pumping capacity to deliver water to its Member Water Agencies in central and south San Diego County. Per a cooperative agreement with the City of San Diego, the City will obtain any ESA authorizations required and construct this facility. This Plan will cover the O&M of the facility. However, if the City does not construct the facility, the Water Authority may construct the facility as a Covered Project under this Plan.

4.1.2 Lower Otay Pump Station

Planned Project

The Lower Otay Pump Station project is part of the Water Authority's ongoing commitment to improving untreated water delivery capacity in the service area. After the section of Pipeline 3 near the Lower Otay Reservoir has been rehabilitated, it will be able to handle higher internal pressures. This project provides a pump station to pump water back to the north from the Lower Otay Reservoir, allowing local water in the Morena-Barrett-Lower Otay system to be treated at the Alvarado or Perdue WTPs in addition to the Otay WTP (Figure C-9). A new pump station and associated facilities would be required to lift water from the Lower Otay high water level of 495 feet up to the probable aqueduct grade line of 700 feet.




 Existing Aqueducts and Pipelines

FIGURE C-9
Project Location for
Lower Otay Pump Station

The project will be located at the south end of the Otay Reservoir adjacent to the existing Lower Otay WTP. The project study area is approximately 3.65 acres, and the surrounding area is largely undeveloped and supports coastal sage scrub and chaparral (Water Authority and PSBS 2003a). Huerhuero clay and sandy loams are located in the area. In the area of the proposed pump station, the following plant species are recorded: Otay tarplant (*Deinandra conjugens*), Munz's sage (*Salvia munzii*), San Diego button-celery, Orcutt's brodiaea, San Diego goldenstar, San Diego barrel cactus (*Ferocactus viridescens*), variegated dudleya (*Dudleya variegata*), San Diego marsh-elder (*Iva hayesiana*), Otay Mesa mint (*Pogogyne nudiuscula*), little mouse-tail (*Myosurus minimus* ssp. *apus*), and snake cholla (*Cylindropuntia californica* var. *californica*). Wildlife species recorded in this area include: coastal California gnatcatcher, southern California rufous-crowned sparrow, San Diego cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), least Bell's vireo, yellow-breasted chat (*Icteria virens*), quino checkerspot butterfly (*Euphydryas editha quino*), Belding's orange-throated whiptail, two-striped garter snake (*Thamnophis hammondi*), San Diego black-tailed jackrabbit, and San Diego fairy shrimp (*Branchinecta sandiegonensis*). Based on the presence of sensitive habitat and suitable substrate impacts to sensitive plant and wildlife species may occur.

4.1.3 Pump Stations for Pipeline 3 and Pipeline 4

Existing Project

Projects would be constructed under the Emergency Storage Project (ESP) permit if built in locations identified in BO 1-6-97-F-13. BO 1-6-97-f-13 covers coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher (*Empidonax traillii extimus*), arroyo toad (*Bufo californicus*), and quino checkerspot butterfly. If locations not previously analyzed are considered, the project would either undergo reinitiation of consultation or require coverage under this Plan.

Preliminary engineering information indicates that two pump stations are needed for the ESP. The new facilities are associated with Pipeline 3 and Pipeline 4 which will be relined in order to handle increased water pressure. The construction date of the Pipeline 3 Pump Station and interconnect/Pipeline 4 Pump Station are 2010 through 2012. The anticipated impacts to coastal sage scrub and coastal California gnatcatcher from construction of the pump stations were analyzed in the ESP EIR/EIS (San Diego County Water Authority Emergency Water Storage Project Final EIR/EIS, July 1996). Mitigation for these projects has been implemented as part of the entire ESP. Credits for coastal sage scrub and gnatcatcher credits have already been debited from Managed Mitigation Areas (mitigation lands) acquired for ESP. This Plan applies to the construction of these facilities if they are sited in a location other than analyzed in the ESP EIR, or if Covered Species are impacted by the facilities. Additionally, this project would require coverage by the Plan if other Covered Species are determined to be affected by the project.

4.2 Expansion of Existing Facilities

4.2.1 Padre Dam Pump Station Expansion

Planned Project

This project involves the expansion of the existing Padre Dam Pump Station from 18 mgd to 28 mgd. This project would allow the Padre Dam Municipal Water District and Lakeside Water District to utilize treated water capacity available in the Helix Water District's Levy WTP. Work would involve identifying a new site, meter modifications, interconnecting piping, and a new two- or three-pump facility (Figure C-10).

This project is proposed in an area dominated by residential and commercial development. The project site is approximately 0.3 acres in size, and is highly disturbed and does not appear to contain any remnant native vegetation (Water Authority and PSBS 2003b). Wildlife species occurring within this area are considered to be primarily generalists and vegetation would most likely consist of ruderal species. Runoff from the project site currently flows into a tributary to the San Diego River. No impacts to sensitive habitats, plants, or wildlife species are anticipated. The project site is located on private property and will not impact Lake Jennings Park, located approximately a half-mile to the west (Water Authority and PSBS 2003b).

5.0 Water Treatment Plants

The following WTP is covered under the Plan for O&M only.

5.1 Twin Oaks Valley WTP Operations and Maintenance

Existing Project

This project addresses the ongoing need for a water treatment plant. Existing development within the project site boundaries include the Twin Oaks Valley Flow Regulatory Structure and associated facilities. The Water Authority's Pipeline Nos. 3, 4 and 5 and Twin Oaks Valley Road are immediately east of the site. The Vallecitos Water District reservoir is located to the south. Construction for the Twin Oaks Valley WTP was completed in 2008.

The WTP is a membrane treatment facility. Membrane treatment uses two filtration processes and two chemical processes to remove impurities from water. As with the




 Existing Aqueducts and Pipelines

FIGURE C-10
Project Location for
Padre Dam Pump Station Expansion

conventional process, treated water would flow by gravity from the plant into a clearwell, which would act as a feed point into the potable water pipeline.

6.0 Reservoir Construction and O&M

The Plan will cover the O&M of Water Authority reservoirs and reservoirs in which the Water Authority stores water:

- O&M Activities for ESP pipeline infrastructure including the Olivenhain, San Vicente and Lake Hodges Reservoirs; and
- Olivenhain (Hodges-Olivenhain Pumped Storage), San Vicente and Lake Hodges Reservoirs water level raising and lowering.

6.1 San Vicente Dam Raise

Existing Project

San Vicente Dam Raise action is made up of two projects: the San Vicente Dam and Reservoir element of the ESP and the Carryover Storage Project (CSP) (see Figure C-5). Due to engineering constraints and financial considerations the ESP San Vicente Dam Raise element and CSP are being implemented as one action. The Water Authority instituted the expansion of San Vicente Dam Raise Project in order to store water so that it is available during emergencies and to meet water demand during other supply interruptions or shortfalls. The combined project has existing Wildlife Agencies' permits (BOs 1-6-97-F-13 and 2008B0061-2008F0732; CESA 2080-2000-003-5; streambed agreements 5-361-96 and 1600-2008-0216-5), and construction is expected to begin in April 2009.

The dam raise is expected to be complete by the end of 2012, and the new reservoir high water elevation was projected in the CSP EIR to occur within three to five years after completion. Completion of the replacement marina facilities is anticipated for the end of 2012. A date for the reopening of the reservoir to recreation is not available, but Water Authority public outreach material states it will occur sometime between 2014 and 2017 when the water level reaches the replacement boat launch ramp.

Once construction of the ESP projects (described below) and CSP is concluded, this Plan is designed to accommodate the Water Authority's O&M activities required for this large-scale facility. Given that ESP and CSP have already been mitigated through the acquisition of upland habitats and securing wetland mitigation sites, their impacts to vegetation communities are not specifically identified or calculated in this Plan.

The ESP is a system of reservoirs, interconnected pipelines, and pumping stations designed to make water available to the region in the event of a disaster that interrupts imported water deliveries. The Water Authority ESP is designed to improve the reliability of the region's existing water supply system by the addition of approximately 90,100 acre-feet of reservoir storage in San Diego County. The ESP includes construction of a new dam and reservoir at the Olivenhain Reservoir site, re-operation of Lake Hodges, expansion of the existing San Vicente Reservoir, and construction of associated pipelines, pump stations, and ancillary structures. With the exception of the San Vicente Dam component and the pump stations identified in Section 4.1.3 above, the other ESP components are complete or actively under construction. Major construction for the San Vicente Dam Raise would be concentrated at the downstream side of the dam and at the on-site quarry associated with the relocated recreational marina. Drilling, blasting, and soil excavation would be required at the quarry and to prepare the dam foundation. Rock removed during this process will be processed on-site and used for aggregate. Finally, roller-compacted concrete would be placed over the face and above the existing dam. The majority of the on-site quarry will be inundated at the completion of the project.

Carryover storage refers to a process of accumulating water during wet seasons/years when it is plentiful, keeping it in storage, and carrying it over for use in subsequent dry years when there is a shortage. Carryover storage is important to increase the reliability and flexibility of the region's water storage through the year 2030. The purpose of the CSP is to establish an additional 100,000 acre-feet of carryover water storage for the region.

The combined San Vicente Dam Raise action will raise the dam height 117-feet, with a spillway height of 766 feet, i.e., new maximum reservoir surface elevation. Typically the reservoir's operational elevation is lower than the spillway elevation. A saddle dam would also be constructed. The relocation of the existing recreational marina is an element of this project. The other appurtenant infrastructure associated with ESP is adequately sized for the operation of additional storage capacity associated with CSP. Total increased reservoir capacity will be 152,100 acre-feet (52,100 acre-feet ESP; 100,000 acre-feet CSP).

The Board certified the Final EIR and adopted the Final CEQA Findings of Fact, Statement of Overriding Considerations, and Mitigation Monitoring Program for the ESP on August 15, 1996. The Record of Decision for the Final EIS was issued by U.S. Army Corps of Engineers (USACE) for the ESP on August 4, 1997.

As part of the ESP process, a ESA Section 7 consultation was conducted with USFWS to address ESA issues, with USACE as the Lead Agency. A Biological Opinion (BO 1-6-97-F-13) was issued by USFWS on April 9, 1997, a Consistency Determination (Tracking No. 2080-2000-003-5) was issued by CDFG on February 2, 2004, and a Section 1601 Streambed Alteration Agreement was issued by CDFG on January 18, 2001, pursuant to Sections 2080.1 and 1600-1607 of the California Fish and Game

Code, respectively. BO 1-6-97-F-13 covers coastal California gnatcatcher (gnatcatcher), least Bell's vireo, southwestern willow flycatcher, arroyo toad, and quino checkerspot butterfly.

The Board certified the Final EIR and adopted the Final CEQA Findings of Fact, Statement of Overriding Considerations, and Mitigation Monitoring Program for the CSP on April 24, 2008. USACE is expected to issue its Record of Decision on the Final EIS for CSP in 2009.

The CSP permitting process also resulted in an ESA Section 7 consultation to address ESA issues, with USACE as the Lead Agency. A Biological Opinion (BO 2008B0061-2008F0732) was issued by USFWS on October 28, 2008, CDFG determined that there were no CESA issues, but did issue a Streambed Alteration Agreement (tracking No. 1600-2008-0216-5) on October 24, 2008, pursuant to 1602 of the California Fish and Game Code. The BO covers gnatcatcher, least Bell's vireo, and arroyo toad impacts beyond those already covered in the ESP.

Impacts to sensitive species and upland habitats will be addressed through construction timing restrictions, habitat preservation, debiting mitigation credits from approved conservation banks, and restoration of habitat. Wetlands and other waters of the U.S. subject to regulation under Section 404 of the Clean Water Act are to be mitigated through restoration, preservation of existing wetlands and creation of replacement wetlands.

The ESP and CSP have the necessary permits from the Wildlife Agencies to commence construction. It is expected that the project will begin the construction phase prior to the finalization of this Plan. This Plan will apply to ESP/CSP if a listed Covered Species is discovered at the project site during the construction phase that is not already authorized for take under Wildlife Agencies permits for ESP/CSP, or if there is a substantial change to project implementation relative to biological impacts, or there is a substantial change to projected impacts to permitted species. Alternately, a reinitiation of formal consultation may be pursued to address any increased impacts.

6.2 Reservoir Maintenance

Existing Project

Construction was conducted under permits obtained for Olivenhain Municipal Water District and the BO (1-6-97-F-13) for Hodges and San Vicente. BO 1-6-97-F-13 covers coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, arroyo toad, and quino checkerspot butterfly. The Water Authority is seeking coverage for O&M under this Plan.

6.3 Olivenhain–Hodges Pumped Storage

Existing Project

This project is covered by existing BO (1-6-97-F-13) and is under construction. BO 1-6-97-F-13 covers coastal California gnatcatcher, least Bell's vireo, southwestern willow flycatcher, arroyo toad, and quino checkerspot butterfly. The project increases the size and varies the operation of ESP facilities planned to connect Lake Hodges with the Olivenhain Reservoir. The project converted the planned Lake Hodges Pump Station to a hydroelectric/pumping facility using reverse-turbine generating units with a planned generating capacity of 40 megawatts (MW). This project is related to the Lake Hodges to Olivenhain Pipeline and Lake Hodges Pump Station/Inlet-Outlet projects (Figure C-11). This project will be covered for O&M.

7.0 Wetland Creation and Enhancement Projects

As an element of this Plan the Water Authority intends to create wetland and riparian habitats for Covered Species, and with the intention to provide pre-mitigation wetlands and riparian mitigation credits associated with USACE 404 permits, RWQCB 401 permits, and CDFG streambed alteration agreements. Because wetlands creation, restoration and enhancement projects generally require manipulation of the physical environment there is a potential for direct and indirect impacts to Covered Species. Impacts can result from grading, temporary removal of vegetation (native or non-native), permanent habitat conversion, construction noise, temporary increase in human presence, and on going preserve management.

7.1 Tijuana River Valley HMA

The Water Authority proposes to construct approximately 40 acres of native wetlands mitigation habitat on a site currently occupied by agricultural fields. The proposed project site, which consists of approximately 55 acres, is located within the city of San Diego, California. The site is located immediately south of the Tijuana River, approximately 0.5 miles west of Hollister Street and 0.25 miles north of Monument Road. The project site is owned by the County of San Diego and is being used by the Water Authority under a cooperative agreement between these agencies. The site is located within the Tijuana River Valley Regional Park (TRVRP) and has a relatively long history of management for agricultural production purposes. It is bordered by rural, agricultural, and undeveloped lands mostly within the TRVRP.



- Existing Aqueducts and Pipelines
- Proposed Pipelines

FIGURE C-11
Project Location for
Olivenhain-Hodges Pumped Storage

The project will satisfy wetlands mitigation requirements for the approved Emergency Storage Project (ESP) and Carryover Storage Project (CSP), and provide wetlands mitigation credits for future Covered Activities. Approximately 9 wetland acres will be allocated as mitigation for ESP impacts, and 10 acres will be allocated as mitigation for CSP impacts. In addition, implementation of the project will result in temporary impacts (3.534 acres) and permanent impacts (0.334 acres) to wetlands and non-wetlands waters of the U.S. Therefore, 4.193 acres of created wetlands will be allocated to mitigate permanent project impacts to wetlands and non-wetland waters of the U.S., as well as temporary impacts that require mitigation above a one to one restoration ratio. Temporally impacted areas will be restored. The remainder of the created wetlands (16.767 acres) will be available as mitigation credits for Covered Activities.

**TABLE C-2
CREATED HABITATS AND AVAILABLE CREDIT FOR COVERED ACTIVITIES (IN ACRES)**

Created Wetland Type	Projected Created Wetlands	Credits Available after debiting Project Mitigation	Credits Available after debiting ESP & CSP Mitigation
Freshwater marsh	2.00	2.00	1.25
Southern willow scrub	32.00	28.053	10.693
Mulefat scrub	4.00	3.754	3.034
Cottonwood willow woodland	2.00	2.00	1.79
Total	40.00	35.807	16.767

The project would include several key features designed specifically to reintegrate the project site with the Tijuana River, restore soil chemistry through surface inputs of freshwater, provide dynamic, self-sustaining native wetlands habitats, and provide protection to adjacent properties from long-term flooding. The project would also provide for multi-purpose trails (pedestrian, equestrian and bicyclists) that are generally intended to remain open except during unusually high water flow in the valley, as well as multi-purpose trails that are subject to storm event closures, similar to existing trails in the floodway. The proposed trails alignment is designed to be consistent with the county's trail system, as approved by the county's Board of Supervisors in December 2006.

Removal of the existing berms located along the project's northern boundary is required to re-establish a surface hydrology connection to the Tijuana River. Existing river berms will be relocated to facilitate the proposed flooding of approximately 40 acres of agricultural fields. The relocated berms will provide for 100-year flood protection, which is the level of protection provided by the current berms (Chang 2007). Minor grading within the agricultural fields would be required to create an appropriate topographic gradient to convey floodwater through the site and return the water to the river. An approximately 3.44-acre area would be graded at the northeast side of the project, where water will flow from the Tijuana River floodway into the proposed site.

Construction of the project is anticipated to extend approximately five months, beginning in the late summer/fall of 2010. Issues related to the construction of the proposed project include the removal of existing on-site abandoned farm buildings, abandoned electricity poles, abandoned groundwater wells, and disassembled and related non-functional pump facilities.

An off-site component of the project is the extension of the city's erodible berm. The berm extension will repair a 2005 breach in the natural levee dividing the river's north and south channels. The proposed extension would be located immediately downstream of the Hollister Street bridge. Flood waters would overtop the berm for flood events greater than the 5-year flood event (Chang 2007), thus achieving the consistency with the *Two Alternatives Report, Tijuana River Valley – Flood Control and Infrastructure Study* (BSI Consultants, Inc., 1994), of maintaining smaller flood events in the primary southern channel. This flood control and infrastructure study is the river valley's governing flood control study.

The berm extension would result in permanent impacts to a total of 0.114 acre of jurisdictional wetlands and non-wetland waters, including 0.082 acre of mulefat scrub, 0.003 acre of southern willow scrub, and 0.029 acre of open water.

Construction of a temporary dike for dewatering the berm work site during project implementation would result in direct temporary impacts to 0.018 acre of jurisdictional wetlands and non-wetland waters of the U.S., including 0.007 acre of mulefat scrub and 0.011 acre of open water. Dewatering during project implementation would also result in direct temporary impacts to 0.076 acre of jurisdictional waters, affecting mostly open water in the Tijuana River channel (0.06 acre), but also 0.016 acre of mulefat scrub.

Therefore, the berm extension would result in approximately 0.208 acres of direct impacts (which includes permanent and temporary impacts) to jurisdictional wetlands and non-wetland waters of the U.S.

The berm extension would also result in permanent impacts to less than 0.01 acre of ruderal land cover. Access and staging for construction of the berm extension would temporarily impact an additional 0.98 acres of ruderal and developed land. Ruderal and developed lands are not considered sensitive in this Plan.

The project is located within the coastal zone, and its implementation must be in compliance with the City of San Diego's Local Coastal Program. Therefore, for permitting purposes, the impact table below identifies upland land covers and wetlands and non-wetland waters subject to USACE/CDFG/California Coastal Commission (CCC) and local regulations. Habitat/land cover tiers correspond to the City of San Diego's approved MSCP. Mitigation ratios of 3:1 and 2:1 were applied to the project's impacts consistent with the city's biological ordinance, as required for the issuance of a coastal

development permit by the city. Restoration of temporary impacts is a component of the applied compensatory mitigation to impact ratios.

**TABLE C-3
PERMANENT AND TEMPORARY HABITAT/LAND COVER IMPACTS (acres)**

Vegetation Community/Land Cover Type	Impacts		Total
	Temporary Impacts	Permanent Impacts	
Upland Habitats			
Disturbed Habitat (Tier IV Uplands)	0.00	3.70	3.70
Ruderal (Tier IV Uplands)	0.129	4.114	4.243
Agricultural (Tier IV Uplands)	0.00	42.08	42.08
Ornamental (Tier IV Uplands)	0.00	0.60	0.60
Developed (Tier IV Uplands)	0.849	0.25	1.099
Uplands Subtotal	0.978	50.744	51.722
Wetland Habitats¹			
Southern Willow Scrub	0.00	0.003	0.003
Disturbed Southern Willow Scrub (Disturbed Wetlands per City of San Diego 2004)	3.41	0.22	3.63
Mulefat scrub	0.023	0.082	0.105
Open Water	0.071	0.029	0.10
Open Channel (Natural Floodway per city 2004)	0.03	0.00	0.03
Wetlands Subtotal	3.534	0.334	3.868
Total	4.512	51.078	55.59

¹Jurisdictional resources include USACE/CDFG/CCC/RWQCB/County of San Diego/City of San Diego Wetlands and Non-Wetland Waters of the U.S.

**TABLE C-4
MITIGATION SUMMARY**

Habitat Type	Total Impacts	Mitigation Ratio	Mitigation in Acres
Upland Habitats			
Disturbed Habitat (Tier IV Uplands)	3.70	0:1	0.00
Ruderal (Tier IV Uplands)	4.243	0:1	0.00
Agricultural (Tier IV Uplands)	42.08	0:1	0.00
Ornamental (Tier IV Uplands)	0.60	0:1	0.00
Developed (Tier IV Uplands)	1.099	0:1	0.00
Wetland Habitats			
Southern Willow Scrub	0.003	3:1	0.009
Disturbed Southern Willow Scrub (Disturbed Wetlands per City of San Diego 2004)	3.63	2:1	7.36
Mulefat scrub (permanent)	0.082	3:1	0.246
Mulefat scrub (temporary)	0.023	1:1	0.023
Open Water (permanent)	0.029	2:1	0.058
Open Water (temporary)	0.071	1:1	0.071
Open Channel (Natural Floodway per City of San Diego 2004)	0.03	2:1	0.06

The project will result in permanent direct impacts to 30.40 acres and temporary direct impacts to 3.44 acres of land designated as critical habitat for least Bell's vireo. Of this area, only 3.41 acres of land supports "primary constituent elements" for the species as designated by the Critical Habitat ruling (USFWS 2004). These 3.41 acres are mapped as disturbed southern willow scrub in the northern portion of the project. This area would be temporarily impacted by the project. However, the project as a whole protects and will contribute to recovery of least Bell's vireo by creating additional suitable habitat areas with primary constituent elements within the agricultural fields.

The following species were observed or detected during the preparation of the project's EIR: white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), Cooper's hawk, least Bell's vireo, California horned lark, yellow-breasted chat, Lawrence's goldfinch (*Carduelis lawercei*), and merlin (*Falco columbarius*). Other species with moderate or high potential to occur on site, but were not observed or detected, include: western spade-foot toad (*Spea [=scaphiopus] hammondi*), silvery legless lizard (*Anniella pulchra pulchra*), Coronado skink, two-striped garter snake, yellow warbler (*Dendroica petechia brewsteri*), tricolor blackbird (*Agelaius tricolor*), osprey (*Pandion haliaetus*), and pallid bat (*Antrozous palidus*).

7.2 San Luis Rey River Valley HMA

The Water Authority has tentatively identified its fee owned parcels located within and along the north side San Luis Rey River as a wetlands HMA. The property encompasses approximately 49 acres of land located south of State Route 76 (Pala Road), north of Dunlin Road, and west of Old Highway 395 and Interstate 15 (I-15) in the unincorporated community of Bonsall, California. State Route 76 (SR-76) forms the northern boundary of the project area and provides the primary access to the property. The Second San Diego Aqueduct crosses the site from north to south.

The majority of the property is utilized for growing row-crops. However, southern cottonwood willow riparian forest occupies 5.9 acres in the San Luis Rey River channel, and elsewhere on the property there is a stand of 0.59 acres of mulefat scrub. The existing southern cottonwood willow riparian forest is disturbed, with an estimated 30-percent of the habitat being dominated by dense stands of giant reed (*Arundo donax*).

Wetlands and riparian habitat objectives for the property include the following wetlands habitats:

Southern Cottonwood Willow Riparian Forest (SCWRF)

Approximately 4.24 acres of southern cottonwood willow riparian forest will be established in the southeast corner of the property. This area currently supports a stand of mature cottonwood trees that are situated in a plowed field. The area corresponds to

a historic braid of the San Luis Rey River that once crossed the site. Topographically, this area is lower than the remainder of the site. Groundwater depth measurements indicate that groundwater in this portion of the site is approximately 10 feet below surface elevation. Soils in the area are suitable for habitat restoration. The project will lower the surface elevations approximately six feet within the wetlands restoration area to create federal jurisdictional wetlands. At the resultant elevation, established SCWRF vegetation will be within four feet of groundwater. Berm removal along the edge of the existing river embankment will facilitate water movement into the graded restoration area. With grading, surface hydrology is expected to be present during moderate flood events through overbank flow. Transition slopes (1.36 acres) surrounding the area will be restored to mule fat scrub as a transition to Sycamore Woodlands.

SCWRF will consist of cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), sandbar willow (*S. exigua*), mule fat (*Baccharis salicifolia*), wild grape (*Vitis girdiana*) and other species that are common constituents of the SCWRF vegetation community.

This area is intended to qualify for USACE and CDFG wetlands restoration credits. In addition, the resultant wetlands vegetation is expected to be suitable habitat for least Bell's vireo and arroyo toad.

In addition, existing SCWRF habitat that occupies 5.9 acres of the existing San Luis Rey River channel will be enhanced through exotic invasive vegetation removal and establishment of SCWRF species. Approximately 30% of this area supports dense stands of giant reed. These activities are expected to result in wetlands enhancement credits from USACE and CDFG for the area occupied by exotic invasive species.

Sycamore Woodlands (SW)

The property will support approximately 17.77 acres of SW that will be associated with intermediate elevations across the property. No topographic modifications are proposed in this area because existing groundwater is present at 15 feet below surface elevation. In addition, lenses of various sand textures present within a 24-foot soil horizon provide significant moisture resources for this SW that is consistent with the ecological niche commonly occupied by SW. Localized topographic shaping within the SW area will occur to create localized depressions and hummocks that are consistent with an active floodplain. The purpose of these features is to capture rainfall and runoff from the surrounding higher ground and to allow for localized percolation and recharge of the perched water table. The effect of these microtopographic features will enhance the moisture carrying capacity of the HMA in support of the planned riparian vegetation.

SW will consist of an open canopy of California sycamore (*Platanus racemosa*) with low density understory vegetation consisting of toyon (*Heteromeles arbutifolia*), Mexican elderberry (*Sambucus mexicana*), gooseberry (*Ribes speciosum*), poison oak

(*Toxicodendron diversilobum*), and other species that are common constituents of the SW vegetation community.

This area is intended to qualify for USACE wetlands buffer credits and CDFG wetlands restoration credits. In addition, the resultant wetlands vegetation is expected to be suitable habitat for least Bell's vireo and arroyo toad.

Mule Fat Scrub (MFS)

Transitional slopes situated between the SCWRF area and SW area will be occupied with MFS vegetation. This 1.36-acre area will be dominated with mule fat, sandbar willow, and arrowweed (*Pluchea sericea*) with an understory of San Diego marsh-elder, western ragweed (*Ambrosia psilostachya*), and other herbaceous wetland species that are characteristic of this habitat type.

This area is intended to qualify for USACE and CDFG wetlands restoration credits. In addition, the resultant wetlands vegetation is expected to be suitable habitat for least Bell's vireo and arroyo toad.

Oak Riparian Forest (ORF)

Oak riparian forest will be established across the northern portion of the HMA parcel. This northern area was associated with a small side drainage. The ORF vegetation will cover 7.59 acres of the property. Soils appear to be appropriate for coast live oak (*Quercus agrifolia*) and the placement within valley is consistent with other oak locales.

ORF will consist of coast live oak to form an open canopy with an understory of species that are typical of this habitat type including toyon, gooseberry, creeping wild rye (*Leymus triticoides*), giant wild rye (*L. condensatus*), deergrass (*Muhlenbergia rigens*), and poison oak.

This area is proposed to qualify for USACE wetlands buffer credits and CDFG wetlands restoration credits. In addition, the resultant wetlands vegetation is expected to be suitable habitat for arroyo toad.

To implement the habitat enhancement element of the project, handheld equipment would be required to cut and treat the giant reed stands. Cut material would be carried out of the habitat area by hand. Initial cutting and removal of giant reed would occur outside the riparian bird-breeding season. However, because giant reed typically requires multiple treatments with herbicide during the growing season, it is likely that some follow-up treatment would occur during the riparian bird-breeding season. Prior to treating invasive plant species during the riparian bird-breeding season, an Environmental Surveyor will identify the access path to the treatment areas, so the maintenance personnel do not directly disturb any active nest.

Also to implement the project, berms and other debris located at the boundary of the agricultural field and habitat will be removed with mechanized equipment. Invasive and native plant species that may have become established on these berms or debris would be removed by this action. This action would be implemented outside the avian bird-breeding season to avoid direct and indirect effects.

The property is located in designated critical habitat for the least Bell's vireo, and the project would convert agricultural land to suitable least Bell's vireo habitat. The portion of the project within the existing San Luis Rey river channel is located in designated critical habitat for southwestern willow flycatcher. The project implementation would enhance critical habitat by the removal of exotic invasive vegetation, and allow for colonization of the area with native species. Least Bell's vireo and southwestern willow flycatcher are known to occur in the San Luis Rey River, but have not been documented on the project site. Arroyo toad have been documented upstream and downstream of the property; however, none have been documented on-site.

ATTACHMENT 1

SUMMARY OF CURRENT NCCP/HCP COVERED PROJECTS

**APPENDIX C: ATTACHMENT 1
SUMMARY OF CURRENT NCCP/HCP COVERED PROJECTS**

Project Category	Project
CIP Projects	<ul style="list-style-type: none"> Aqueduct Protection Program Long-Term Replacement/Relining of Pre-stressed Concrete Cylinder Pipeline Pipeline 6 Construction System Regulatory Storage <ul style="list-style-type: none"> a. Hubbard Hill FRS b. Slaughterhouse Terminal Reservoir c. North County Distribution Pipeline FRS Restore Untreated Water Delivery in La Mesa-Sweetwater Extension Second Crossover Pipeline San Diego 24/25/26 FCF San Diego 12 Expansion Lower Otay Pump Station Conversion of Pipeline 3 to Untreated Water; Crossover to Miramar Padre Dam Pump Station Expansion Poway Pump Station and Treated Water Connection Escondido-Vista WTP Connection <ul style="list-style-type: none"> a. Escondido-Vista Pipeline Connection b. Escondido-Vista Pump Station c. Escondido-Dixon Pipeline Ramona Reservoir Bypass San Diego 17 Pump Station Tijuana River Valley (MHA) Wetlands Mitigation project San Luis Rey River (MHA) Wetland Mitigation Project
ESP and CSP	<ul style="list-style-type: none"> San Vicente Dam Raise Storage Olivenhain-Hodges Pumped Storage Operations and Maintenance Lake Hodges, San Vicente, and Olivenhain Operations and Maintenance
Planned O&M Activities	<ul style="list-style-type: none"> Twin Oaks Valley Water Treatment Plant Operations and Maintenance Aqueduct Security and Surveillance Diversion Structure Security Improvements Access Road Maintenance and Repair Mowing Protection of Underground Facilities in Waterways Fire Protection Weed Abatement in Mitigation Areas Tree Trimming and Removal Pest Control Drain Downs
Right-of-Way Activities	<ul style="list-style-type: none"> Line Structure and Access Improvements Right-of-Way Patrols and Inspection Right-of-Way Management Right-of-Way Expansion: Additional Aqueduct Right-of-Way Width Right-of-way Expansion: Aqueduct Alignment Corrections
Unplanned Urgent and Emergency Repairs	<ul style="list-style-type: none"> Urgent Repairs and Protocol Emergency Repairs and Protocol

General Conditions and Standard Specifications

2005 Edition

**John A. Economides
Director of Engineering**



San Diego County Water Authority

SECTION 02110 - CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the work included in clearing, grubbing, stripping, and mulching to prepare the project site for construction operations, and to salvage topsoil and vegetative material for later revegetation of cleared areas.
- B. Perform mulching of vegetative material, stripping of topsoil and salvaging of such within all construction disturbed areas to the limits designated on the Plans and as specified herein. Comply with prohibitions, if any, on the removal of vegetation in accordance with regulatory permit conditions. Comply with seasonal restrictions as indicated on such permits, or as specified herein.
- C. The removal and storage of topsoil and existing vegetation is included in the work of this section. Topsoil replacement is included in Section 02200, Earthwork.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 Earthwork
- B. Section 02270 Temporary Erosion Control
- C. Section 02510 Access Roads
- D. Section 02830 Fencing
- E. Section 02940 Revegetation

1.03 SUBMITTALS

- A. Storm Water Pollution Prevention Plan in accordance with the National Pollution Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activities prior to commencing clearing and grubbing operations. The erosion and sedimentation control measures included in the SWPPP shall be in accordance with Section 02270, Temporary Erosion Control.
- B. Copies of required permits for off-site disposal of cleared material not specified for reuse.
- C. List of equipment to be used for clearing, grubbing, stripping and mulching.

1.04 DEFINITIONS

- A. Topsoil is defined as the top layer of pre-construction ground surfaces and earthen material, excluding vegetation. Salvage material shall include topsoil and mulched native vegetation.

PART 2 - MATERIALS

2.01 TREE WOUND PAINT

- A. Tree wound paint shall be bituminous based of standard manufacture for treating tree cuts and wounds.

2.02 PROTECTIVE FENCING AND ENVIRONMENTAL FLAGGING

- A. Protective fencing shall be four foot tall lightweight polypropylene, orange color barrier safety fencing.

- B. Environmental flagging shall be single strand fluorescent red or orange color, 3-mil thick, 1-3/16 inch wide vinyl tape.
- C. Support posts for protective fencing and environmental flagging shall be four foot tall above grade, placed at maximum spacing of ten feet on center.

PART 3 - EXECUTION

3.01 CLEARING AND GRUBBING LIMITS

- A. Clear and grub only the areas to be disturbed by excavations, embankments, structures, slabs and roadways. Do not clear and grub topsoil stockpile areas.
- B. Existing trees, shrubbery and other vegetation may not be shown on the Plans. Inspect the site prior to beginning of clearing and grubbing operations to document the nature, location, size and extent of vegetation, structures, fencing, pavement, poles, posts, rock outcroppings and other items within the designated area to be cleared, grubbed, stripped, mulched or preserved, as specified herein. Prior to the start of grading, verify with the Engineer the areas where topsoil is to be salvaged and the locations where topsoil will be stockpiled.

3.02 PROTECTION

- A. Protect and preserve in place all trees, plants, lawns, structures, and other improvements that are specifically designated on the Plans to be preserved, or are not required to be removed for the performance of the work.
- B. Conduct clearing and grubbing operations in a manner that will preserve and protect vegetation beyond the limits of clearing and grubbing. No filling, excavating, trenching or stockpiling of materials shall be permitted within the drip line of the protected vegetation. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of the vegetation. To prevent soil compaction within the drip line area, no equipment will be permitted within this area.
- C. When protected trees are close together, restrict entry to area within drip line by fencing. In areas where no fence is erected, protect tree trunks two inches or greater in diameter, by encircling the trunk entirely with boards held securely by 12-gauge wire and staples. This protection shall extend from ground level to a height of six feet. Cut and remove tree branches only where such cutting is necessary to effect construction operation. Remove branches other than those required to effect the work to provide a balanced appearance of any tree. Treat scars resulting from the removal of branches with tree wound paint. Replace trees in kind which die as a result of construction work.
- D. Prior to the start of clearing and grubbing, schedule and attend a site observation visit with the Engineer to verify existing conditions and the location of environmentally sensitive areas. Erect protective fencing or environmental flagging around environmentally sensitive areas and along the rights-of-way as shown on the Plans and as directed by the Engineer during the site observation visit. Maintain fencing and flagging in good condition for the duration of the work.

3.03 CLEARING

- A. Remove trees, stumps, shrubs, brush, limbs and other vegetative growth from areas where topsoil salvaging is not required. Remove evidence of their presence from the surface including sticks and branches greater than one inch in diameter or thickness.
- B. Remove all fencing that interferes with construction of new facilities. Where shown on the Plans, salvage fencing materials for later reconstruction or construct new fencing in accordance with Section 02830, Fencing.

3.04 MULCHING OF NATIVE VEGETATION

- A. In areas where topsoil salvaging is required, mulch or crush the existing native vegetation into the topsoil prior to salvaging. Native vegetation shall include grasses, brush, and woody materials. Remove rocks, stumps and branches larger than 12 inches and dispose offsite.
- B. Mulch vegetative material to a size no larger than six inches long by one inch wide by any mechanical means available. Incorporate and store mulched native vegetation with salvaged topsoil.

3.05 TOPSOIL STRIPPING AND SALVAGING

- A. Strip topsoil to a depth of six inches in all disturbed areas, unless otherwise shown or specified. Where the in situ topsoil depth exceeds six inches, and upon written approval of the Engineer, the Contractor may remove suitable topsoil to a depth as directed by the Engineer to meet topsoil replacement requirements described in Section 02200, Earthwork. Do not contaminate topsoil with other excavated materials.
- B. Stockpile topsoil within the limit of construction, separate from other excavated materials and pile free of undesirable materials. Place topsoil in elongated piles, or "windrows," no greater than six feet in height. Windrows shall run parallel to the easement edge from which the topsoil was removed, or at offsite locations approved by the Engineer. Keep separate stockpiles of the topsoil and native vegetation that is salvaged from distinct vegetative types.
- C. Provide the Engineer with an estimate of the quantity of salvaged topsoil at each stockpile location. Mark stockpiled topsoil with signs noting the location where the topsoil was removed, and the type of vegetation that was mulched.
- D. Prior to stockpiling topsoil, spread clean rice straw or crushed native vegetation on the ground surface to delineate between the in-situ and salvaged topsoil.
- E. Do not allow weed growth on salvaged topsoil stockpiles. Control weeds in accordance with Section 02940, Revegetation. Do not apply pre-emergent herbicides on topsoil stockpiles. Remove and dispose offsite any weed growth before weeds produce mature seed heads.
- F. If erosion occurs to stockpiled topsoil, or as requested by the Engineer to control erosion, hydroseed without seed in the stockpile areas in accordance with Section 02940, Revegetation.
- G. Protect topsoil stockpiles from intrusion by erecting and maintaining protective fencing around stockpiles.
- H. If the Contractor fails to perform topsoil salvaging, or if the quantity of topsoil salvaged does not equal the quantity of topsoil available for salvaging due to improper removal, storage or maintenance of stockpiles, import additional topsoil in quantities sufficient to meet the topsoil replacement requirements described in Section 02200, Earthwork. Imported topsoil shall be of natural, friable material possessing the characteristics of representative in situ materials.

3.06 GRUBBING

- A. Remove wood or root matter below the ground surface remaining after clearing and stripping, including stumps, trunks, roots or root systems greater than one inch in diameter or thickness to a depth of 12 inches below the ground surface.

END OF SECTION

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SECTION 02140 - DEWATERING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials, installation, maintenance, operation, and removal of temporary dewatering systems for the control and disposal of surface and ground waters.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 Earthwork
- B. Section 02270 Temporary Erosion Control
- C. Section 02310 Tunneling
- D. Section 02315 Portal Area Development
- E. Section 02655 Installation of Pipe

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. California Regional Water Quality Control Board General Waste Discharge Requirements for Groundwater Remediation and Dewatering Waste Discharges, Order Numbers 95-25 and 96-41. Copies of the Waste Discharge Requirements may be obtained from the Water Authority.

1.04 JOB CONDITIONS

- A. Methods of dewatering may include sump pumping, single or multiple stage well point systems, eductor and ejector type systems, deep wells, and combinations thereof.
- B. Locate dewatering facilities where they shall not interfere with utilities and construction work to be performed by others.
- C. Modify dewatering procedures which cause, or threaten to cause, damage to new or existing facilities, so as to prevent further damage. Install settlement gauges, as necessary, to monitor settlement of critical structures or facilities adjacent to areas of dewatering. Control the rate of dewatering to avoid all objectionable settlement and subsidence.
- D. Comply with Regional Water Quality Control Board Waste Discharge requirements under Orders 96-41 and 95-25. Obtain authorization, as required, prior to discharge of groundwater, and comply with the sampling, testing, monitoring, and reporting requirements specified therein.

1.05 SUBMITTALS

- A. Shop Drawings which, at a minimum, indicate the proposed type of dewatering system; the arrangement, location, and depths of systems components; a complete description of equipment and instrumentation to be used, with installation, operation and maintenance procedures; and the methods of disposal of pumped water.
- B. Well installation or destruction permits.

PART 2 - MATERIALS

2.01 MATERIALS AND EQUIPMENT

- A. Furnish and maintain all materials, tools, equipment, facilities, and services as required for providing the necessary dewatering work and facilities.
- B. Provide piezometers for monitoring groundwater levels and other instruments and measuring devices as required.

PART 3 - EXECUTION

3.01 DEWATERING

- A. Perform dewatering in accordance with approved Shop Drawings. Keep the Engineer advised of any changes made to accommodate field conditions and, on completion of the dewatering system installation, revise and resubmit Shop Drawings as necessary to indicate the installed configuration.
- B. Organize dewatering operations to lower the groundwater level in excavations as required for prosecution of the work, and to provide a stable, dry subgrade for the prosecution of construction operations.
- C. Maintain water level at lower elevations, so that no danger to structures can occur because of buildup of excessive hydrostatic pressure, and provide for maintaining the water level a minimum of two feet below the subgrade, unless otherwise permitted by the Engineer.
- D. Maintain groundwater level a minimum of five feet below the prevailing level of backfill being placed.
- E. Dispose of water in such a manner as to cause no injury or nuisance to public or private property, or be a menace to the public health. Dispose of the water in accordance with applicable regulatory agency requirements. Do not drain trench water through the pipeline under construction.
- F. The dewatering operation will be continuous, so that the excavated areas shall be kept free from water during construction, while concrete is setting and achieves full strength, and until backfill has been placed to a sufficient height to anchor the work against possible flotation.
- G. Prevent disposal of sediments from the soils to adjacent lands or waterways by employing necessary methods, including settling basins. Locate settling basins away from watercourses to prevent silt-bearing water from reaching the watercourse during flow regime.
- H. Where excavations may obstruct the natural flow of a watercourse, implement measures to control and dispose of the surface water that will not adversely affect water quality or beneficial uses of the watercourse. Divert watercourse flows around excavation areas by constructing barriers, temporary culverts, new channels or other appropriate means.
- I. Do not allow water containing mud, silt or other pollutants from aggregate washing or other construction activities to enter a watercourse or be placed in locations that may be subjected to high storm flows.

3.02 RECORDS

- A. Provide a daily record of the average flow rate. Provide water quality testing as required by the Regional Water Quality Control Board.
- B. Observe and record the elevation of the groundwater during the period that the dewatering system is in operation.

END OF SECTION

SECTION 02229 - BLASTING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the methods, limitations, and reporting requirements for the use of explosives and blasting conducted during excavation and tunneling operations.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 Earthwork
- B. Section 02310 Tunneling
- C. Section 02315 Portal Area Development

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. California Code of Regulations, Title 8, Subchapter 20, Tunnel Safety Orders.
- B. Occupational Safety and Health Administration Regulations (Standards-29 CFR) Standard 1926, Subpart U, Blasting and Use of Explosives.
- C. RI 8507, "Structure Response and Damage Produced by Ground Vibrations from Surface Blasting," U.S. Bureau of Mines Report of Investigation by D.E. Siskind, M.S. Stagg, J.W. Kipps, and C.H. Dowding.

1.04 SUBMITTALS

- A. Copies of required blasting permits.
- B. A two-part conceptual blasting plan prior to the start of drilling. Submit additional reports on blasting operations as specified herein. The conceptual blasting report shall be as follows:
 - 1. Part 1 - General Plan: The General Plan shall include a complete summary of proposed methods for transporting, handling, storage, and use of explosives. The plan shall include a description of the experience record of the responsible blaster and copies of his California blasting license and his San Diego County Explosives Permit. The plan shall include the approval of the Chief of the San Diego County Fire Department and the Sheriff of San Diego County. The plan shall include copies of approved noise variances issued by local jurisdictions.
 - 2. Part 2 - Site Specific Plan: The Site Specific Plan shall include the proposed general concept for trench excavation blasting, including controlled blasting techniques and control and monitoring of fly rock, airblast and ground vibration. Blasting intensities shall be limited as required to prevent damage to all existing structures, and in no case, shall intensities exceed the safety standard of particle velocity recommended by the U.S. Bureau of Mines. Provision shall be made for one or more test blasts. Samples of the proposed daily blasting report and the daily seismographic monitoring report shall be included in the plan submittal. The Site Specific Plan shall also contain samples of forms to be used for Blasting Notification (blasting notification includes notification to owner), Preblast Inspection, Blasting Complaint Form, Preblast Inspection Waiver Form, and Procedure for Handling Blasting-Related Complaints.
- C. Seismic monitoring procedure.
- D. Submit qualifications of the blasting consultant meeting the quality assurance requirements specified herein. Submit qualifications for the registered civil or geotechnical engineer, or a certified engineering geologist, or a State of California registered geophysicist; preblast inspector; seismic monitoring inspector; and blasting inspector.

1.05 QUALITY ASSURANCE

- A. Retain the services of a qualified blasting consultant specialist to assist in the preparation of the required blasting plans and verification of reports. The blasting consultant's staff shall include:
1. A registered civil or geotechnical engineer or a certified engineering geologist or a State of California registered geophysicist with a minimum five years of recent experience in supervising the loading and firing of charges for rock slopes or tunnel excavations.
 2. A qualified preblast inspector specializing in preblast surveys, with a minimum of five years experience in the field of preblast inspections.
 3. A qualified seismic monitoring inspector specializing in the field of blast vibration monitoring, with a minimum of five years experience in the field of blast vibration monitoring.
 4. A blasting inspector to observe all blasting operations, including the loading of drill holes for blasting, to verify that blasting operations are in conformance with approved plans. The minimum qualifications for the blasting inspector would be a State of California Blaster's License, Class B, recognition in the blasting field as an expert in drilling and blasting whose primary source of income is from providing specialized blasting and/or blasting consultant services.
- B. The blasting consultant shall not be an employee of, nor be affiliated with, any explosives manufacturer, explosives distributor, or the Contractor. Should the Engineer determine during the course of the work, that the blasting consultant is not performing as required, retain the services of a different blasting consultant with qualifications satisfactory to the Engineer at no additional cost to the Water Authority.
- C. The Engineer's review of the Contractor's blasting plans shall not relieve the Contractor of any of his responsibilities under the Contract for assuring the complete safety of his operation with respect to adjacent improvements and so as to not aggravate existing structural conditions or cause damage or for the successful completion of the work in conformity with the requirements of the Contract Documents. Blasting plan review shall not operate to waive any of the requirements of the Contract Documents nor relieve the Contractor of any regulation, permit obligation or condition therein. Graduation from an accredited four year college with a degree in engineering, geology, or equivalent, and demonstrated ten years recent blasting project experience in supervising the loading and firing of charges for rock slopes or tunnel excavations may be substituted for professional registration and/or certification at the discretion of the Engineer.

PART 2 - MATERIALS

2.01 MATERIALS AND EQUIPMENT

- A. Furnish materials and equipment as required for blasting operations. Material usage, including transportation and storage, shall conform to all applicable regulatory agency requirements.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. No blasting shall be permitted which, in the Engineer's judgment, may be detrimental to existing installations, including the Water Authority's existing and under construction pipelines, structures, and all other related facilities.
- B. Do not perform drilling or blasting work until the Contractor's plan for blasting operations has been submitted to and accepted by the Engineer. Limit blasting intensities as required to prevent damage to existing structures and utilities. Do not allow intensities to exceed the safety standards of particle velocity/frequency established by the U.S. Bureau of Mines (RI8507).
- C. Prior to blasting, obtain the blasting permits/licenses required by City of San Diego, San Diego County, the State of California, and any other agency having jurisdiction. The San Diego County blasting ordinance and

local city ordinances typically contains several project-specific conditions which affect the cost of the work. Investigate these conditions during bid proposal preparation.

- D. Conform to the requirements specified in the State of California Construction Safety Orders for the transporting, handling, storage, and use of explosives. Transportation of explosives shall be in accordance with the regulations of the State Fire Marshall and the California Highway Patrol. The locations, access and construction of explosive storage magazines shall be in accordance with the American Table of Distances for Storage of Explosives and approved by the Chief of San Diego County Fire Department and the Sheriff of San Diego County.
- E. Blasting shall only be permitted between the hours of 8:00 a.m. and 4:00 p.m. during any weekday (Monday through Friday), unless special circumstances warrant another time or day, and special approval is granted in writing by the Engineer and the agency having jurisdiction. Submit any special approvals to the Engineer.

3.02 REPORTING AND NOTIFICATION

- A. No blasting shall be permitted until the Contractor receives notification in writing from the Engineer that the blasting plans have been reviewed and until all preblast inspections and reports have been completed.
- B. Provide a Blast Plan to the Engineer at least two work days prior to any proposed blast. The Blast Plan shall include explosives loading, distribution, delay periods, maximum pounds of explosives detonated per delay period, blast location, time of blast, distance to nearest improvement, identification of improvement and other blast parameters which are typically included for quality control and construction record purposes. The Blast Plan shall include a written plan describing the proposed seismic monitoring procedure, location, instrumentation, and testing agency. If two work days advance notice is not provided, blasting may be suspended by the Engineer.
- C. Notify the Engineer at least two work days in advance of his intention to perform blasting within 400 feet of a residence or commercial building, including Water Authority facilities.
- D. Provide a minimum of two working days advance notice in writing to all residences or businesses within 400 feet of the blast area. Provide two-work days notice to all utility agencies whose facilities may be influenced by the blasting operation. Provide the Engineer with a list of all people and agencies notified. Contact Underground Service Alert (USALERT/ DIGALERT) as required by State Law. Determine the blasting notification requirements of the owner and devise a procedure to provide the requested notifications.
- E. Submit a blasting report within two-work days following a blast. Provide actual values of explosives loading, distribution, delay periods, maximum pounds of explosives detonated per delay period, blast location, time of blast, distance to nearest improvement, identification of improvements and other blast parameters which are typically included for quality control and construction record purposes. The blast report shall also include results from seismic monitoring performed by the Seismic Monitoring Expert. Seismic monitoring shall be conducted under the supervision of the blasting consultant. Seismic monitoring reports are to include identification of the instrumentation, monitoring location, frequency of the ground motion, peak particle velocity, displacement, airblast, recorded waveforms, date and time, and other relevant data. The blasting and seismic monitoring reports are to be in the format contained in the blasting plan. The blasting consultant shall verify the Contractor's blasting report and seismographic reports prior to submission to the Engineer.

3.03 INSPECTION REQUIREMENTS

- A. Conduct preblast inspections of all residential, commercial, and Water Authority structures, and other improvements and facilities as necessary, within 400 feet of the blast area. Preblast inspections are to be conducted by the preblast inspector. Conduct the inspections a minimum of one week and no more than three weeks before blasting operations, unless otherwise approved by the Engineer due to special circumstances. A representative of the Contractor shall accompany the preblast inspector while conducting the inspections. The Contractor shall obtain the permission of the respective building owners prior to conducting the inspection. The Contractor shall arrange for inspection times. The results of the inspection

shall be reviewed by the blasting consultant in order to identify any structural conditions judged to be sensitive to blasting effects. The preblast inspection shall be for the purpose of determining the existence of any visible or reasonably recognizable pre-existing defects or damages in any structure and for quality control and construction record purposes. Visual inspection and photographic documentation methods shall be employed to ensure the validity of information obtained just prior to blasting operations.

- B. Complete inspection reports of private property identifying all findings shall be signed by the Contractor, blasting consultant, preblast inspector, and the property owner/occupant. Upon completion of all blasting, the Contractor shall forward all preblast inspection reports and photographs to the Engineer. The inspection reports shall be either typed or recorded on standard 90 minute or microcassette tape.
- C. File with the Engineer a summary report of all private property inspections identifying address, occupant/owner's name, time and date of inspections, and any inspection waiver signed by the property owner with an explanation as to why an inspection of a specific structure was not made. This summary and waiver report shall be signed by the Contractor, preblast inspector, and blasting consultant and delivered to the Engineer prior to blasting.
- D. Conduct post-blast inspections upon receipt of a written or verbal request or complaint of damage to property, structure, or other improvement from the respective owners. Perform such inspections and provide a written report to the Engineer within 30 calendar days of receipt of the request or complaint.

3.04 BLASTING

- A. Drilling and blasting patterns, delay distribution and, explosive types and quantities, shall be at the Contractor's option; provided the ground motion frequency and airblast limitations, as specified herein, are met with respect to pounds of explosive detonated per delay period; and provided further that non-nitroglycerin explosive types are used in wet ground conditions. Use only non-electric explosives detonators.
- B. Perform blasting with skilled workers and under the direction of a State of California and San Diego County licensed blasting foreman. Perform blasting only when proper precautions have been taken for the protection of people, private property, and existing structures. Injury to people, or damage to private property, or existing structures is the responsibility of the Contractor.
- C. As production blasting operations progress, evaluate the drilling and blasting procedures based on the results achieved. If a drilling and blasting program yields unsatisfactory results with regard to excessive blasting effects, the Contractor and Blasting Consultant shall be required to devise and employ methods which shall improve results. The revision may include special methods such as, but not limited to, different delay patterns, adjustment in size of individual blasts, adjustment in diameter of blast holes, closer spacing of blast holes, reduction of the explosives quantity detonated per delay period, or improved stemming procedures, as necessary, to improve results.
- D. Conduct controlled blasting in a manner which produces relatively smooth and sound rock faces at the final excavation lines and maintain blasting effects within the prescribed limits. The type, distribution and quantity of explosive detonated per delay period shall be such that existing rock fractures shall neither be opened nor new fractures created outside of the minimum excavation limits. Whenever, in the opinion of the Engineer, further blasting is liable to reduce rock stability or damage pipelines or other structures, cease blasting and continue to excavate the rock by approved mechanical or chemical means. Excessive blasting or "overshooting" shall not be permitted. Fly rock shall be contained within the project rights of way and shall not represent a hazard to people, vehicles, existing improvements or vegetation. Use blasting mats to prevent possible flyrock damage. At the end of each working day, clean the blasting site of all debris associated with the blasting operation. Remove and replace with acceptable material any material outside the authorized cross section which may be shattered or loosened by blasting.
- E. Do not permit blasting within 15 feet of an existing pipeline or structure without submission of a site-specific blasting plan to the Engineer and written approval of the plan by the agency having jurisdiction. Do not conduct blasting within 100 feet of concrete which has been placed less than seven calendar days.

3.05 MONITORING REQUIREMENTS AND BLASTING LIMITATIONS

- A. Perform seismographic monitoring of all blasting. A seismograph shall be placed at the nearest structure to the blast area to monitor the ground motion particle velocity and frequency during each blast. When blasting adjacent to existing Water Authority pipelines an additional seismograph will be placed over the pipeline at a point closest to the blast area.
- B. The maximum particle velocity at the nearest point to the Water Authority pipelines from the blast area shall be six inches per second at a minimum frequency of 10 hertz. In the event either of these limitations are exceeded, the Contractor will perform excavations to determine the extent of possible damage to the pipelines. Perform repair work as necessary and backfill all excavations. The excavation, repair and backfilling will be the sole responsibility of the Contractor whether damage has or has not been incurred.
- C. The maximum peak particle velocity at the nearest residential or commercial structure shall be as follows:

<u>Frequency (hertz)</u>	<u>Maximum Peak Particle Velocity (inch per second)</u>
2.5 to 10	0.5
11 to 40	0.05 x frequency*
> 40	2.0

* The maximum allowable peak particle velocity is the product of 0.05 multiplied by the seismogram frequency (e.g., assuming the frequency is 30 Hz., the maximum allowable peak particle velocity is 30 times 0.05 or 1.5 inches per second).

- D. Airblast at the nearest residential or commercial building shall not exceed 129 Db-Linear at six hertz high pass system.

3.06 SUSPENSION OF BLASTING

- A. Blasting operations may be suspended by the Engineer for any one or more of the following:
 - 1. Safety precautions are inadequate;
 - 2. Ground motion vibration levels exceed specified particle velocity/frequency limits as specified herein;
 - 3. New or further damage to existing structures or improvements as a result of blasting;
 - 4. Blasting methods which in the opinion of the Engineer endanger the stability of intact rock outside of the prescribed limits of excavation;
 - 5. Skilled operators and/or the licensed blasting supervisor is not present;
 - 6. Failure to comply with blasting notification requirements; or
 - 7. Fly rock travels beyond the project right-of-way or strikes overhead lines.
- B. Suspension of blasting operations shall not relieve the Contractor of his responsibilities under the terms of the Contract Documents. Do not resume blasting operations until modifications have been made to correct the conditions that resulted in the suspension. The Contractor shall not be entitled to any extension in time, nor to any claim of damage or to excess costs, by reason of any blasting suspension order.

END OF SECTION

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SECTION 02270 - TEMPORARY EROSION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the furnishing, installation, and maintenance of temporary erosion and sedimentation controls for all earthwork, trenching, clearing and grubbing operations.
- B. For projects with soil disturbances of one acre or more, comply with the National Pollution Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, General Permit No. CAS000002 and requirements included herein.
- C. For projects with soil disturbances under one acre, erosion and sedimentation control measures shall comply with requirements provided herein, local jurisdictional agency requirements, and applicable requirements in local storm water management programs developed to comply with NPDES permits issued by the Regional Water Quality Control Board.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02110 Clearing and Grubbing
- B. Section 02140 Dewatering
- C. Section 02200 Earthwork
- D. Section 02315 Portal Area Development
- E. Section 02510 Access Roads
- F. Section 02940 Revegetation

1.03 SUBMITTALS

- A. Six copies of a SWPPP prior to commencement of construction in conformance to the requirements for the General Permit. A copy of the General Permit may be obtained from the Water Authority. The SWPPP shall address both storm water and non-storm water discharges.
- B. Manufacturers catalog data and samples on materials used for erosion control, including the physical characteristics, application and installation instructions.
- C. NOTICE OF INTENT: Submit a Notice of Intent and pay filing fee prior to commencement of construction activities covered by the NPDES General Permit to:

State Water Resources Control Board
Division of Water Quality
Storm Water Permit Unit
P.O. Box 1977
Sacramento, CA 95812

- D. NOTICE OF TERMINATION: When construction is complete, submit a Notice of Termination certifying that state and local requirements have been met in accordance the General Permit to:

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

- E. RECORDS RETENTION: Retain records of monitoring information, copies of all reports required by the NPDES General Permit, and records of data used to complete the NOI for construction activities covered by the General Permit for at least three years from the date generated. This period may be extended by request from the State Water Resources Control Board and/or San Diego Regional Water Quality Control Board.
- F. NONCOMPLIANCE REPORTING: Report instances of noncompliance with the SWPPP to the RWQCB.

PART 2 - MATERIALS

2.01 MATERIALS

- A. Provide sand bags, silt fences, straw bales and other materials to control erosion and sedimentation as shown on the SWPPP and Shop Drawings.

PART 3 - EXECUTION

3.01 CONSTRUCTION

- A. Construct and implement erosion control measures in accordance with the SWPPP and as described herein.
- B. Grade disturbed surfaces to provide positive drainage and prevent ponding of water. Surface water shall be controlled to prevent water damage or deposition of sediment to all adjoining and downstream properties.
- C. Install silt fences, sedimentation ponds, sandbag dikes, stabilized construction entrances and any other erosion control measure to minimize sediment escape from the construction site and to maintain runoff quality in compliance with the General Permit. Prevent construction sediment from entering any streams, ponds or drainage facilities.
- D. At a minimum, provide erosion and sedimentation control measures immediately following clearing and grubbing operations in the following locations:
 - 1. In pipeline rights of way immediately upstream of all natural channels.
 - 2. At the lowest end of areas disturbed by construction before runoff from storms can reach natural streams.
 - 3. At additional locations as required to control sedimentation as required by the SWPPP.
- E. Erosion and sedimentation control measures shall remain in place until such time that the site of work is prepared for permanent drainage and erosion control measures. Remove temporary erosion and sediment control measures so as not to interfere with permanent drainage, erosion control and revegetation.

3.02 MAINTENANCE

- A. Conduct site inspections of the erosion and sedimentation control measures prior to forecasted storm events and after the actual storm to evaluate the adequacy and effectiveness of such measures. Make and implement modifications as necessary to comply with the General Permit. Submit inspection reports to the Engineer after each storm event. Include in the inspection reports at a minimum, the date of the inspection, the individual(s) who performed the inspection, the observations, and any modifications implemented.
- B. Maintain sedimentation and erosion control measures, ensuring proper operation before, during, and after storm events.

- C. Repair all damaged erosion and sedimentation controls. Reinstate to finished condition any erosion damage within the construction area for the duration of the Contract.
- D. In accordance with the General Permit, annually certify that the construction activity is in compliance with the requirements of the SWPPP. The certification shall be based upon the site inspections required above. The written certification shall be submitted to the Engineer by each July 1. Immediately notify the Engineer in writing if it is determined, during the annual certification that the construction activity is not or has not been in compliance with any of the General Permit and SWPPP requirements. The notification shall identify the type of noncompliance and include a time schedule when compliance will be achieved.
- E. Additional site inspections and/or sampling and analysis may be required at the request of the California Regional Water Quality Control Board, San Diego Region, or the Engineer.

3.03 REMOVAL

- A. Remove and dispose of materials used for temporary sedimentation and erosion control measures offsite when permanent erosion control facilities are completed and accepted by the Engineer.

END OF SECTION

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SECTION 02940 - REVEGETATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes materials and services required to revegetate areas disturbed by construction activities, and other areas to be revegetated as shown on the Plans. Revegetation includes, but is not limited to, application of seed mixes, planting of container plants and cuttings, straw mulching, establishment of plant materials, weed control and maintenance of seeded and planted areas for a two-year period following the date of filing of the Notice of Completion

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02110 Clearing and Grubbing
- B. Section 02200 Earthwork
- C. Section 02315 Portal Area Development
- D. Section 02830 Fencing

1.03 DEFINITIONS

- A. Plant names indicated in plant palettes conform to "Standard Plant Names" established by the American Joint Committee on Horticultural Nomenclature, and, for California native plant species, "The Jepson Manual: Higher Plants of California" - Hickman, J.C., 1993.

1.04 SUBMITTALS

- A. List of plant materials and seeds to be provided, with quantities of each and sources indicated, no later than 60 days after Notice to Proceed. Indicate that the materials specified will be available at anticipated installation date, or are to be contract grown.
- B. Delivery certificates for container plant materials stating source, quantity, type of material (container size, genus and species), and that plant materials conform to the specifications. Certificates shall be submitted prior to approval to begin planting.
- C. Seed bag certification tags and a signed certificate listing the quantity and type of seed. Tags shall include seed type (genus and species), quantity (weight), analysis, name of supplier, seed purity percentage, seed germination percentage, weed seed content, and date seed was tested.
- D. Source, supplier's and manufacturer's literature for bulk material samples, and samples of up to half a pound of mulch and soil stabilizers.
- E. Furnish bulk material delivery certificates of each delivery stating source, quantity, type of material, and that material conforms to specifications. For mulch and binders in containers, furnish a certificate stating total quantity by weight and volume for each material.
- F. Provide a schedule of revegetation work consistent with regulatory permits and requirements herein, prior to commencement of revegetation work.
- G. Samples of two ounces of each individual species' seed, drawn at the time of each seed delivery to site.
- H. Three samples of plant materials and cuttings for each variety and size specified delivered to the site a minimum of three days prior to planting operations. Approved samples shall be inspected by the Engineer for conformity to the requirements herein and shall remain on the site and shall be maintained by the

Contractor as standards of comparison for plant materials to be furnished. Upon acceptance of plant materials, approved samples shall be tagged and incorporated into the work.

- I. Reports on the status of revegetation activities. Status reports shall be submitted with the Contractor's daily reports.
- J. Qualifications of revegetation specialists.

1.05 QUALITY ASSURANCE

- A. Contractor qualifications: Perform work in accordance with best standards of practice under continuous supervision of a qualified, experienced revegetation specialists capable of interpreting the specifications and distinguishing the various vegetation types encountered in execution of the work.
- B. The Contractor or subcontractor performing revegetation shall possess valid California Contractor License, Class C-27.
- C. Nursery qualifications: All plant nurseries providing materials shall possess a valid California Nursery License and shall show proof of growing the type of specified plants a minimum of five years. Plant and seed materials shall meet applicable inspections required by law.
- D. Review and conform to all permits, and regulatory requirements applicable to revegetation of this project, as issued by the California Department of Fish and Game, United States Fish and Wildlife Service, Army Corps of Engineers, Regional Water Quality Control Board and any of the federal, state or local regulatory agency. Copies of permits will be provided to the Contractor by the Engineer.
- E. The type and amount of herbicides shall be prescribed by a licensed pest control advisor. Herbicides shall be in accordance with the manufacturer's product label and all applicable regulations. Do not use pre-emergent herbicides.

1.06 REJECTION AND SUBSTITUTION

- A. Plants, seeds, and other revegetation materials not conforming to the requirements specified herein shall be considered defective, and such materials, whether in place or not, shall be marked as rejected, removed from the site, and replaced with acceptable materials. The Engineer may reject entire lot of plants represented by defective samples.
- B. Make no substitutions from specified plant, seed, or other specified revegetation materials without written approval of the Engineer. All requests for substitute plant and seed materials shall be submitted to the Engineer a minimum of 30 days prior to the scheduled seed application or planting date.

1.07 SEQUENCING AND SITE CONDITIONS

- A. Prior to the start of work, examine site conditions, and locate all environmentally sensitive areas, and other features, so that precautions may be taken not to damage such areas. In the event of conflicts between environmentally sensitive areas and the work of this section, promptly notify the Engineer. Provide for the protection of environmentally sensitive species and habitats within and adjacent to the work areas at all times.
- B. With the exception of surveying and collection of seeds or plant cuttings, no construction or other disruptive activities (including soil testing or other form of surface disturbance) may occur in or adjacent to environmentally sensitive areas without prior written approval from the Engineer.
- C. Planting and seeding shall not start in any area prior to inspection and approval of site preparation work, which includes topsoil replacement, weed control and soil preparation.
- D. Install container plants and cuttings, where shown, prior to seeding.

1.08 SITE OBSERVATION VISITS

- A. Schedule site observation visits with the Engineer prior to the start of each of the activities listed below. Provide a minimum of two and not more than ten working days advance notice for each day in which the following activities will occur.
 - 1. Commencement of work for verification of existing conditions and locations of environmentally sensitive areas.
 - 2. Topsoil salvaging for review of salvage and stockpile procedures.
 - 3. Completion of backfilling and grading.
 - 4. Replacement of salvaged topsoil and soil preparation.
 - 5. Delivery of plant materials and when the plants and cuttings are spotted in place for planting, but prior to excavation of planting holes.
 - 6. Excavation of plant holes, and plant installation.
 - 7. Seeding and straw mulching operations.
 - 8. Plant watering.
- B. The cost to the Water Authority associated with any testing, sampling and inspection scheduled by the Engineer on account of the advance notice provided by the Contractor that is delayed or prevented from occurring on the scheduled day due to insufficient progress or other fault of the Contractor, shall be backcharged to the Contractor and deducted from future partial or final payments.

PART 2 - PRODUCTS

2.01 FIBER MULCH

- A. Provide fiber mulch consisting of a green-dyed virgin wood cellulose fiber mulch containing no germination or growth inhibiting factors. Suppliers shall certify that their products meet all specified requirements based on laboratory and field testing. Weight specifications of this material shall refer to air dry weight of fiber material. Absolute air dry weight is based on normal standards of Technical Association of Pulp and Paper Industry for wood cellulose and is considered equivalent to 10 percent moisture. Each package of cellulose fiber shall be marked by manufacturer to show air dry weight content.

2.02 SEED MATERIALS

- A. A general seed mix shall consist of the following:

<u>Species/Common Name</u>	<u>Min. % Purity</u>	<u>Min. % Germination</u>	<u>lb. per acre</u>
Plantago insularis/Plantain	98	75	25.0
Lotus scoparius/Deerweed	90	60	5.0
Lupinus succulentus/Arroyo Lupine	98	85	2.0
Lasthenia chrysostoma/Goldfield	50	60	1.0
Phacelia ramosissima/ Phacelia	95	85	1.0

- B. Seed not required to be labeled under the California Food and Agriculture Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed

technologists certified by the Society of Commercial Seed Technologists. Seed shall have been tested for purity and germination not more than one year prior to application of seed.

- C. Deliver to the jobsite seeds for each plant species in separate, sealed containers. Perform proportioning by weight and mixing of seed mixes in the field in the presence of the Engineer immediately prior to application.

2.03 SOIL STABILIZER

- A. Soil stabilizer will be a 100 percent organic tackifier, supplied in powder form and comprised of at least 83 percent pure mucinoid derived from organic sources. Tackifier will be water soluble, non-toxic, hydrophilic and will not inhibit germination. Acceptable products include "M-Binder," or equal.

2.04 STRAW MULCH

- A. Provide certified clean, weed free rice straw.

2.05 STRAW WATTLES

- A. Straw wattles shall be manufactured from rice straw and be wrapped in a tubular plastic netting. The netting shall have a strand thickness of 0.30 inch, a knot thickness of 0.55 inch and a weight of 0.35 oz/ft, and shall be made from 85 percent high density polyethylene, 14 percent ethyl vinyl acetate, and 1 percent color for UV protection. Straw wattles shall be nine inches in diameter, 25 feet long and weight approximately 30 pounds.
- B. Wood stakes for anchoring straw wattles shall be 3/4-inch-square and 24 inches long.

2.06 PLANT MATERIALS

- A. Plant materials shall consist of container-grown plants as described herein. Provide container plants in accordance with the planting schedule shown on the Plans.
- B. Provide plant materials typical for variety and species, sound, healthy, vigorous, and free from plant disease, insect pests or eggs. Provide plants with healthy, normal root systems. Do not prune plants or trees prior to delivery.
- C. Provide container plants which have been grown in containers for a period of time sufficient to develop root growth to hold soil ball together to side and bottom of container in which it was delivered, but not to the point of being root bound.
- D. Do not grow container plants with stakes, nor prune into unnatural forms. Only plants with natural shapes and growth forms will be accepted.

2.07 CUTTINGS

- A. Provide cuttings which originate from the same watershed in which they are to be planted. Collect cuttings during the plant dormancy (leafless) period of December 15 to February 15, or as determined by the Engineer.
- B. Cuttings shall be 24 inches in length and between 1/2 inch and one-inch in diameter. Cut the base of each cutting at a 45-degree angle to distinguish the planting end from the growing top.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

- A. Deliver seed in unopened supplier's sealed containers bearing original certification labels. Label seed according to state and federal laws.

- B. Keep seed materials, during delivery and when temporarily stored on site, in a cool dry place, protected from moisture, wind, heat, vandalism, rodents, insects, weather and other conditions that would damage or impair viability of seed.
- C. Keep container plants and cuttings, during delivery and when temporarily stored on site, in a cool place, protected from wind, heat, vandalism, rodents, insects, weather, desiccation and other conditions that would damage plants. Care shall be taken in handling plants to prevent damage to stems and trunks.
- D. Water container plants to maintain soil moisture and to prevent desiccation or damage to root ball or leaves.
- E. Store container plants and seed materials on site for no longer than two weeks.
- F. The Engineer may reject any plant material damaged due to mishandling.

3.02 VERIFICATION OF SITE CONDITIONS

- A. Locations of plant materials as shown on the Plans are approximate only. Before proceeding with any work, verify all dimensions and quantities and inform the Engineer of discrepancies between contract documents and actual conditions. Do not perform work in any area where a discrepancy exists.

3.03 WEATHER

- A. Perform planting and seeding during periods when weather and soil conditions are normal for season and suitable in accordance with locally accepted horticultural practice. Apply hydroseeding and straw mulching only when winds are calm. Do not apply hydroseeding during rainy weather or when the soil temperature is below 40 degrees F.

3.04 SOIL PREPARATION

- A. Mechanically scarify (rip) the soil surface to roughen and alleviate compaction prior to seeding. Thoroughly scarify areas to be planted and seeded with ripper blades spaced 12 inches apart to a depth of 12 inches.
- B. Leave soil surface in acceptable condition, suitable for seeding, installation of container-grown plants or cuttings.
- C. Verify adequacy of soil preparation in revegetation areas with the Engineer prior to initiating seeding and planting operations.

3.05 EROSION CONTROL

- A. Continuously control erosion as specified herein and in accordance with measures shown on the Plans or the SWPPP. Erosion control measures shall be implemented and maintained throughout the warranty period. Remove temporary erosion control measures that will not be a part of the permanent erosion control plan.
- B. Immediately notify the Engineer of any situation requiring additional erosion control devices to prevent soil erosion or sedimentation into any area beyond the project limits.
- C. Monitor for erosion within revegetation areas and provide measures to prevent gullies, rill and sheet erosion, and silt deposition from occurring. Erosion control shall emphasize prevention. Repair erosion as required and include redirection or dissipation of the water source and recontouring of soil, followed by seeding, mulching, or planting. Strategically placed and secured straw wattles, hay bales or sandbags may be used to dissipate water sources.
- D. Use methods and materials for re-hydroseeding, or planting of eroded areas consistent with the requirements herein. Do not use invasive exotic species for erosion control.

3.06 CONTAINER PLANTING

- A. Spot planting locations for container plants in place prior to planting. Relative position of all plants is subject to approval by the Engineer.
- B. Prior to installing plants, build moisture reserve in soil by twice filling excavated plant holes with water and allowing to drain naturally.
- C. Set plants in center of plant hole, in vertical position, so that after allowing for watering and settling, the crown of root ball is 1 inch above surrounding finish grade.
- D. Backfill around plant root balls with native topsoils from the site, excluding rock greater than two inches. Do not use muddy soil. Backfill by gently tamping down soil to remove air pockets. Do not fill around trunks or stems. Cut off all broken or frayed roots.
- E. Do not allow plants to dry out before or while being planted. Keep exposed roots moist at all times during planting operations. Do not expose roots to air except while being placed in ground.
- F. Remove and replace any plants not properly handled, spotted or planted.
- G. Upon delivery, plant root systems shall be inspected by the Engineer to ensure that roots are both straight and well established. Plants with coiled roots will be rejects.
- H. Construct raised earthen berms around each container plant installed to create water basins. Construct basins approximately four-feet in diameter, with berms three inches high.
- I. Water each plant immediately after planting. Backfill any voids or settlement with additional topsoil. Allow topsoil surface to naturally drain, then repeat the watering.

3.07 CUTTINGS

- A. Collect cuttings no earlier than 24 hours prior to planting. Place cuttings out of direct sunlight in a cooler maintained at a temperature between 35 degrees and 45 degrees F. Do not, at any time, expose cuttings to dry conditions for more than 10 minutes prior to planting and watering.
- B. Spot locations for cuttings prior to planting. Relative position of all cuttings is subject to approval by the Engineer.
- C. Plant cuttings after topsoil replacement operations are complete. Plant cuttings so that 2/3 of the cutting length is placed below ground. Space cuttings every four feet on-center.
- D. Remove and replace any cuttings not properly handled, spotted or planted.
- E. Water each cutting immediately after planting. Backfill any voids or settlement with additional topsoil. Allow topsoil surface to naturally drain, then repeat the watering.

3.08 HYDROSEEDING

- A. Hydroseeding shall consist of a slurry mix of seed, soil stabilizer, fiber mulch, water and other approved additives. The mix shall include 2000 lb/acre of fiber mulch, 100 lb/acre of soil stabilizer, seed materials as specified and water as required to prepare a mix that shall become uniformly suspended to form a homogeneous slurry, that when hydraulically sprayed on the ground, will form a blotter-like ground cover impregnated uniformly with seeds and which, after application, will allow absorption of moisture and rainfall to percolate to underlying soil.
- B. Use hydraulic hydroseeding equipment, with a built-in agitation system and sufficient operating capacity to continuously agitate, suspend and homogeneously mix the slurry. Use distribution lines of sufficient size to prevent stoppage and provide even distribution of slurry. Use traveling unit hydroseed equipment capable

of placing slurry tank and spray nozzles within sufficient proximity of areas to be hydroseeded so as to provide uniform distribution without waste. Limit the operation of hydraulic hydroseeding equipment to access roads to prevent soil compaction or damage to seeded areas. Provide extension hoses, as necessary, to reach all areas to be hydroseeded. Damage to prepared ground surface resulting from hydroseed application shall be repaired and reseeded at the direction of the Engineer.

- C. Apply hydroseed within 30 days after topsoil replacement operations are complete. Perform topsoil replacement coincident with backfilling operations.
- D. Mix hydroseed slurry immediately prior to hydroseed application. Do not allow slurry to remain in the tank for more than one hour before application.
- E. Apply the slurry in a one step application. Using the wood fiber as a guide, spray soil with uniform visible coat of slurry in sweeping motion, allowing wood fibers to build upon each other, until complete, even coverage is achieved.
- F. Apply hydroseed to all areas disturbed during construction, with the exception of permanent access roads, structures, or other areas designated for other revegetation as shown on the Plans. Designated slope areas are subject to approval by the Engineer.

3.09 IMPRINT SEEDING

- A. Use imprint seeding methods only in areas designated on the Plans. Imprint seed to areas disturbed during construction, with the exception of permanent access roads, structures, or other areas designated for other revegetation as shown on the Plans. Use imprint seeding after topsoil replacement operations are complete. Perform topsoil replacement coincident with backfilling operations.
- B. Imprint seeding equipment shall consist of a heavy weighted roller with minimum core diameter of 20 inches, and a length of eight feet or less. The roller shall form discontinuous, v-shaped troughs on the soil surface that produce corresponding soil imprint patterns when towed. The imprint roller shall have teeth between four inches and 10 inches in height. Teeth shall be v-shaped in transverse section and rectangular or triangular in longitudinal section. Crest to crest spacing between teeth shall be one foot or less and the angle between front and rear faces of imprinting teeth shall be 60 degrees or less. The imprint roller shall provide a minimum static pressure on the soil surface between 10 psi and 50 psi. Provide a minimum of one imprint pattern per every square foot of area imprinted. The imprint shall cover a minimum of 70 percent of the area imprinted.
- C. Attach a calibrated seed bin on top or directly in front of the imprinting roller to distribute seed mixes. Thoroughly clean the seed bin prior to use. Do not allow residual seeds remaining from previous uses in the seed bin.
- D. Mix seed with wheat bran or approved substitute to aid in calibrating seed application rate and to prevent seed segregation. Determine the mixing ratio in the presence of the Engineer at the seeding site immediately prior to commencing with imprint seeding. Do not allow seed and bran mixture to remain in seed bin for more than four hours.
- E. Seed bin shall drop seeds onto or directly in front of imprinting roller during application. Rollers shall immediately firm seeds into contact with soil.

3.10 STRAW MULCHING

- A. Apply straw mulching on all slopes 2:1 or steeper, and as designated on the Plans, promptly after topsoil replacement operations are complete. Apply straw mulching in a four-step operation as follows:
 - 1. Hydroseed areas with the specified seed mix, except that the quantity of fiber mulch in the mix shall be reduced to 1700 lb/acre and the soil stabilizer shall be removed.

2. Uniformly apply straw at a minimum rate of 4000 lb/acre. When weather conditions are suitable, straw may be pneumatically applied by equipment that will not render the straw unsuitable for incorporation into the soil. Use hand spreading or other means where pneumatic equipment is unable to reach the limits for straw mulching.
3. Roll straw into soil surface with studded steel plate straw roller equipment capable of forcing straw into the soil to a sufficient depth to tie down the surface soils. Steel plate studs shall be at least six inches wide, and approximately one inch thick, with rounded edges.
4. Apply a fiber mulch mix consisting of 300 lb/acre fiber mulch and 100 lb/acre soil stabilizer over the rolled straw.

3.11 STRAW WATTLES

- A. Install straw wattles, where shown on the Plans, on slopes with minimum spacing as follows:

<u>Gradient</u>	<u>Measured Slope Surface</u>
1:1 or steeper	20 feet apart
1:1 to 2:1	30 feet apart
2:1 to 3:1	50 feet apart

- B. Install straw wattles across the full width of the restored area level to the slope contour, in three-inch deep trenches. Anchor straw wattles with wood stakes at four-foot intervals, with additional stakes at each end. Tightly abut the ends of adjacent straw wattles to each other. Do not overlap ends.

3.12 CLEAN UP

- A. Keep all work areas clean, neat and orderly at all times.
- B. Upon completion of revegetation work, remove rubbish, trash, and debris resulting from the revegetation operations.
- C. Remove oversprayed hydroseeding and straw from walks, lights, access roads, streets, fences, structures, etc.
- D. Remove any detrimental, non-native plants growing in the work area not specified in the seed mix.

3.13 ESTABLISHMENT MAINTENANCE

- A. The establishment maintenance period will begin on the first day following completion and acceptance of the revegetation work. Continue the establishment maintenance activities for a period of two years following the date of filing of the Notice of Completion (i.e., the contract warranty period), and as specified herein.
- B. Maintain all container plants and cuttings in a vigorous, thriving condition by proper watering, weed control, clean up, general care, and any other means necessary.
- C. Provide water, as necessary, to plantings during the establishment period. Determine watering frequency by checking soil moisture levels to prevent wilting or other damage to plant materials.
- D. Apply water in a manner that ensures deep penetration into the soils surrounding the plant root balls. Fill plant basins until the soil around the roots is moist from the bottom of the hole to the top of the ground. Filling the plant basins several times per watering event may be required.
- E. Inspect and repair plant basins as needed prior to each watering.

- F. Perform weed control as specified herein, or as directed by the Engineer.
- G. Make inspections at a minimum of every three months to ensure plant materials are healthy and free of insect infestations and plant diseases. Report any findings to the Engineer. Remove diseased plants and replace them to prevent the spread of diseases and insects.
- H. Monitor plant materials for damage caused by animals, and inform the Engineer of such damage. Propose remedial actions to the Engineer for approval. Provide remedial actions, such as fencing.
- I. Remove and dispose of, all trash and litter accumulated during the establishment maintenance period.
- J. At no time apply fertilizers, pesticides, or herbicides other than those specified to any of the planted or hydroseeded areas without the written approval of the Engineer. Biological control agents, such as insect predators, may be used with the approval of the Engineer.
- K. During the establishment maintenance period, replace in like kind and size to the same specifications required for original planting all plants which die, are unhealthy, or diseased. All replacement planting shall be performed within 30 days receipt of written notice provided by the Engineer.

3.14 WEED CONTROL

- A. Control noxious and annual weeds in all areas to be planted and hydroseeded during construction and throughout the establishment maintenance period. Within 10 days prior to initiating seeding and planting operations, perform weed eradication. Noxious and annual weeds are identified as follows:
 - 1. Noxious weeds are perennial weeds that pose a threat to establishment of revegetation areas and resprout from underground roots. A general list of noxious weeds targeted for control include Artichoke thistle (*Cynara cardunculus*), Fennel (*Foeniculum vulgare*), Castor bean (*Ricinus communis*), Tree tobacco (*Nicotiana glauca*), Pampas grass (*Cortaderia* spp.), Bermuda grass (*Cynodon dactylon*), Tamarisk (*Tamarix* spp.), Eucalyptus (*Eucalyptus* spp.), Acacia (*Acacia* spp.), Hottentot fig (*Carpobrotus* spp.) palms (phoenix spp. and *Washingtonia* spp.), Gazania (*Gazania* spp.), and Giant reed (*Arundo donax*).
 - 2. Annual weeds are those that pose a threat to establishment of revegetation areas due to vigorous, competitive growth habits. A general list of annual weeds targeted for control include tall annual grasses of various species, Mustard (*Brassica* spp.), Russian thistle (*Salsola australis*), Medic (*Medicago* spp.), Sweet-Clover (*Melilotus* spp.), Wild radish (*Raphanus* spp.), Tocalote (*Centaurea melitensis*), Garland chrysanthemum (*Chrysanthemum coronarium*), and Cocklebur (*Xanthium spinosum* and *X. strumarium*).
 - 3. Other weeds may be identified for control by the Engineer during the establishment maintenance period.
- B. All areas shall be weeded prior to the weeds reaching 12 inches in height or before ripening of seed.
- C. Employ weed control methods as follows:
 - 1. Train personnel to be knowledgeable in the identification of weed species and desirable seeded and planted species to ensure only the spraying and removal of weed species.
 - 2. Control noxious weeds and their root systems by cutting top growth off and spot spraying the stumps with an approved herbicide that will translocate to the roots. Top growth, seed heads and plant mass shall be removed from the site.
 - 3. Control annual weeds by either pulling out by hand or hoeing. The stems of the hoed plants will be cut below ground level. Weed plant mass shall be removed from the site.
- D. Leaf and branch drop, and other organic debris of species not identified as weeds may be left in place.

3.15 PERFORMANCE STANDARDS DURING PLANT ESTABLISHMENT PERIOD

- A. At six-month intervals following the completion of planting, or at other intervals as directed by the Engineer, inspect the container plants in the presence of the Engineer and determine the plant survival rate. At each inspection, should the mortality rate of any individual species exceed 10 percent of the original number of that species, or should the mortality rate of the total planting exceed 10 percent of the total original number of container plants, or at the completion of the warranty period should the plant mortality rate of any individual species exceed 20 percent of the original number, or should the mortality rate of the total planting exceed 20 percent of the total original number of container plants, plant additional container plants of like kind and to original numbers and size as specified herein for the original planting. Warranty replacement plants for the duration of the warranty period, but in no case for less than eight months.

END OF SECTION



PLEASE RECORD THIS DOCUMENT AT
NO FEE AS IT IS TO THE BENEFIT
OF THIS DISTRICT (GOV. CODE [6103])

RECORDING REQUESTED BY, AND
WHEN RECORDED PLEASE MAIL TO:

San Diego County Water Authority
Right of Way Department
4677 Overland Avenue
San Diego, CA 92123

Assessor's Parcel No: _____

Space above this line for Recorder's use.

Project Name & No: _____

DOCUMENTARY TRANSFER TAX: None
San Diego County Water Authority

William J. Rose, Director of Right of Way

GRANT OF EASEMENT TO THE SAN DIEGO COUNTY WATER AUTHORITY

The undersigned ("Grantor") owns the real property described in Exhibit A, Paragraph 1 ("Property"), attached hereto and made a part hereof by this reference. For valuable consideration, receipt of which is acknowledged, Grantor grants to the San Diego County Water Authority ("Grantee") an exclusive and permanent easement, together with the right to use and occupy the surface and subsurface of the real property described in Exhibit A, Paragraph 2 ("Easement Area") and as shown on Exhibit B, Grantee's Right of Way Drawing, attached hereto and made a part hereof by this reference.

The easement granted hereby shall be for the following purposes, including without limitation, the construction, installation, operation, repair, reconstruction, relocation and removal and all activities necessary to construct, install, reconstruct, relocate, replace, remove, operate, maintain, inspect and repair, now and in the future, a pipeline or pipelines, which may parallel each other, designed for the general purpose of transporting and distributing water, together with related appurtenant facilities, which may extend above the surface of the Easement Area, including vaults, manholes, flow control and measuring devices, air release and air vacuum valves, alarms, erosion control facilities, blow-offs, pumping wells, power transmission and communication conduits, antennas and cables necessary to the operation and maintenance of the pipelines, underground anodes, anode wells and related facilities for cathodic protection of pipelines and any other facilities necessary for the operation, protection and maintenance of pipeline or pipelines.

Grantor further grants the right of unobstructed ingress and egress by a practical route across the Property to, along and from the Easement Area, including the right to pass and re-pass over and along the Easement Area, including access to Grantee's other easements, and to deposit tools, implements and other materials on the Easement Area and to utilize construction, automotive and other equipment thereon when necessary for the purpose of exercising its rights hereunder.

Grantee may remove any buildings, structures, brush, trees or other vegetation or objects which are located on the Easement Area at the time of acquisition at Grantee's sole cost. Upon completion of any work by Grantee on the Easement Area, Grantee shall restore the surface at Grantee's cost to a compacted, neat, clean condition but not necessarily the same condition as prior to such work. Grantee may trim, cut or clear any tree, brush or other vegetation on the Easement Area from time to time as Grantee determines necessary to the exercise of its rights hereunder.

Grantor reserves the right to use the surface of the Easement Area in a manner which does not conflict, interfere with or disturb the rights and uses herein granted to the Grantee, including paving with asphalt and use for access and parking purposes so long as Grantee can gain immediate access to perform such work as necessary for its purposes and uses as herein granted. Grantor shall not cause or permit, by grading or filling, an increase or decrease in the surface elevation of the Easement Area, nor dig or drill any wells, or construct fences, gates, posts, chains, walls or other objects, which occupy or physically intrude on the land, nor plant any trees, without prior written approval of the Grantee. Grantee shall establish reasonable procedures for such approvals, including encroachment permits, and shall not unreasonably withhold approval of uses which are not detrimental to the rights and uses granted it hereunder.

Grantor shall not construct any permanent buildings or structures and place any toxic or hazardous materials or objects on the easement area.

Grantee, after reasonable written notice to Grantor or its heirs, successors and assigns, shall have the right to remove any earthfill, fences, gates, posts, chains, walls, buildings, structures, trees, toxic or hazardous materials or objects placed on the Easement Area by Grantor without the consent of Grantee. Grantor agrees to pay Grantee the cost of removal and of restoring the Easement Area to its prior condition, including staff, costs and interest.

Grantor waives any right under Civil Code Section 845 and any other right, if any, to compel Grantee to improve or maintain any part of the Easement Area as a roadway or private right of way.

The rights and obligations contained herein shall inure to the benefit of and be binding upon the successors-in-interest, agents, employees, assigns, and transferees of the parties hereto.

Executed by the GRANTOR this _____ day of _____, 20_____.

GRANTOR(S):

By: _____

By: _____

- Notarization Required -

- Notarization Required -

Approved as to form:

By: _____

General Counsel
San Diego County Water Authority

Appendix F Pre-activity Survey Form

The purpose of the Pre-activity Survey Form (PSF) is to determine the presence or absence of sensitive resources on or in the vicinity of a project area. Pre-activity surveys may be appropriate for any type of Water Authority field operation in a natural area or where Covered Species may occur. Prior to activities in potential sensitive habitat areas, an Environmental Surveyor (as defined in the Water Authority's Natural Community Conservation Plan/Habitat Conservation Plan [NCCP/HCP or Plan]) conducts a pre-activity survey and records the findings on a PSF. The pre-activity survey documents information including, but not limited to:

- Type, location, and size of project;
- Date, time, weather, and surrounding land uses;
- Evaluation of type and quality of habitat;
- Work description and methods which will be used to avoid or minimize disturbance to Covered Species from construction-related activities, including biological monitoring during construction;
- Anticipated direct and indirect impacts (if any) to a Covered Species and its habitat, and proposed mitigation (i.e., enhancement or deduction from mitigation credits);
- Additional permitting that is needed (e.g. United States Army Corps of Engineers); and
- Map of location of work area.

The Conditions provided by the Environmental Surveyor regarding how to complete the project while avoiding or minimizing impacts to environmental resources are detailed verbally to field personnel and followed by written documentation. The pre-activity survey will be conducted no earlier than 30 days before the surface disturbing activity. If surface disturbance has not commenced within 30 days, the Environmental Surveyor will conduct a verification study. The site-specific Conditions provided by the Environmental Surveyor will be submitted to the field crew within one week of conducting the study, and prior to project commencement.

If the Environmental Surveyor determines during the initial pre-activity survey that a project will completely avoid impacts to Covered Species and their habitat, the Water Authority's project may proceed during this time if necessary. If impacts to habitat and/or Covered Species cannot be avoided, the Environmental Surveyor shall be called in to

Appendix F

perform follow-up surveys following methodologies accepted by the Wildlife Agencies prior to project commencement.

In both cases, the data recorded on the PSF will then be entered into a Water Authority computer database, which is used to develop the Water Authority's annual report to the Wildlife Agencies.

ATTACHMENT 1
SAMPLE PRE-ACTIVITY SURVEY FORM

Pre-Activity Survey Form

Date			
Date Due			
Tracking Number			
Project Name			
Address/Location			
TB Coordinate(s)			
Project Type			
Project Description	See attached.		
Type of Activity	Maintenance <input type="checkbox"/> New Facility <input type="checkbox"/>		
Client Lead			
Client Lead Contact Info	Office: Mobile: Email:		
Contract Number			
Environmental Surveyor	Biologist: Company:		
Date of Field Survey			
Weather Conditions	Temp: ° F	Wind: mph	Weather:
Site Elevation	ft		
Survey Start/End Times	Start:	End:	Total: hours
Types of Surveys Conducted (e.g. protocol)			
Preserve	Inside Preserve <input type="checkbox"/> Outside Preserve <input type="checkbox"/>		
Additional Permitting	Yes <input type="checkbox"/> No <input type="checkbox"/>		
Comments			

PROPOSED WORK DESCRIPTION

[Attach map of project area]

SURROUNDING LAND USE/HABITAT

[Describe surrounding land use and habitat. Reference photographs here.]

HABITAT EVALUATION

[Quantify habitat value. List Covered Species present or with potential to occur that may be affected.]

IMPACTS

[Quantify permanent and temporary habitat impacts and potential direct and indirect impacts to Covered Species.]

ENVIRONMENTAL SURVEYOR LIST OF PROJECT CONDITIONS

[Conditions for avoidance or minimization. Outline required mitigation measures with references to the specific sections and condition numbers from Chapter 6 and Appendix B of the Water Authority's Plan.]

GRAPHICS AND PHOTOGRAPHS

**FACT SHEET
FOR
WATER QUALITY ORDER 2003 – 0007 - DWQ**

**STATE WATER RESOURCES CONTROL BOARD (SWRCB)
1001 I STREET, SACRAMENTO, CALIFORNIA 95814**

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION ACTIVITY FROM SMALL LINEAR
UNDERGROUND/OVERHEAD PROJECTS (GENERAL PERMIT)**

BACKGROUND

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added Section 402(p) that establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) promulgated final regulations that establish storm water permit application requirements for specified categories of industries. These regulations require that discharges of storm water to waters of the United States associated with construction activities from projects that result in land disturbance greater than five (5) or more acres to be subject to an NPDES Permit. Regulations (Phase II Rule) that were promulgated on December 8, 1999 expand the existing NPDES program to address storm water discharges from construction sites that disturb land equal to or greater than one (1) acre and less than five (5) acres (small construction activity). These regulations require that small construction activity, other than those regulated under an individual or Regional Water Quality Control Board (RWQCB) General Permit, must be permitted no later than March 10, 2003.

Currently the SWRCB has adopted one statewide NPDES General Storm Water Permit for Storm Water Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ referred to as Order 99-08) that applies to all storm water discharges associated with construction activities that disturb greater than one-acre of land unless the discharge is covered by a different NPDES permit. Requirements established in Order 99-08 are applied mostly to the more traditional construction projects such as residential and commercial developments, and large linear projects, that typically result in areas of disturbed land being exposed for extended periods of time. Construction activities associated with small linear underground/overhead projects that result in land disturbances greater than one acre, but less than five acres (hereafter referred to as small LUPs), are not like traditional construction projects. Small LUPs have a lower potential to impact receiving waters because these projects are typically short duration and constructed within or around hard paved surfaces that result in minimal disturbed land areas being exposed at the close of the construction day. Therefore, this

General Permit has been adopted statewide, and it is applicable to construction activities associated with small LUPs.

Underground/overhead facilities typically constructed as small LUPs include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water, wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio or television messages); and associated ancillary facilities. Construction activities associated with small LUPs include, but are not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

SMALL LUPs SUBJECT TO THIS PERMIT

Small LUPs vary in complexity and water quality concerns based on the type of project. This General Permit has varying application requirements based on the type of project and various permitting requirements depending on the complexity of the project. As discussed below, factors that lead to the characterization of the type and complexity of the project include location, whether the project is associated with private or municipal development, and the length of time the area is open to the elements.

Determining the Type of Project

Small LUPs that may be subject to coverage under this General Permit can be categorized into two major types: (1) projects associated with private or municipal development projects, and (2) projects not associated with private or municipal development projects:

1. *Projects Associated with Private or Municipal Development Projects.* These are construction projects conducted by an owner or operator of the small LUP (hereafter referred to as discharger¹) or its authorized representative² to relocate facilities in advance of pending developments or redevelopments or to provide new service to new development or redevelopment projects owned or operated by private parties or municipal or other public agencies. These projects can be further categorized into three types of development activities:

¹ The term “discharger” means the utility company, municipality or other public or private company or agency that owns or operates the small LUP.

² An authorized representative is a contractor employed by the owner or operator of the small LUP and is the person responsible for oversight of the day to day operations of construction activities associated with small LUPs. The appointment of an authorized representative by a discharger does not relieve the discharger of its responsibility for compliance with this General Permit. This term is different from that of the duly authorized representative, which is defined in Standard Provision F.9.b.

- a. Linear Underground/Overhead Projects associated with pre-development activities. These are construction activities associated with small LUPs conducted by a discharger or its authorized representative to remove and/or relocate lines and facilities prior to the start of construction for new development and redevelopment projects that are owned or operated by third parties or municipal agencies. Soil disturbances from preconstruction projects are considered separately from the development or redevelopment projects for the purposes of determining if they meet minimum threshold requirements for areas of soil disturbance that would require coverage by a construction storm water permit.
 - b. Linear Underground/Overhead Projects associated with new development. These involve construction activities associated with small LUPs by dischargers or their authorized representatives to provide service to new development projects that are owned or operated by third parties or municipal agencies, and can be further categorized as:
 - i. Activities associated with construction activities within the boundaries of the development project, and
 - ii. Activities associated with bringing service from offsite up to the boundary of the development project (commonly referred to as bring-ups).
 - c. Linear Underground/Overhead Projects associated with redevelopment projects. These involve construction activities associated with small LUPs constructed by a discharger or its authorized representative to relocate lines or convert facilities from overhead to underground as a result of a redevelopment project owned or operated by a third party or municipal agency.
2. *Projects Not Associated with Private or Municipal Development Projects.* These involve construction activities associated with small LUPs that are: (1) constructed by dischargers or their authorized representatives of a small LUP, (2) typically constructed outside of developed areas, and (3) not associated with new development or redevelopment projects.

Determining Project Complexity

Once a project type for the small LUP has been established, the complexity of the project must be determined. As described below, small LUPs have been categorized into two tiers of complexity. The complexity of a project will be used to calculate land disturbance area of a proposed small LUP and to establish applicable permit requirements if it is determined the project is subject to this General Permit.

Tier I Small LUPs

Tier I small LUPs are those construction projects:

- Where 70 percent or more of the construction activity occurs on a paved surface and where areas disturbed during construction will be returned to preconstruction conditions or equivalent protection established at the end of the construction activities for the day, or
- Where greater than 30 percent of construction activities occur within the non-paved shoulders or land immediately adjacent to paved surfaces, or where construction occurs on unpaved improved roads, including their shoulders or land immediately adjacent to them where:
 - Areas disturbed during construction will be returned to preconstruction conditions or equivalent protection established at the end of the construction activities for the day to minimize the potential for erosion and sediment deposition, and
 - Areas where established vegetation was disturbed during construction will be stabilized and revegetated by the end of project. When required, adequate temporary stabilization Best Management Practices (BMPs) will be installed and maintained until vegetation is established to meet minimum cover requirements established in this General Permit for final stabilization.

Tier I small LUPs typically do not have a high potential to impact storm water quality because (1) these construction activities are not typically conducted during a rain event, (2) these projects are normally constructed over a short period of time³, minimizing the duration that pollutants could potentially be exposed to rainfall; and (3) disturbed soils such as those from trench excavation are required to be hauled away, backfilled into the trench, and/or covered (e.g., metal plates, pavement, plastic covers over spoil piles) at the end of the construction day. This General Permit requires activity appropriate BMPs to be installed for construction activities conducted at Small LUPs. A listing of BMPs that are applicable to a number of construction activities typically conducted at Small LUPs is included in Section A of this General Permit. Alternative BMPs that provide equivalent protection, but which are not listed in Section A, may be implemented. This General Permit requires the discharger or its authorized representative to develop and implement a Tier I Storm Water Pollution Prevention Plan (SWPPP) using the template provided in Attachment 5. Sections A and B of this General Permit establishes the minimum requirements for construction activities that must be addressed in an SWPPP and monitoring requirements for Tier I projects.

Tier II Small LUPs

Tier II projects are all other small LUPs that do not meet the definition of Tier I projects. Tier II projects may have a higher potential to impact storm water quality, and they need to be regulated with a higher level of review and oversight. Like Tier I projects, Tier II projects are typically constructed over a short period of time. However, these projects have a higher potential to impact water quality because (1) typically they occur outside the more urban/developed areas, (2) they have larger areas of soil disturbance that are not closed or restored at the end of the day; (3) they may have onsite stockpiles of soil, spoil and other materials; (4) they cross or occur in close proximity to a wide variety of sensitive resources which may include, but are not limited to, steep topography and/or water bodies; and (5) they

³ Short period of time refers to a project duration of weeks to months, but typically less than one-year in duration.

have larger areas of disturbed soils that may be exposed for a longer time interval before final stabilization, cleanup and/or reclamation occurs. This General Permit requires the discharger or its authorized representative to develop and implement an SWPPP for these construction activities that are specific for project type, location and characteristics. Sections A and B of this General Permit establish the minimum requirements for SWPPP and monitoring programs for Tier II projects.

Process and Methods for Calculating Land Disturbance Areas of Small LUPs

To determine when a Notice of Intent (NOI) for individual Tier II projects and Linear Construction Activity Notifications (LCAN) for Tier I projects must be submitted, the discharger or its duly authorized representative must determine if the land area to be disturbed by the small LUP construction activity will be greater than one acre but less than five acres in size. As described below, the method to calculate the disturbed area will vary depending on the type and complexity of a project.

Depending on the project type, the following areas of a small LUP shall be included in calculating the disturbed area:

- Surface areas of trenches and laterals associated with small LUPs;
- Surface area of stockpiling/borrow areas as defined below;
- Paved surface areas constructed for the project;
- New roads constructed or major reconstruction to existing roads (e.g., improvements to two-track surfaces or road widening) for the sole purpose of accessing construction activities or as part of the final project;
- Equipment and material storage, staging, and preparation areas (laydown areas) not on paved surfaces;
- Soil areas outside the surface area of trenches, laterals, and ancillary facilities that will be graded or disturbed by the use of construction equipment, vehicles and, machinery during construction activities; and
- Surface areas of all other ancillary facilities (e.g., poles, pull boxes, fuse boxes, splice boxes, pads, etc.) associated with a small LUP.

Stockpiling areas, borrow areas, and removal of soils from a construction site may or may not be included when calculating the area of disturbed soil for a site depending on the following conditions:

- For stockpiling of soils onsite or immediately adjacent to a small LUP site and the stockpile is not on a paved surface, the area of the base of the stockpile is to be included in the disturbed area calculation.
- The surface area of borrow areas that are onsite or immediately adjacent to a project site are to be included in the disturbed area calculation.

- For soil that is hauled offsite to a location owned or operated by the discharger that is not a paved surface, the area of the base of the stockpile is to be included in the disturbed area calculation except when the offsite location is already subject to a separate storm water permit.
- For soil that is brought to the project from an offsite location owned or operated by the discharger, the surface area of the borrow pit is to be included in the disturbed area calculation except when the offsite location is already subject to a separate storm water permit.
- Trench spoils on a paved surface that are either returned to the trench or excavation or hauled away from the project daily for disposal or reuse will not be included in the disturbed area calculation.

All soil removed from the construction site will be hauled away in accordance with all applicable laws and regulations.

Any soil that is determined to be contaminated⁴ by the discharger or its authorized representative shall be handled, stored, hauled, and disposed of in accordance with all applicable laws and regulations. The discharger or its authorized representative will notify the appropriate local, State, or federal agency(ies) and RWQCB when required. This General Permit prohibits the discharge of contaminated soil in storm water runoff to storm drains and waterbodies unless such a discharge is authorized by an NPDES permit.

Methods to Calculate Land Disturbance Areas

Calculating the land disturbance area will depend on the complexity of a project. When the area calculated for a small LUP is greater than one acre, but less than five acres, the discharger or its duly authorized representative must file for coverage under this General Permit or seek coverage under a separate NPDES permit for its construction activities. If the calculated area for a small LUP is greater than five acres, the discharger may not seek coverage under this General Permit. Instead, the discharger must file an NOI for coverage under Order 99-08 or seek coverage under a separate NPDES permit.

⁴ Contaminated soil is soil that contains pollutants in concentrations that exceed the appropriate thresholds of various regulatory agencies for those substances. Preliminary testing of potentially contaminated soils will be based on odor, soil discoloration, or prior history of the site's chemical use and storage and other similar factors. When soil contamination is found or suspected and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the discharger or authorized representative shall have those soils sampled and tested to ensure proper handling and public safety measures are implemented. The discharger or its authorized representative will notify the appropriate local, state or federal agency(ies) when contaminated soil is found at a construction site, and will notify the RWQCB through the submittal of the LCTN or NOT at the completion of the project.

Tier I Small LUPs

Using the definitions and descriptions provided in the above discussion, the total land area disturbed for Tier I small LUPs (based on the activities listed below that are conducted by the discharger or their authorized representative) is the sum of the:

- Surface areas of trenches and laterals;
- Area of the base of stockpiles and laydown areas on unpaved surfaces;
- Surface area of the borrow area;
- Soil areas outside the surface area of trenches, laterals, and ancillary facilities that will be disturbed by the use of construction equipment, vehicles, and machinery during construction activities;
- Any graded areas; and
- Twenty-Five percent of the sum of the surface areas of the trench and laterals for electric projects⁵ or 5 percent of the sum of the surface areas of the trench and laterals for all other projects to account for all ancillary facilities. Alternatively, a discharger may calculate the project specific soil disturbance area for ancillary facilities.

Tier II Small LUPs

Using the definitions and descriptions provide in the above discussion, the total land area disturbed for Tier II small LUPs (based on the activities listed below that are conducted by the discharger or their authorized representative) is the sum of the:

- Surface areas of trenches, laterals, and ancillary facilities;
- Area of the base of stockpiles on unpaved surfaces;
- Surface area of the borrow area;
- Areas of new roads constructed or areas of major reconstruction to existing roads (e.g., improvements to two-track surfaces or road widening) for the sole purpose of accessing construction activities or part of the final project;
- Equipment and material storage, staging, and preparation areas (laydown areas) not on paved surfaces;
- Area of any paved surfaces constructed for the project; and
- Soil areas outside the surface area of trenches, laterals, and ancillary facilities that will be graded and/or disturbed by the use of construction equipment, vehicles, and machinery during construction activities.

Determining Who Must Submit the NOI Under This General Permit

Once it is determined that a construction project is a small LUP project that is eligible for coverage under this General Permit, the discharger or its duly authorized representative must determine if the application for permit coverage must be submitted to obtain coverage under this General Permit, or if the construction activities are covered by a different NOI or NPDES permit.

⁵ Percentage for underground electric projects was provided by an electric company and is an average estimate based on 18 inch and 24 inch trenches.

The type and location of the small LUP are factors to be considered to determine how a small LUP is to be covered by the requirements of this General Permit.

Small LUPs associated with Private or Municipal Development Projects

1. For small LUPs associated with pre-development and pre-redevelopment construction activities:

The discharger or its duly authorized representative must seek coverage⁶ under this General Permit for its pre-development and pre-redevelopment construction activities where the total disturbed land area of these construction activities is greater than one acre but is less than five acres.

2. For small LUPs associated with new development and redevelopment construction projects:

The discharger or its duly authorized representative must seek coverage⁶ under this General Permit for small LUP construction activities associated with new development and redevelopment projects where the total disturbed land area of the small LUP is greater than one acre but is less than five acres. Coverage under this permit is not required where the small LUP construction activities are covered by another NPDES permit (e.g., where the NOI and SWPPP of the owner or operator of a new or redevelopment site includes the small LUP activities).

Small LUPs not associated with private or municipal new development or redevelopment projects:

The discharger or its duly authorized representative must seek coverage under this General Permit for its small LUP construction activities where the total disturbed land area is greater than one acre but is less than five acres.

TEMPORARY PERMITTING EXTENSION FOR SMALL LUPS ASSOCIATED WITH OIL AND GAS EXPLORATION CONTRUCTION ACTIVITIES

Due to regulations promulgated by USEPA (40 CFR Part 122, [FRL-7464-2], RIN 2040-AC82) on March 5, 2003, oil and gas exploration, production, processing, and treatment operations, or transmission facilities (i.e., gathering lines, flow lines, feeder lines, and transmission lines) for projects encompassing from one to five acres, are exempt from this General Permit until March 10, 2005. The construction of water lines, electrical utility lines, etc., as part of the oil and gas exploration, production, processing, treatment, and transmission projects is also included in this exemption. This exemption does not include distribution lines that deliver natural gas to homes, businesses, etc., or those pipelines that transport refined petroleum product and chemicals from refineries and chemical plants.

⁶ Seek coverage means filing either a Notice of Intent (NOI) or Linear Construction Activity Notification (LCAN) for the project. NOI and LCANs requirements are discussed under Permit Coverage and Requirements of this Fact Sheet.

PROJECTS AND ACTIVITIES NOT DEFINED AS CONSTRUCTION ACTIVITY

1. Small LUP construction activity does not include routine maintenance projects. Routine maintenance projects are projects associated with operations and maintenance activities that are conducted on existing lines and facilities and within existing right-of-way, easements, franchise agreements, or other legally binding agreements of the discharger. Routine maintenance projects include, but are not limited to projects that are conducted to:
 - Maintain the original purpose of the facility or hydraulic capacity.
 - Update existing lines⁷ and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.
 - Repairing leaks.

Routine maintenance does not include construction of new⁸ lines or facilities resulting from compliance with applicable codes, standards, and regulations.

Routine maintenance projects do not include those areas of maintenance projects that are outside of an existing right-of-way, franchise, easements, or agreements. When a project must secure new areas, those areas may be subject to this General Permit based on the area of disturbed land outside the original right-of-way, easement, or agreement.

2. Small LUPs construction activity does not include field activities associated with the planning and design of a project (e.g., activities associated with route selection).
3. Tie-ins conducted immediately adjacent to “energized” or “pressurized” facilities by the discharger or their authorized representative are not considered small construction activities where all other small LUP construction activities associated with the tie-in are covered by an NOI and SWPPP of a third party or municipal agency.
4. Small LUPs construction activity does not include activities associated with responding to emergencies to protect public health and safety and restoration of public services after natural or manmade disasters.

PROJECTS NOT COVERED BY THIS PERMIT

This General Permit does not apply to storm water discharges from small LUPs for (a) those areas on Tribal Lands; (b) the Lake Tahoe Hydrologic Unit; (c) small LUPs which disturb less than one acre, unless directed by an RWQCB to obtain coverage under a construction storm water permit; (d) projects covered by another construction storm water general permit or an individual NPDES Permit for storm water discharges associated with construction activity; (e) linear construction projects that exceed five acres of soil disturbance;

⁷ Update existing lines includes replacing existing lines with new materials or pipes.

⁸ New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

(f) non-linear construction projects; (g) storm water discharges which are determined ineligible for coverage under this General Permit by an RWQCB.

Storm water discharges in the Lake Tahoe Hydrologic Unit are regulated by a separate permit(s) adopted by the Lahontan Regional Water Quality Control Board, (LRWQCB). Permit applications for storm water discharges that will be conducted in the Lake Tahoe Hydrologic Unit must be submitted directly to the LRWQCB.

USEPA regulates storm water discharges on Tribal Lands.

PERMIT COVERAGE AND REQUIREMENTS

This General Permit incorporates permitting and implementation requirements to control and reduce the discharge of pollutants in storm water runoff associated with construction activities of small LUPs. Dischargers or their duly authorized representatives that seek coverage under this General Permit for small LUPs are required to:

1. Develop and implement an SWPPP which specifies BMPs to control and reduce discharges of pollutants associated with construction in storm water runoff into storm drains and receiving waters.
2. Eliminate or reduce nonstorm water discharges to storm sewer systems and waters of the United States.
3. Monitor the construction site to ensure all BMPs are implemented, maintained, and effective.

Permit requirements, such as NOI submittal requirements, minimum SWPPP elements, and the amount and degree of monitoring vary depending on the complexity of the small LUP. Because Tier I projects have a lower threat to water quality than Tier II projects, Tier I projects have less stringent, more streamlined requirements.

NOI Submittal Requirements

This General Permit establishes different requirements for an NOI (see copy in Attachment 1) and fee submittal depending on the complexity of a small LUP. When using this permit the discharger or its duly authorized representative shall obtain coverage prior to commencement of small LUP construction activities that are eligible to be covered by this General Permit. Notification requirements of this General Permit are intended to establish a mechanism, which can be used to clearly identify the responsible parties, locations, and scope of operations of small LUPs covered by this General Permit and to notify the SWRCB and RWQCBs that the discharger or its duly authorized representative intends to comply with the requirements of this General Permit.

Tier I Small LUPs NOI Submittal Requirements

Prior to the start of construction the following must occur for a small LUP to be covered under this General Permit:

1. The discharger submits an NOI and appropriate fee to the SWRCB for each RWQCB office⁹ where construction activities for the Tier I small LUPs are planned. The NOI authorizes a discharger or its duly authorized representative to construct any number of small LUPs within the jurisdictional area of the appropriate RWQCB office. The NOI submitted will remain in effect until the discharger requests termination and it is approved by the appropriate RWQCB office. By submitting the NOI the discharger is notifying the SWRCB and appropriate RWQCB office that all small LUPs covered by the NOI (i.e., those for which an LCAN is submitted) will be in compliance with requirements of this General Permit.
2. The discharger or its duly authorized representative must submit a Linear Construction Activity Notification (LCAN) (see copy in Attachment 2) to the appropriate RWQCB for all small LUPs to be constructed within the RWQCB jurisdictional boundaries. LCANs are to be submitted prior to the start of construction for each small LUP. The discharger or its duly authorized representative may submit one LCAN for multiple projects or one LCAN for an individual project. For a multiple project LCAN, the discharger or its duly authorized representative should submit the LCAN on at least a quarterly basis. At a minimum, LCANs will provide the Waste Discharge Identification (WDID) number of the NOI, project name and/or reference number, location of the project, approximate size of the project, estimated start and end date, type of project, and project contact name, phone number, and address.
3. The discharger or its authorized representative is to develop and implement a SWPPP for each project including monitoring requirements in accordance with the requirements of this General Permit and Sections A and B.

Tier II Small LUPs NOI Submittal Requirements

Prior to the start of construction activities, a discharger or its duly authorized representative seeking coverage under this General Permit must submit one NOI and fee to the SWRCB for each Tier II small LUP. They must also:

1. Submit along with the NOI a site vicinity map and a map delineating the project area.
2. Develop and implement an SWPPP for each project including monitoring and reporting requirements in accordance with the requirements of this General Permit and Sections A and B.

⁹ RWQCB offices are located in the following regions: Region 1 in Santa Rosa; Region 2 in Oakland; Region 3 in San Luis Obispo; Region 4 in Los Angeles; Region 5a in Redding; Region 5b in Sacramento; Region 5c in Fresno; Region 6a in South Lake Tahoe; Region 6b in Victorville; Region 7 in Palm Desert; Region 8 in Riverside; and Region 9 in San Diego.

New and Ongoing Small LUPs

Owners or operators of new small LUPs that commence construction activities after the adoption date of this General Permit shall file an NOI prior to the commencement of construction and implement the SWPPP upon the start of construction. For Tier I small LUPs, the discharger or its duly authorized representative shall also submit an LCAN to the appropriate RWQCB office before the start of construction activities.

Construction activities may commence only after the discharger or its duly authorized representative has submitted of an NOI and LCAN (Tier 1) or NOI (Tier II), and has developed an SWPPP. The SWPPP is to be implemented concurrent with the start of construction.

Owners or operators of ongoing small LUPs that are currently covered under Order No. 99-08 shall continue coverage under Order 99-08 until the construction activities are complete except where less than 50 percent of the construction project is complete. When ongoing construction activities are less than 50 percent complete, the operator of the small LUP may choose to seek coverage under this General Permit by filing the appropriate NOI and/or LCAN, revising its SWPPP, if appropriate, and terminating coverage under Order 99-08. Termination of coverage under Order 99-08 is subject to the approval of the RWQCB.

Where NOIs and LCANs are to be Submitted

The NOI and appropriate fee must be sent to the following address prior to the start of construction activities:

State Water Resources Control Board
Division of Water Quality
Storm Water Permit Section
P.O. Box 1977
Sacramento, CA 95812-1977

Annual fees are established through regulations adopted by the SWRCB. The current annual fee for storm water general permits is \$700.

All LCANs are to be submitted without a fee to the appropriate RWQCB office. A listing of the RWQCB offices is available at www.waterboards.ca.gov/stormwtr/contact.html under *Contacts*.

Dischargers who meet the criteria for requiring coverage under a construction storm water permit, but fail to obtain coverage under this General Permit or another general or individual construction storm water permit for storm water discharges to surface waters, will be in violation of the CWA and the California Water Code.

TERMINATING COVERAGE UNDER THIS GENERAL PERMIT AND CERTIFICATION OF COMPLIANCE

When construction of a small LUP is complete, the discharger or its duly authorized representative must notify the RWQCB office in writing. The process for notifying the RWQCB will be different depending on the project complexity. Given the short duration of these projects, the discharger or its duly authorized representative will not be required to conduct an annual certification of these projects. Instead, the discharger or its duly authorized representative will be required to submit a statement with its written notification that certifies construction activities for small LUPs were in compliance with the requirements of this General Permit. All notices of termination are to be signed and certified in accordance with Standard Provisions of this General Permit.

Termination Requirements for Tier I Small LUPs:

A discharger or its duly authorized representative shall file a Linear Construction Termination Notification (LCTN) to the appropriate RWQCB office certifying that construction activities for each Tier I small LUPs are complete and that the site was in full compliance with requirements of this General Permit during active construction and was compliant with soil stabilization requirements, where appropriate. A discharger or its duly authorized representative may submit an LCTN for multiple projects completed over a specified period of time or may submit an LCTN for an individual small LUP. Photographs of the completed construction site will be submitted upon request by the RWQCB. Attachment 3 provides a copy of the LCTN to be used by the discharger or its duly authorized representative.

The discharger must submit a Notice of Termination (NOT) request (see copy Attachment 4) to the appropriate RWQCB office to terminate coverage under this General Permit for Tier I small LUPs within a specific RWQCB office. Upon approval by the appropriate RWQCB office, permit coverage will be terminated; and the discharger will no longer be authorized to conduct Tier I small LUPs within the RWQCB office's jurisdictional area until such time the company has obtained coverage under this General Permit or another NPDES storm water permit for these activities.

Termination Requirements for Tier II Small LUPs

The discharger or its duly authorized representative shall file an NOT to the appropriate RWQCB office certifying that construction activities for Tier II small LUPs are complete and that the site was in full compliance with requirements of this General Permit during active construction and was compliant with soil stabilization requirements, where appropriate. Upon approval by the appropriate RWQCB office, permit coverage will be terminated. Photographs of the completed construction site must be submitted with the NOT. Attachment 4 provides a copy of the NOT to be used by the discharger or its duly authorized representative.

DESCRIPTION OF GENERAL PERMIT CONDITIONS

The following is a brief description of the major provisions of the General Permit and the basis for the General Permit.

Prohibitions

This General Permit authorizes the discharge of storm water directly and indirectly to surface waters from small linear underground/overhead construction activities that result in land disturbance of one or more, but less than five acres (referred to as small LUPs). It prohibits the discharge of non-storm water discharges not authorized by this permit and all discharges which contain a hazardous substance in excess of reportable quantities established at Title 40 Code of Federal Regulations (CFR) Section 117.3 or 40 CFR 302.4 unless a separate NPDES Permit has been issued to regulate those discharges. In addition, this General Permit contains provisions that incorporate discharge prohibitions contained in water quality control plans adopted by the nine RWQCBs.

Elimination or reduction of non-storm water discharges is a major goal of this General Permit. Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may contribute a significant pollutant load to receiving waters. Measures to control spills, leakage, and dumping and to prevent illicit connections during construction shall be addressed through structural as well as non-structural BMPs.

This General Permit prohibits the discharge of non-storm water not authorized by this Permit or authorized by a separate NPDES permit. This General Permit authorizes certain non-storm water discharges provided that they are not relied upon to clean up failed or inadequate construction or post-construction BMPs designed to keep materials onsite. These authorized non-storm water discharges shall; (1) be infeasible to eliminate, (2) comply with BMPs as described in the SWPPP, and (3) not cause or contribute to a violation of water quality standards. Special Provision D.6 of this General Permit establishes the requirements for identifying, controlling and preventing non-storm water discharges from a small LUP construction site. Special Provision D.6 describes the conditions under which some non-storm water discharges are prohibited or subject to a different NPDES permit.

Effluent Limitations

Permits for storm water discharges associated with small LUPs shall meet all applicable provisions of CWA Sections 301 and 402. These provisions require control of pollutant discharges that utilize best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to reduce pollutants and any more stringent controls necessary to meet water quality standards. This General Permit is performance-based to the extent that it prohibits the discharge of storm water that causes or threatens to cause pollution, contamination, or nuisance; but it also allows the discharger or its authorized representative to determine the most economical, effective, and possibly innovative BMPs.

Title 40 (CFR) Section 122.44(k)(2) allows the SWRCB to require implementation of BMPs to control or abate the discharges of pollutants from storm water authorized under CWA Section 402(p). Section 122.44(k)(4) of the regulations allows the implementation of BMPs where BMPs are necessary to carry out the purposes and intent of the CWA. Therefore, the effluent limitations contained in this General Permit are narrative and require a discharger or its authorized representative to implement appropriate BMPs to reduce the discharge of pollutants in storm water runoff to comply with BAT/BCT discharge standards. The BMPs shall primarily emphasize source controls, such as erosion control and pollution prevention methods. The discharger or its authorized representative shall also install structural controls, as necessary, such as sediment control, which will constitute BAT and BCT and will achieve compliance with water quality standards.

The requirements of this General Permit are intended to be implemented on a year-round basis, not just during the part of the year when there is a high probability of a precipitation event which results in storm water runoff. The permit should be implemented at the appropriate level and in a proactive manner during all seasons while construction on small LUPs is ongoing.

Weather and storm predictions or weather information concerning storm events and mean annual rainfall can be obtained via the internet at <http://iwin.nws.noaa/iwin/ca/ca.html>.

Receiving Water Limitation Language

The receiving water limitation language in this General Permit is identical to the receiving water limitation language contained in Order 99-08. Construction related activities associated with small LUPs that cause or contribute to an exceedance of water quality standards must be corrected immediately. The dynamic nature of linear construction activity allows the discharger or its authorized representative the ability to more quickly identify and correct the source of the exceedances. Therefore, the discharger or its authorized representative is required to take immediate corrective action and the discharger is to provide a report to the appropriate RWQCB within 14 calendar days of the violation describing the corrective action.

Storm Water Pollution Prevention Plan (SWPPP)

This General Permit requires development and implementation of an SWPPP for all tiers of project complexity. This General Permit establishes different SWPPP requirements depending on the complexity of the small LUP. In all cases, there is an emphasis on the use of appropriately selected, correctly installed, and maintained pollution reduction BMPs. This approach provides the flexibility necessary to establish BMPs that can effectively address source control of pollutants during small LUP construction activities.

A discharger or its authorized representative shall prepare an SWPPP prior to the start of construction and immediately implement the SWPPP at the start of construction for small LUPs. The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. Non-storm water BMPs must be implemented at all times during the project. The SWPPP shall be available at the construction site during working hours while construction is occurring and shall be made available upon request. When the original

SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants associated with a construction project and activities that affect the quality of storm water discharges and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in storm water as well as non-storm water discharges. The SWPPP shall include BMPs that address source control and, if necessary, shall also include BMPs that address pollutant control and treatment when necessary.

Section A establishes the required elements of an SWPPP and varies depending on the complexity of the small LUP.

Tier I Small LUPs SWPPP Requirements

Attachment 5 of this General Permit provides the Tier I SWPPP template that must be used to fulfill the SWPPP requirements. If needed, a discharger may attach supplemental information to the Tier I SWPPP form. It is a simple SWPPP that provides basic project information, such as project location, contact, size, construction start date and estimated completion date, and type of project being constructed, and provides a check list of the activities to be conducted and BMPs to be implemented. The SWPPP will include a construction drawing or other appropriate drawing/map showing the locations of storm drain inlets and waterbodies that may receive discharges from the construction activities and will show locations of BMPs to be installed for all those that can be illustrated on the drawing/map. If storm drain inlets, waterbodies, and/or BMPs cannot be adequately shown on the drawing/map they will be described in detail within the SWPPP. Each SWPPP shall initially be signed and certified by the discharger or its duly authorized representative and will include the date of initial preparation. Each amendment to a SWPPP shall be signed and dated by the discharger or its authorized representative that has been trained in accordance with Section A.10 of this General Permit.

The discharger or its authorized representative for the SWPPP must complete Table 1 of the Tier I SWPPP form. Table 2 of the SWPPP form must be used as a reference for completing Table 1. Table 1 is to be used; (1) to identify the construction practices to be conducted at the site, and (2) to identify one or more BMPs to be implemented to address the practices. These must include BMPs addressing non-storm water discharges. Table 2 lists the same activities and BMPs provided in Table 1. The construction practices listed are those that are typically conducted during Tier I small LUPs. Table 2 identifies the BMPs (e.g., storm drain inlet protection, saw-cutting, street sweeping, etc.) that may be implemented for these practices. The discharger or its authorized representative must select from the BMPs provided in Table 2 that are associated with a particular construction activity. Attachment 6 of this General Permit provides fact sheets for the BMPs listed in Tables 1 and 2.

When an activity or BMP is not listed the discharger or its authorized representative must add the activity or BMP to Table 1. Alternative BMPs that provide equivalent protection as those identified in Table 2 may also be listed. When new or alternate BMPs are added to Table 1, the

discharger or its authorized representative must include additional information about the BMPs in the SWPPP, including but not limited to BMP reference(s), BMP description(s), and drawings or other attachments to describe the BMPs in the SWPPP.

Additional references for applicable construction site BMPs can be found at the SWRCB website at <http://www.waterboards.ca.gov/stormwtr>.

For small LUPs that result in soil disturbance outside of paved areas, the SWPPP will identify types and locations of BMPs for temporary and permanent soil stabilization.

Tier II Small LUP SWPPP Requirements

Section A of this General Permit establishes the minimum SWPPP requirements for Tier II small LUPs. These SWPPPs are developed based on project and site specific characteristics because these types of projects have a higher degree of complexity and exposed disturbed soil than Tier I projects. Tier II SWPPPs may be developed on standard project construction plans or equivalent plans that provide the following minimum elements:

- Project location and area of project.
- Location of right-of-way, easement, and agreements.
- Location of storm inlets, conveyances, and water bodies.
- Location of applicable project activities including areas for staging, stockpiling, laydown, equipment and material storage, fueling, and other areas related to the construction activities.
- A description of all BMPs to be implemented in the construction notes or attachments and the location of certain BMPs as appropriate. Standard drawings and specifications will be included on the plans (or attached) as needed. BMPs will include those to be implemented during active construction and after construction activities are complete, including BMPs for temporary and permanent soil stabilization.
- Construction notes as needed for implementing and maintaining the SWPPP and BMPs during the life of the project.
- Certification statement and signature in accordance with signatory requirements established in this General Permit.
- Where construction activities listed in Table 2 apply to Tier II small LUPs, select BMPs in Table 2, or identify alternative BMPs that provide equivalent protection as those identified in Table 2. When new or alternate BMPs are added to Table 1, the discharger or its authorized representative must include additional information about the BMPs in the SWPPP, including but not limited to BMP reference(s), BMP description(s), and drawings or other attachments to describe the BMPs in the SWPPP.

SWPPP Requirements Applicable to all Tiers

To ensure that the preparation, implementation, and oversight of the SWPPP is sufficient for effective pollution prevention, individuals responsible for creating, revising, overseeing, and implementing the SWPPP should participate in applicable training programs and document such training in the discharger's records.

SWPPPs are to be available to the public and will be made available by the RWQCB upon request.

Monitoring Program

Section B of this General Permit establishes minimum monitoring and reporting requirements for all small LUPs. It establishes different monitoring requirements depending on project complexity. The monitoring requirements for Tier I small LUPs are less than Tier II projects because of the lower potential these types of projects have to impact water quality.

A discharger or its authorized representative shall prepare a monitoring program prior to the start of construction and immediately implement the program at the start of construction for small LUPs. The monitoring program must be implemented at the appropriate level to protect water quality at all times throughout the life of the project.

Tier I Small LUPs Monitoring Requirements

A discharger or its authorized representative must conduct daily visual inspections of Tier I small LUPs during working hours while construction activities are occurring. Inspections are to be conducted by qualified personnel and can be conducted in conjunction with other daily activities. Inspections will be conducted to ensure the BMPs are adequate, maintained, and in place at the end of the construction day. The discharger or its authorized representative will revise the SWPPP, as appropriate, based on the results of the daily inspections. Inspections can be discontinued in non-active construction areas where soil disturbing activities have been completed and final stabilization has been achieved (e.g., trench has been paved, substructures have been installed, and successful final vegetative cover or other stabilization criteria have been met).

A discharger or its authorized representative shall implement the monitoring program for inspecting Tier I small LUPs provided in the Tier I small LUP SWPPP (Attachment 5). This program requires temporary and permanent stabilization BMPs after active construction is completed. Inspection activities will continue until adequate permanent stabilization has been established and will continue in areas where revegetation is chosen until minimum vegetative coverage has been established.

Tier II Small LUPs Monitoring Requirements

A discharger or its authorized representative must conduct daily visual inspections of Tier II small LUPs during working hours while construction activities are occurring. Inspections are to be conducted by qualified personnel and can be in conjunction with other daily activities.

All dischargers or their authorized representatives of Tier II small LUPs are required to conduct inspections by qualified personnel of the construction site during normal working hours prior to all anticipated storm events and after actual storm events. During extended storm events, the discharger or its authorized representative shall conduct inspections during normal working hours for each 24-hour period. Inspections can be discontinued in non-active construction areas

where soil disturbing activities have been completed and final stabilization has been achieved (e.g., trench has been paved, substructures installed, and successful vegetative cover or other stabilization criteria have been met).

The goals of these inspections are (1) to identify areas contributing to a storm water discharge; (2) to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly installed and functioning in accordance with the terms of the General Permit; and (3) to determine whether additional control practices or corrective maintenance activities are needed. Equipment, materials, and workers must be available for rapid response to failures and emergencies. All corrective maintenance to BMPs shall be performed as soon as possible, depending upon worker safety.

All dischargers or their authorized representatives shall develop and implement a monitoring program for inspecting Tier II small LUPs that require temporary and permanent stabilization BMPs after active construction is completed. Inspections will be conducted to ensure the BMPs are adequate and maintained. Inspection activities will continue until adequate permanent stabilization has been established and will continue in areas where revegetation is chosen until minimum vegetative coverage has been established.

A log of the pre-, during, and post-rain inspections conducted will be maintained in the SWPPP. The log will provide the date and time of the inspection and who conducted the inspection.

Sampling Requirements for all Tiers

This permit contains sampling and analysis requirements for visible pollutants (i.e., sedimentation/siltation, turbidity) and for non-visible pollutants.

- Sampling for visible pollutants is required only when a small LUP has a direct discharge to a water body segment that is listed on the SWRCB's CWA Section 303(d) list as impaired for sedimentation/ siltation, or turbidity. The current CWA Section 303(d) list is provided in Attachment 7.
- Non-visible pollutant monitoring is required for pollutants associated with construction sites and activities that (1) are not visually detectable in storm water discharges, and (2) are known or should be known to occur on the construction site, and (3) could cause or contribute to an exceedance of water quality objectives in the receiving waters. Sample collection for non-visible pollutants shall only be required; (1) during a storm event when pollutants associated with construction activities may be discharged with storm water runoff due to a spill, or in the event there was a breach, malfunction, failure, and/or leak of any BMP, and (2) the discharger or its authorized representative has failed to adequately clean the area of material and pollutants. Also a failure to implement appropriate BMPs will trigger sampling requirements the same as those required for a breach, malfunction and/or leak, when the discharger or its authorized representative has failed to implement appropriate BMPs prior to the next storm event.

It is not anticipated that many small LUPs subject to this General Permit will be required to collect samples for pollutants not visually detected in runoff due to the nature and character of

the construction site and activities as previously described in this fact sheet. Most small LUPs are constructed in urban areas with public access (e.g., existing roadways, road shoulders, parking areas, etc.). This raises a concern regarding the potential contribution of pollutants from vehicle use and/or from normal activities of the public (e.g., vehicle washing, landscape fertilization, pest spraying, etc.) in runoff from the project site. Since the dischargers are not the land owners of the project area and are not able to control the presence of these pollutants in the storm water that runs through their projects, it is not the intent of this General Permit to require dischargers to sample for these pollutants. This General Permit does not require the discharger or its authorized representative to sample for these types of pollutants except where the discharger or its authorized representative has brought materials onsite that contain these pollutants and when a condition (e.g., breach, failure, etc.) described above occurs.

On August 19, 1999, the SWRCB reissued Order 99-08. The San Francisco BayKeeper, Santa Monica BayKeeper, San Diego BayKeeper, and Orange Coast Keeper filed a petition for writ of mandate challenging Order 99-08 in the Superior Court, County of Sacramento. The Court issued a judgment and writ of mandate on September 15, 2000. The Court directed the SWRCB to modify the provisions of the Order 99-08 to require specific sampling and analytical procedures to determine whether BMPs implemented on a construction site are: (1) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired for sediment or silt, and (2) preventing other pollutants that are known or should be known by permittees to occur on construction sites and are not visually detectable in storm water discharges from causing or contributing to exceedances of water quality objectives. The monitoring requirements established in Order 99-08 pursuant to the Court's decision have been incorporated into this General Permit.

RWQCB Authorities

RWQCBs will be responsible for implementing and enforcing this General Permit. Under its authority, the RWQCB may require the discharger or its authorized representative to revise an SWPPP, implement additional monitoring, implement additional BMPs, or implement other actions as needed to ensure full compliance with this General Permit. RWQCBs may take enforcement against a discharger and/or its authorized representative for violating or threatening to violate requirements and conditions of this General Permit. The RWQCB may direct a discharger to seek coverage under Order 99-08 or a separate NPDES permit for small LUPs meeting the land disturbance threshold for coverage under this General Permit.

Retention of Records

The discharger is required to retain records of all monitoring information, copies of all reports required by this General Permit, and records of all data used to complete the NOI and LCANs for all small LUPs covered by this General Permit for a period of at least three years from the date generated. This period may be extended by request of the SWRCB and/or the appropriate RWQCB. With the exception of reporting noncompliance to the appropriate RWQCB office, dischargers are not required to submit the records, except upon specific request by the appropriate RWQCB.

Relationship with U.S. Corps Army of Engineer's CWA Section 404 Permits

Small LUPs that involve the discharge of dredge and fill material to a water of the United States (e.g., wetland, stream or other channel, pond, or marine water) will need a U.S. Army Corps of Engineer's Permit and State water quality certification pursuant respectively to CWA Sections 404 and 401. The 404 permit and 401 certification specifically authorize dredge and fill discharge. In addition, the CWA Section 401 certification must also generally ensure compliance with all applicable water quality standards. This General Permit authorizes the potential discharge of storm water from small LUPs pursuant to CWA Section 402(p). Small LUPs regulated by this General Permit that also have dredge and fill activities must comply with CWA Sections 404 permit and 401 certification requirements and the requirements of this General Permit.

California Invasive Plant Council

Protecting California's wildlands from invasive plants through research, restoration, and education.

www.cal-ipc.org

Invasive plants are one of the most serious environmental issues facing California. They disrupt ecosystems by altering physical processes, displacing native plants, and degrading wildlife habitat. The California Invasive Plant Inventory is a vital resource for those working to protect the state's natural areas. The Inventory summarizes the impacts, potential for spread, and distribution of more than 200 non-native plants that invade wildlands in California. The Inventory represents the best available knowledge of the state's invasive plant experts. It is designed to prioritize plants for control at the state and local levels, to provide key information to those working in habitat restoration, to show areas where research is needed, to aid those preparing or commenting on environmental planning documents, and to educate public policy makers. Detailed assessments for each plant, with documented sources, are available online at www.cal-ipc.org.



Cal-IPC



Pampasgrass (*Cortaderia selloana*) displaces native plant communities in coastal habitats. (Photo by Bob Case, California Native Plant Society).

Front cover photo credits:

Centaurea solstitialis (yellow starthistle) left, and *Eichornia crassipes* (water hyacinth) bottom right, by Bob Case.

Cynara cardunculus (artichoke thistle) center right, by Jason and Jesse Giessow, Dendra, Inc.

Delairea odorata (Cape-ivy) top right, by Carolyn Martus, California Native Plant Society.

CALIFORNIA INVASIVE PLANT INVENTORY

California Invasive Plant Council

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The California Invasive Plant Council (Cal-IPC) formed as a non-profit organization in 1992 to address the growing ecological and economic impacts caused by invasive plants in California's wildlands. We promote research, restoration, and education in pursuit of this goal. Formerly known as the California Exotic Pest Plant Council, Cal-IPC is a member-driven organization with land managers, researchers, policy makers, and concerned citizens working together to protect the state's natural areas from invasive plants. For more information, visit our website at www.cal-ipc.org.

PROVIDING INPUT FOR FUTURE REVISIONS

If you have additional information to add to a plant assessment, please submit it to info@cal-ipc.org. The Inventory Review Committee will meet periodically to consider additions and modifications to the Inventory.

ACKNOWLEDGMENTS

We gratefully acknowledge the effort of all those who volunteered their time to write plant assessment forms, provide comments on assessments, or add observations to fill gaps in information. Too many people contributed information for us to list them individually, but each assessment contains the name of its author and those who provided information on that species. In particular, we thank those who helped develop the criteria, including John Hall of The Nature Conservancy in Arizona, Ann Howald of Garcia and Associates, and Maria Ryan of University of Nevada Cooperative Extension. We also wish to thank Kristin Dzurella of UC Davis and John Knapp of the Catalina Island Conservancy for their contributions of time and data.

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Designed by Melanie Haage

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Introduction

Invasive plants damage ecosystems around the world. They displace native species, change plant community structure, and reduce the value of habitat for wildlife.¹ Invasive plants may disrupt physical ecosystem processes, such as fire regimes, sedimentation and erosion, light availability, and nutrient cycling. In aquatic ecosystems, invasive plants clog lakes, streams, and waterways, reducing oxygen levels for fish and degrading habitat for waterbirds. The impact is especially severe in California, with its rich diversity of natural resources.

The California Invasive Plant Inventory categorizes non-native invasive plants that threaten the state's wildlands. Categorization is based on an assessment of the ecological impacts of each plant. The Inventory represents the best available knowledge of invasive plant experts in the state. However, it has no regulatory authority, and should be used with full understanding of the limitations described later in this Introduction.

California is home to 4,200 native plant species, and is recognized internationally as a "biodiversity hotspot." Approximately 1,800 non-native plants also grow in the wild in the state. A small number of these, approximately 200, are the ones that this Inventory considers invasive. Improved understanding of their impacts will help those working to protect California's treasured biodiversity.

The Inventory

The Inventory categorizes plants as High, Moderate, or Limited, reflecting the level of each species' negative ecological impact in California. Other factors, such as economic impact or difficulty of management, are not included in this assessment.

It is important to note that every species listed in Table 1 is invasive, regardless of its overall rating, and should be of concern to land managers. Although the impact of each plant varies regionally, its rating represents cumulative impacts statewide. Therefore, a plant whose statewide impacts are categorized as Limited may have more severe impacts in a particu-



In the past 15 years, approximately \$15 million has been spent statewide to control Arundo donax (giant reed) in California. (Photo by David Chang, Santa Barbara County Agricultural Commissioner's office)

lar region. Conversely, a plant categorized as having a High cumulative impact across California may have very little impact in some regions.

Members of the Inventory Review Committee, Cal-IPC staff, and volunteers drafted assessments for each plant based on the formal criteria system described below. The committee solicited information from land managers across the state to complement the available literature. Assessments were released for public review before the committee finalized them. All plant assessments that form the basis for this summary document are available at www.cal-ipc.org. The final list includes 39 High species, 65 Moderate species, and 89 Limited species. Additional information, including updated observations, will be added to the Cal-IPC website periodically, with revisions tracked and dated.

Definitions

The Inventory categorizes "invasive non-native plants that threaten wildlands" according to the definitions below. Plants were evaluated only if they invade

Figure 1. The Criteria System

Section 1. Ecological Impact

- 1.1 Impact on abiotic ecosystem processes (e.g. hydrology, fire, nutrient cycling)
- 1.2 Impact on native plant community composition, structure, and interactions
- 1.3 Impact on higher trophic levels, including vertebrates and invertebrates
- 1.4 Impact on genetic integrity of native species (i.e. potential for hybridization)

Section 2. Invasive Potential

- 2.1 Ability to establish without anthropogenic or natural disturbance
- 2.2 Local rate of spread with no management
- 2.3 Recent trend in total area infested within state
- 2.4 Innate reproductive potential (based on multiple characteristics)
- 2.5 Potential for human-caused dispersal
- 2.6 Potential for natural long-distance (>1 km) dispersal
- 2.7 Other regions invaded worldwide that are similar to California

Section 3. Distribution

- 3.1 Ecological amplitude (ecological types invaded in California)
- 3.2 Ecological intensity (highest extent of infestation in any one ecological type)

Documentation Levels

Assessed as highest level of documentation for each criterion.

- 4 = Reviewed scientific publications
- 3 = Other published material (reports or other non-peer-reviewed documents)
- 2 = Observational (unpublished information confirmed by a professional in the field)
- 1 = Anecdotal (unconfirmed information)
- 0 = No information

Complete description of criteria system and detailed plant assessments available at www.cal-ipc.org.



*Dense mats formed by aquatic plants such as water hyacinth (*Eichhornia crassipes*) reduce habitat for waterfowl and fish. (Photo by Bob Case, California Native Plant Society)*

California wildlands with native habitat values. The Inventory does not include plants found solely in areas of human-caused disturbance such as roadsides and cultivated agricultural fields.

- **Wildlands** are public and private lands that support native ecosystems, including some working landscapes such as grazed rangeland and active timberland.
- **Non-native** plants are species introduced to California after European contact and as a direct or indirect result of human activity.
- **Invasive non-native plants that threaten wildlands** are plants that 1) are not native to, yet can spread into, wildland ecosystems, and that also 2) displace native species, hybridize with native species, alter biological communities, or alter ecosystem processes.

Criteria for Listing

The California Invasive Plant Inventory updates the 1999 “Exotic Pest Plants of Greatest Ecological Concern in California.”² Cal-IPC’s Inventory Review Committee met regularly between 2002 and 2005 to review 238 non-native species with known or suspected impacts in California wildlands. These assessments are based on the “Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands”³ which were developed in collaboration with the Southwestern Vegetation Management Association in Arizona (www.swvma.org) and the University of Nevada Cooperative Extension (www.unce.unr.edu).

edu) so that ratings could be applied across political boundaries and adjusted for regional variation. The goals of the criteria system and the Inventory are to:

- Provide a uniform methodology for categorizing non-native invasive plants that threaten wildlands;
- Provide a clear explanation of the process used to evaluate and categorize plants;
- Provide flexibility so the criteria can be adapted to the particular needs of different regions and states;
- Encourage contributions of data and documentation on evaluated species;
- Educate policy makers, land managers, and the public about the biology, ecological impacts, and distribution of invasive non-native plants.

The criteria system generates a plant's overall rating based on an evaluation of 13 criteria, which are divided into three sections assessing Ecological Impacts, Invasive Potential, and Ecological Distribution (Fig. 1). Evaluators assign a score of A (severe) to D (no impact) for each criterion, with U indicating unknown. The scoring scheme is arranged in a tiered format, with individual criteria contributing to section scores that in turn generate an overall rating for the plant.

Detailed plant assessment forms list the rationale and applicable references used to arrive at each criterion's score. The level of documentation for each question is also rated, and translated into a numerical score for averaging (Fig. 1). The documentation score presented in the tables is a numeric average of the documentation levels for all 13 criteria.

Inventory Categories

Each plant in Table 1 has received an overall rating of High, Moderate or Limited based on evaluation using the criteria system. The meaning of these overall ratings is described below. In addition to the overall ratings, specific combinations of section scores that indicate significant potential for invading new ecosystems triggers an Alert designation so that land managers may watch for range expansions. Table 3 lists plants categorized as Evaluated But Not Listed because either we lack sufficient information to assign a rating or the available information indicates that the species does not have significant impacts at the present time.

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Reading the Tables

The core of the Inventory is Table 1, which lists those plants we have categorized as invasive plants that threaten California wildlands.. The types of information contained in Table 1 is described below.



When *Bromus tectorum* (downy brome or cheatgrass) replaces native perennial grasses, the frequency of wildfires shortens from 60-100 years to 3-5 years. (Photo by Joe DiTomaso, UC Davis)

Figure 2. Jepson Geographic Regions

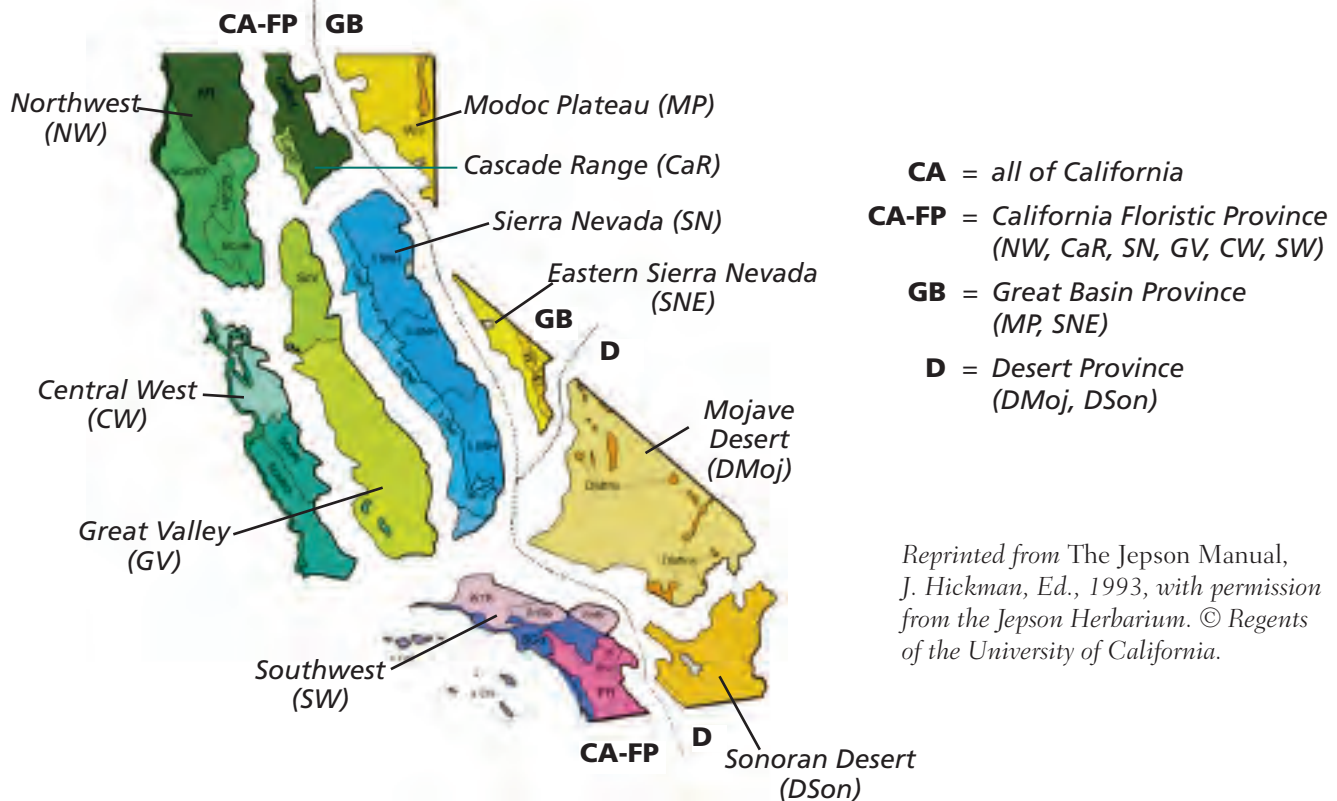


Table 2 contains four plants that are native to specific regions of California but have become invasive in other regions of the state to which humans have moved them. Table 3 lists those plant species that were evaluated but did not meet the threshold for listing. Finally, Table 4 contains plants that were nominated for review but dismissed without a formal assessment because either they do not invade wildlands (except for isolated instances) or the Inventory Review Committee lacked adequate information to answer the criteria questions.

Table 1 summarizes rating information for all plant species categorized as invasive by this Inventory. The columns contain the following information:

- A diamond (◆) in the first column designates an Alert status for that species.
- Scientific nomenclature for most species follows *The Jepson Manual*.⁴
- For each species, the first common name is based on the Weed Science Society of America,⁵ followed by other names commonly used in California. (Appendix 4 provides an index of common names.)
- The overall rating for the plant (High, Moderate,

or Limited) is listed next. (Because Table 1 is organized alphabetically, we have included a listing organized by rating level in Appendix 1.)

- Section scores are shown for Ecological Impact, Invasive Potential, and Distribution. These can typically be interpreted as A=high, B=moderate, C=limited, D=none, U=unknown.
- Documentation Level presents the average level of the references used to evaluate that species, from 0 (no information) to 4 (all information based on peer-reviewed scientific publications).
- Ecological Types Invaded and Other Comments provides additional information of interest. The classification of ecological types is adapted from a system developed by the California Department of Fish and Game.⁶ (Appendix 3 provides detailed examples of ecological types.)
- Regions Invaded are based on floristic regions described in *The Jepson Manual*⁴ (Fig. 2) and indicate heavily impacted areas. This information is incomplete for many species, so regions listed in this column should be considered the minimum area invaded.



Cirsium vulgare (bull thistle) is spreading at high elevations, such as in Yosemite National Park. (Photo by Bob Case, California Native Plant Society)

Uses and Limitations

The California Invasive Plant Inventory serves as a scientific and educational report. It is designed to prioritize plants for control, to provide information to those working on habitat restoration, to show areas where research is needed, to aid those who prepare or comment on environmental planning documents, and to educate public policy makers. Plants that lack published information may be good starting points for student research projects.

The Inventory cannot address, and is not intended to address, the range of geographic variation in California, nor the inherently regional nature of invasive species impacts. While we have noted where each plant is invasive, only the cumulative statewide impacts of the species have been considered in the evaluation. The impact of these plants in specific geographic regions or habitats within California may be greater or lesser than their statewide rating indicates. Management actions for a species should be considered on a local and site-specific basis, as the

inventory does not attempt to suggest management needs for specific sites or regions. The criteria system was designed to be adapted at multiple scales, and local groups are encouraged to use the criteria for rating plants in their particular area.

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Lepidium latifolium (perennial pepperweed or tall whitetop) concentrates salt in marsh soils, threatening several rare plant species. (Photo by Bob Case)

TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California

Alert	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
	<i>Acacia melanoxylon</i>	black acacia, blackwood acacia	Limited	C	C	B	2.7	Coniferous forest, chaparral, woodland, riparian. Impacts low in most areas.	NW, CW, SW
	<i>Acroptilon repens</i>	Russian knapweed	Moderate	B	B	B	3.2	Scrub, grasslands, riparian, pinyon-juniper woodland, forest. Severe impacts in other western states. Spreading in many areas of CA.	CA-FP, GB
	<i>Aegilops triuncialis</i>	barb goatgrass	High	A	A	B	3.6	Grassland, oak woodland. Spreading in NW and Central Valley.	CaR, CW, SN, GV
	<i>Ageratina adenophora</i>	croftonweed, eupatorium	Moderate	B	B	B	2.8	Coastal canyons, scrub, slopes. Very invasive in Australia, limited information and distribution in CA.	CW, SW
	<i>Agrostis avenacea</i>	Pacific bentgrass	Limited	C	C	C	2.4	Vernal pools, coastal prairie, meadows, grasslands. Impacts are low in most areas.	NW, SN, GV, CW, SW
	<i>Agrostis stolonifera</i>	creeping bentgrass	Limited	C	B	C	1.9	Wetlands, riparian; grown for domestic forage. Limited distribution and impacts unknown.	NW, SN, GV, CW, SW
	<i>Ailanthus altissima</i>	tree-of-heaven	Moderate	B	B	B	3.0	Riparian areas, grasslands, oak woodland. Impacts highest in riparian areas.	CA-FP
	<i>Alhagi maurorum</i> (= <i>A. pseudalhagi</i>)	camelthorn	Moderate	B	B	B	3.2	Grassland, meadows, riparian and desert scrub, Sonoran thorn woodland. Very invasive in southwestern states. Limited distribution in CA.	GV, D, SNE
◆	<i>Alternanthera philoxeroides</i>	alligatorweed	High	A	B	C	2.9	Freshwater aquatic systems, including marshes	GV, SW
	<i>Ammophila arenaria</i>	European beachgrass	High	A	B	B	3.2	Coastal dunes	NW, CW, SW
	<i>Anihoxanthum odoratum</i>	sweet vernalgrass	Moderate	B	B	B	2.7	Coastal prairie, coniferous forest. Little information available on impacts and limited ecological range.	NW, SN, CW
◆	<i>Arctotheca calendula</i> (fertile strains)	fertile capeweed	Moderate	B	B	C	3.6	Coastal prairie. Can produce seed. Important agricultural weed in Australia, but limited distribution in CA.	NW, CW
	<i>Arctotheca calendula</i> (sterile strains)	sterile capeweed	Moderate	B	B	B	2.8	Coastal prairie. Only propagates vegetatively. More competitive than fertile form, but limited distribution.	NW, CW
	<i>Arundo donax</i>	giant reed	High	A	B	A	2.8	Riparian areas. Commercially grown for musical instrument reeds, structural material, etc.	CW, SN, GV, SW

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds" (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Alert	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
◆	<i>Asparagus asparagoides</i>	bridal creeper	Moderate	B	B	D	2.6	Riparian woodland	CW, SW
◆	<i>Asphodelus fistulosus</i>	onionweed	Moderate	B	A	C	2.9	Coastal dunes, prairie, grasslands. Invasive in Australia. High invasiveness but limited distribution in CA.	GV, SW
	<i>Atriplex semibaccata</i>	Australian saltbush	Moderate	B	B	B	2.9	Coastal grasslands, scrub, upper salt marsh. Limited distribution, but can be very invasive regionally.	CA except CaR and SN
	<i>Avena barbata</i>	slender wild oat	Moderate	B	B	A	3.5	Coastal scrub, grasslands, oak woodland, forest. Very widespread, but impacts more severe in desert regions.	CA-FP, MP, DMoj
	<i>Avena fatua</i>	wild oat	Moderate	B	B	A	3.2	Coastal scrub, chaparral, grasslands, woodland, forest. Very widespread, but impacts more severe in desert regions.	CA-FP, MP, DMoj
	<i>Bassia hyssopifolia</i>	fivehook bassia	Limited	C	C	B	2.7	Alkaline habitats. Weed of agriculture or disturbed sites. Impacts minor in wildlands.	CA except NW
	<i>Bellardia trixago</i>	bellardia	Limited	C	C	C	1.9	Grasslands, including serpentine. Impacts and invasiveness appear to be minor.	NW, CW
◆	<i>Brachypodium sylvaticum</i>	perennial false-brome	Moderate	B	A	D	2.5	Redwoods and mixed evergreen forest in Santa Cruz Mtns. Expanding range rapidly in OR, potentially very invasive.	CW
	<i>Brassica nigra</i>	black mustard	Moderate	B	B	A	2.0	Widespread. Primarily a weed of disturbed sites, but can be locally a more significant problem in wildlands.	CA-FP
	<i>Brassica rapa</i>	birdrape mustard, field mustard	Limited	C	B	B	1.8	Coastal scrub, grasslands meadows, riparian. Primarily in disturbed areas. Impacts appear to be minor or unknown in wildlands.	CA-FP
	<i>Brassica tournefortii</i>	Saharan mustard, African mustard	High	A	A	B	2.3	Desert dunes, desert and coastal scrub	SW, D
	<i>Briza maxima</i>	big quakinggrass, rattlesnakegrass	Limited	B	C	B	2.3	Grasslands. Widespread in coast range. Impacts generally minor, but locally can be higher.	NW, SN, CW, SW
	<i>Bromus diandrus</i>	ripgut brome	Moderate	B	B	A	3.3	Dunes, scrub, grassland, woodland, forest. Very wide-spread, but monotypic stands uncommon.	CA

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds" (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Alert	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
	<i>Bromus hordeaceus</i>	soft brome	Limited	B	C	A	2.8	Grasslands, sagebrush, serpentine soils, many other habitats. Very widespread, but primarily in converted annual grasslands.	CA
	<i>Bromus madriensis</i> ssp. <i>rubens</i> (= <i>B. rubens</i>)	red brome	High	A	B	A	3.0	Scrub, grassland, desert washes, woodlands. Impacts most significant in desert areas.	CA
	<i>Bromus tectorum</i>	downy brome, cheatgrass	High	A	B	A	3.1	Interior scrub, woodlands, grasslands. Most widely distributed invasive plant in the US.	SN, GB, D
	<i>Cakile maritima</i>	European sea-rocket	Limited	C	B	B	3.6	Coastal dunes. Widespread, but impacts appear to be minor.	NW, CW, SW
◆	<i>Cardaria chalapensis</i> (= <i>C. draba</i> ssp. <i>chalepensis</i>)	lens-podded whitetop	Moderate	B	B	C	3.2	Central Valley wetlands. Limited distribution in CA. May not be as invasive as <i>C. draba</i> .	CA-FP, GB
	<i>Cardaria draba</i>	hoary cress	Moderate	B	B	B	2.6	Riparian areas, marshes of central coast. More severe invasive in northern CA.	CW, SW
	<i>Cardaria pubescens</i>	hairy whitetop	Limited	C	B	C	2.5	Grasslands and meadows. Impacts unknown but may be significant in meadows of Cascade Range.	GV, SW
	<i>Carduus acanthoides</i>	plumeless thistle	Limited	B	C	C	3.0	Valley and foothill grasslands. Limited distribution in CA, impacts higher locally.	NW, SN, CW
	<i>Carduus nutans</i>	musk thistle	Moderate	B	B	B	3.1	Grasslands. More invasive in other western states. Limited distribution in CA.	NW, CaR, SN
	<i>Carduus pycnocephalus</i>	Italian thistle	Moderate	B	B	A	2.9	Forest, scrub, grasslands, woodland. Very widespread. Impacts may be variable regionally.	NW, SN, CW, SW
	<i>Carduus tenuiflorus</i>	slenderflower thistle	Limited	C	C	B	2.8	Valley and foothill grasslands. Limited distribution. Impacts appear to be minor.	NW, SN, CW, SW
	<i>Carpobrotus chilensis</i> (and <i>C. edulis</i> x <i>chilensis</i> hybrids)	sea-fig, iceplant	Moderate	B	B	A	1.8	Coastal dunes, scrub, prairie. Little information on species, most inferred from <i>C. edulis</i> .	NW, CW, SW
	<i>Carpobrotus edulis</i>	Hottentot-fig, iceplant	High	A	B	A	3.3	Coastal habitats, especially dunes	NW, CW, SW
◆	<i>Carthamus lanatus</i>	woolly distaff thistle	Moderate	A	B	C	2.8	Grasslands. Expanding in coast ranges, may become more severe. Current distribution limited.	NW, SN, CW

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds" (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Alert ◆	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
	<i>Centaurea calcitrapa</i>	purple starthistle	Moderate	B	B	B	2.7	Grasslands. Impacts regionally variable. Relatively limited distribution.	NW, SN, GV, CW, SW
◆	<i>Centaurea debeauxii</i> (= <i>C. jacea</i> x <i>C. nigra</i> , <i>C. x pratensis</i>)	meadow knapweed	Moderate	B	B	C	2.7	Grasslands. Spreading rapidly in NW CA, but limited distribution elsewhere. Little known of impacts.	NW, CW
	<i>Centaurea diffusa</i>	diffuse knapweed	Moderate	B	B	B	3.3	Great Basin scrub, coastal prairie. Severe impacts in other western states. Limited distribution in CA with impacts higher in some locations.	Ca-R, CW, NW, SN
	<i>Centaurea maculosa</i> (= <i>C. biebersteinii</i>)	spotted knapweed	High	A	B	B	3.4	Riparian, grasslands, wet meadows, forests. More widely distributed in other western states.	CA-FP, GB
	<i>Centaurea melitensis</i>	Malta starthistle, tocalote	Moderate	B	B	B	2.6	Grasslands, oak woodland. Sometimes misidentified as <i>C. solstitialis</i> . Impacts vary regionally.	CW, SW, D
	<i>Centaurea solstitialis</i>	yellow starthistle	High	A	B	A	3.0	Grasslands, woodlands, occasionally riparian	CA-FP
	<i>Centaurea virgata</i> var. <i>squarrosa</i> (= <i>C. squarrosa</i>)	squarrose knapweed	Moderate	B	B	B	2.8	Scrub, grassland, pinyon-juniper woodland. Highly invasive in Utah and other western states. Limited distribution in CA.	NW, CaR, MP
	<i>Chondrilla juncea</i>	rush skeletonweed	Moderate	B	B	B	3.1	Grasslands. Very invasive in other western states, but currently limited distribution in CA.	NW, CaR, SN, GV, CW,
	<i>Chrysanthemum coronarium</i>	crown daisy	Moderate	B	B	B	2.0	Coastal prairie, dunes, and scrub. Impacts generally low to moderate, but can vary regionally.	CW, SW
	<i>Cirsium arvense</i>	Canada thistle	Moderate	B	B	B	2.8	Grasslands, riparian areas, forests. Severe impacts in other western states. Limited distribution in CA.	CA-FP, DMoj
	<i>Cirsium vulgare</i>	bull thistle	Moderate	B	B	B	3.3	Riparian areas, marshes, meadows. Widespread, can be very problematic regionally.	CA-FP, GB
	<i>Conicosia pugioniformis</i>	narrow/leaf iceplant	Limited	C	B	C	2.1	Coastal dunes, scrub, grassland. Limited distribution. Impacts generally minor but can be higher locally.	CW
	<i>Conium maculatum</i>	poison-hemlock	Moderate	B	B	B	2.8	Riparian woodland, grassland. Widespread in disturbed areas. Abiotic impacts unknown. Impacts can vary locally.	CA-FP

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds" (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
<i>Cordylone australis</i>	giant dracaena, New Zealand-cabbage tree	Limited	C	C	C	2.0	Coniferous forest. Two reports of horticultural escape into wildlands. Appears best suited to moist, cool climates.	NW, CW
<i>Cortaderia jubata</i>	jubatagrass	High	A	A	A	3.1	Many coastal and interior habitats	NW, CW, SW
<i>Cortaderia seloana</i>	pampasgrass	High	A	A	B	3.2	Coastal dunes, coastal scrub, Monterey pine, riparian, grasslands, wetlands, serpentine soils. Still spreading both coastal and inland.	CW, SW
<i>Cotoneaster franchetii</i>	orange cotoneaster	Moderate	B	A	B	2.6	Coniferous forest. Limited distribution. Abiotic impacts largely unknown.	NW, CW
<i>Cotoneaster lacteus</i>	Parney's cotoneaster	Moderate	B	B	B	2.1	Many coastal habitats, mainly a problem from SF Bay Area north along coast. Limited distribution. Abiotic impacts largely unknown.	NW, CW
<i>Cotoneaster pannosus</i>	silverleaf cotoneaster	Moderate	B	A	B	2.5	Many coastal habitats, mainly a problem from SF Bay Area north along coast. Limited distribution. Abiotic impacts largely unknown.	NW, CW
<i>Cotula coronopifolia</i>	brassbuttons	Limited	C	C	B	2.2	Salt and freshwater marshes. Impacts largely unknown, but appear to be minor.	NW, CW, SW
<i>Crataegus monogyna</i>	English hawthorn	Limited	C	B	C	3.4	Riparian habitats, woodland. Limited distribution. Impacts appear to be minor.	NW, CW, SW
<i>Crocsmia x crocosmiflora</i>	montbretia	Limited	C	B	B	2.6	Coastal scrub and prairie, north coast forests. Abiotic impacts unknown. Higher invasiveness in some areas.	NW, CW
<i>Crupina vulgaris</i>	common crupina, bearded creeper	Limited	B	C	B	3.2	Forest, woodland, grassland. Limited distribution. More invasive in other western states.	NW, MP
<i>Cynara cardunculus</i>	artichoke thistle	Moderate	B	B	B	4.0	Coastal grasslands. Impacts more severe in southern CA where monotypic stands are more common.	CW, SW
<i>Cynodon dactylon</i>	bermudagrass	Moderate	B	B	B	3.3	Riparian scrub in southern CA. Common landscape weed, but can be very invasive in desert washes.	SW, DSon
<i>Cynoglossum officinale</i>	houndstongue	Moderate	B	B	B	2.5	Woodland, forest, interior dunes. Abiotic impacts unknown. Limited distribution. Can have impacts in other western states.	CaR, SN

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds" (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
<i>Cynosurus echinatus</i>	hedghog dogtailgrass	Moderate	B	B	A	2.5	Oak woodland, grassland. Widespread, impacts vary regionally, but typically not in monotypic stands.	NW, SN, GV, CW, SW
<i>Cytisus scoparius</i>	Scotch broom	High	A	B	A	3.2	Coastal scrub, oak woodland, horticultural varieties may also be invasive.	CA-FP
<i>Cytisus striatus</i>	Portuguese broom	Moderate	B	B	B	2.7	Coastal scrub, grasslands. Often confused with <i>C. scoparius</i> . Limited distribution.	NW, CW, SW
<i>Dactylis glomerata</i>	orchardgrass	Limited	C	B	B	2.9	Grasslands, broadleaved forest, woodlands. Common forage species. Impacts appear to be minor.	CA-FP
<i>Delairea odorata</i> (= <i>Senecio mikanioides</i>)	Cape-ivy, German-ivy	High	A	A	B	3.1	Coastal, occasionally other riparian areas.	CW, SW
<i>Descurainia sophia</i>	flixweed, tansy mustard	Limited	C	B	B	1.9	Scrub, grassland, woodland. Impacts appear to be minor, but locally more invasive in NE CA.	CA
<i>Digitalis purpurea</i>	foxglove	Limited	C	B	B	2.4	Forest, woodland. Widely escaped ornamental. Impacts largely unknown or appear to be minor.	NW, SN, CW
<i>Dipsacus fullonum</i>	common teasel	Moderate	B	B	B	3.8	Grasslands, seep, riparian scrub. Impacts regionally variable, forms dense stands on occasion.	NW, CW, SN
<i>Dipsacus sativus</i>	fuller's teasel	Moderate	B	B	B	3.8	Grasslands, seep, bogs. Impacts regionally variable, forms dense stands on occasion.	NW, CW, SW
◆ <i>Dittrichia graveolens</i>	stinkwort	Moderate	B	A	C	3.0	Grasslands, riparian scrub. Spreading rapidly, impacts may become more important in future.	NW, SN, CW, GV, SW
<i>Echium candicans</i>	pride-of-Madeira	Limited	C	B	B	1.5	Two escaped populations near Big Sur and San Elijo Lagoon. Little information on impacts.	CW, NW, SW
<i>Egeria densa</i>	Brazilian egeria	High	A	A	B	3.1	Streams, ponds, sloughs, lakes, Sacramento-San Joaquin Delta	SN, GV, SW
<i>Ehrharta calycina</i>	purple veldtgrass	High	A	A	B	3.4	Sandy soils, especially dunes. Rapidly spreading on central coast.	CW, SW
<i>Ehrharta erecta</i>	erect veldtgrass	Moderate	B	B	B	2.2	Scrub, grasslands, woodland, forest. Spreading rapidly. Impacts may become more important in future.	CW, SW

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TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Alert	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
◆	<i>Ehretia longiflora</i>	long-flowered veldtgrass	Moderate	B	B	C	2.8	Coastal scrub. Limited distribution, but spreading rapidly in southern CA. Impacts largely unknown.	SW
◆	<i>Eichhornia crassipes</i>	water hyacinth	High	A	A	C	3.2	Aquatic systems in Sacramento-San Joaquin Delta	GV, CW, SW
	<i>Elaeagnus angustifolia</i>	Russian-olive	Moderate	B	A	B	3.3	Interior riparian. Impacts more severe in other western states. Current distribution limited in CA.	GV, CW, DMoj
◆	<i>Emex spinosa</i>	spiny emex, devil's-thorn	Moderate	B	B	D	1.6	Edges of beaches, other coastal habitats. Invasive in other states and countries. Spreading rapidly in southern CA. Impacts not well known.	SW
	<i>Erechtites glomerata</i> , <i>E. minima</i>	Australian fireweed, Australian burnweed	Moderate	C	B	A	3.2	Coastal woodland, scrub, forests. Widespread on coast, but impacts low overall. May vary locally.	NW, CW
	<i>Erodium cicutarium</i>	redstem filaree	Limited	C	C	A	3.1	Many habitats. Widespread. Impacts minor in wildlands. High-density populations are transient.	CA
	<i>Eucalyptus camaldulensis</i>	red gum	Limited	C	C	C	2.2	Mainly southern CA urban areas. Impacts, invasiveness and distribution all minor.	NW, GV, CW, SW
	<i>Eucalyptus globulus</i>	Tasmanian blue gum	Moderate	B	B	B	2.8	Riparian areas, coastal grasslands, scrub. Impacts can be much higher in coastal areas.	NW, GV, CW, SW
◆	<i>Euphorbia esula</i>	leafy spurge	High	A	A	C	3.5	Forests, woodlands, juniper forest. More widespread invasive in northern states.	NW, CaR, MP
	<i>Euphorbia oblongata</i>	oblong spurge	Limited	C	C	B	2.0	Meadows, woodlands. Limited distribution. Impacts unknown. Locally in dense stands.	GV, CW
◆	<i>Euphorbia terracina</i>	carnation spurge	Moderate	B	B	C	1.7	Coastal scrub. Limited distribution. Spreading in southern CA. Impacts unknown.	SW
	<i>Festuca arundinacea</i>	tall fescue	Moderate	B	B	A	2.9	Coastal scrub, grasslands; common forage grass. Widespread, abiotic impacts unknown.	CA-FP
	<i>Ficus carica</i>	edible fig	Moderate	B	A	B	2.6	Riparian woodland. Can spread rapidly. Abiotic impacts unknown. Can be locally very problematic.	CW, SW, GV
	<i>Foeniculum vulgare</i>	fennel	High	A	B	A	3.0	Grasslands, scrub.	CA-FP

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TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

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	<i>Genista monspessulana</i>	French broom	High	A	A	B	3.2	Coastal scrub, oak woodland, grasslands. Horticultural selections may also be invasive.	NW, CW, SW
	<i>Geranium dissectum</i>	cutleaf geranium	Limited	C	B	A	1.7	Numerous habitats but impacts appear minor.	CA-FP
	<i>Glyceria declinata</i>	waxy manna grass	Moderate	B	B	B	1.9	Vernal pools, moist grasslands. Often confused with native <i>Glyceria</i> . Impacts largely unknown, but may be significant in vernal pools.	GV
	<i>Halogeton glomeratus</i>	halogeton	Moderate	B	A	B	3.0	Scrub, grasslands, pinyon-juniper woodland. Larger problem in NV. Monotypic stands are rare.	CaR, DMoj, GB
	<i>Hedera helix</i> , <i>H. canariensis</i>	English ivy, Algerian ivy	High	A	A	A	2.7	Coastal forests, riparian areas. Species combined due to genetics questions.	CA-FP
	<i>Helichrysum petiolare</i>	licorice plant	Limited	C	B	C	2.0	North coastal scrub. Limited distribution. Impacts unknown, but can form dense stands.	NW, CW
	<i>Hirschfeldia incana</i>	shortpod mustard, summer mustard	Moderate	B	B	A	1.9	Scrub, grasslands, riparian areas. Impacts not well understood, but appear to be greater in southern CA.	CW, GV, NW, SN, SW
	<i>Holcus lanatus</i>	common velvet-grass	Moderate	B	B	A	2.9	Coastal grasslands, wetlands. Impacts can be more severe locally, especially in wetland areas.	CA-FP, DMoj, GB
	<i>Hordeum marinum</i> , <i>H. murinum</i>	Mediterranean barley, hare barley, wall barley	Moderate	B	B	A	2.8	Grasslands. <i>H. marinum</i> invades drier habitats, while <i>H. murinum</i> invades wetlands. Widespread, but generally do not form dominant stands.	CA
◆	<i>Hydrilla verticillata</i>	hydrilla	High	A	B	C	3.2	Freshwater aquatic systems. The most important submerged aquatic invasive in southern states.	NW, SN, GV, SW, D
◆	<i>Hypericum canariense</i>	Canary Island hypericum	Moderate	B	B	C	1.2	Coastal scrub, prairie. Impacts unknown. Limited distribution. Spreading rapidly on central coast.	SW, CW
	<i>Hypericum perforatum</i>	common St. Johnswort, klamathweed	Moderate	B	B	B	3.7	Many northern CA habitats. Abiotic impacts low. Biological control agents have reduced overall impact.	SN, CW, GV, NW, SW
	<i>Hypochaeris glabra</i>	smooth catsear	Limited	C	B	B	3.1	Scrub and woodlands. Widespread. Impacts appear to be minor. Some local variability.	CA-FP
	<i>Hypochaeris radicata</i>	rough catsear, hairy dandelion	Moderate	C	B	A	2.2	Coastal dunes, scrub, and prairie, woodland, forest. Widespread. Impacts unknown or appear to be minor.	CA-FP

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Alert	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
◆	<i>Ilex aquifolium</i>	English holly	Moderate	B	B	C	2.7	North coast forests. Expanding range south from Oregon.	CW, NW
	<i>Iris pseudacorus</i>	yellowflag iris	Limited	C	B	C	2.3	Riparian, wetland areas, especially southern CA. Limited distribution. Abiotic impacts unknown.	SN, GV, CW, SW
	<i>Isatis tinctoria</i>	dyer's woad	Moderate	B	B	A	3.0	Great Basin scrub and grasslands, coniferous forest. More severe impacts in other western states, but can be locally very invasive in northern CA.	CaR, NW, SN, MP
	<i>Kochia scoparia</i>	kochia	Limited	B	C	B	3.2	Scrub, chaparral, grasslands. Primarily a weed of disturbed sites.	CW, GV, D, GB
	<i>Lepidium latifolium</i>	perennial pepperweed, tall whitetop	High	A	A	A	3.1	Coastal and inland marshes, riparian areas, wetlands, grasslands. Has potential to invade montane wetlands.	CA-FP, GB
	<i>Leucanthemum vulgare</i>	oxeye daisy	Moderate	B	B	B	2.5	Montane meadows, coastal grasslands, coastal scrub. Expanding range, invasiveness varies locally.	CW, NW, SN, SW
	<i>Linaria genisifolia</i> ssp. <i>dalmatica</i> (= <i>L. dalmatica</i>)	Dalmatian toadflax	Moderate	B	B	B	2.8	Grasslands, forest clearings. Limited distribution. More severe impacts in other western states.	CA-FP
	<i>Lobularia maritima</i>	sweet alyssum	Limited	C	B	B	2.4	Coastal dune, coastal scrub, coastal prairie, riparian.	NW, CW, SW
	<i>Lolium multiflorum</i>	Italian ryegrass	Moderate	B	B	A	2.6	Grasslands, oak woodland, pinyon-juniper woodland; widely used for post-fire erosion control. Widespread. Impacts can vary with region.	CA-FP
	<i>Ludwigia peploides</i> ssp. <i>montevidensis</i>	creeping water-primrose	High	A	B	B	2.5	Freshwater aquatic systems. Clarification needed on taxonomic identification.	NW, SN, GV, CW, SW, DMoj
◆	<i>Ludwigia hexapetala</i> (= <i>L. uruguayensis</i>)	Uruguay water-primrose	High	A	B	C	2.6	Freshwater aquatic systems. Clarification needed on taxonomic identification.	NW, CW, SW
	<i>Lythrum hyssopifolium</i>	hyssop loosestrife	Limited	C	B	B	3.0	Grasslands, wetlands, vernal pools. Widespread. Impacts unknown, but appear to be minor.	CA-FP
	<i>Lythrum salicaria</i>	purple loosestrife	High	A	A	B	3.8	Wetlands, marshes, riparian areas	NW, GV, MP
	<i>Marrubium vulgare</i>	white horehound	Limited	C	C	B	2.8	Grasslands scrub, riparian areas. Widespread. Rarely in dense stands. Impacts relatively minor.	CA-FP, DMoj

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	<i>Medicago polymorpha</i>	California burclover	Limited	C	C	A	2.8	Grasslands. Widespread weed of agriculture and disturbed areas. Impacts in wildlands minor.	CA-FP
	<i>Mentha pulegium</i>	pennyroyal	Moderate	C	A	A	2.7	Vernal pools, wetlands. Poisonous to livestock. Spreading rapidly. Impacts largely unknown.	CW, GV, NW, SW
◆	<i>Mesembryanthemum crystallinum</i>	crystalline iceplant	Moderate	B	B	C	3.7	Coastal bluffs, dunes, scrubs, grasslands. Limited distribution. Locally problematic, especially in southern CA.	CW, NW, SW
	<i>Myoporum laetum</i>	myoporum	Moderate	B	B	B	2.6	Coastal habitats, riparian areas. Mostly along the southern coast. Abiotic impacts unknown.	CW, SW
	<i>Myosotis latifolia</i>	common forget-me-not	Limited	C	B	B	2.2	Coniferous forest, riparian. Little information on impacts.	CA-FP
◆	<i>Myriophyllum aquaticum</i>	parrotfeather	High	A	B	C	2.8	Freshwater aquatic systems	NW, CaR, CW, SW
	<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	High	A	A	B	2.8	Freshwater aquatic systems	SN, GV, CW
	<i>Nicotiana glauca</i>	tree tobacco	Moderate	B	B	B	2.5	Coastal scrub, grasslands, riparian woodland. Abiotic impacts unknown. Impacts vary locally. Rarely in dense stands.	NW, SN, GV, SW, D
	<i>Olea europaea</i>	olive	Limited	C	B	B	2.5	A problem in Australia. Rarely escapes in CA but is a concern due to the possibility of spread from planted groves.	CW, GV, NW, SW
	<i>Ononis alopecuroides</i>	foxtail restharrow	Limited	C	B	C	2.2	Grasslands, oak woodland. Highly invasive but impacts unknown. Nearly eradicated.	CW
	<i>Onopordum acanthium</i>	Scotch thistle	High	A	B	B	2.9	Wet meadows, sage brush, riparian areas	CA-FP, MP
	<i>Oxalis pes-caprae</i>	buttercup oxalis, Bermuda buttercup, yellow oxalis	Moderate	B	B	B	2.9	Coastal dunes, scrub, oak woodland. Impacts in coastal areas may prove more severe in time.	CW, NW, SW
	<i>Parentucellia viscosa</i>	yellow glandweed, sticky parentucellia	Limited	C	B	B	2.5	Coastal prairie, grassland, and dunes. Impacts unknown, but can be locally significant.	NW, CaR, SN, CW, SW
	<i>Pennisetum clandestinum</i>	kikuyugrass	Limited	C	C	B	2.3	Present at low levels in numerous wildland habitats. Impacts unknown. Common turf weed.	NW, CW, SW

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	<i>Pennisetum setaceum</i>	crimson fountaingrass	Moderate	B	B	B	2.9	Coastal dunes and scrub, chaparral, grasslands. Some horticultural cultivars sterile. Very invasive in Hawaii.	CW, NW, SN, SW
	<i>Phalaris aquatica</i>	hardinggrass	Moderate	B	B	B	2.6	Coastal sites, especially moist soils. Limited distribution. Can be highly invasive locally.	CW, NW, SN, SW
	<i>Phoenix canariensis</i>	Canary Island date palm	Limited	C	B	D	2.3	Desert washes; agricultural crop plant. Limited distribution in southern CA. Impacts can be higher locally.	CW, SW
	<i>Picris echioides</i>	bristly oxtongue	Limited	C	B	B	2.4	Coastal prairie, scrub, riparian woodland. Widespread locally. Abiotic impacts unknown.	CA-FP
	<i>Piptatherum miliaceum</i>	smilgrass	Limited	C	B	B	2.4	Coastal dunes, scrub, riparian, grassland. Expanding range. Impacts largely unknown.	GV, CW, SW
	<i>Plantago lanceolata</i>	buckhorn plantain, English plantain	Limited	C	C	B	2.1	Many habitats. Turf weed primarily. Low density and impact in wildlands.	CA-FP
	<i>Poa pratensis</i>	Kentucky bluegrass	Limited	C	B	B	2.7	Grasslands scrub, riparian areas. Widespread turf plant. Abiotic impacts unknown.	CA
◆	<i>Polygonum cuspidatum</i> (= <i>Fallopia japonica</i>)	Japanese knotweed	Moderate	B	B	D	2.7	Riparian areas, wetlands, forest edges. More severe impacts in NW wetlands. Distribution limited in CA.	NW, CaR, SN, GV, CW
◆	<i>Polygonum sachalinense</i>	Sakhalin knotweed	Moderate	B	A	D	2.5	Riparian areas. More severe impacts in NW wetlands. Distribution limited in CA.	NW, CaR, SN, GV, CW
	<i>Polygonum monspeliensis</i> and subsp.	rabbitfoot polygon, rabbitgoot grass	Limited	C	C	B	2.3	Margins of ponds and streams, seasonally wet places, edge of coastal dunes. Widespread. Impacts appear to be minor.	CA
	<i>Potamogeton crispus</i>	curlyleaf pondweed	Moderate	B	B	B	3.2	Freshwater aquatic systems. Can be very invasive locally.	NW, GV, CW, SW, DMoj
	<i>Prunus cerasifera</i>	cherry plum, wild plum	Limited	C	B	B	1.8	Riparian habitats, chaparral, woodland. Limited distribution. Abiotic impacts unknown.	NW, CW
	<i>Pyracantha angustifolia</i> , <i>P. crenulata</i> , <i>P. coccinea</i>	pyracantha, firethorn	Limited	C	B	B	2.8	Coastal scrub and prairie, riparian areas. Horticultural escape. Impacts unknown or minor.	NW, CW, SW
	<i>Ranunculus repens</i>	creeping buttercup	Limited	C	C	B	2.9	Riparian areas, coniferous forest. Impacts appear to be minor to negligible in most areas.	NW, CaR, SN, CW, SW
	<i>Raphanus sativus</i>	radish	Limited	C	C	B	2.5	Present at low levels in numerous habitats. Widespread in disturbed sites.	CA-FP

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◆	<i>Retama monosperma</i>	bridal broom	Moderate	B	B	C	1.8	Coastal scrub. Can spread rapidly but largely if uncontrolled. Limited distribution in CA.	SW
	<i>Ricinus communis</i>	castorbean	Limited	C	B	B	2.5	Coastal scrub and prairie, riparian areas. Widespread in southern CA. Impacts locally variable.	GV, CW, SW
	<i>Robinia pseudoacacia</i>	black locust	Limited	C	B	B	2.8	Riparian areas, canyons. Severe impacts in southern states. Impacts minor in CA.	CA-FP, GB
	<i>Rubus armeniacus</i> (= <i>R. discolor</i>)	Himalaya blackberry	High	A	A	A	3.0	Riparian areas, marshes, oak woodlands	CA-FP
	<i>Rumex acetosella</i>	red sorrel, sheep sorrel	Moderate	B	B	A	2.3	Many habitats, riparian areas, forest, wetlands. Widespread. Abiotic impacts unknown. Impacts can vary locally.	CA-FP
	<i>Rumex crispus</i>	curly dock	Limited	C	C	A	2.7	Grasslands, vernal pool, meadows, riparian. Widespread. Impacts appear to be minor.	CA
	<i>Salsola paulsenii</i>	barbwire Russian-thistle	Limited	C	C	C	2.9	Desert and Great Basin scrub. Limited distribution. Impacts in desert appear to be minor.	SW, SNE, DMoj
	<i>Salsola tragus</i> (= <i>S. kali</i>)	Russian-thistle	Limited	C	B	B	2.8	Desert dunes and scrub, alkali playa. Widespread. Impacts minor in wildlands.	CA
	<i>Salvia aethiopsis</i>	Mediterranean sage	Limited	C	B	B	2.5	Sagebrush, juniper, bunchgrass. Limited distribution. Impacts minor but can be locally higher.	MP
◆	<i>Salvinia molesta</i>	giant salvinia	High	A	A	C	2.9	Freshwater aquatic systems	CW, DSon
◆	<i>Sapium sebiferum</i> (= <i>Triadica sebifera</i>)	Chinese tallowtree	Moderate	B	B	C	3.2	Riparian areas. Impacts severe in southeast US. Limited distribution, but spreading rapidly regionally.	GV
	<i>Saponaria officinalis</i>	bouncingbet	Limited	C	B	C	2.5	Riparian scrub and woodland. Impacts unknown or minor, but appear to be locally variable.	NW, GV, CW, SW, GB
	<i>Schinus molle</i>	Peruvian peppertree	Limited	C	B	B	2.5	Riparian. Limited distribution. Impacts largely unknown in CA.	GV, SN, CW, SW
	<i>Schinus terebinthifolius</i>	Brazilian peppertree	Limited	C	B	C	2.6	Riparian. Very invasive in tropics. Abiotic impacts unknown, but appear significant locally.	SW

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	<i>Selismus arabicus</i> , <i>S. barbatus</i>	mediterranean-grass	Limited	B	C	A	2.3	Scrub, thorn woodland. Widespread in deserts. Impacts can be more important locally.	GV, CW, SW, D
	<i>Senecio jacobaea</i>	tansy ragwort	Limited	C	B	B	2.8	Grasslands, riparian. Impacts generally minor. Can be locally important in NW CA.	CA-FP
◆	<i>Sesbania punicea</i>	red sesbania, scarlet wisteria	High	A	B	C	3.2	Riparian areas	GV
	<i>Silybum marianum</i>	blessed milkthistle	Limited	C	C	A	3.5	Grasslands, riparian. Widespread, primarily in disturbed areas. Impacts can be higher locally	NW, GV, CW, SW
	<i>Sinapis arvensis</i>	wild mustard, charlock	Limited	C	C	C	2.9	Grasslands. Primarily in disturbed sites. Impacts minor or unknown in wildlands.	CA-FP
	<i>Sisymbrium irio</i>	London rocket	Moderate	B	B	A	1.9	Scrub, grasslands. Widespread. Primarily in disturbed sites. Impacts vary locally.	GV, SW
◆	<i>Spartina alterniflora</i> (and <i>S. alterniflora</i> x <i>foliosa</i> hybrids)	smooth cordgrass & hybrids, Atlantic cordgrass	High	A	A	C	3.5	San Francisco Bay salt marshes and mudflats. Hybridizes with native <i>S. foliosa</i> .	CW
◆	<i>Spartina anglica</i>	common cordgrass	Moderate	B	B	D	3.4	San Francisco Bay salt marshes. Very severe impact in other countries. Limited distribution in CA.	CW
◆	<i>Spartina densiflora</i>	dense-flowered cordgrass	High	A	B	C	3.3	San Francisco and Humboldt Bay salt marshes	NW, CW
	<i>Spartina patens</i>	saltmeadow cordgrass	Limited	C	C	D	2.9	San Francisco Bay salt marshes. Very limited distribution. Impacts currently minor in CA, but high in other countries.	CW
	<i>Spartium junceum</i>	Spanish broom	High	A	B	B	3.2	Coastal scrub, grasslands, wetlands, oak woodland, forests	NW, CW, SW
◆	<i>Stipa capensis</i>	Mediterranean steppegrass, twisted-awned speargrass	Moderate	B	B	D	1.9	Desert scrub. First recorded in CA 1995. Limited distribution, but spreading rapidly in CA deserts.	Dson
	<i>Taenatherum caput-medusae</i>	medusahead	High	A	A	A	3.4	Grasslands, scrub, woodland	CaR, NW, SN, GV, SW

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TABLE 1: Invasive Non-Native Plants that Threaten Wildlands in California (continued)

Alert	Scientific Name	Common Name	Rating	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Regions Invaded
	<i>Tamarix aphylla</i>	athel tamarisk	Limited	C	B	B	3.5	Desert washes, riparian areas. Limited distribution. Impacts minor, but can be locally higher.	GV, SW, D
	<i>Tamarix parviflora</i>	smallflower tamarisk	High	A	A	B	3.1	Riparian areas, desert washes, coastal scrub	NW, GV, CW, Dmoj
	<i>Tamarix ramosissima</i>	saltcedar, tamarisk	High	A	A	A	3.3	Desert washes, riparian areas, seeps and springs	SN, GV, CW, SW, D, SNE
	<i>Tanacetum vulgare</i>	common tansy	Moderate	B	B	B	2.3	Riparian areas, forest. Limited distribution. Severe problem in other western states.	NW, CaR,
	<i>Torilis arvensis</i>	hedgearsley	Moderate	C	B	A	2.3	Expanding range. Appears to have only moderate ecological impacts.	CA-FP, especially CW, NW
	<i>Trifolium hirtum</i>	rose clover	Moderate	C	B	B	2.8	Grasslands, oak woodland. Widely planted in CA. Impacts relatively minor in most areas.	CA-FP
	<i>Ulex europaeus</i>	gorse	High	A	B	B	2.9	Scrub, woodland, forest, coastal grassland	NW, CaR, SN, CW
	<i>Undaria pinnatifida</i>	wakame	Limited	C	B	C	3.3	Algae of estuaries. First recorded in CA in 2000. Impacts unknown, but do not appear to be significant	CW, SW
	<i>Verbascum thapsus</i>	common mullein, woolly mullein	Limited	C	B	B	3.8	Meadows, riparian, sagebrush, pinyon-juniper woodlands. Widespread. Impacts minor.	NW, CaR, SN
	<i>Vinca major</i>	big periwinkle	Moderate	B	B	B	2.8	Riparian, oak woodlands, coastal scrub. Distribution currently limited but spreading in riparian areas. Impacts can be higher locally.	CaR, SW, SN, GV
	<i>Vulpia myuros</i>	rattail fescue	Moderate	B	B	A	3.0	Coastal sage scrub, chaparral. Widespread. Rarely forms monotypic stands, but locally problematic.	CA-FP, D
◆	<i>Washingtonia robusta</i>	Mexican fan palm	Moderate	B	B	C	2.7	Desert washes. Limited distribution but spreading in southern CA. Impacts can be higher locally.	SW
	<i>Watsonia meriana</i>	bulbil watsonia	Limited	C	B	C	2.3	Coastal prairie, coniferous forest. Abiotic impacts unknown, but may be locally dense.	NW
	<i>Zantedeschia aethiopica</i>	calla lily	Limited	C	B	C	2.1	Coastal prairie, wetlands. Impacts high in other countries and local impacts may be high in CA.	NW, CW, SW

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America's "Composite List of Weeds" (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 2: Species Native to Part of California, but Invasive in Other Parts of the State

A few native species have become invasive in regions outside their natural range. This table lists those species that cause negative impacts in their introduced range. No overall rating is provided, since impacts are not statewide, but the section scores for each of the three plants assessed would result in Moderate ratings for the areas in which they are invasive.

Scientific Name	Common Name	Impacts	Invasiveness	Distribution	Doc. Level	Ecological Types Invaded and Other Comments	Native Range	Invasive Range
<i>Cupressus macrocarpa</i>	Monterey cypress	B	B	B	2.3	Native to Monterey area. Invades coastal prairie, desert scrub, riparian areas.	CW	NW
<i>Lupinus arboreus</i>	yellow bush lupine	B	B	B	3.5	Native south of Point Reyes. Invasive in north coast dunes.	SW, CW Bay Area	NW
<i>Phragmites australis</i>	common reed	Unable to score.				Genetic issues make it unclear which strains are native to CA.	Uncertain	
<i>Pinus radiata</i> cultivars	Monterey pine	B	B	B	2.6	Five populations native to CA. Invades coastal scrub, prairie, and chaparral.	CW	NW

Scientific names based on *The Jepson Manual*. For each species, the first common name is based on the Weed Science Society of America’s “Composite List of Weeds” (www.wssa.net), followed by other names used in California. Scores: A = Severe, B = Moderate, C = Limited, D = None, U = Unknown. Documentation level averaged. Regions invaded based on Jepson geographic regions. Plant assessment forms, literature citations, and full rating criteria available at www.cal-ipc.org.

TABLE 3: Species Evaluated But Not Listed

In general, this designation is for species for which information is currently inadequate to respond with certainty to the minimum number of criteria questions (i.e., too many “U” responses), or for which the sum effects of Ecological Impacts, Invasive Potential, and Ecological Amplitude and Distribution fall below the threshold for ranking (i.e. the overall score falls below Limited). Many such species are widespread but are not known to have substantial ecological impacts (though such evidence may appear in the future). All species receiving a D score for Ecological Impacts, regardless of other section scores, are by default placed into this category.

Scientific Name	Common Name	Impacts	Invasiveness	Distribution	Doc. Level	Comments
<i>Acacia paradoxa</i>	kangaroothorn	D	C	C	2.5	Does not spread in wildlands.
<i>Aeschynomene rudis</i>	rough jointvetch	D	C	D	3.2	Serious agricultural weed, but not known to have impacts in wildlands.
<i>Aira caryophylla</i>	silver hairgrass	D	C	A	2.6	Widespread in grasslands, but impacts appear negligible.
<i>Aira praecox</i>	European hairgrass	D	C	C	2.8	Appears to be spreading locally, but impacts unknown.
<i>Albizia lophantha</i>	plume acacia	U	B	C	1.5	Present in Golden Gate National Recreation Area. Need more information
<i>Allium triquetrum</i>	three-cornered leak	U	C	C	1.6	Impacts unknown.
<i>Anthemis cotula</i>	mayweed chamomile, dog fennel	D	B	B	2.4	Abiotic and wildlife impacts unknown
<i>Bellis perennis</i>	English daisy	D	C	C	2.8	Present along trails, not known to spread into undisturbed areas.
<i>Berberis darwinii</i>	Darwin barberry	U	B	D	2.1	Impacts unknown.
<i>Buddleja davidii</i>	butterflybush	D	B	D	2.5	Not known to be invasive in CA, although it is a problem in Oregon.
<i>Cestrum parqui</i>	willow jessamine	U	B	C	2.0	Impacts unknown.
<i>Chorispora tenella</i>	blue mustard	U	C	C	1.5	Impacts unknown.
<i>Cistus ladanifer</i>	gum rockrose	D	C	C	3.3	Negligible known impacts in wildlands.
<i>Convolvulus arvensis</i>	field bindweed	D	B	B	3.5	Only known as agricultural weed.
<i>Daucus carota</i>	wild carrot, Queen Anne’s lace	D	C	B	2.7	Very widespread, but primarily in disturbed sites, particularly roadsides.
<i>Dimorphotheca sinuata</i>	African daisy	D	C	B	1.8	Impacts to abiotic processes and plant communities unknown.
<i>Erigeron karvinskianus</i>	Mexican daisy	U	B	C	1.9	Impacts unknown, but appears to be expanding. May become more problematic in future.
<i>Erodium botrys</i>	broadleaf filaree	D	C	A	2.8	Present in wildlands but known impacts are negligible. Often transient.
<i>Erodium brachycarpum</i>	short-fruited filaree	D	C	A	2.6	Present in wildlands but known impacts are negligible. Often transient.
<i>Erodium moschatum</i>	whitestem filaree	D	C	A	2.7	Primarily an agricultural weed, little impact in wildlands.
<i>Euphorbia lathyris</i>	caper spurge	D	C	B	2.2	Abiotic impacts unknown.
<i>Fumaria officinalis</i>	fumitory	D	C	D	2.3	Abiotic impacts unknown.
<i>Geranium molle</i>	dovefoot geranium	D	B	A	1.7	Present in wildlands, but known impacts are negligible.

TABLE 3: Species Evaluated But Not Listed (continued)

Scientific Name	Common Name	Impacts	Invasiveness	Distribution	Doc. Level	Comments
<i>Geranium retrorsum</i>	New Zealand geranium	D	B	B	1.9	Present in wildlands, but known impacts are negligible.
<i>Geranium robertianum</i>	herb-robert, Robert geranium	D	B	C	2.8	Present in wildlands, but known impacts are negligible.
<i>Gleditsia triacanthos</i>	honey locust	D	B	C	3.3	Very limited distribution.
<i>Lactuca serriola</i>	prickly lettuce	D	C	B	3.1	Primarily an agricultural and roadside weed.
<i>Leptospermum laevigatum</i>	Australian tea tree	D	C	D	2.2	Very limited distribution.
<i>Ligustrum lucidum</i>	glossy privet	D	B	C	3.1	May prove problematic in riparian areas.
<i>Lotus corniculatus</i>	birdsfoot trefoil	D	B	B	2.8	Primarily a turf or agricultural weed in CA.
<i>Malephora crocea</i>	coppery mesembryanthemum	D	C	C	2.0	A problem on southern CA islands, but statewide impacts are limited.
<i>Maytenus boaria</i>	mayten	D	C	D	2.4	Infestation on Angel Island, San Francisco Bay.
<i>Melilotus officinalis</i>	yellow sweetclover	D	C	C	3.3	Present in human-disturbed habitats only.
<i>Nerium oleander</i>	oleander	D	B	D	2.6	Not known to be invasive, although reported from riparian areas in Central Valley and San Bernardino Mtns.
<i>Nothoscordum gracile</i>	false garlic	D	B	D	2.1	Mainly an urban garden weed.
<i>Nymphaea odorata</i>	fragrant waterlily	D	B	C	2.3	Present only at one site.
<i>Oxalis corniculata</i>	creeping woodsorrel	D	C	C	2.2	Primarily a turf weed in CA.
<i>Parkinsonia aculeata</i>	Mexican palo-verde	D	B	D	2.2	Has not escaped into wildlands enough to cause impacts.
<i>Pistachia chinensis</i>	Chinese pistache	U	C	D	0.9	Impacts unknown.
<i>Pittosporum undulatum</i>	Victorian box	D	C	D	2.7	Infestations in CA are small. More problematic on north coast.
<i>Plantago coronopus</i>	cutleaf plantain	U	C	B	1.7	Impacts unknown. Common on north coast.
<i>Solanum elaeagnifolium</i>	silverleaf nightshade	D	B	B	2.8	Primarily an agricultural weed, but escaping to wildlands in other countries. May prove to be more important in future.
<i>Sonchus asper</i>	spiny sowthistle	D	B	B	3.1	Primarily an agricultural weed.
<i>Taraxacum officinale</i>	common dandelion	D	B	B	2.8	Primarily a turf weed in CA.
<i>Tragopogon dubius</i>	yellow salsify	D	C	B	3.2	Generally a minor component of disturbed areas.
<i>Tropaeolum majus</i>	garden nasturtium	D	C	C	1.4	Impacts on abiotic processes and native plants unknown.
<i>Ulmus pumila</i>	Siberian elm	D	B	B	2.5	Impacts unknown.
<i>Verbena bonariensis</i> , <i>V. litoralis</i>	tall vervain, seashore vervain	D	B	C	2.1	Often in disturbed areas of irrigation canals.
<i>Vicia villosa</i>	hairy vetch	D	C	B	2.8	Primarily an agricultural weed. Widespread but impacts minor in wildlands.
<i>Vulpia bromoides</i>	squirreltail fescue	D	C	B	2.9	Less common than <i>V. myuros</i> .

TABLE 4: Species Nominated but Not Reviewed

The following species were nominated for review, but not evaluated because either they are not known to escape into wildlands or we lacked sufficient information to complete an assessment.

Scientific Name	Common Name	Comments
<i>Aptenia cordifolia</i>	baby sun rose, heartleaf iceplant	Occasional ornamental escape.
<i>Araujia sericifera</i>	bladderflower	Need more information.
<i>Brassica oleracea</i>	cabbage	Disturbed areas along north and central coast.
<i>Catalpa bignonioides</i>	southern catalpa	Reported from Sacramento/San Joaquin Valley riparian corridors. Need more information.
<i>Chrysanthemum segetum</i>	corn daisy	Disturbed areas only.
<i>Coprosma repens</i>	creeping mirrorplant	1999 Cal-EPPC list indicated no evidence of wildland threat.
<i>Crepis capillaris</i>	smooth hawkbeard	Primarily in pastures and roadsides in coastal areas of northwest CA.
<i>Erica lusitanica</i>	Spanish heath	Reported from Humboldt and Del Norte Cos. Need more information.
<i>Eriogonum fasciculatum</i>	California buckwheat	Invades along roadsides and other areas of human disturbance. Not known to threaten wildlands.
<i>Gazania linearis</i>	gazania	Reported to invade in San Francisco Bay Area. Need more information.
<i>Grindelia squarrosa</i>	curlycup gumweed, gumplant	Mainly along roadsides. More a problem in Nevada.
<i>Kniphofia varia</i>	redhot poker	Primarily along roadsides.
<i>Lathyrus latifolius</i>	perennial sweetpea	Reported from the north coast. Need more information.
<i>Lathyrus tingitanus</i>	Tangier pea	Along roadsides. Need more information.
<i>Limonium ramosissimum</i> ssp. <i>provinciale</i>	sea-lavender	Present in salt marshes. Need more information.
<i>Melilotus indicus</i>	Indian sweetclover	Reported from disturbed sites. Need more information.
<i>Mesembryanthemum nodiflorum</i>	slenderleaf iceplant	Common in San Diego area along coast. Need more information on impacts.
<i>Osteospermum fruticosum</i>	shrubby daisybush	Occasional ornamental escape in southern CA. Does not appear to be invasive.
<i>Passiflora caerulea</i>	blue passionflower	Not known to invade wildlands.
<i>Phalaris arundinacea</i>	reed canarygrass	<i>Jepson Manual</i> lists it as native in CA. Acts like a native in most areas of the state. A problem in NW states.
<i>Phoenix dactylifera</i>	date palm	Reported from southern CA deserts. Need more information.
<i>Phytolacca americana</i>	pokeweed	Reported invading riparian areas in northern Sacramento Valley. Need more information.
<i>Salsola soda</i>	glasswort	Reported from San Francisco Bay shorelines and creek mouths. Need more information.
<i>Ulmus parvifolia</i>	Chinese elm	Present in disturbed areas or old homesites only.
<i>Watsonia borbonica</i>	watsonia	May be confused with <i>W. meriana</i> , which is invasive in Mendocino Co.
<i>Zoysia</i> spp.	zoysiagrass	Does not appear to have escaped from turf.

APPENDIX 1. Species Listed by Category

◆ = Alert

High

- Aegilops triuncialis* (barb goatgrass)
- ◆ *Alternanthera philoxeroides* (alligatorweed)
- Ammophila arenaria* (European beachgrass)
- Arundo donax* (giant reed)
- Brassica tournefortii* (Saharan mustard, African mustard)
- Bromus madritensis* ssp. *rubens* (= *B. rubens*) (red brome)
- Bromus tectorum* (downy brome, cheatgrass)
- Carpobrotus edulis* (Hottentot-fig, iceplant)
- Centaurea maculosa* (= *C. biebersteinii*) (spotted knapweed)
- Centaurea solstitialis* (yellow starthistle)
- Cortaderia jubata* (jubatagrass)
- Cortaderia selloana* (pampasgrass)
- Cytisus scoparius* (Scotch broom)
- Delairea odorata* (= *Senecio mikanioides*) (Cape-ivy, German-ivy)
- Egeria densa* (Brazilian egeria)
- Ehrharta calycina* (purple veldtgrass)
- ◆ *Eichhornia crassipes* (water hyacinth)
- ◆ *Euphorbia esula* (leafy spurge)
- Foeniculum vulgare* (fennel)
- Genista monspessulana* (French broom)
- Hedera helix*, *H. canariensis* (English ivy, Algerian ivy)
- ◆ *Hydrilla verticillata* (hydrilla)
- Lepidium latifolium* (perennial pepperweed, tall whitetop)
- ◆ *Ludwigia hexapetala* (= *L. uruguayensis*) (Uruguay water-primrose)
- Ludwigia peploides* ssp. *montevidensis* (creeping water-primrose)
- Lythrum salicaria* (purple loosestrife)
- ◆ *Myriophyllum aquaticum* (parrotfeather)
- Myriophyllum spicatum* (Eurasian watermilfoil)
- Onopordum acanthium* (Scotch thistle)

Rubus armeniacus (= *R. discolor*) (Himalaya blackberry, Armenian blackberry)

- ◆ *Salvinia molesta* (giant salvinia)
- ◆ *Sesbania punicea* (red sesbania, scarlet wisteria)
- ◆ *Spartina alterniflora* hybrids (smooth cordgrass, Atlantic cordgrass)
- ◆ *Spartina densiflora* (dense-flowered cordgrass)
- Spartium junceum* (Spanish broom)
- Taeniatherum caput-medusae* (medusahead)
- Tamarix parviflora* (smallflower tamarisk)
- Tamarix ramosissima* (saltcedar, tamarisk)
- Ulex europaeus* (gorse)

Moderate

- Ageratina adenophora* (croftonweed, eupatorium)
- Ailanthus altissima* (tree-of-heaven)
- Alhagi maurorum* (= *A. pseudalhagi*) (camelthorn)
- Anthoxanthum odoratum* (sweet vernalgrass)
- ◆ *Arctotheca calendula* (fertile) (fertile capeweed)
- Arctotheca calendula* (sterile) (sterile capeweed)
- ◆ *Asparagus asparagoides* (bridal creeper, smilax asparagus)
- ◆ *Asphodelus fistulosus* (onionweed)
- Atriplex semibaccata* (Australian saltbush)
- Avena barbata* (slender wild oat)
- Avena fatua* (wild oat)
- ◆ *Brachypodium sylvaticum* (perennial false-brome)
- Brassica nigra* (black mustard)
- Bromus diandrus* (ripgut brome)
- ◆ *Cardaria chalepensis* (= *C. draba* ssp. *chalepensis*) (lens-podded whitetop)
- Cardaria draba* (hoary cress)
- Carduus nutans* (musk thistle)
- Carduus pycnocephalus* (Italian thistle)
- Carpobrotus chilensis* (sea-fig, iceplant)
- ◆ *Carthamus lanatus* (woolly distaff thistle)

APPENDIX 1: Species Listed by Category (continued)

Moderate (continued)

- Centaurea calcitrapa* (purple starthistle)
- ◆ *Centaurea debeauxii* (= *C. x pratensis*) (meadow knapweed)
 - Centaurea melitensis* (Malta starthistle, tocalote)
 - Centaurea virgata* ssp. *squarrosa* (= *C. squarrosa*) (squarrose knapweed)
 - Chondrilla juncea* (rush skeletonweed)
 - Chrysanthemum coronarium* (crown daisy)
 - Cirsium arvense* (Canada thistle)
 - Cirsium vulgare* (bull thistle)
 - Conium maculatum* (poison-hemlock)
 - Cotoneaster franchetii* (orange cotoneaster)
 - Cotoneaster lacteus* (Parney's cotoneaster)
 - Cotoneaster pannosus* (silverleaf cotoneaster)
 - Cynara cardunculus* (artichoke thistle)
 - Cynodon dactylon* (bermudagrass)
 - Cynoglossum officinale* (houndstongue)
 - Cynosurus echinatus* (hedgehog dogtailgrass)
 - Cytisus striatus* (Portuguese broom, striated broom)
 - Dipsacus fullonum* (wild teasel)
 - Dipsacus sativus* (fuller's teasel)
 - ◆ *Dittrichia graveolens* (stinkwort)
 - Ehrharta erecta* (erect veldtgrass)
 - ◆ *Ehrharta longiflora* (long-flowered veldtgrass)
 - Elaeagnus angustifolia* (Russian-olive)
 - ◆ *Emex spinosa* (spiny emex, devil's thorn)
 - Erechtites glomerata*, *E. minima* (Australian fireweed, Australian burnweed)
 - Eucalyptus globulus* (Tasmanian blue gum)
 - ◆ *Euphorbia terracina* (carnation spurge)
 - Festuca arundinacea* (tall fescue)
 - Ficus carica* (edible fig)
 - Geranium dissectum* (cutleaf geranium)
 - Glyceria declinata* (waxy mannagrass)
 - Halogeton glomeratus* (halogeton)
 - Hirschfeldia incana* (shortpod mustard, summer mustard)
 - Holcus lanatus* (common velvetgrass)
 - Hordeum marinum*, *H. murinum* (Mediterranean barley, hare barley, wall barley)
 - ◆ *Hypericum canariense* (Canary Island hypericum)
 - Hypericum perforatum* (common St. Johnswort, klamathweed)
 - Hypochaeris radicata* (rough catsear, hairy dandelion)
 - ◆ *Ilex aquifolium* (English holly)
 - Isatis tinctoria* (dyer's woad)
 - Kochia scoparia* (kochia)
 - Leucanthemum vulgare* (oxeye daisy)
 - Linaria genistifolia* ssp. *dalmatica* (= *L. dalmatica*) (Dalmation toadflax)
 - Lolium multiflorum* (Italian ryegrass)
 - Lythrum hyssopifolium* (hyssop loosestrife)
 - Mentha pulegium* (pennyroyal)
 - ◆ *Mesembryanthemum crystallinum* (crystalline iceplant)
 - Myoporum laetum* (myoporum)
 - Nicotiana glauca* (tree tobacco)
 - Oxalis pes-caprae* (buttercup oxalis, yellow oxalis, Bermuda buttercup)
 - Pennisetum setaceum* (crimson fountaingrass)
 - Phalaris aquatica* (hardinggrass)
 - ◆ *Polygonum cuspidatum* (= *Fallopia japonica*) (Japanese knotweed)
 - ◆ *Polygonum sachalinense* (Sakhalin knotweed, giant knotweed)
 - Potamogeton crispus* (curlyleaf pondweed)
 - ◆ *Retama monosperma* (bridal broom)
 - Rumex acetosella* (red sorrel, sheep sorrel)
 - ◆ *Sapium sebiferum* (Chinese tallowtree)
 - Sisymbrium irio* (London rocket)
 - ◆ *Spartina anglica* (common cordgrass)
 - ◆ *Stipa capensis* (Mediterranean steppegrass, twisted-awned spargrass)
 - Tanacetum vulgare* (common tansy)
 - Torilis arvensis* (hedgearsley)
 - Trifolium hirtum* (rose clover)
 - Vinca major* (big periwinkle)
 - Vulpia myuros* (rattail fescue)
 - ◆ *Washingtonia robusta* (Mexican fan palm, Washington palm)

APPENDIX 1: Species Listed by Category (continued)

Limited

- Acacia melanoxylon* (black acacia, blackwood acacia)
Agrostis avenacea (Pacific bentgrass)
Agrostis stolonifera (creeping bentgrass)
Bassia hyssopifolia (fivehook bassia)
Bellardia trixago (bellardia)
Brassica rapa (birdsrape mustard, field mustard)
Briza maxima (big quackinggrass, rattlesnakegrass)
Bromus hordeaceus (soft brome)
Cakile maritima (European sea-rocket)
Cardaria pubescens (hairy whitetop)
Carduus acanthoides (plumeless thistle)
Carduus tenuifolius (slenderflower thistle)
Conicosia pugioniformis (narrowleaf iceplant)
Cordyline australis (giant dracaena, New Zealand-cabbage tree)
Cotula coronopifolia (brassbuttons)
Crataegus monogyna (English hawthorn)
Crocsmia x crocosmiiflora (montbretia)
Crupina vulgaris (common crupina, bearded creeper)
Dactylis glomerata (orchardgrass)
Descurainia sophia (flixweed, tansy mustard)
Digitalis purpurea (foxglove)
Echium candicans (pride-of-Madeira)
Erodium cicutarium (redstem filaree)
Eucalyptus camaldulensis (red gum)
Euphorbia oblongata (oblong spurge)
Helichrysum petiolare (licoriceplant)
Hypochaeris glabra (smooth catsear)
Iris pseudacorus (yellowflag iris)
Lobularia maritima (sweet alyssum)
Marrubium vulgare (white horehound)
Medicago polymorpha (California burclover)
Myosotis latifolia (common forget-me-not)
Olea europaea (olive)
Ononis alopecuroides (foxtail restharrow)
Parentucellia viscosa (yellow glandweed, sticky parentucellia)
Pennisetum clandestinum (kikuyugrass)
Phoenix canariensis (Canary Island date palm)
Picris echioides (bristly oxtongue)
Piptatherum miliaceum (smilograss)
Plantago lanceolata (buckhorn plantain, English plantain)
Poa pratensis (Kentucky bluegrass)
Polypogon monspeliensis and subspp. (rabbitfoot polypogon, annual beardgrass, rabbitfoot grass)
Prunus cerasifera (cherry plum, wild plum)
Pyracantha angustifolia, *P. crenulata*, *P. coccinea*, etc. (pyracantha, firethorn)
Ranunculus repens (creeping buttercup)
Raphanus sativus (radish)
Ricinus communis (castorbean)
Robinia pseudoacacia (black locust)
Rumex crispus (curly dock)
Salsola paulsenii (barbwire Russian-thistle)
Salsola tragus (Russian-thistle)
Salvia aethiopis (Mediterranean sage)
Saponaria officinalis (bouncingbet)
Schinus molle (Peruvian peppertree)
Schinus terebinthifolius (Brazilian peppertree)
Schismus arabicus, *S. barbatus* (mediterraneangrass)
Senecio jacobaea (tansy ragwort)
Silybum marianum (blessed milkthistle)
Sinapis arvensis (wild mustard, charlock)
Spartina patens (saltmeadow cordgrass)
Tamarix aphylla (athel tamarisk)
Undaria pinnatifida (wakame)
Verbascum thapsus (common mullein, woolly mullein)
Watsonia meriana (bulbil watsonia)
Zantedeschia aethiopica (calla lily)

APPENDIX 2. Cal-IPC Species Listed by Other Ratings Systems

This table is provided so that those familiar with other commonly-used ratings systems may compare those lists to the 2006 Cal-IPC ratings. See the cited websites for explanations of rating systems. Species not included in this appendix do not appear on any of these lists.

CAL-EPPC 1999 – Cal-EPPC. 1999. The Cal-EPPC List: Exotic Pest Plants of Greatest Ecological Concern in California. California Exotic Pest Plant Council: San Juan Capistrano, CA. Available: www.cal-ipc.org.

C DFA – CDFA. 2005. EncycloWeedia: Notes on Identification, Biology, and Management of Plants Defined as Noxious Weeds by California Law. California Department of Food and Agriculture: Sacramento, CA. Available: www.cdffa.ca.gov/weedhome.

USDA – Plant Protection and Quarantine. 2002. Federal Noxious Weed List. USDA Animal and Plant Health Inspection Service. US Department of Agriculture: Washington, D.C. Available: plants.usda.gov.

AZ – Arizona Invasive Plant Working Group. 2005. Invasive Non-native Plants that Threaten Wildlands in Arizona. Southwest Vegetation Management Association. Available: www.swvma.org.

NATURESERVE – NatureServe. 2005. Invasive Species Impact Ranks for the United States: Summary of Results as of January 10, 2005. NatureServe: Arlington, VA. Available: www.natureserve.org.

Scientific Name	Cal-EPPC 1999	C DFA	USDA	Arizona	NatureServe
<i>Acacia melanoxylon</i>	Need More Info				Medium/Insignificant
<i>Acacia paradoxa</i>		B			
<i>Acroptilon repens</i>		B		High	High/Medium
<i>Aegilops triuncialis</i>	Annual Grasses	B			
<i>Aeschynomene rudis</i>	Need More Info	A			
<i>Ageratina adenophora</i>	B		✓		
<i>Agrostis avenacea</i>	Need More Info				
<i>Ailanthus altissima</i>	A-2	*			Medium/Low
<i>Aira caryophylla</i>					Medium/Insignificant
<i>Albizia lophantha</i>	Considered, not listed				
<i>Alhagi maurorum</i> (=A. <i>pseudalhagi</i>)	Red Alert	A		Medium	Medium/Low
<i>Alternanthera philoxeroides</i>		A			Medium
<i>Ammophila arenaria</i>	A-1				High/Medium
<i>Anthemis cotula</i>					Medium/Insignificant
<i>Anthoxanthum odoratum</i>	Considered, not listed				
<i>Aptenia cordifolia</i>	Need More Info				
<i>Araujia sericifera</i>		B			
<i>Arctotheca calendula</i> (fertile strains)	Red Alert	A			

APPENDIX 2: Cal-IPC Species Listed by Other Rating Systems (continued)

Scientific Name	Cal-EPPC 1999	CDFA	USDA	Arizona	NatureServe
<i>Arundo donax</i>	A-1	*		High	High
<i>Asparagus asparagoides</i>					Low/Insignificant
<i>Asphodelus fistulosus</i>	Need More Info		✓	Low	
<i>Atriplex semibaccata</i>	A-2				High/Low
<i>Avena barbata</i>	Annual Grasses				
<i>Avena fatua</i>	Annual Grasses			Medium	High/Low
<i>Bassia hyssopifolia</i>	B				Low/Insignificant
<i>Bellardia trixago</i>	B				Medium/Insignificant
<i>Brachypodium sylvaticum</i>					High/Low
<i>Brassica nigra</i>	B				
<i>Brassica tournefortii</i>	A-2			Medium	High/Low
<i>Bromus diandrus</i>	Annual Grasses			Medium-Alert	
<i>Bromus madritensis</i> ssp. <i>rubens</i> (=B. <i>rubens</i>)	A-2			High	
<i>Bromus tectorum</i>	A-1			High	High
<i>Buddleja davidii</i>					High/Low
<i>Cardaria chalepensis</i> (=C. <i>draba</i> ssp. <i>chalepensis</i>)	B	B		Medium-Alert	
<i>Cardaria draba</i>	A-2	B		Medium-Alert	
<i>Cardaria pubescens</i>		B		Medium-Alert	
<i>Carduus acanthoides</i>	Need More Info	A			Medium/Low
<i>Carduus nutans</i>		A		Medium	High/Low
<i>Carduus pycnocephalus</i>	B	C			Medium
<i>Carduus tenuifolius</i>		C			Unknown
<i>Carpobrotus chilensis</i>	Considered, not listed				Medium
<i>Carpobrotus edulis</i>	A-1				High
<i>Carthamus lanatus</i>		B			
<i>Centaurea debeauxii</i> (=C. x <i>pratensis</i>)		A			
<i>Centaurea diffusa</i>		A		Medium	
<i>Centaurea maculosa</i> (=C. <i>bibersteinii</i>)	Red Alert	A		Medium	
<i>Centaurea melitensis</i>	B	C		Medium	Medium/Low
<i>Centaurea solstitialis</i>	A-1	C		High	High/Medium
<i>Centaurea virgata</i> ssp. <i>squarrosa</i> (=C. <i>squarrosa</i>)		A			
<i>Chondrilla juncea</i>		A		Medium-Alert	Medium/Insignificant
<i>Chorispora tenella</i>		B			Insignificant
<i>Cirsium arvense</i>	B	B		Medium	
<i>Cirsium vulgare</i>	B	*		Low	
<i>Cistus ladanifer</i>	Need More Info				
<i>Conicosia pugioniformis</i>	A-2				

APPENDIX 2: Cal-IPC Species Listed by Other Rating Systems (continued)

Scientific Name	Cal-EPPC 1999	CDFA	USDA	Arizona	NatureServe
<i>Conium maculatum</i>	B			Medium-Alert	Medium/Low
<i>Convolvulus arvensis</i>	Considered, not listed	C		Medium	Medium/Low
<i>Coprosma repens</i>	Considered, not listed				
<i>Cordyline australis</i>	Need More Info				
<i>Cortaderia jubata</i>	A-1	*			Medium
<i>Cortaderia selloana</i>	A-1			Medium	Medium/Low
<i>Cotoneaster franchetii</i>	Need More Info				
<i>Cotoneaster lacteus</i>	A-2				
<i>Cotoneaster pannosus</i>	A-2				Medium
<i>Crataegus monogyna</i>	B				
<i>Crocoshia x crocosmiiflora</i>	Considered, not listed				
<i>Crupina vulgaris</i>	Red Alert	A	✓		Medium/Low
<i>Cupressus macrocarpa</i>	Need More Info				
<i>Cynara cardunculus</i>	A-1	B			Medium
<i>Cynodon dactylon</i>		C		Medium	Medium/Low
<i>Cynoglossum officinale</i>				Low	Medium/Low
<i>Cytisus scoparius</i>	A-1	C			High/Medium
<i>Cytisus striatus</i>	A-2				
<i>Dactylis glomerata</i>					Medium/Insig
<i>Daucus carota</i>					Low
<i>Delairea odorata</i>	A-1	*			Medium
<i>Descurainia sophia</i>	Need More Info				Medium/Low
<i>Digitalis purpurea</i>	Considered, not listed				Medium/Insignificant
<i>Dimorphotheca sinuata</i>	Need More Info				
<i>Dipsacus fullonum</i>	Considered, not listed				High/Low
<i>Dipsacus sativus</i>	Considered, not listed				
<i>Echium candicans</i>	Need More Info				
<i>Egeria densa</i>	A-2	C			High/Medium
<i>Ehrharta calycina</i>	A-2				Medium/Low
<i>Ehrharta erecta</i>	B				Medium/Insignificant
<i>Ehrharta longiflora</i>	Need More Info				
<i>Eichhornia crassipes</i>	A-2			High-Alert	High
<i>Elaeagnus angustifolia</i>	A-2			High	High
<i>Emex spinosa</i>			✓		Insignificant
<i>Erechtites glomerata, E. minima</i>	B				Medium/Insignificant
<i>Erica lusitanica</i>	Need More Info				
<i>Erodium brachycarpum</i>					Insignificant

APPENDIX 2: Cal-IPC Species Listed by Other Rating Systems (continued)

Scientific Name	Cal-EPPC 1999	CDFA	USDA	Arizona	NatureServe
<i>Erodium cicutarium</i>				Medium	Medium/Low
<i>Eucalyptus globulus</i>	A-1				Medium
<i>Euphorbia esula</i>	A-2	A		High-Alert	High/Medium
<i>Euphorbia lathyris</i>	Need More Info				
<i>Euphorbia oblongata</i>		B			
<i>Festuca arundinacea</i>	B				
<i>Ficus carica</i>	A-2				Medium
<i>Foeniculum vulgare</i>	A-1				Medium/Low
<i>Fumaria officinalis</i>	Considered, not listed				
<i>Gazania linearis</i>	Need More Info				
<i>Genista monspessulana</i>	A-1	C			Medium
<i>Glyceria declinata</i>	Need More Info				
<i>Halogeton glomeratus</i>	Red Alert	A			High/Medium
<i>Hedera helix</i>	B				High/Medium
<i>Hedera canariensis</i>	Need More Info				
<i>Helichrysum petiolare</i>	Red Alert				
<i>Hirschfeldia incana</i>	Need More Info				High/Low
<i>Holcus lanatus</i>	B				
<i>Hordeum marinum, H. murinum</i>				Medium	High/Low
<i>Hydrilla verticillata</i>	Red Alert	A	✓	Not listed	High/Medium
<i>Hypericum canariense</i>	Need More Info				Low
<i>Hypericum perforatum</i>	B	C			High/Medium
<i>Hypochaeris radicata</i>	Need More Info				High/Low
<i>Ilex aquifolium</i>	B				High/Low
<i>Iris pseudacorus</i>	B				
<i>Isatis tinctoria</i>	Need More Info	B			High/Low
<i>Lactuca serriola</i>					Low/Insignificant
<i>Lepidium latifolium</i>	A-1	B		High-Alert	High
<i>Leucanthemum vulgare</i>	B			Low	Medium/Low
<i>Ligustrum lucidum</i>	Need More Info				
<i>Limonium ramosissimum</i> ssp. <i>provinciale</i>	Need More Info				
<i>Linaria genistifolia</i> ssp. <i>dalmatica</i> (= <i>L. dalmatica</i>)		A		Medium-Alert	
<i>Lolium multiflorum</i>	Annual Grasses				
<i>Lotus corniculatus</i>					Medium/Low
<i>Ludwigia hexapetala</i> (= <i>L. uruguayensis</i>)	Need More Info				
<i>Lupinus arboreus</i>	A-2				
<i>Lythrum salicaria</i>	Red Alert	B			

APPENDIX 2: Cal-IPC Species Listed by Other Rating Systems (continued)

Scientific Name	Cal-EPPC 1999	CDFA	USDA	Arizona	NatureServe
<i>Malephora crocea</i>	Need More Info				
<i>Marrubium vulgare</i>					Medium/Low
<i>Maytenus boaria</i>	Need More Info				
<i>Medicago polymorpha</i>	Considered, not listed				
<i>Melilotus officinalis</i>	Considered, not listed			Medium	Medium/Low
<i>Mentha pulegium</i>	A-2				
<i>Mesembryanthemum crystallinum</i>	B			Low	
<i>Mesembryanthemum nodiflorum</i>	Need More Info			Medium-Alert	
<i>Myoporum laetum</i>	A-2				
<i>Myriophyllum aquaticum</i>	B			High-Alert	High/Medium
<i>Myriophyllum spicatum</i>	A-1			High-Alert	High
<i>Nerium oleander</i>	Considered, not listed				Low/Insignificant
<i>Nicotiana glauca</i>	Need More Info				High/Low
<i>Olea europaea</i>	B				
<i>Ononis alopecuroides</i>	Red Alert	Q			
<i>Onopordum acanthium</i>		A		Low	
<i>Oxalis pes-caprae</i>	Need More Info				
<i>Parentucellia viscosa</i>	Need More Info				
<i>Passiflora caerulea</i>	Need More Info				
<i>Pennisetum clandestinum</i>	Need More Info	C	✓		
<i>Pennisetum setaceum</i>	A-1			High	High/Medium
<i>Phalaris aquatica</i>	B				
<i>Picris echioides</i>	Considered, not listed				
<i>Pinus radiata</i> cultivars	Need More Info				
<i>Piptatherum miliaceum</i>	Need More Info				
<i>Pistachia chinensis</i>	Need More Info				
<i>Pittosporum undulatum</i>					High/Low
<i>Plantago lanceolata</i>					High/Low
<i>Polygonum cuspidatum</i> (=Fallopia japonica)		B			
<i>Polygonum sachalinense</i>					High/Medium
<i>Polypogon monspeliensis</i> and subspp.					High/Low
<i>Potamogeton crispus</i>	B				Medium
<i>Prunus cerasifera</i>	Need More Info				Medium/Insignificant
<i>Pyracantha angustifolia, crenulata, coccinea, etc.</i>	Need More Info				Hi/Low, Low/Insig
<i>Ranunculus repens</i>					High/Medium
<i>Retama monosperma</i>	Red Alert				
<i>Ricinus communis</i>	B				

APPENDIX 2: Cal-IPC Species Listed by Other Rating Systems (continued)

Scientific Name	Cal-EPPC 1999	CDFA	USDA	Arizona	NatureServe
<i>Robinia pseudoacacia</i>	B				
<i>Rubus armeniacus</i> (=R. <i>discolor</i>)	A-1			Medium-Alert	Medium/Insignificant
<i>Salsola paulsenii</i>		C		Medium	Low
<i>Salsola soda</i>	Need More Info				
<i>Salsola tragus</i> (=S. <i>kali</i>)	Need More Info	C		Medium	
<i>Salvia aethiops</i>	Need More Info	B			Low
<i>Salvinia molesta</i>	Red Alert		✓	High-Alert	Medium
<i>Sapium sebiferum</i>	Red Alert				
<i>Saponaria officinalis</i>	A-2				Low/Insignificant
<i>Schimus molle</i>	B				Medium/Low
<i>Schimus terebinthifolius</i>	B				
<i>Schismus arabicus</i> , <i>S. barbatus</i>	Annual Grasses			Medium	Medium, Hi/Medium
<i>Senecio jacobaea</i>	B	B			Low
<i>Sesbania punicea</i>	Red Alert				
<i>Silybum marianum</i>	Considered, not listed				Medium/Low
<i>Sisymbrium irio</i>					Medium/Insignificant
<i>Solanum elaeagnifolium</i>		B			
<i>Sonchus asper</i>				Medium	
<i>Spartina alterniflora</i> hybrids	A-2				
<i>Spartina anglica</i>	Red Alert				
<i>Spartina densiflora</i>	Red Alert				High/Medium
<i>Spartina patens</i>	Red Alert				
<i>Spartium junceum</i>	B	*			
<i>Stipa capensis</i>	Need More Info				
<i>Taeniatherum caput-medusae</i>	A-1	C			High
<i>Tamarix aphylla</i>	Need More Info			Low	
<i>Tamarix parviflora</i>	A-1	*			
<i>Tamarix ramosissima</i>	A-1	*		High	High
<i>Tanacetum vulgare</i>	Need More Info				Low
<i>Ulex europaeus</i>	A-1	B			
<i>Ulmus pumila</i>				Medium	Medium/Low
<i>Verbascum thapsus</i>	B			Not listed	Medium
<i>Verbena bonariensis</i> , <i>V. litoralis</i>	Need More Info				
<i>Vinca major</i>	B			Medium-Alert	
<i>Zantedeschia aethiopica</i>	Considered, not listed				Medium/Low
<i>Zoysia</i> spp.	Considered, not listed				

*Under consideration. Not yet rated.

APPENDIX 3. Examples of Ecological Types

These ecological types were used to score the Distribution section of plant assessment forms. Adapted from “Preliminary Descriptions of the Terrestrial Natural Communities of California” drafted by R. F. Holland for the California Department of Fish and Game (1986). Communities within minor ecotypes include all those listed in Holland (1986). Additional information from Sawyer, J. O., and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society: Sacramento, CA.

Major Ecological Types	Minor Ecological Types	Communities within Minor Ecotypes
Marine Systems	marine systems	kelp and other macroalgae
	lakes, ponds, reservoirs	submergent and emergent vegetation in standing water
Freshwater and Estuarine Aquatic Systems	rivers, streams, canals	submergent and emergent vegetation in moving ephemeral, intermittent or perennial water
	estuaries	submergent vegetation in estuaries (seagrass beds)
	coastal	foredunes, dune scrub
Dunes	desert	desert dunes and sand fields
	interior	interior and relictual dunes, primarily in the Great Valley
	coastal bluff scrub	northern and southern coastal bluff scrub
Scrub and Chaparral	coastal scrub	coyote bush, salal, silk-tassel, coastal sage, maritime succulent, Diegan coastal, Diablan, and Riversidian sage scrubs
	Sonoran desert scrub	Sonoran creosote bush, Sonoran mixed woody and succulent scrubs
	Mojavean desert scrub	Mojave creosote bush, blackbush, Mojave mixed woody, Mojave mixed steppe, and Mojave wash scrubs; Joshua tree woodland
	Great Basin scrub	big sagebrush and rabbitbrush scrubs; sagebrush steppe
	chenopod scrub	desert saltbush, desert sink, desert greasewood, shadscale, valley sink, and valley saltbush scrubs
	montane dwarf scrub	low sagebrush series
	Upper Sonoran subshrub scrub	bladderpod-California ephedra-narrowleaf goldenbush series
	chaparral	mixed, redshank, semi-desert, and montane (mixed, ceanothus, manzanita) chaparrals; chamise
	coastal prairie	coastal terrace and bald hills prairies
	valley and foothill grassland	valley needlegrass, valley sacaton, serpentine bunchgrass, valley wildrye and, pine bluegrass grasslands
Grasslands, Vernal Pools, Meadows, and other Herb Communities	Great Basin grassland	open, steppe-like vegetation of perennial bunchgrasses
	vernal pool	hardpan, claypan, basalt flow, and San Diego mesa vernal pools
	meadow and seep	wet or dry montane meadows; wet or dry subalpine or alpine meadows; alkali meadows and seeps; freshwater seep
	alkali playa	low, grayish, microphyllous, and succulent shrubs primarily in transmontane deserts
	pebble plain	dense clay soils with quartzite pebbles

APPENDIX 3: Examples of Ecological Types (continued)

Major Ecological Types	Minor Ecological Types	Communities within Minor Ecotypes
Bog and Marsh	bog and fen	sphagnum bog, Darlingtonia bog, fen
	marsh and swamp	salt, brackish, freshwater, transmontane alkali, and vernal marshes; freshwater swamp
Riparian and Bottomland	riparian forest	cottonwood, cottonwood-sycamore, red alder, white alder, aspen, willow, live oak, valley oak, Mojave, and mixed riparian forests; mesquite bosque
	riparian woodland	sycamore, sycamore-alder, desert dry wash, and fan palm oasis woodlands
	riparian scrub	riparian, mulefat, willow, mesquite, and buttonbush, desert wash, tamarisk and arrowweed scrubs; elderberry savanna; desert washes
Woodland	cismontane	blue oak, coast live oak, interior live oak, valley oak, island oak, California walnut, and foothill pine woodlands
	piñon and juniper	juniper woodland and scrub, pinon woodland
	Sonoran thorn	crucifixion thorn and Arizona woodlands
Forest	broadleaved upland	mixed evergreen, California bay, coast live oak, black oak, tan oak, red alder, and aspen forests
	North Coast coniferous	redwood, Sitka spruce-grand fir, western hemlock, Douglas-fir, and Port Orford Cedar forests
	closed cone coniferous	beach pine, bishop pine, Monterey pine, Torrey pine, Monterey cypress, pygmy cypress, interior cypress, knobcone pine forests
	lower montane coniferous	Coast Range coniferous, Klamath coniferous, ponderosa pine, Coulter pine, white pine, white fir, and big tree forests
	upper montane coniferous	Jeffrey pine, upper montane mixed coniferous, upper montane fir, and Klamath enriched coniferous forests
	subalpine coniferous	lodgepole pine, whitebark pine, foxtail pine, bristlecone pine, and limber pine forests
Alpine Habitats	alpine boulder and rock field	fell-field, talus and scree slope, snow margin
	alpine dwarf scrub	shrub dominated communities above the treeline

APPENDIX 4. Species by Common Name

Includes Species from Tables 1, 2, 3 and 4.

acacia, blackwood	<i>Acacia melanoxylon</i>	camelthorn	<i>Alhagi maurorum</i> (=A. <i>pseudalhagi</i>)
acacia, plume	<i>Albizia lophantha</i>	canarygrass, reed	<i>Phalaris arundinacea</i>
alligatorweed	<i>Alternanthera philoxeroides</i>	Cape-ivy	<i>Delairea odorata</i> (= <i>Senecio mikanioides</i>)
alyssum, sweet	<i>Lobularia maritima</i>	capeweed, fertile	<i>Arctotheca calendula</i> (fertile)
asparagus, smilax	<i>Asparagus asparagoides</i>	capeweed, sterile	<i>Arctotheca calendula</i> (sterile)
barberry, Darwin	<i>Berberis darwinii</i>	carrot, wild	<i>Daucus carota</i>
barbwire Russian-thistle	<i>Salsola paulsenii</i>	castorbean	<i>Ricinus communis</i>
barley, Mediterranean	<i>Hordeum marinum</i> ,	catalpa, southern	<i>Catalpa bignonioides</i>
barley, wall	<i>Hordeum murinum</i>	catsear, rough	<i>Hypochaeris radicata</i>
beachgrass, European	<i>Ammophila arenaria</i>	catsear, smooth	<i>Hypochaeris glabra</i>
beardgrass, annual	<i>Polypogon monspeliensis</i> and subspp.	chamomile, mayweed	<i>Anthemis cotula</i>
bellardia	<i>Bellardia trixago</i>	charlock	<i>Sinapis arvensis</i>
bentgrass, creeping	<i>Agrostis stolonifera</i>	cheatgrass	<i>Bromus tectorum</i>
bentgrass, Pacific	<i>Agrostis avenacea</i>	cherry plum	<i>Prunus cerasifera</i>
bermudagrass	<i>Cynodon dactylon</i>	Chinese tallotree	<i>Sapium sebiferum</i>
bindweed, field	<i>Convolvulus arvensis</i>	clover, California bur	<i>Medicago polymorpha</i>
birdsfoot trefoil	<i>Lotus corniculatus</i>	clover, rose	<i>Trifolium hirtum</i>
blackberry, Armenian	<i>Rubus armeniacus</i> (=R. <i>discolor</i>)	cordgrass, Atlantic	<i>Spartina alterniflora</i>
blackberry, Himalaya	<i>Rubus armeniacus</i> (=R. <i>discolor</i>)	cordgrass, common	<i>Spartina anglica</i>
bladderflower	<i>Araujia sericifera</i>	cordgrass, dense-flowered	<i>Spartina densiflora</i>
bluegrass, Kentucky	<i>Poa pratensis</i>	cordgrass, saltmeadow	<i>Spartina patens</i>
blue gum, Tasmanian	<i>Eucalyptus globulus</i>	cordgrass, smooth	<i>Spartina alterniflora</i> hybrids
bouncingbet	<i>Saponaria officinalis</i>	cotoneaster, orange	<i>Cotoneaster franchetii</i>
brassbuttons	<i>Cotula coronopifolia</i>	cotoneaster, Parney's	<i>Cotoneaster lacteus</i>
brome, downy	<i>Bromus tectorum</i>	cotoneaster, silverleaf	<i>Cotoneaster pannosus</i>
brome, red	<i>Bromus madritensis</i> ssp. <i>rubens</i> (=B. <i>rubens</i>)	creeper, Australian bluebell	<i>Sollya heterophylla</i>
brome, ripgut	<i>Bromus diandrus</i>	creeper, bearded	<i>Crupina vulgaris</i>
brome, soft	<i>Bromus hordeaceus</i>	creeper, bridal	<i>Asparagus asparagoides</i>
broom, bridal	<i>Retama monosperma</i>	creep, hoary	<i>Cardaria draba</i>
broom, French	<i>Genista monspessulana</i>	croftonweed	<i>Ageratina adenophora</i>
broom, Portuguese	<i>Cytisus striatus</i>	crupina, common	<i>Crupina vulgaris</i>
broom, Scotch	<i>Cytisus scoparius</i>	cypress, Monterey	<i>Cupressus macrocarpa</i>
broom, Spanish	<i>Spartium junceum</i>	daisy, African	<i>Dimorphotheca sinuata</i>
broom, striated	<i>Cytisus striatus</i>	daisy, corn	<i>Chrysanthemum segetum</i>
buckwheat, California	<i>Eriogonum fasciculatum</i>	daisy, crown	<i>Chrysanthemum coronarium</i>
burclover, California	<i>Medicago polymorpha</i>	daisy, English	<i>Bellis perennis</i>
burnweed, Australian	<i>Erechtites glomerata</i> , <i>E. minima</i>	daisy, Mexican	<i>Erigeron karvinskianus</i>
buttercup, Bermuda	<i>Oxalis pes-caprae</i>	daisy, oxeye	<i>Leucanthemum vulgare</i>
buttercup, creeping	<i>Ranunculus repens</i>	daisybush, shrubby	<i>Osteospermum fruticosum</i>
butterflybush	<i>Buddleja davidii</i>	dandelion, common	<i>Taraxacum officinale</i>
cabbage	<i>Brassica oleracea</i>	dandelion, hairy	<i>Hypochaeris radicata</i>
cabbage tree, New Zealand	<i>Cordyline australis</i>	devil's thorn	<i>Emex spinosa</i>
calla lily	<i>Zantedeschia aethiopica</i>	dock, curly	<i>Rumex crispus</i>
		dogtailgrass, hedgehog	<i>Cynosurus echinatus</i>
		dracaena, giant	<i>Cordyline australis</i>
		dyer's woad	<i>Isatis tinctoria</i>
		egeria, Brazilian	<i>Egeria densa</i>

APPENDIX 4: Species by Common Name (continued)

elm, Chinese	<i>Ulmus parvifolia</i>	houndstongue	<i>Cynoglossum officinale</i>
elm, Siberian	<i>Ulmus pumila</i>	hydrilla	<i>Hydrilla verticillata</i>
emex, spiny	<i>Emex spinosa</i>	hypericum, Canary Island	<i>Hypericum canariense</i>
eupatorium	<i>Ageratina adenophora</i>	iceplant	<i>Carpobrotus chilensis</i>
false-brome, perennial	<i>Brachypodium sylvaticum</i>	iceplant	<i>Carpobrotus edulis</i>
fennel	<i>Foeniculum vulgare</i>	iceplant, crystalline	<i>Mesembryanthemum crystallinum</i>
fennel, dog	<i>Anthemis cotula</i>	iceplant, heartleaf	<i>Aptenia cordifolia</i>
fescue, rattail	<i>Vulpia myuros</i>	iceplant, narrowleaf	<i>Conicosia pugioniformis</i>
fescue, squirreltail	<i>Vulpia bromoides</i>	iceplant, slenderleaf	<i>Mesembryanthemum nodiflorum</i>
fescue, tall	<i>Festuca arundinacea</i>	iris, yellowflag	<i>Iris pseudacorus</i>
fig, edible	<i>Ficus carica</i>	ivy, Algerian	<i>Hedera canariensis</i>
filaree, broadleaf	<i>Erodium botrys</i>	ivy, English	<i>Hedera helix</i>
filaree, redstem	<i>Erodium cicutarium</i>	jessamine, willow	<i>Cestrum parqui</i>
filaree, shortfruited	<i>Erodium brachycarpum</i>	jointvetch, rough	<i>Aeschynomene rudis</i>
filaree, whitestem	<i>Erodium moschatum</i>	jubatagrass	<i>Cortaderia jubata</i>
firethorn	<i>Pyracantha</i> spp.	kangaroothorn	<i>Acacia paradoxa</i>
fireweed, Australian	<i>Erechtites glomerata</i> , <i>E. minima</i>	kikuyugrass	<i>Pennisetum clandestinum</i>
fivehook bassia	<i>Bassia hyssopifolia</i>	klamathweed	<i>Hypericum perforatum</i>
flixweed	<i>Descurainia sophia</i>	knapweed, diffuse	<i>Centaurea diffusa</i>
forget-me-not, common	<i>Myosotis latifolia</i>	knapweed, meadow	<i>Centaurea debeauxii</i> (=C. \times <i>pratensis</i>)
fountaingrass, crimson	<i>Pennisetum setaceum</i>	knapweed, Russian	<i>Acroptilon repens</i>
foxglove	<i>Digitalis purpurea</i>	knapweed, spotted	<i>Centaurea maculosa</i> (=C. <i>bibersteinii</i>)
foxtail restharrow	<i>Ononis alopecuroides</i>	knapweed, squarrose	<i>Centaurea virgata</i> ssp. <i>squarrosa</i> (=C. <i>squarrosa</i>)
fumitory	<i>Fumaria officinalis</i>	knotweed, Japanese	<i>Polygonum cuspidatum</i> (=Fallopija <i>japonica</i>)
garlic, false	<i>Nothoscordum gracile</i>	knotweed, Sakhalin	<i>Polygonum sachalinense</i>
gazania	<i>Gazania linearis</i>	kochia	<i>Kochia scoparia</i>
geranium, cutleaf	<i>Geranium dissectum</i>	leek, three-cornered	<i>Allium triquetrum</i>
geranium, dovefoot	<i>Geranium molle</i>	lettuce, prickly	<i>Lactuca serriola</i>
geranium, New Zealand	<i>Geranium retrorsum</i>	licoriceplant	<i>Helichrysum petiolare</i>
geranium, Robert	<i>Geranium robertianum</i>	locust, black	<i>Robinia pseudoacacia</i>
German-ivy	<i>Delairea odorata</i>	locust, honey	<i>Gleditsia triacanthos</i>
glandweed, yellow	<i>Parentucellia viscosa</i>	London rocket	<i>Sisymbrium irio</i>
glasswort	<i>Salsola soda</i>	loosestrife, hyssop	<i>Lythrum hyssopifolium</i>
goatgrass, barb	<i>Aegilops triuncialis</i>	loosestrife, purple	<i>Lythrum salicaria</i>
gorse	<i>Ulex europaeus</i>	lupine, yellow bush	<i>Lupinus arboreus</i>
grass, rabbitfoot	<i>Polypogon monspeliensis</i>	mannagrass, waxy	<i>Glyceria declinata</i>
gumweed, curlycup	<i>Grindelia squarrosa</i>	mayten	<i>Maytenus boaria</i>
hairgrass, European	<i>Aira praecox</i>	Mediterranean grass	<i>Schismus arabicus</i> , <i>S. barbatus</i>
hairgrass, silver	<i>Aira caryophyllea</i>	Mediterranean sage	<i>Salvia aethiops</i>
halogeton	<i>Halogeton glomeratus</i>	medusahead	<i>Taeniatherum caput-medusae</i>
hardinggrass	<i>Phalaris aquatica</i>	mesembryanthemum, coppery	<i>Malephora crocea</i>
hawksbeard, smooth	<i>Crepis capillaris</i>	milkthistle, blessed	<i>Silybum marianum</i>
hawthorn, English	<i>Crataegus monogyna</i>	mirrorplant, creeping	<i>Coprosma repens</i>
heath, Spanish	<i>Erica lusitanica</i>		
hedgearsley	<i>Torilis arvensis</i>		
herb-robert	<i>Geranium robertianum</i>		
holly, English	<i>Ilex aquifolium</i>		
horehound, white	<i>Marrubium vulgare</i>		
Hottentot-fig	<i>Carpobrotus edulis</i>		

APPENDIX 4: Species by Common Name (continued)

montbretia	<i>Crocosmia x crocosmiiflora</i>	polypogon, rabbitfoot	<i>Polypogon monspeliensis</i> and subspp.
mullein, common	<i>Verbascum thapsus</i>	pondweed, curlyleaf	<i>Potamogeton crispus</i>
mullein, woolly	<i>Verbascum thapsus</i>	pride-of-Madeira	<i>Echium candicans</i>
mustard, birdsrape	<i>Brassica rapa</i>	privet, glossy	<i>Ligustrum lucidum</i>
mustard, black	<i>Brassica nigra</i>	pyracantha	<i>Pyracantha</i> spp.
mustard, blue	<i>Chorispora tenella</i>	quackinggrass, big	<i>Briza maxima</i>
mustard, field	<i>Brassica rapa</i>	Queen Anne's lace	<i>Daucus carota</i>
mustard, Saharan	<i>Brassica tournefortii</i>	radish	<i>Raphanus sativus</i>
mustard, shortpod	<i>Hirschfeldia incana</i>	ragwort, tansy	<i>Senecio jacobaea</i>
mustard, summer	<i>Hirschfeldia incana</i>	rattlesnakegrass	<i>Briza maxima</i>
mustard, tansy	<i>Descurainia sophia</i>	red gum	<i>Eucalyptus camaldulensis</i>
mustard, wild	<i>Sinapis arvensis</i>	redhot poker	<i>Kniphofia uvaria</i>
myoporum	<i>Myoporum laetum</i>	reed, common	<i>Phragmites australis</i>
nasturtium, garden	<i>Tropaeolum majus</i>	reed, giant	<i>Arundo donax</i>
nightshade, silverleaf	<i>Solanum elaeagnifolium</i>	rockrose, gum	<i>Cistus ladanifer</i>
oat, slender wild	<i>Avena barbata</i>	rose, baby sun	<i>Aptenia cordifolia</i>
oat, wild	<i>Avena fatua</i>	Russian-thistle	<i>Salsola tragus</i>
oleander	<i>Nerium oleander</i>	ryegrass, Italian	<i>Lolium multiflorum</i>
olive, Russian-	<i>Elaeagnus angustifolia</i>	salsify, yellow	<i>Tragopogon dubius</i>
olive	<i>Olea europaea</i>	saltbush, Australian	<i>Atriplex semibaccata</i>
onionweed	<i>Asphodelus fistulosus</i>	saltcedar	<i>Tamarix ramosissima</i>
orchardgrass	<i>Dactylis glomerata</i>	salvinia, giant	<i>Salvinia molesta</i>
oxalis, buttercup	<i>Oxalis pes-caprae</i>	sea-fig	<i>Carpobrotus chilensis</i>
oxalis, yellow	<i>Oxalis pes-caprae</i>	sea-lavender	<i>Limonium ramoissimum</i> ssp. <i>provinciale</i>
oxtongue, bristly	<i>Picris echioides</i>	sea-rocket, European	<i>Cakile maritima</i>
palm, Canary Island date	<i>Phoenix canariensis</i>	sesbania, red	<i>Sesbania punicea</i>
palm, date	<i>Phoenix dactylifera</i>	skeletonweed, rush	<i>Chondrilla juncea</i>
palm, Mexican fan	<i>Washingtonia robusta</i>	smilgrass	<i>Piptatherum miliaceum</i>
palm, Washington	<i>Washingtonia robusta</i>	sorrel, red	<i>Rumex acetosella</i>
paloverde, Mexican	<i>Parkinsonia aculeata</i>	sorrel, sheep	<i>Rumex acetosella</i>
pampasgrass	<i>Cortaderia selloana</i>	sowthistle, spiny	<i>Sonchus asper</i>
parentucellia, sticky	<i>Parentucellia viscosa</i>	speargrass, twisted-awned	<i>Stipa capensis</i>
parrotfeather	<i>Myriophyllum aquaticum</i>	spiny emex	<i>Emex spinosa</i>
passionflower, blue	<i>Passiflora caerulea</i>	spurge, caper	<i>Euphorbia lathyris</i>
pea, perennial sweet	<i>Lathyrus latifolius</i>	spurge, carnation	<i>Euphorbia terracina</i>
pea, Tangier	<i>Lathyrus tingitanus</i>	spurge, leafy	<i>Euphorbia esula</i>
pennyroyal	<i>Mentha pulegium</i>	spurge, oblong	<i>Euphorbia oblongata</i>
peppertree, Brazilian	<i>Schinus terebinthifolius</i>	St. Johnswort, common	<i>Hypericum perforatum</i>
peppertree, Peruvian	<i>Schinus molle</i>	starthistle, Malta	<i>Centaurea melitensis</i>
pepperweed, perennial	<i>Lepidium latifolium</i>	starthistle, purple	<i>Centaurea calcitrapa</i>
periwinkle, big	<i>Vinca major</i>	starthistle, yellow	<i>Centaurea solstitialis</i>
pine, Monterey	<i>Pinus radiata</i> cultivars	steppeggrass, Mediterranean	<i>Stipa capensis</i>
pistache, Chinese	<i>Pistachia chinensis</i>	stinkwort	<i>Dittrichia graveolens</i>
plantain, buckhorn	<i>Plantago lanceolata</i>	sweetclover, Indian	<i>Melilotus indicus</i>
plantain, cutleaf	<i>Plantago coronopus</i>	sweetclover, yellow	<i>Melilotus officinalis</i>
plantain, English	<i>Plantago lanceolata</i>	sweetpea, perennial	<i>Lathyrus latifolius</i>
plum, wild	<i>Prunus cerasifera</i>	tallowtree, Chinese	<i>Sapium sebiferum</i>
poison-hemlock	<i>Conium maculatum</i>		
pokeweed	<i>Phytolacca americana</i>		

APPENDIX 4: Species by Common Name (continued)

tamarisk	<i>Tamarix ramosissima</i>	velvetgrass, common	<i>Holcus lanatus</i>
tamarisk, athel	<i>Tamarix aphylla</i>	vernalgrass, sweet	<i>Anthoxanthum odoratum</i>
tamarisk, smallflower	<i>Tamarix parviflora</i>	vervain, seashore	<i>Verbena litoralis</i>
tansy, common	<i>Tanacetum vulgare</i>	vervain, tall	<i>Verbena bonariensis</i>
tea tree, Australian	<i>Leptospermum laevigatum</i>	vetch, hairy	<i>Vicia villosa</i>
teasel, fuller's	<i>Dipsacus sativus</i>	Victorian box	<i>Pittosporum undulatum</i>
teasel, wild	<i>Dipsacus fullonum</i>	wakame	<i>Undaria pinnatifida</i>
thistle, artichoke	<i>Cynara cardunculus</i>	water hyacinth	<i>Eichhornia crassipes</i>
thistle, bull	<i>Cirsium vulgare</i>	waterlily, fragrant	<i>Nymphaea odorata</i>
thistle, Canada	<i>Cirsium arvense</i>	watermilfoil, Eurasian	<i>Myriophyllum spicatum</i>
thistle, Italian	<i>Carduus pycnocephalus</i>	water-primrose, creeping	<i>Ludwigia peploides</i> ssp.
thistle, musk	<i>Carduus nutans</i>		<i>montevidensis</i>
thistle, plumeless	<i>Carduus acanthoides</i>	water-primrose, Uruguay	<i>Ludwigia hexapetala</i>
thistle, Scotch	<i>Onopordum acanthium</i>		(= <i>L. uruguayensis</i>)
thistle, slenderflower	<i>Carduus tenuifolius</i>	watsonia	<i>Watsonia borbonica</i>
thistle, woolly distaff	<i>Carthamus lanatus</i>	watsonia, bulbil	<i>Watsonia meriana</i>
toadflax, Dalmatian	<i>Linaria genistifolia</i> ssp.	whitetop, hairy	<i>Cardaria pubescens</i>
	<i>dalmatica</i> (= <i>L. dalmatica</i>)	whitetop, lens-podded	<i>Cardaria chalepensis</i>
	<i>Nicotiana glauca</i>		(= <i>C. draba</i> ssp. <i>chalepensis</i>)
tobacco, tree	<i>Centaurea melitensis</i>	whitetop, tall	<i>Lepidium latifolium</i>
tocalote	<i>Ailanthus altissima</i>	wisteria, scarlet	<i>Sesbania punicea</i>
tree-of-heaven	<i>Ailanthus altissima</i>	woodsorrel, creeping	<i>Oxalis corniculata</i>
veldtgrass, erect	<i>Ehrharta erecta</i>	zoysiagrass	<i>Zoysia</i> spp.
veldtgrass, long-flowered	<i>Ehrharta longiflora</i>		
veldtgrass, purple	<i>Ehrharta calycina</i>		



The Nation Park Service's Exotic Plant Management Team removes satellite infestations of *Centaurea solstitialis* (yellow starthistle) to prevent the plant's spread. (Photo by Bobbi Simpson, Point Reyes National Seashore)

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*Circular clones of *Spartina alterniflora* x *foliosa* (smooth cordgrass hybrid) spread in San Francisco Bay. (Photo by Stephen Joseph, Invasive Spartina Project)*

Appendix I Lake Stream and River Work Condition

When working in or adjacent to the bed, channel, or bank of any river, stream, or lake regulated pursuant to Fish and Game Code Sections 1600-1616, the Water Authority will implement the following work conditions to avoid or minimize substantial adverse effects:

1. CDFG employees are authorized to conduct on-site inspections relevant to San Diego County Water Authority NCCP/HCP Section 6.6.1.1, upon reasonable notice.
2. Silty/turbid water shall not be discharged into the stream. Such water shall be settled, filtered, or otherwise treated prior to discharge. The Crew's/Contractor's ability to minimize turbidity/siltation shall be the subject of pre-construction planning and design feature implementation.
3. Preparation shall be made so that runoff from steep, erodible surfaces will be diverted into stable areas with little erosion potential. Frequent water checks shall be placed on dirt roads, cat tracks, or other work trails to control erosion.
4. Water containing mud, silt, or other pollutants from equipment washing or other activities shall not be allowed to enter a lake or flowing stream or placed in locations that may be subjected to high storm flows.
5. If off-stream siltation pond(s) is/are used to control sediment, pond(s) shall be constructed in a location, or shall be designed, such that potential spills into the stream/lake during periods of high water levels/flow are precluded.
6. If silt catchment basin(s) is/are used, the basin(s) shall be constructed across the stream immediately downstream of the project site. Catchment basins shall be constructed of materials that are free from mud and silt. Upon completion of the project, all basin materials along with the trapped sediments shall be removed from the stream in such a manner that said removal shall not introduced sediment to the stream.
7. Silt settling basins shall be located away from the stream or lake to prevent discolored, silt-bearing water from reaching the stream or lake during any flow regime.

8. Notwithstanding the use of silt catchment basins, upon Department determination that turbidity/siltation levels resulting from project related activities constitute a significant threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective Department approved control devices are installed or abatement procedures are initiated.
9. Precautions to minimize turbidity/siltation shall be taken into account during project planning and shall be installed prior to construction. This may require that the work site be isolated and that water be diverted around the work area by means of a barrier, temporary culvert, new channel, or other means approved by CDFG. Precautions may also include placement of silt fencing, straw bales, sand bags, and/or the construction of silt catchment basins so that silt or other deleterious materials are not allowed to pass to downstream reaches. The method used to prevent siltation shall be monitored and cleaned/repared weekly, or more frequently if warranted by local conditions. CDFG shall provide any determinations or approvals in writing within 14 days of receiving from the Water Authority or its agents a written request which includes a plan sheet or diagram indicating how the work site will be isolated.
10. No equipment shall be operated in ponded or flowing areas except as otherwise addressed in Water Authority project's Notification of Lake or Streambed Alteration application, contract specifications, and any applicable regulatory permits.
11. Rock, gravel, and/or other materials shall not be imported to, taken from, or moved within the bed or banks of the stream except as otherwise specifically identified in the project's Notification of Lake or Streambed Alteration application.
12. Temporary fills shall be constructed of nonerodible materials and shall be removed immediately upon work completion.
13. If operations require moving equipment across a flowing stream, such operations shall be conducted without substantially increasing stream turbidity. Where repeated crossings could result in a substantial increase in stream turbidity, the Water Authority shall install a permanent or temporary bridge, culvert, or rock-fill crossing as approved by the Water Authority Project Engineer.
14. If a stream channel and/or gradient have been temporarily altered during construction, it shall be returned as nearly as possible to pre-project conditions without creating a possible future bank erosion problem. If a lake margin has been altered, it shall be returned as nearly as possible to pre-project conditions without creating a future bank erosion problem.

15. Structures and associated materials not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
16. Spoil sites shall not be located within a stream/lake, or where spoil shall be washed back into a stream/lake, or where it will cover aquatic or riparian vegetation, unless the site is specifically identified in the project's Notification of Lake or Streambed Alteration application.
17. Staging/storage areas for equipment and materials shall be located outside of the stream, unless the area is specifically identified in the project's Notification of Lake or Streambed Alteration application.
18. Access to the work site shall be via existing roads and access ramps when legally available to the Water Authority and its contractors for such use.
19. No equipment maintenance shall be done within or near any stream channel where petroleum products or other pollutants from the equipment may enter these areas under any flow.
20. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.
21. The Water Authority and its contractors, subcontractors, and employees shall comply with all litter and pollution laws. It is the responsibility of the Water Authority to ensure compliance.
22. Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.
23. Stationary equipment such as motors, pumps, generators, and welders located within or adjacent to the stream/lake shall be positioned over drip pans or confined within berms capable of containing any spills.
24. The clean-up of all spills shall begin immediately. CDFG shall be notified immediately by the Water Authority of any spills that affect aquatic habitat, and shall be consulted regarding clean-up procedures.

25. Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.
26. Installation of bridges, culverts, or other structures shall be such that water flow is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade, and bottoms of permanent culverts shall be placed below stream channel grade. Excavation of the streambed and banks shall be limited to the extent necessary, as determined by the Water Authority Project Engineer, to install bottoms of culverts below stream grade. Temporary culverts placed on existing streambed grade shall be done so with minimal disturbance.
27. The inlet and outlet of all permanent culverts shall be protected by the placement of head walls that shall be constructed of rock riprap, gabions, concrete, or other suitable nonerodible material as determined by the Water Authority project engineer. To prevent undercutting, the head walls shall be keyed in place. To prevent erosion, energy dissipaters will be installed.
28. Culverts shall be long enough to extend completely beyond the toe of the fill (unless both the up and downstream sides of the fill are adequately protected to the maximum high-water mark).
29. All in-stream structures shall be designed so that no sudden change in stream velocity shall occur above, below, or in the structure. If a sudden change in stream velocities occurs upon installation of the structure, the structure shall be removed immediately.
30. If any wildlife is encountered in the stream or lake zone during the course of construction, said wildlife shall be allowed to leave the construction area unharmed.
31. All diversion channels shall be designed to maintain velocities at levels acceptable to all native and recreational fish species determined to be in the project impact area and adjacent upstream and downstream reaches.

**AGREEMENT
REGARDING THE TRANSFER, CONSERVATION, AND MAINTENANCE OF
THE CRESTRIDGE HABITAT MANAGEMENT AREA**

THIS AGREEMENT REGARDING THE TRANSFER, CONSERVATION AND MAINTENANCE OF THE CRESTRIDGE HABITAT MANAGEMENT AREA ("Agreement"), dated January ____, 2002, for reference purposes only, is made by and among the State of California Department of Fish and Game ("Department"), a subdivision of the California Resources Agency, and the San Diego County Water Authority ("Authority"), a public agency organized and existing under the State of California County Water Authority Act (Stats. 1943).

RECITALS

- A. Authority currently owns fee simple title to, and manages for wildlife purposes, eight assessor parcels known as the Crestridge Habitat Management Area, totaling approximately 261.05 acres near the community of Crest, San Diego County, California (CHMA). The CHMA is legally described and generally depicted in **Exhibit A**, attached hereto and incorporated by reference in this Agreement.
- B. The CHMA is a mitigation area for Authority's Capital Improvement Program (CIP) and was purchased by Authority as a biological preserve area in accordance with the provisions of U.S. Fish and Wildlife Service (Service) Biological Opinion #1-6-93-F-28 issued on July 19, 1993 to the Department of the Navy, attached hereto as **Exhibit B** and incorporated by reference in this Agreement (the "Biological Opinion").
- C. The Department has among its purposes the conservation and management of real property for the benefit of wildlife, and desires to include the CHMA within its managed properties for the benefit of wildlife species and the people of the State of California.
- D. The Department and Authority intend by this Agreement to provide for the transfer of ownership of the CHMA from the Authority to the Department, and for the assumption by the Department following such transfer of all conservation, maintenance, management, and other responsibilities of the Authority for the CHMA in perpetuity pursuant to the terms and conditions of the Biological Opinion.
- E. The Department will manage the land in an environmentally and biologically beneficial manner consistent with state and federal environmental laws.
- F. This Agreement does not in any manner affect the statutory authorities and responsibilities of the Department or Authority.

NOW, THEREFORE, in consideration of the above recitals and the mutual terms and provisions set forth in this Agreement, the parties agree to the following:

AGREEMENT

1. Transfer of CHMA. Within 30 days of the date of last execution of this Agreement, Authority shall transfer fee simple title to the CHMA to the Department, by Grant Deed substantially in the form contained in **Exhibit C**, attached hereto and incorporated by reference in this Agreement (the "Grant Deed"). The Department shall accept the Grant Deed within 30 days of receipt thereof. The CHMA shall be conveyed to the Department subject only to those exceptions set forth in First American Title Insurance Company Preliminary Report No. 1265600-20, dated May 29, 2001, as the Department may reasonably approve, and in accordance with Escrow Instructions substantially in the form of **Exhibit D**, attached hereto and incorporated by reference in this Agreement.
2. Department Responsibilities. Upon its acceptance of the Grant Deed, the Department shall assume all responsibility of the Authority for conservation, maintenance, and management activities for the CHMA. Such activities shall be consistent with the provisions of the Biological Opinion, and shall include, but are not limited to, any fencing and signs needed for the protection of the Property; biological monitoring and reporting to the Service; patrolling; management of equipment access including vehicles; and removal of trash and other items as determined by the Department. All of the above activities, plus any others deemed necessary by the Department, shall be performed by the Department at no expense to the Authority. The Department shall prepare, or cause to be prepared, a long term management plan for the CHMA for concurrence by the Service.
3. Authority Retention of Mitigation Credits. The Authority shall retain the exclusive rights to all unallocated mitigation credits attributable to the CHMA, including 2.6 acres of successfully restored habitat, pursuant to the Crestridge Habitat Management Area Interim Habitat Management Plan, San Diego County, California, dated January 26, 1994, a copy of which is attached hereto as **Exhibit E** and incorporated by reference in this Agreement (the "Management Plan"). The Authority recognizes that use of mitigation credits for any future project is dependent on approvals of Service and/or Department in accordance with the Management Plan and the Federal and California Endangered Species Acts.

4. Representations and Warranties. Authority makes the following representations and warranties for the benefit of the Department, each of which shall be true, correct and complete as of the effective date of this Agreement and as of the date the Department accepts the Grant Deed.

A. This Agreement and all other documents delivered by Authority to the Department has been (or at the time of delivery will have been) duly authorized, executed and delivered by the Authority and are, (or when delivered shall be) valid, binding and enforceable obligations of Authority.

B. There are no existing claims, actions, suits, proceedings, judgments, orders, decrees, arbitration awards, defaults, delinquencies or deficiencies pending or outstanding or threatened against the CHMA or to which Authority is a party relating in any way to the CHMA, the Biological Opinion, the Management Agreement or this Agreement.

C. No consent from or notice to any third party or governmental entity is required to permit Authority to enter into and perform this Agreement.

D. The CHMA is not in violation of any federal, state or local law, ordinance or regulation relating to physical or environmental conditions on, under or about the CHMA, including, but not limited to, soil and groundwater conditions or above or below-ground storage tanks. There are no environmental, health or safety hazards on, under or about the CHMA. Neither Authority nor any third party has used, generated, manufactured, treated, stored, released, placed, deposited or disposed of on, under or about the CHMA, or transported to or from the CHMA, any Hazardous Substances. The term "Hazardous Substances" includes, without limitation, (a) material that is flammable, explosive or radioactive; (b) petroleum products, including by-products and fractions thereof; and (c) hazardous materials, hazardous wastes, hazardous or toxic substances, or related materials defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 U.S.C. Section 9601 *et seq.*), as amended, the Hazardous Materials Transportation Act (49 U.S.C. Section 6901 *et seq.*), as amended; the Hazardous Waste Control Law (California Health & Safety Code Section 25100 *et seq.*), as amended; the Hazardous Substance Account Act (California Health & Safety Code Section 25300 *et seq.*), as amended; and in the regulations adopted and publications promulgated pursuant to such laws.

E. Authority has no knowledge of any unrecorded or undisclosed legal or equitable interest in all or any part of the CHMA owned or

claimed by any person, firm, corporation or governmental entity. Authority has enjoyed the continuous and uninterrupted quiet possession, use and enjoyment of the CHMA without material complaint or objection by any person or entity.

F. Authority has fully observed and performed, and is not in breach or default of, any of its obligations under the Biological Opinion or the Management Agreement. Authority shall continue to observe and perform those obligations until the Department accepts the Grant Deed.

5. Interpretation. This Agreement shall be governed by and construed in accordance with the internal laws of the State of California. The captions of paragraphs used in this Agreement are for convenience only. No addition to or modification of any term or provision shall be effective unless set forth in writing, and signed by all the parties. This Agreement and the exhibits attached hereto contain the entire agreement of the parties, and supersede any prior written or oral Agreements between them concerning the subject matter contained herein. There are no representations, agreements, or understandings, oral or written, relating to the subject matter of this Agreement, which are not fully expressed herein.
6. Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties and their respective successors and assigns. The Department agrees to reference and require compliance with the terms of this Agreement in any deed or other legal instrument by which the Department divests itself of any interest in all or a portion of the CHMA, including without limitation, a leasehold interest. The Department or its successors and assigns shall not transfer, assign, give, nor sell the Property to any person, entity or government agency unless the purpose of said person, entity or government agency includes the preservation of habitats and related species. The failure of the parties to perform any act required by this Paragraph 6 shall not impair the validity of this Agreement nor limit its enforcement in any way.
7. Payments. There is no monetary payment between Department and Authority associated with this Agreement. The Authority will perform and pay for the revegetation of an approximately 0.5-acre area of the CHMA located adjacent to the Eaton property (APN# 508-130-02) which was previously disturbed by grading.
8. Exhibits. The following exhibits referred to herein are attached to this Agreement and by this reference incorporated herein:

- Exhibit A: Legal Description and Parcel Map of CHMA
- Exhibit B: Biological Opinion for Authority's CIP (1-6-93-F-28)
- Exhibit C: Grant Deed
- Exhibit D: Escrow Instructions
- Exhibit E: Management Plan

9. No Agency or Partnership. This Agreement shall not make or be deemed to make any party to this Agreement the agent for or the partner of any other party.
10. Notices. Any notice permitted or required by this Agreement shall be delivered personally to the persons set forth below or shall be deemed given five (5) days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows or at such other address which any party may from time to time notify each of the other parties, in writing:

San Diego County Water Authority
Director of Water Resources
4677 Overland Ave.
San Diego, CA 92123

California Department of Fish and Game
Regional Manager
4949 Viewridge Avenue
San Diego, CA 92123

11. Indemnification. The Department will indemnify and hold harmless the Authority, its officers and employees, from any and all claims, suits or actions at law or in equity, arising out of the Department's failure to perform or comply with any of its obligations contained in this Agreement. The Authority will indemnify and hold harmless the Department, its officers and employees, from any and all claims, suits or actions at law or in equity, and any and all liabilities, losses, costs, expenses or damages: (a) arising out of Authority's failure to perform or comply with any of its obligations contained in this Agreement, (b) resulting from any inaccuracy or breach of any representation or warranty of Authority, or (c) arising from, in connection with or related in any way to the CHMA pertaining to any period of time before the Department accepts the Grant Deed. The provisions of this Paragraph 11 shall survive the Department's acceptance of the Grant Deed.


12. Attorneys' Fees. If any action at law or equity, including any action for declaratory relief, is brought to enforce or interpret the provisions of this Agreement, all parties to the litigation shall bear their own attorney's fees and costs.
13. Counterparts. This Agreement may be executed in any number of counterpart originals, each of which shall be deemed an original and all of which, together, shall constitute one and the same Agreement. A complete original of this Agreement containing original signatures of each of the parties shall be circulated to each of the parties by the Authority, and a complete original of this Agreement shall be maintained in the official records of each of the parties hereto.
14. No Third-Party Beneficiary. This Agreement shall not create the public or any member thereof as a third beneficiary hereto, nor shall it authorize anyone not a party to this Agreement to maintain a suit for personal injuries or property damages pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the parties to this Agreement with respect to third parties shall remain as otherwise provided by law.
15. Effective Date. This Agreement has been executed on the day set by each signature attached hereto and shall become effective on the day and year last written below.
16. Amendment. This Agreement may be amended only with the written consent of each of the parties hereto.
17. Integration. This Agreement supersedes any and all prior agreements, either oral or in writing, between the parties hereto with respect to the subject matter hereof and contains all of the covenants and agreements between them with respect to said matter, and each party acknowledges that no representation, inducement, promise or agreement, oral or otherwise, has been made by any other party or anyone acting on behalf of any party which is not embodied herein.
18. Dependency and Survival of Provisions. The respective agreements, obligations, representations, warranties and undertakings of each party under this Agreement shall be construed as dependent upon and given in consideration of those of the other party and shall survive the delivery by Authority and acceptance by the Department of the Grant Deed. No waiver by either party of any provision of this Agreement shall be deemed

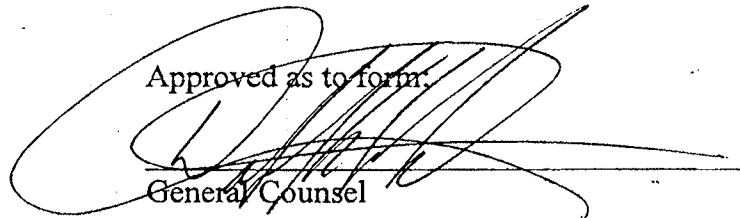
waiver of any other provision hereof or of any subsequent breach by either party of the same or any other provision.

IN WITNESS WHEREOF, the parties have entered into this Agreement effective as of the date last written below.

SAN DIEGO COUNTY WATER AUTHORITY

DATED: 2/6/02


Maureen A. Stapleton
General Manager

Approved as to form:

General Counsel

STATE OF CALIFORNIA
DEPARTMENT OF
FISH AND GAME

DATED: 04/17/02

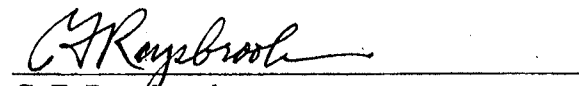

C. F. Raysbrook
Regional Manager

Exhibit "A"



LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SAN DIEGO, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1:

THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF RANCHO EL CAJON, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF IN BOOK 170, PAGE 71 OF DEEDS, RECORDED OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST EASTERLY CORNER OF PARCEL 14 AS SHOWN ON RECORD OF SURVEY MAP NO. 3906, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 24, 1956; THENCE ALONG THE EASTERLY BOUNDARY OF SAID RECORD OF SURVEY MAP NO. 3906 NORTH $36^{\circ}53'40''$ WEST, 139.60 FEET; THENCE NORTH $58^{\circ}58'50''$ EAST, 324.55 FEET TO THE NORTHERLY BOUNDARY OF SAID LOT 2; THENCE ALONG SAID BOUNDARY SOUTH $66^{\circ}02'30''$ EAST, 317.23 FEET, NORTH $49^{\circ}26'50''$ EAST, 263.33 FEET AND SOUTH $89^{\circ}30'50''$ EAST, 277.06 FEET; THENCE LEAVING SAID BOUNDARY SOUTH $58^{\circ}47'10''$ EAST, 265.43 FEET; THENCE SOUTH $69^{\circ}30'$ EAST, 585.99 FEET; THENCE SOUTH $56^{\circ}06'10''$ EAST, 251.88 FEET; THENCE SOUTH $2^{\circ}51'$ EAST, 101.40 FEET; THENCE SOUTH $47^{\circ}45'20''$ WEST, 407.98 FEET; NORTH $82^{\circ}21'50''$ WEST, 349.75 FEET; THENCE SOUTH $59^{\circ}26'40''$ WEST, 100.65 FEET; THENCE SOUTH $25^{\circ}27'$ WEST, 77.63 FEET; THENCE SOUTH $14^{\circ}42'40''$ EAST, 820.90 TO A POINT ON THE ARC OF A 200.00 FOOT RADIUS CURVE CONCAVE NORTHERLY THE CENTER OF WHICH BEARS NORTH $4^{\circ}40'10''$ EAST FROM SAID POINT; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $16^{\circ}24'50''$, A DISTANCE OF 57.41 FEET; THENCE TANGENT TO SAID CURVE, NORTH $68^{\circ}53'$ WEST, 113.26 FEET TO THE BEGINNING OF A TANGENT 150.00 FOOT RADIUS CURVE CONCAVE SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $48^{\circ}36'40''$, A DISTANCE OF 127.26 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $62^{\circ}30'20''$ WEST, 239.26 FEET TO THE BEGINNING OF A TANGENT 177.05 FOOT RADIUS CURVE CONCAVE NORTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $45^{\circ}08'40''$, A DISTANCE OF 139.50 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 200.00 FEET; THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $44^{\circ}36'$, A DISTANCE OF 155.68 FEET; THENCE TANGENT TO SAID CURVE SOUTH $63^{\circ}13'$ WEST, 259.61 FEET TO THE BEGINNING OF A TANGENT 400.00 FOOT RADIUS CURVE CONCAVE SOUTHEASTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $19^{\circ}42'50''$, A DISTANCE OF 137.63 FEET TO THE EASTERLY BOUNDARY OF THE AFOREMENTIONED RECORD OF SURVEY MAP NO. 3906; THENCE ALONG SAID BOUNDARY NORTH $6^{\circ}39'10''$ WEST, 560.07 FEET; THENCE NORTH $23^{\circ}06'10''$ WEST, 519.07 FEET; THENCE NORTH $0^{\circ}04'50''$ EAST, 663.65 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

AN EASEMENT AND RIGHT OF WAY FOR ROAD AND UTILITY PURPOSES, OVER THOSE CERTAIN APPURTENANT EASEMENTS 30 FEET AND 60 FEET WIDE, AS RESERVED AND DESCRIBED UNDER PARCEL 1 IN DEED TO LAWRENCE TERENCE MOORE, ET AL, RECORDED NOVEMBER 2, 1959 IN BOOK 7971, PAGE 147 OF OFFICIAL RECORDS.



PARCEL-3:

ALL THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF RANCHO EL CAJON, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF RECORDED IN BOOK 170, PAGE 71 OF DEEDS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO BLOCKS 43 AND 44 OF SAID SUBDIVISION OF THE "S" TRACT, WHICH IS ALSO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF SAID LOT 2 OF BLOCK 38; THENCE ALONG THE NORTHEASTERLY AND NORTHERLY BOUNDARY OF SAID LOT AS FOLLOWS:

NORTH 54°19'20" WEST, 878.84 FEET (RECORD OF SURVEY NO. 4999 – NORTH 54°28' WEST, 880.00 FEET); SOUTH 62°40'40" WEST, 256.68 FEET; THENCE SOUTH 68°26'20" EAST, 64.23 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 250.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 29°10'40", A DISTANCE OF 127.31 FEET; THENCE TANGENT TO SAID CURVE SOUTH 39°15'40" EAST, 53.04 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE WESTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 52°14'10", A DISTANCE OF 182.33 FEET; THENCE TANGENT TO SAID CURVE SOUTH 12°59' WEST, 27.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE EASTERLY HAVING A RADIUS OF 130.00 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 41°24', A DISTANCE OF 93.93 FEET TO THE BEGINNING OF A REVERSE CURVING HAVING A RADIUS OF 110 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 48°51'40", A DISTANCE OF 93.81 FEET TO THE BEGINNING OF A REVERSE CURVE HAVING A RADIUS OF 186.66 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 35°34'40", A DISTANCE OF 115.91 FEET; THENCE TANGENT TO SAID CURVE SOUTH 15°27'50" EAST, 175.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHWESTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 58°26', A DISTANCE OF 101.99 FEET; THENCE TANGENT TO SAID CURVE SOUTH 42°58'10" WEST, 96 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 53°31'30", A DISTANCE OF 93.42 FEET TO THE BEGINNING OF A COMPOUND CURVE, HAVING A RADIUS OF 219.35 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 21°43'10", A DISTANCE OF 83.15 FEET; THENCE TANGENT TO SAID CURVE SOUTH 32°16'30" EAST, 66.07 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 500 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 96.43 FEET; THENCE TANGENT TO SAID CURVE SOUTH 21°13'30" EAST, 51.90 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE 103.65 FEET; THENCE TANGENT TO SAID CURVE SOUTH 50°55'10" EAST, 50.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 150 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF



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25°25'10", A DISTANCE OF 66.55 FEET; THENCE TANGENT TO SAID CURVE SOUTH 25°30' EAST, 210.83 FEET TO AN ANGLE POINT IN THE SOUTHWESTERLY BOUNDARY OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAN DIEGO COUNTY; THENCE NORTH 85°39' EAST, 128 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 33°46', A DISTANCE OF 58.93 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 60 FEET; THENCE COUNTERCLOCKWISE, ALONG SAID CURVE THROUGH AN ANGLE OF 204°26'10", A DISTANCE OF 285.45 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 33°22'20", A DISTANCE OF 58.25 FEET; THENCE TANGENT TO SAID CURVE NORTH 51°18'50" WEST, 231.58 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 26°28'10" A DISTANCE OF 138.19 FEET; THENCE NORTH 24°50'40" WEST, 79.88 FEET TO THE BEGINNING OF A TANGENT 250 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 19°41'50", A DISTANCE OF 85.94 FEET; THENCE NORTH 5°08'30" WEST, 44.37 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE NORTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 30°29'40", A DISTANCE OF 53.22 FEET; THENCE NORTH 25°20'50" EAST, 19.72 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY; THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 38°06'10" A DISTANCE OF 66.50 FEET; THENCE NORTH 63°27' EAST, 62.09 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 29°04'20", A DISTANCE OF 91.33 FEET; THENCE SOUTH 87°28'40" EAST, 97.64 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 21°32'40", A DISTANCE OF 67.68 FEET; THENCE SOUTH 65°56' EAST, 217.48 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 7°47'20", A DISTANCE OF 108.75 FEET; THENCE SOUTH 73°43'20" EAST, 41.98 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 20°05'50", A DISTANCE OF 70.25 FEET; THENCE SOUTH 53°37'30" EAST, 127.51 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 45°04', A DISTANCE OF 117.98 FEET; THENCE SOUTH 8°33'30" EAST, 28.78 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 31°42', A DISTANCE OF 82.99 FEET; THENCE SOUTH 40°15'30" EAST, 171.10 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 13°03'30" A DISTANCE OF 113.95 FEET; THENCE SOUTH 53°19' EAST, 129.60 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 8°01'20", A DISTANCE OF 76.01 FEET; THENCE SOUTH 45°17'40" EAST, 342.61 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE



OF 48°34'30", A DISTANCE OF 84.78 FEET; THENCE SOUTH 3°16'50" WEST, 117.42 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 15°24'40", A DISTANCE OF 53.79 FEET; THENCE SOUTH 18°41'30" WEST, 89.46 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 28°24'10", A DISTANCE OF 74.36 FEET; THENCE SOUTH 9°42'40" EAST, 33.31 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE RADIALLY TO SAID CURVE NORTH 80°17'20" EAST, 20 FEET; THENCE SOUTH 29°45' EAST TO AN INTERSECTION WITH THE SOUTHEASTERLY LINE OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB, RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAID COUNTY, SAID LINE HAVING THE COURSE OF NORTH 65°55'30" EAST, 1283.34 FEET; THENCE NORTH 65°55'30" EAST ALONG SAID SOUTHEASTERLY LINE TO THE MOST EASTERLY CORNER OF SAID LAND; THENCE ALONG THE NORTHEASTERLY BOUNDARY OF SAID LAND BEING THE NORTHEASTERLY BOUNDARY OF SAID BLOCK 38, AS NORTH 64°06'20" WEST 338.69 FEET (RECORD OF SURVEY MAP NO. 4999 – NORTH 64°15' WEST), NORTH 28°06'20" WEST, 940 FEET (RECORD OF SURVEY MAP NO. 4999 – NORTH 28°15' WEST); NORTH 52°27'20" WEST, 2200 FEET (RECORD OF SURVEY MAP NO. 4999 – NORTH 52°36' WEST) TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHERLY TERMINUS OF THAT CERTAIN COURSE DESIGNATED AS NORTH 27°47'10" WEST 939.67 FEET ON SHEET 15 OF RECORD OF SURVEY MAP NO. 8013 ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY; THENCE ALONG THE BOUNDARY OF SAID RECORD OF SURVEY MAP NO. 8013, SOUTH 27°48'33" EAST (SOUTH 27°47'10" EAST RECORD) 164.46 FEET; THENCE LEAVING SAID BOUNDARY NORTH 67°40'00" WEST 221.73 FEET; THENCE NORTH 22°20'00" EAST 131.89 FEET TO A POINT IN THE BOUNDARY OF SAID RECORD OF SURVEY MAP NO. 8013; THENCE ALONG SAID BOUNDARY SOUTH 52°09'25" EAST 99.09 FEET TO THE POINT OF BEGINNING.

PARCEL 4:

AN EASEMENT FOR INGRESS AND EGRESS FOR ROAD PURPOSES OVER THOSE CERTAIN 40 FOOT AND 60 FOOT STRIPS OF LAND AS DESIGNATED "EASEMENT RESERVED FOR ROAD PURPOSES" AND "EXISTING EASEMENT RESERVED FOR ROAD PURPOSES" ON RECORD OF SURVEY MAP NO. 6180, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

EXCEPTING THAT PORTION LYING WITHIN PARCEL 3 OF THIS DESCRIPTION.

PARCEL 5:

ALL THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF RANCHO EL CAJON, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF RECORDED IN BOOK 170, PAGE 71 OF DEEDS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:



ORDER NO. 1265600-20

BEGINNING AT THE CORNER COMMON TO BLOCKS 43 AND 44 OF SAID SUBDIVISION OF THE "S" TRACT, WHICH IS ALSO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF SAID LOT 2 OF BLOCK 38; THENCE ALONG THE NORTHEASTERLY AND NORTHERLY BOUNDARY OF SAID LOT AS FOLLOWS:

NORTH $54^{\circ}19'20''$ WEST, 878.84 FEET (RECORD OF SURVEY NO. 4999 - NORTH $54^{\circ}28'$ WEST, 880 FEET); SOUTH $62^{\circ}40'40''$ WEST, 256.68 FEET; THENCE SOUTH $68^{\circ}26'20''$ EAST, 64.23 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 250 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $29^{\circ}10'40''$, A DISTANCE OF 127.31 FEET; THENCE TANGENT TO SAID CURVE SOUTH $39^{\circ}15'40''$ EAST, 53.04 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE WESTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $52^{\circ}14'10''$, A DISTANCE OF 182.33 FEET; THENCE TANGENT TO SAID CURVE SOUTH $12^{\circ}59'$ WEST, 27.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE EASTERLY HAVING A RADIUS OF 130 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $41^{\circ}24'$, A DISTANCE OF 93.93 FEET TO THE BEGINNING OF A REVERSE CURVE HAVING A RADIUS OF 110 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $48^{\circ}51'40''$, A DISTANCE OF 93.81 FEET TO THE BEGINNING OF A REVERSE CURVE HAVING A RADIUS OF 186.66 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $35^{\circ}34'40''$, A DISTANCE OF 115.91 FEET; THENCE TANGENT TO SAID CURVE SOUTH $15^{\circ}27'50''$ EAST, 175.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHWESTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $58^{\circ}26'$, A DISTANCE OF 101.99 FEET; THENCE TANGENT TO SAID CURVE SOUTH $42^{\circ}58'10''$ WEST, 96 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $53^{\circ}31'30''$, A DISTANCE OF 93.42 FEET TO THE BEGINNING OF A COMPOUND CURVE, HAVING A RADIUS OF 219.35 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $21^{\circ}43'10''$, A DISTANCE OF 83.15 FEET; THENCE TANGENT TO SAID CURVE SOUTH $32^{\circ}16'30''$ EAST, 66.07 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 500 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 96.43 FEET; THENCE TANGENT TO SAID CURVE SOUTH $21^{\circ}13'30''$ EAST, 51.90 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE 103.65 FEET; THENCE TANGENT TO SAID CURVE SOUTH $50^{\circ}55'10''$ EAST, 50.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 150 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $25^{\circ}25'10''$, A DISTANCE OF 66.55 FEET; THENCE TANGENT TO SAID CURVE SOUTH $25^{\circ}30'$ EAST, 210.83 FEET TO AN ANGLE POINT IN THE SOUTHWESTERLY BOUNDARY OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB, RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAN DIEGO COUNTY, BEING THE TRUE POINT OF BEGINNING; THENCE NORTH $85^{\circ}59'$ EAST, 128 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $33^{\circ}46'$, A DISTANCE OF 58.93 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 60 FEET; THENCE COUNTERCLOCKWISE, ALONG SAID



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CURVE THROUGH AN ANGLE OF $204^{\circ}26'10''$, A DISTANCE OF 285.45 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $33^{\circ}22'20''$, A DISTANCE OF 58.25 FEET; THENCE TANGENT TO SAID CURVE NORTH $51^{\circ}18'50''$ WEST, 231.58 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $26^{\circ}28'10''$ A DISTANCE OF 138.59 FEET; THENCE NORTH $24^{\circ}50'40''$ WEST, 79.88 FEET TO THE BEGINNING OF A TANGENT 250 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $19^{\circ}41'50''$, A DISTANCE OF 85.94 FEET; THENCE NORTH $5^{\circ}08'50''$ WEST, 44.37 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE NORTHERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $30^{\circ}29'40''$, A DISTANCE OF 53.22 FEET; THENCE NORTH $25^{\circ}20'50''$ EAST, 19.72 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY; THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $38^{\circ}06'10''$ A DISTANCE OF 66.50 FEET; THENCE NORTH $63^{\circ}27'$ EAST, 62.09 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $29^{\circ}04'20''$, A DISTANCE OF 91.33 FEET; THENCE SOUTH $87^{\circ}28'40''$ EAST, 97.64 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $21^{\circ}34'40''$, A DISTANCE OF 67.68 FEET; THENCE SOUTH $65^{\circ}56'$ EAST, 217.48 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $7^{\circ}47'20''$, A DISTANCE OF 108.75 FEET; THENCE SOUTH $73^{\circ}43'20''$ EAST, 41.98 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $20^{\circ}05'50''$, A DISTANCE OF 70.15 FEET; THENCE SOUTH $53^{\circ}37'30''$ EAST, 127.51 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $45^{\circ}04'$, A DISTANCE OF 117.98 FEET; THENCE SOUTH $8^{\circ}33'30''$ EAST, 28.78 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $31^{\circ}42'$, A DISTANCE OF 82.99 FEET; THENCE SOUTH $40^{\circ}15'30''$ EAST, 171.10 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $13^{\circ}03'30''$ A DISTANCE OF 113.95 FEET; THENCE SOUTH $53^{\circ}19'$ EAST, 129.60 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $8^{\circ}01'20''$, A DISTANCE OF 70.01 FEET; THENCE SOUTH $45^{\circ}17'40''$ EAST, 342.61 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $48^{\circ}34'30''$, A DISTANCE OF 84.78 FEET; THENCE SOUTH $3^{\circ}16'50''$ WEST, 117.42 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF $15^{\circ}24'40''$ A DISTANCE OF 53.79 FEET; THENCE SOUTH $18^{\circ}41'30''$ WEST, 89.46 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF $28^{\circ}24'10''$, A DISTANCE OF 74.36 FEET; THENCE SOUTH $9^{\circ}42'40''$ EAST, 33.81 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE RADIAL TO SAID CURVE NORTH $80^{\circ}17'20''$ EAST, 20 FEET;



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THENCE SOUTH 29°45' EAST TO AN INTERSECTION WITH THE SOUTHEASTERLY LINE OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB, RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAID COUNTY, SAID LINE HAVING THE COURSE OF NORTH 65°55'30" EAST, 1,283.34 FEET; THENCE SOUTH 65°55'30" WEST ALONG SAID SOUTHEASTERLY LINE OF THE SOUTHWESTERLY TERMINUS THEREOF; THENCE CONTINUING ALONG THE BOUNDARY OF SAID LAND AS FOLLOWS:

SOUTH 77°40'50" WEST, 511.55 FEET, SOUTH 39°25'20" EAST, 686.02 FEET TO A POINT IN THE CENTER LINE OF COUNTY ROAD SURVEY NO. 435-B AS SHOWN ON RECORD OF SURVEY MAP NO. 6180, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY; THENCE CONTINUING ALONG SAID BOUNDARY SOUTH 39°25'20" EAST, 263.98 FEET MORE OR LESS TO THE MOST SOUTHERLY CORNER OF SAID PARLAY INVESTMENT CLUB LAND BEING A POINT IN THE CENTER LINE OF ROAD SURVEY 435 AS SHOWN ON RECORD OF SURVEY 5529, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY; THENCE ALONG THE SOUTHWESTERLY BOUNDARY OF SAID LAND NORTHWESTERLY ALONG LAST SAID CENTER LINE TO AN ANGLE POINT IN SAID SOUTHWESTERLY BOUNDARY BEING THE SOUTHEASTERLY TERMINUS OF THAT COURSE SOUTH 25°33'30" EAST, 43 FEET, MORE OR LESS, DESCRIBED IN SAID DEED; THENCE LEAVING SAID CENTER LINE AND CONTINUING ALONG THE BOUNDARY OF SAID PARLAY INVESTMENT CLUB; AND AS FOLLOWS:

NORTH 25°33'30" WEST, 43 FEET, MORE OR LESS, TO THE BEGINNING OF A TANGENT 80 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 53°, A DISTANCE OF 74 FEET; NORTH 78°33'30" WEST, 83.61 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 15°15', A DISTANCE OF 133.08 FEET; NORTH 63°18'30" WEST, 272.80 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 21°02', A DISTANCE OF 110.13 FEET; NORTH 42°16'30", WEST 23.22 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 18°30'10", A DISTANCE OF 96.88 FEET; NORTH 60°46'40" WEST, 237.61 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 36°45'20", A DISTANCE OF 128.30 FEET; NORTH 24°01'20" WEST, 105.27 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 9°28'40", A DISTANCE OF 132.33 FEET; NORTH 33°30' WEST, 185.92 FEET TO THE BEGINNING OF A TANGENT 316.24 FEET (RECORD 300 FEET) RADIUS CURVE, CONCAVE EASTERLY; NORTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 40°34'50", A DISTANCE OF 223.98 FEET (RECORD 212.48 FEET) NORTH 7°04'50" EAST, 76.24 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE WESTERLY; NORTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 13°43'50", A DISTANCE OF 191.71 FEET; NORTH 6°39' WEST, 664.36 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM ANY PORTION THEREOF LYING SOUTHERLY OF THE CENTER LINE OF COUNTY ROAD SURVEY NO. 435-B AS SHOWN ON RECORD OF SURVEY NO. 6180.



PARCEL 6:

AN EASEMENT FOR INGRESS AND EGRESS FOR ROAD PURPOSES OVER THOSE CERTAIN 40 FOOT AND 60 FOOT STRIPS OF LAND AS DESIGNATED "EASEMENT RESERVED FOR ROAD PURPOSES" AND "EXISTING EASEMENT RESERVED FOR ROAD PURPOSES" ON RECORD OF SURVEY MAP NO. 6180 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

EXCEPTING THAT PORTION LYING WITHIN PARCEL 6 OF THIS DESCRIPTION.

PARCEL 7:

ALL THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF THE RANCHO EL CAJON, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF RECORDED IN BOOK 170, PAGE 71 OF DEEDS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO BLOCKS 43 AND 44 OF SAID SUBDIVISION OF THE "S" TRACT, WHICH IS ALSO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF SAID LOT 2 OF BLOCK 38; THENCE ALONG THE NORTHEASTERLY AND NORTHERLY BOUNDARY OF SAID LOT AS FOLLOWS:

NORTH $54^{\circ}19'20''$ WEST, 878.84 FEET (RECORD OF SURVEY MAP NO. 4999 EQUALS NORTH $54^{\circ}28'$ WEST, 880.00 FEET); SOUTH $62^{\circ}40'40''$ WEST, 899.26 FEET, AND NORTH $89^{\circ}30'50''$ WEST, 342.51 FEET TO AN ANGLE POINT IN THE BOUNDARY OF THE LAND DESCRIBED IN DEED TO ORIL S. HARBAUGH, ET UX, RECORDED NOVEMBER 5, 1958 IN BOOK 7335, PAGE 317 OF OFFICIAL RECORDS; THENCE ALONG THE BOUNDARY THEREOF AS FOLLOWS:

SOUTH $58^{\circ}47'10''$ EAST, 265.43 FEET, SOUTH $69^{\circ}30'$ EAST, 585.99 FEET; SOUTH $56^{\circ}06'10''$ EAST; 251.88 FEET, SOUTH $2^{\circ}51'$ EAST, 101.40 FEET, SOUTH $47^{\circ}45'20''$ WEST, 407.98 FEET, NORTH $82^{\circ}21'50''$ WEST, 349.75 FEET SOUTH $57^{\circ}26'40''$ WEST, 100.65 FEET, SOUTH $25^{\circ}27'$ WEST, 77.63 FEET, AND SOUTH $14^{\circ}42'40''$ EAST, 820.90 FEET TO THE WESTERLY TERMINUS OF A 200.00 FOOT RADIUS CURVE, CONCAVE NORTHERLY A RADIAL LINE OF SAID CURVE BEARS SOUTH $4^{\circ}40'10''$ WEST TO THE WESTERLY TERMINUS OF SAID CURVE; THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $18^{\circ}16'40''$ A DISTANCE OF 63.80 FEET TO THE BEGINNING OF A COMPOUND CURVE HAVING A RADIUS OF 174.65 FEET, BEING THE TRUE POINT OF BEGINNING; THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $27^{\circ}42'20''$ A DISTANCE OF 84.61 FEET; THENCE TANGENT TO SAID CURVE, NORTH $48^{\circ}41'10''$ EAST, 95.62 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 250.00 FEET; THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $30^{\circ}28'50''$ A DISTANCE OF 133.00 FEET; THENCE TANGENT TO SAID CURVE, NORTH $18^{\circ}12'20''$ EAST, 208.77 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 100.00 FEET; THENCE NORTHEASTERLY, EASTERLY AND SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $103^{\circ}27'$ A DISTANCE OF 180.55 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $58^{\circ}20'40''$ EAST 191.01 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 350.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A



CENTRAL ANGLE OF $43^{\circ}21'50''$ A DISTANCE OF 264.89 FEET; THENCE TANGENT TO SAID CURVE, NORTH $78^{\circ}17'30''$ EAST, 107.65 FEET TO A POINT HEREINAFTER REFERRED TO AS POINT "A"; THENCE SOUTH $6^{\circ}39'$ EAST, 664.36 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE WESTERLY HAVING A RADIUS OF 800.00 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $13^{\circ}43'50''$ A DISTANCE OF 191.71 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $7^{\circ}04'50''$ WEST, 76.34 FEET TO THE BEGINNING OF TANGENT CURVE CONCAVE EASTERLY HAVING A RADIUS OF 300.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $40^{\circ}34'50''$ A DISTANCE OF 212.48 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $33^{\circ}30'$ EAST, 185.92 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 800.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $9^{\circ}28'40''$ A DISTANCE OF 132.33 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $24^{\circ}01'20''$ EAST, 105.27 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY HAVING A RADIUS OF 200.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $36^{\circ}45'20''$ A DISTANCE OF 128.30 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $60^{\circ}46'40''$ EAST, 237.61 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 300.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $18^{\circ}30'10''$ A DISTANCE OF 96.88 FEET; THENCE TANGENT TO SAID CURVE SOUTH $42^{\circ}16'30''$ EAST, 23.22 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY HAVING A RADIUS OF 300 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $21^{\circ}02'$ A DISTANCE OF 110.13 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $63^{\circ}18'30''$ EAST, 272.80 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY HAVING A RADIUS OF 500 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $15^{\circ}15'$ A DISTANCE OF 133.08 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $73^{\circ}33'30''$ EAST, A DISTANCE OF 83.61 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 80 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $53^{\circ}00'$ A DISTANCE OF 74.00 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $25^{\circ}33'30''$ EAST, 43.00 FEET, MORE OR LESS, TO THE INTERSECTION WITH THE CENTER LINE OF THE COUNTY ROAD KNOWN AS ROAD SURVEY NO. 435, A PLAT OF WHICH IS ON FILE IN THE OFFICE OF THE COUNTY SURVEYOR OF SAN DIEGO COUNTY AS SAID ROAD EXISTED PRIOR TO 1959; THENCE SOUTHEASTERLY ALONG SAID ROAD SURVEY NO. 435 TO AN INTERSECTION WITH THE CENTER LINE OF EASEMENT FOR COUNTY HIGHWAY DESCRIBED IN DEED TO COUNTY OF SAN DIEGO RECORDED JANUARY 25, 1960 AS FILE NO. 15330 OF OFFICIAL RECORDS; THENCE WESTERLY ALONG SAID CENTER LINE DESCRIBED IN SAID DOCUMENT NO. 15330 TO AN INTERSECTION WITH THE EASTERLY BOUNDARY OF LAND DESCRIBED IN DEED TO LAWRENCE TERENCE MOORE, ET AL, RECORDED NOVEMBER 2, 1959 AS FILE NO. 226805 OF OFFICIAL RECORDS; THENCE NORTHWESTERLY ALONG SAID BOUNDARY TO THE SOUTHEASTERLY TERMINUS OF THAT CERTAIN COURSE DESCRIBED AS NORTH $76^{\circ}02'20''$ WEST, 151.65 FEET; THENCE CONTINUING ALONG SAID BOUNDARY NORTH $79^{\circ}02'20''$ WEST, 151.65 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE, 115.04 FEET; TANGENT TO SAID CURVE, NORTH $10^{\circ}07'30''$ WEST, 44.52 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE 162.27 FEET, TANGENT TO SAID CURVE, NORTH $72^{\circ}06'30''$ WEST, 33.48 FEET TO THE BEGINNING OF A

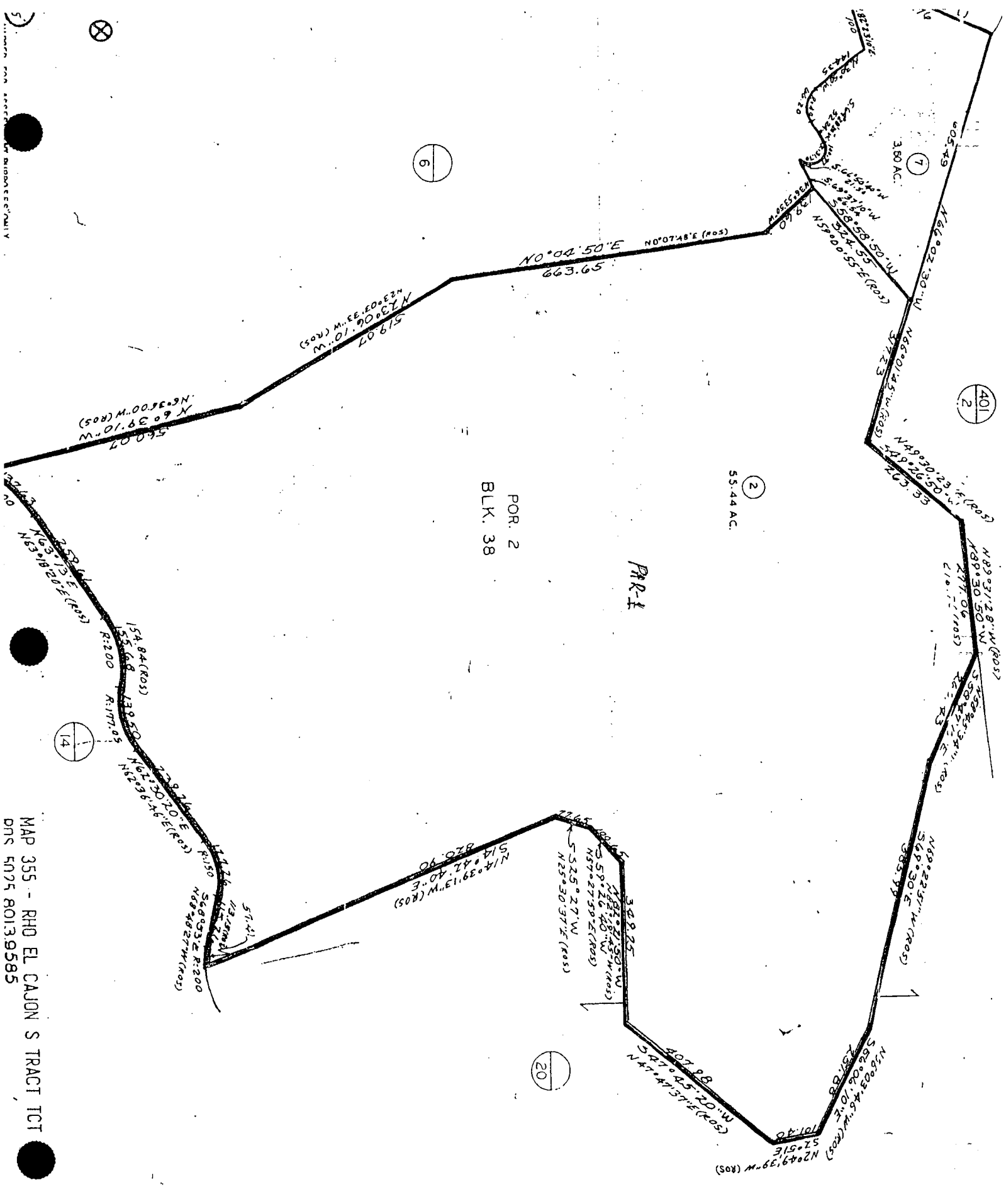


ORDER NO. 1265600-20

TANGENT 150 FOOT RADIUS CURVE, CONCAVE EASTERLY; NORTHWESTERLY ALONG SAID CURVE, 263.68 FEET; TANGENT TO SAID CURVE, NORTH 28°36'40" EAST, 47.20 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; NORTHERLY ALONG SAID CURVE 106.05 FEET; TANGENT TO SAID CURVE, NORTH 1°46'10" WEST, 213.96 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE, 194.68 FEET; THENCE TO SAID CURVE, NORTH 76°08' WEST, 49.08 FEET TO THE BEGINNING OF A TANGENT 110 FOOT RADIUS CURVE, CONCAVE EASTERLY, NORTHERLY ALONG SAID CURVE 222.30 FEET; TANGENT TO SAID CURVE, NORTH 39°39'30" EAST, 75.40 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; NORTHERLY ALONG SAID CURVE 120.03 FEET; TANGENT TO SAID CURVE, NORTH 5°16'20" EAST, 108.23 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE EASTERLY; NORTHERLY ALONG SAID CURVE, 77.96 FEET; TANGENT TO SAID CURVE, NORTH 27°36'20" EAST, 163.04 FEET TO THE BEGINNING OF A TANGENT 125 FOOT RADIUS CURVE, CONCAVE SOUTHERLY, CLOCKWISE ALONG SAID CURVE, 174.78 FEET;; TANGENT TO SAID CURVE, SOUTH 72°16'50" EAST, 105.81 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHERLY; EASTERLY ALONG SAID CURVE, 110.8 FEET, AND TANGENT TO SAID CURVE, NORTH 44°14' EAST, 48.89 FEET; THENCE SOUTH 76°23'30" WEST, 43.07 FEET TO THE TRUE POINT OF BEGINNING.

4-13-

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BLK OLD	
314	
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2	
01/266	

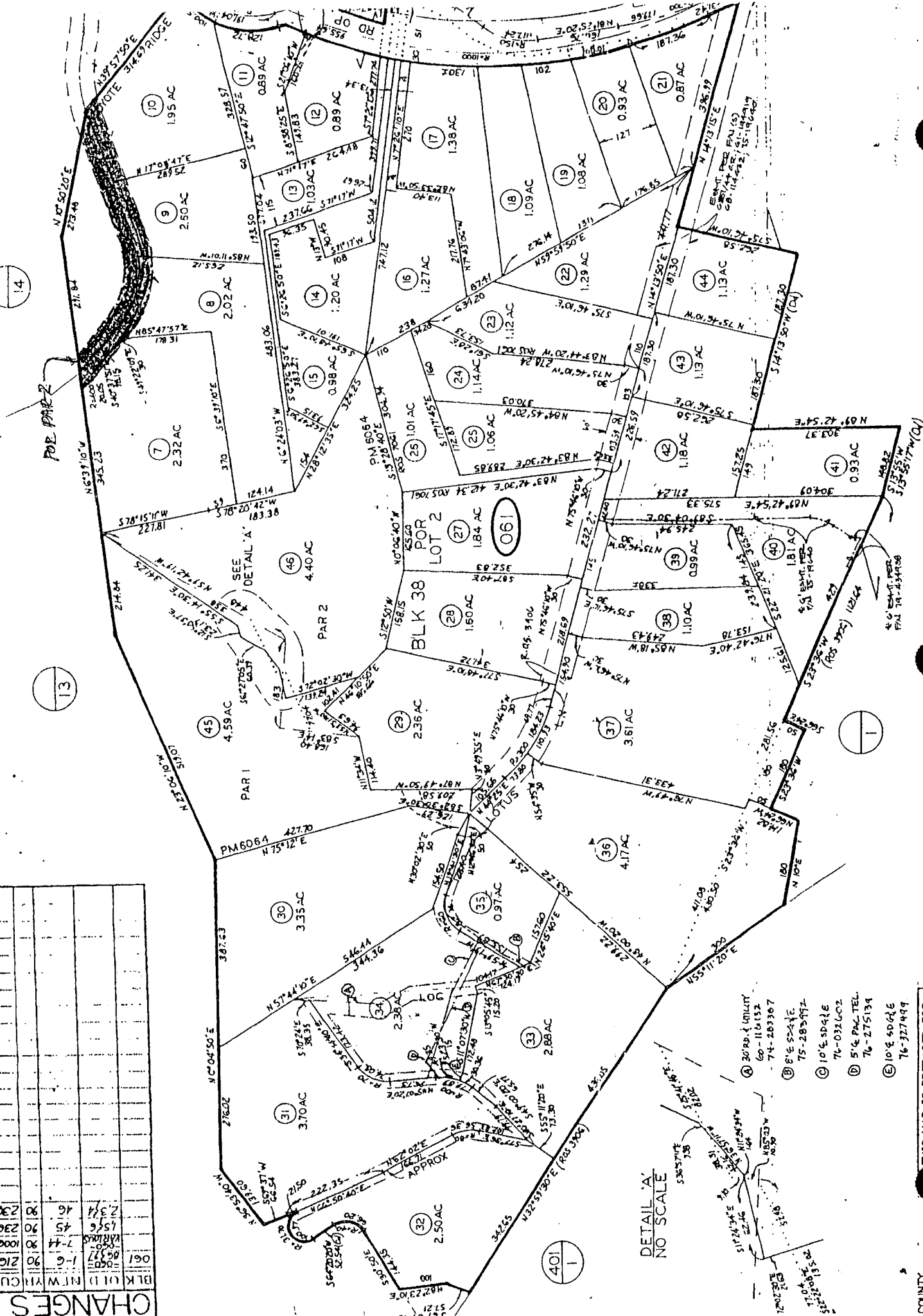


MAP 355 - RHO EL CAJON S TRACT TCT
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5
 ...MACH FOR ...
 ...MACH FOR ...

CHANGES

BLK	OLD	RT	W	YR	CUL
061	6837	1-6	90	2168	
	1506	7-4	80	10084	
	2374	45	80	2360	
	46	16	80	2361	



- ④ 30' x 60' LOT 60-116152 74-283367
- ⑤ 8' x 57' 4 1/2' 75-283397Z
- ⑥ 10' x 50' 4 1/2' 76-032160Z
- ⑦ 5' x 6' PAC. TEL 76-275134
- ⑧ 10' x 50' 4 1/2' 76-327499

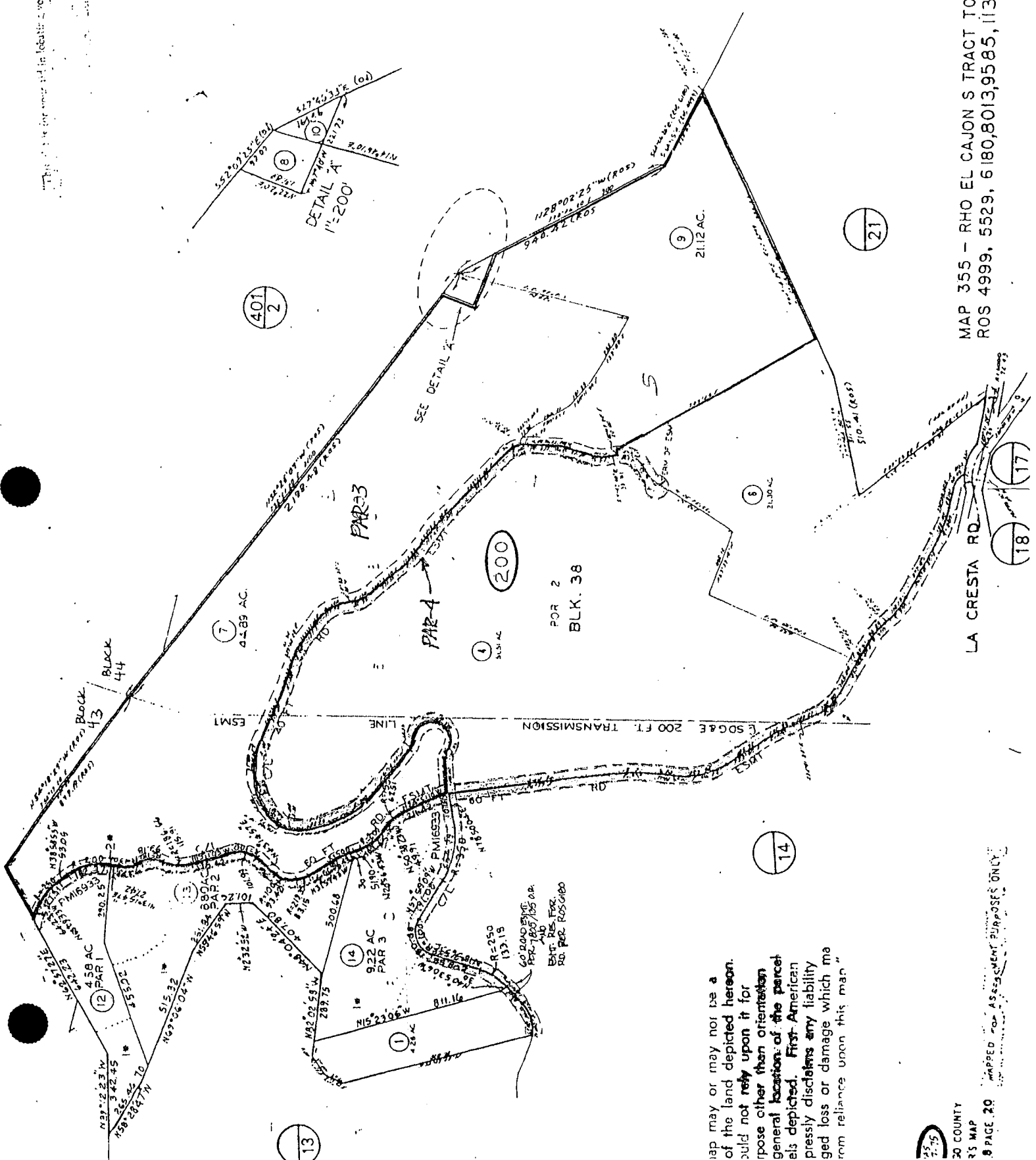
THIS MAP IS PREPARED FOR ASSESSMENT PURPOSES ONLY.

COUNTY
 MAP
 AGE 06

9-2

CHA	BLK OLD	772	345	340-10-2	15-2	2

This map is for your information and is not to be used for any other purpose.



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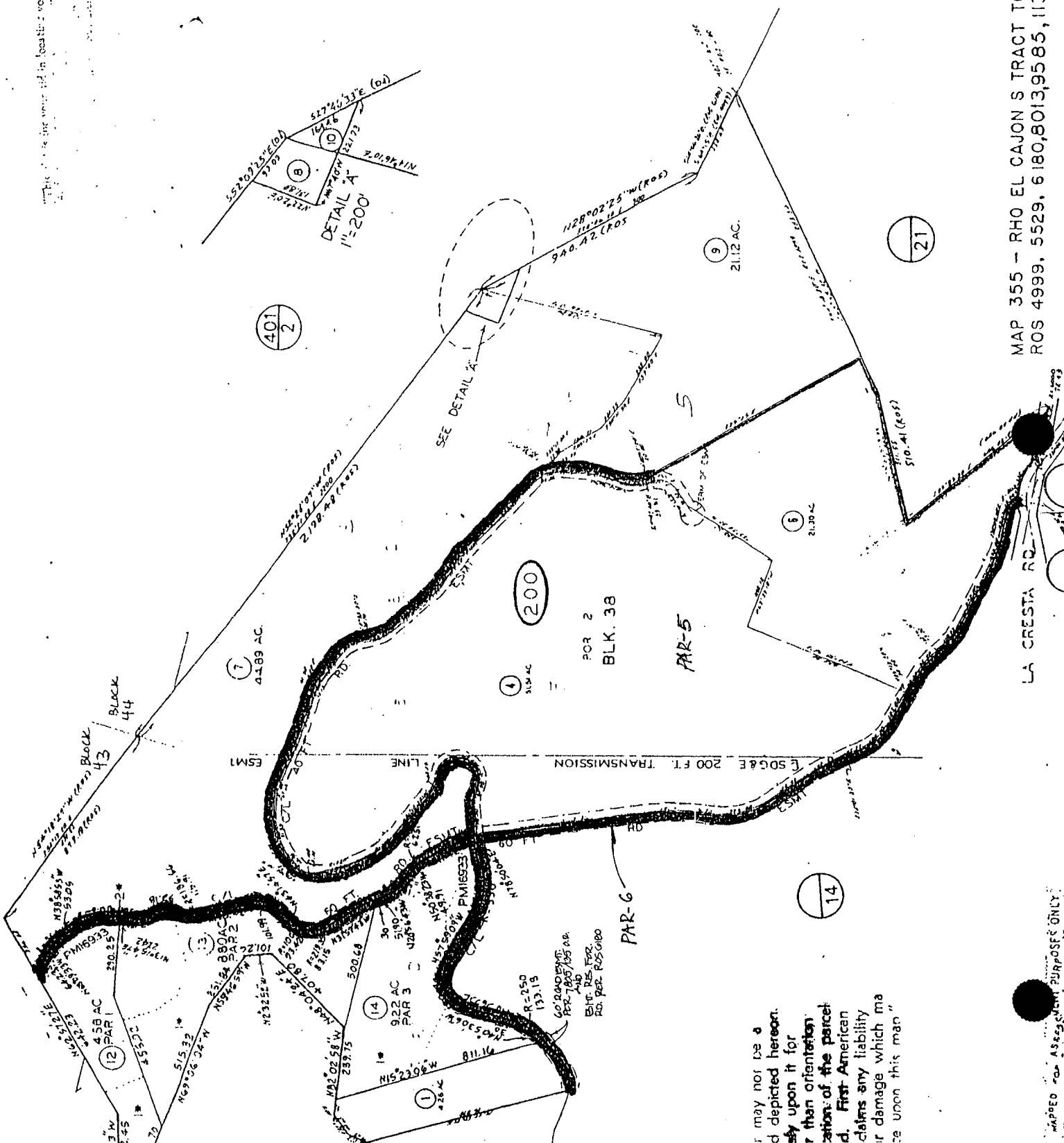


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2	12-14 12 1/2

1* OPEN SPACE
 2* APPROX LOC VISTA DE MONTEMAR

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MAP 355 - RHO EL CAJON S TRACT TCT NO. 1
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MADE FOR ASSESSMENT PURPOSES ONLY

Exhibit "B"

**CRESTRIDGE
HABITAT MANAGEMENT AREA
INTERIM HABITAT MANAGEMENT PLAN
SAN DIEGO COUNTY, CALIFORNIA**



Pacific Southwest Biological Services, Inc.
Post Office Box 985
National City, California
91951-0985

San Diego County Water Authority
3211 Fifth Avenue
San Diego, California
92103-5718

Contacts:

Keith W. Merkel
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(619) 477-5333

Laurence J. Purcell
Manager Water Resources Planning
(619) 682-4158

26 January 1994



United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
CARLSBAD FIELD OFFICE
2730 Loker Avenue West
Carlsbad, California 92008

RECEIVED

FEB 2 1994

WATER RESOURCES
S.D.C.W.A.
January 27, 1994

Mr. Laurence Purcell,
Water Resources Planning Manager
San Diego County Water Authority
3211 Fifth Avenue
San Diego, California 92103-5718

Re: Crestridge Mitigation Site and Interim Habitat Management Plan

Dear Mr. Purcell:

The Fish and Wildlife Service (Service), as requested by the San Diego County Water Authority (Authority), is reconfirming the acceptability of the Crestridge mitigation site relative to the requirements within the Capital Improvement Program Biological Opinion (1-6-93-F-28) issued by the Service on July 19, 1993. Additionally, the Service has reviewed the document titled "Crestridge Habitat Management Area Interim Habitat Management Plan San Diego County, California" dated January 26, 1993, for compliance with the Terms and Conditions of the above referenced Biological Opinion.

The Biological Opinion for the subject project included a Reasonable and Prudent Measure to minimize the incidental take of the federally listed threatened California gnatcatcher (*Poliioptila californica californica*). The Biological Opinion included 8 mandatory Terms and Conditions to implement the Reasonable and Prudent Measure. Term and Condition number 2 stated that "The Authority shall seek and acquire a 180.9 acre mitigation parcel within 12 months of the date of the finalization of this Biological Opinion. The final selection of a mitigation site shall be approved by the Service. A conservation management plan shall be prepared by the Authority and approved by the Service to ensure long-term viability of the site. The long-term manager shall also be subject to the approval of the Service".

The Crestridge site was one of seven sites that was "pre-approved" by the Service. The Service concurs that the Crestridge site is consistent with the requirements for off-site acquisition of 180.9 acres with a California gnatcatcher density of no less than 0.03 birds per acre (3 pair), as required by the Biological Opinion.

The Crestridge Habitat Management Area Interim Habitat Management Plan (Management Plan) is consistent with the commitments made by the Authority within their "Final San Diego County Water Authority Capital Improvement Program Biological Assessment and Mitigation Program for the California Gnatcatcher" dated April 1993 and the Terms and Conditions contained within the Biological Opinion. The Management Plan was prepared to provide a framework for the interim management of the Crestridge Habitat Management Area. The goals of the Management Plan are to protect the California

Mr. Laurence Purcell

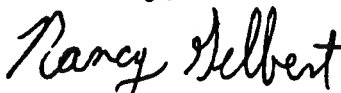
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gnatcatcher and important coastal sage scrub and other natural habitats. The plan is subject to revision by the identified Management Board as discussed within the Management Plan. Should the management responsibilities for this site be transferred to another party, the Management Plan may be replaced by an alternate management program subject to the approval of the Service.

The Management Plan states that the Crestridge site contains 261.05 acres of habitat including 24.8 acres of southern mixed chaparral, 233.65 acres of coastal sage scrub, and 2.6 acres of disturbed habitat. Based on the information within the Management Plan the Service acknowledges that after compliance with the Biological Opinion requirement for 180.9 acres of off-site mitigation, that an additional 51.35 acres of coastal sage scrub, and 24.80 acres of southern mixed chaparral are suitable and available on the Crestridge site to be used as mitigation for future projects. Additionally, 2.6 acres of disturbed habitat occur on the mitigation site and, with successful habitat enhancement measures could also be suitable mitigation lands. It is important to note that although the Service fully recognizes the Crestridge Habitat Management Area as an acceptable mitigation site the acceptability of any future impacts is dependent upon site specific project information and compliance with all Federal and State laws, regulations, guidelines and policy. The Service will determine the appropriate mitigation ratio for future project impacts based on site specific analysis.

The Service appreciates the efforts by the Authority on behalf of endangered and threatened species. If we can be of further assistance or if you have any questions please contact Nancy Gilbert of my staff at (619) 431-9440.

Sincerely,


for Gail C. Kobetich
Field Supervisor

cc: CDFG, San Diego, CA (Attn: B. Tippets)

1-6-94-HC-72



San Diego County Water Authority

A Public Agency

3211 Fifth Avenue • San Diego, California 92103-5718
(619) 682-4100 FAX (619) 297-0511

CRESTRIDGE HABITAT MANAGEMENT AREA

HABITAT MANAGEMENT PLAN

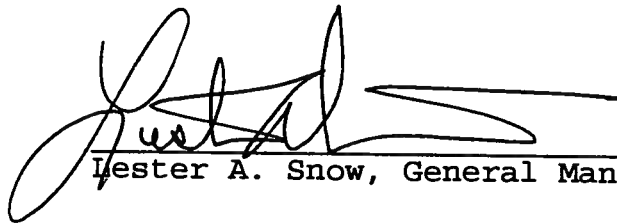
SAN DIEGO COUNTY, CALIFORNIA

This Interim Management Plan has been prepared to provide a framework for the management of the Crestridge Habitat Management Area. The Plan has been reviewed for its abilities to meet the goals of protecting the California Gnatcatcher, important coastal sage scrub and other natural habitats. The acquisition and management of the Crestridge Habitat Management Area, in accordance with this plan, fulfills the San Diego County Water Authority's commitment for off-site land acquisition and management as required by the July 19, 1993 Biological Opinion on Pipeline 4BI and other projects of the Authority's Capital Improvement Program.

The San Diego County Water Authority commits that it will execute the terms and conditions contained in this Interim Management Plan.

Dated:

1-26-94



Lester A. Snow, General Manager

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- Del Mar • Escondido • National City
 - Oceanside • Poway • San Diego

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CRESTRIDGE HABITAT MANAGEMENT AREA INTERIM HABITAT MANAGEMENT PLAN SAN DIEGO COUNTY, CALIFORNIA

1.0. INTRODUCTION

1.1. BACKGROUND

In 1989, the San Diego County Water Authority (Authority) adopted a facilities upgrade plan known as the Water Distribution Plan (WDP). The WDP was developed to meet water demand projections and provide for facility requirements to meet the needs of San Diego County to the year 2010. The WDP contains numerous capital projects, collectively known as the Capital Improvements Program (CIP), to be implemented over a ten year period. The Authority's CIP currently includes 32 projects. The CIP includes projects in all phases of development ranging from preliminary planning through completed projects.

The Authority, in accordance with its Strategic Plan environmental policy, identified significant adverse impacts associated with its WDP through the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) and committed to mitigation measures to off-set these impacts. With the federal listing of the coastal California gnatcatcher (*Polioptila californica californica*) as a threatened species under the Endangered Species Act (ESA), an evaluation of the CIP was undertaken to determine what effects the included projects may have on the gnatcatcher or its habitat and to identify measures to minimize and compensate for unavoidable impacts. This evaluation was conducted through a formal consultation process between the U.S. Navy (Navy) as lead federal agency and the U.S. Fish and Wildlife Service (Service). In accordance with Section 7 of the ESA, a Biological Assessment (BA) was prepared (Pacific Southwest 1993a) and a non-jeopardy Biological Opinion (BO) based on this assessment was issued by the Service (Appendix 1).

The BA and BO set forth guidelines under which take (as defined in Section 9 of the ESA) of gnatcatchers would be authorized and outlined measures to be implemented during construction and as a part of regular operations to ensure that work would not exceed authorized take allocations. In addition, the BA and BO included requirements for the acquisition and management of an off-site reserve area supporting Coastal Sage Scrub habitat and Coastal California Gnatcatchers.

Specifically, mitigation measures #11 and #12 in the BO identify the need to acquire and preserve a minimum of 180.9 acres of coastal sage scrub habitat which support not less than 0.03 birds/acre and which are to be considered viable as habitat for the long-term preservation of the species. The Authority proposed seven sites which met these requirements (Pacific Southwest 1993b). All seven of the sites were deemed acceptable by Service in the BO and the Authority was given 12 months to select and acquire a site.

Upon further research and property acquisition negotiations, the Authority has acquired a 261.05 acre multiple parcel site south of Interstate 8 within the Crest area of San Diego County (Figure 1). The site is to be known as the Crestridge Habitat Management Area (HMA) and was selected as an appropriate site based on acreage, bird densities, habitat linkage values and availability for purchase. This parcel has been identified as a part of an important natural north-south linkage in the City of San Diego, Clean Water Program's Multi-Species Habitat Conservation Plan (MSCP) and has been rated as having moderate to very high value under the plan's composite habitat evaluation of coastal sage scrub.

Additional mitigation requirements imposed by the BO which are relevant to the Crestridge HMA are measures #13, #14, and #16. Mitigation measure #13 directs the Authority to implement an interim management program which will be in effect from the time the selected mitigation site transfers ownership until the ultimate management program takes effect. Interim management shall consist of fencing, blocking undesirable access roads, and gating of desired access. Other responsibilities included under the interim management phase are posting of the site, weekly patrols, debris removal, and any necessary repair of fencing.

Under mitigation measure #14, the Authority is responsible for providing for the long-term maintenance and management of the Crestridge HMA. Long-term management measures are to be based on those outlined in chapter 3 of the BA (Pacific Southwest 1993a).

Mitigation measure #16 requires monitoring of Authority projects by a qualified biologist to verify impacts and to balance exchange "credits" with impacted areas. The Authority has initiated contracting for these services and will maintain a database on the status of CIP project impacts. An annual summary report is to be submitted to the Service. As the Crestridge HMA contains surplus "credits", a mitigation bank in which "credits" may be withdrawn in the future is being established as an element of this management plan.

This document describes the management of the Crestridge HMA to be undertaken while under Authority control. As multi-species planning in the region continues and large habitat banks are assembled, it is anticipated that the Crestridge HMA may transfer to a separate management agency. At that time, the Service, Authority, and future management entity shall reach agreement on an alternative management program or transfer this program in its entirety to the subsequent management agency.

1.2. GOALS AND OBJECTIVES

The primary goal of the Crestridge HMA is to preserve coastal sage scrub habitat and coastal California gnatcatchers in fulfillment of off-site mitigation requirements as outlined in the BO. The objectives of this Habitat Management Plan (HMP) are as follows:

- Provide meets and bounds description of the Crestridge HMA and identify easements and encumbrances associated with the HMA (Appendix 2).
- Summarize existing known biological resources of the Crestridge HMA and identify means of preparing a baseline database (section 3 & 4.1.4).

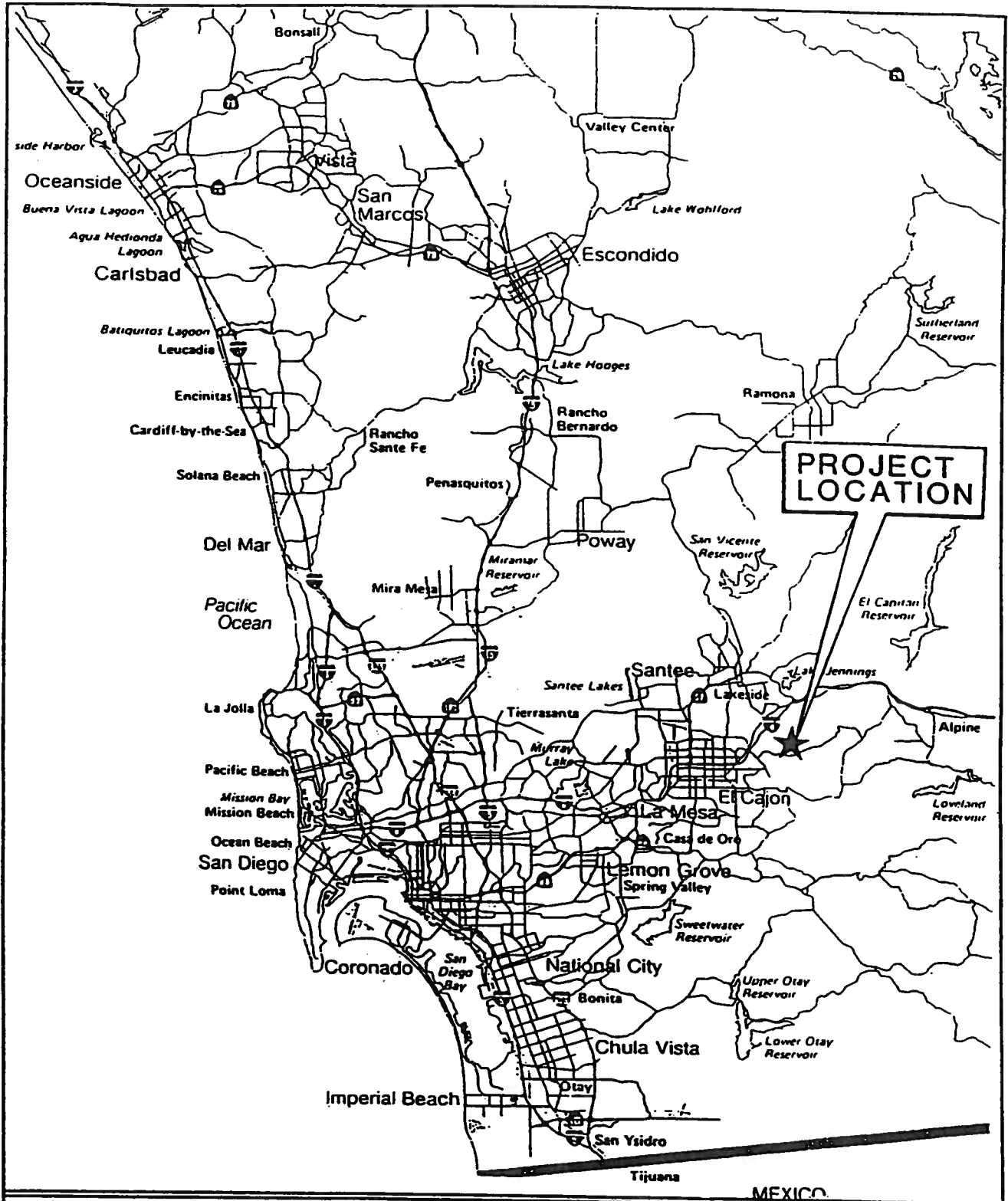
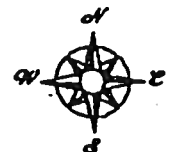


Figure 1. Crestridge Habitat Management Area Regional Location Map



- Identify protocols for interim implementation of supplemental or alternative management measures (section 4).
- Identify principal management mechanisms for the Crestridge HMA (section 4 & 5).
- Identify mechanisms for reporting on biological conditions, management efforts, and excess mitigation credit use (section 5.5).
- Identify funding sources for the long-term management of the Crestridge HMA (section 5.6).
- Identify opportunity for the future divestment of management responsibilities (section 5.7).
- Identify means of drawing on excess mitigation credits acquired beyond the 180.9 acres required by the BO (section 6).

2.0. SITE IDENTIFICATION

2.1. REGIONAL LOCATION AND PHYSIOGRAPHY

The Crestridge HMA is located at the eastern edge of the City of El Cajon, San Diego County, south of Interstate 8 (Figures 1 and 2). The southern edge of the management area is demarcated by La Cresta Road while the northern edge of the site is on Valleyview Truck Trail, a small private road crossing the extensive undeveloped Crestridge property. The site is situated within Township 15S and 16S; Range 1E in unsectioned lands of the Rancho El Cajon land grant, U.S.G.S. 7.5' El Cajon, CA Quadrangle, San Bernardino Base and Meridian.

2.2. GENERAL PHYSIOGRAPHY

The Crestridge HMA is a predominantly south and southwesterly facing site within the Forester Creek watershed. Several small canyons and knolls add to the site's topographic relief. The elevation ranges from a low of 825 feet on the western boundary to a high elevation of 1754 feet on the eastern boundary (Figure 2). No perennial water exists on the site, however seasonal seepage occurs within some of the on-site canyons well into the mid-summer months and several perennial springs occur within undeveloped lands contiguous to the north.

The soils of the site are characterized as coarse and very coarse sandy loams of the Cieneba, Cieneba-Fallbrook, Greenfield, and Vista series (Bowman 1975). The underlying geology is mapped as pre-Cretaceous metamorphic rock on the southwestern portion of the site and Mesozoic granitic rock on the northern and eastern portions of the site (Rogers 1973). Surficial granitic boulders are a common feature on the site.

Lands adjacent to the HMA are predominately rural in character including undeveloped lands, low density residential uses, limited commercial, public utilities, and one active ranch site.

2.3. BOUNDARIES AND EASEMENTS

Several easements exist on the site including private roadways and public utilities. Most of the easements provide legal access to parcels which have been included in the acquisition and therefore these easements are no longer necessary. Easements which are required include the La Cresta Road frontage and an access to four parcels located as inholdings of the HMA. The site is also crossed by a 200 foot wide SDG&E transmission line easement which hosts a 230 kV transmission line and an SDG&E patrol road. Figure 3 identifies the existing easements on or through the HMA. Those easements which result in substantial encumbrances to the land use or which require special consideration have been highlighted. Continued access by easement holders, including owners of inholding parcels and utilities, will be required.

Currently, both the private access easement and the SDG&E transmission corridor support the intended uses (i.e., roads and transmission towers and lines) and, as a result, future expansion of allowable uses are expected to be limited in nature. The SDG&E easement currently supports three sets of electrical support structures and at least one more set of poles may be accommodated in the future. This potential additional line and SDG&E's ongoing maintenance needs, including access road maintenance and brush management within the immediate vicinity of pole structures, may reasonably be expected to result in future habitat losses from within the HMA boundary. To account for this potential loss, 1.4 acres of existing habitat within the easement has been subtracted from the overall habitat acreage. This acreage includes four probable tower pad expansion areas, a stringing and pulling station location at the on-site angle point, and the area necessary to upgrade access roads to an average of 20 feet in width along the entire alignment. Estimated future impacts do not include the entire easement area but are based on specific route management information provided by SDG&E (Burton 1994) and recent evaluations of a similar line between the Sycamore Canyon Substation and the Creelman Substation (Pacific Southwest Biological Services 1993d). These anticipated future habitat impacts are subtracted from the available mitigation lands in section 6 of this management plan.

The Crestridge HMA includes 261.05 acres of land on eight legal parcels (Figure 3) identified as follows:

Assessor's Parcel Number

508-130-02
 508-140-03
 508-200-04
 508-200-06
 508-200-07
 508-200-08
 508-200-09
 508-200-10

The legal description for the acquisition area is included as Appendix 2.

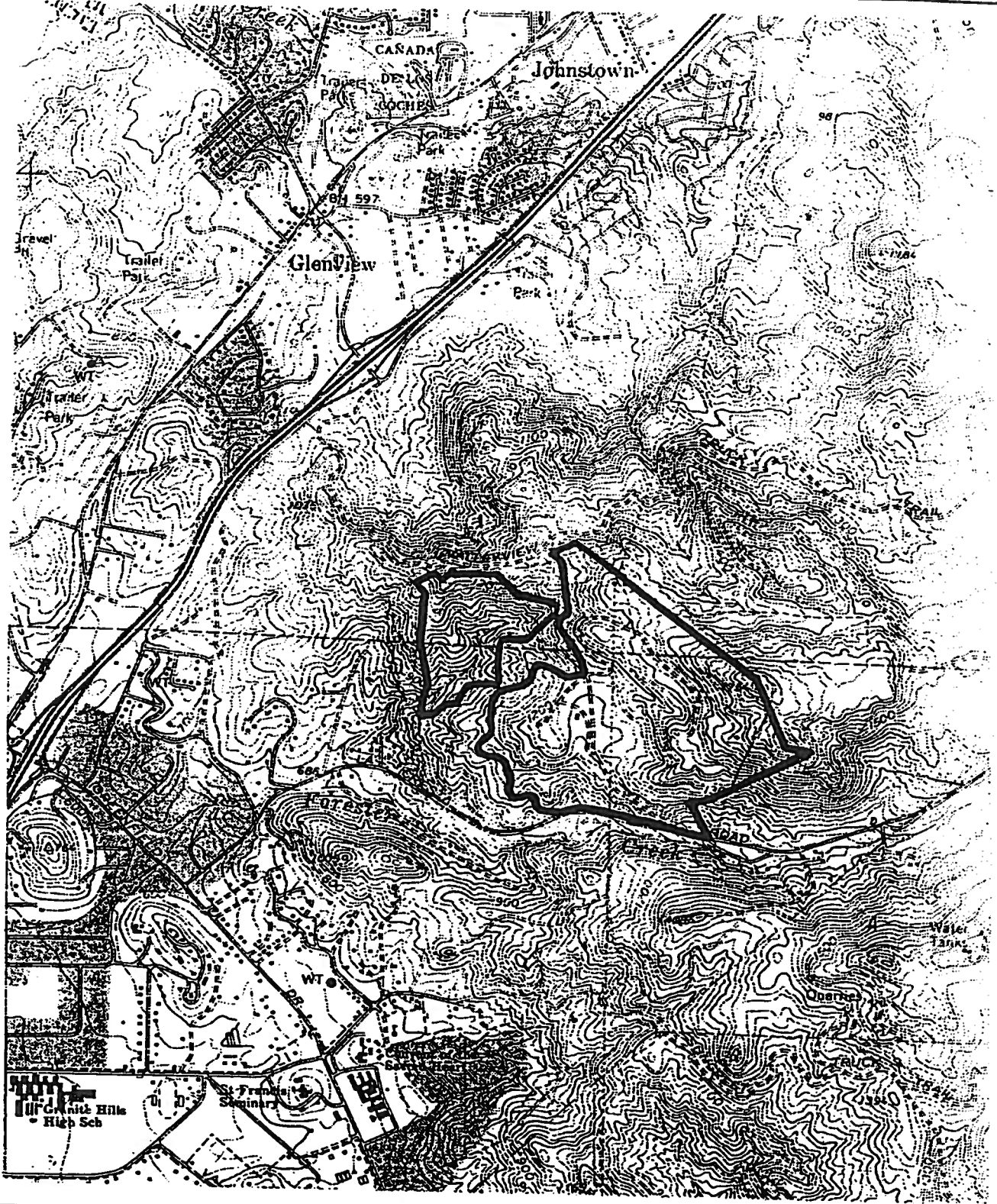
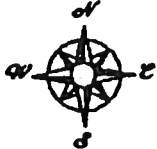


Figure 2. Crestridge Vicinity Map Habitat Management Area



1" = 2000'

3.0. EXISTING BIOLOGICAL RESOURCES

3.1. VEGETATION

Two vegetation categories; Diegan Coastal Sage Scrub and Southern Mixed Chaparral, and one disturbance category associated with two on-site residences occur within the Crestridge HMA (Figure 4).

Diegan Coastal Sage Scrub accounts for 89.5% (233.65 acres) of the HMA. Sage scrub on the site is generally considered to be of high quality and dominated by typical sage scrub species such as California sagebrush (*Artemisia californica*), laurel-leaf sumac (*Malosma laurina*), toyon (*Heteromeles arbutifolia*), flat-top buckwheat (*Eriogonum fasciculatum*), and white sage (*Salvia apiana*). Other plant species present include redberry (*Rhamnus crocea*), broom baccharis (*Baccharis sarothroides*), California encelia (*Encelia californica*), and common monkey flower (*Mimulus guttatus*). Understory includes both native and non-native grasses and forbs.

Southern Mixed Chaparral comprises 9.5% (24.8 acres) of the site and is restricted to the northeastern portion of the site. This chaparral is connected to more extensive chaparral habitat located to the northeast of the site. Typical plant species found in this vegetation category include mission manzanita (*Xylococcus bicolor*), eastwood manzanita (*Arctostaphylos glandulosa* ssp. *glandulosa*), mountain mahogany (*Cercocarpus minutiflorus*), chamise (*Adenostoma fasciculatum*), chaparral whitethorn (*Ceanothus leucodermis*), and toyon.

Disturbed areas account for 1.0% (2.6 acres) of the site and are dominated by Eurasian grasses such as bromes (*Bromus mollis*, *B. diandrus*) and slender oat (*Avena barbata*). Also represented in these areas are sweet fennel (*Foeniculum vulgare*) and groves of exotic trees such as Peruvian pepper (*Schinus molle*) and eucalyptus (*Eucalyptus* spp.).

Sensitive plant species identified within or adjacent to the Crestridge HMA include San Diego sagewort (*Artemisia palmeri*), San Diego sunflower (*Viguiera laciniata*), Engelmann oak (*Quercus engelmannii*), Lakeside ceanothus (*Ceanothus cyaneus*), ashy spike-moss (*Selaginella cinerascens*), and California copperleaf (*Acalypha californica*) (Pacific Southwest 1981, 1986; Sweetwater Environmental Biologists 1993). More detailed discussions on vegetation found within the HMA and adjacent lands is included in the referenced documents.

3.2. GENERAL WILDLIFE

Biological surveys of the Crestridge HMA and adjacent lands were conducted by Pacific Southwest (1981, 1986) and by Sweetwater Environmental Biologists (1993). Focused surveys to determine the status of the coastal California gnatcatcher were conducted by Pacific Southwest (1993c). Information concerning characteristic and sensitive wildlife species detected within the Crestridge HMA and adjacent lands is based on those reports.

Five species of amphibians have been reported as occurring within or adjacent to the Crestridge HMA (Pacific Southwest 1981, 1986). Most of these species, such as the western toad (*Bufo boreas*) and Pacific chorus frog (*Pseudacris regilla*), are common to scrub habitats in southern California. A 1986 report by Pacific Southwest lists the western spadefoot (*Spea hammondi*), a California Species of Special Concern as occurring; however, as this species was

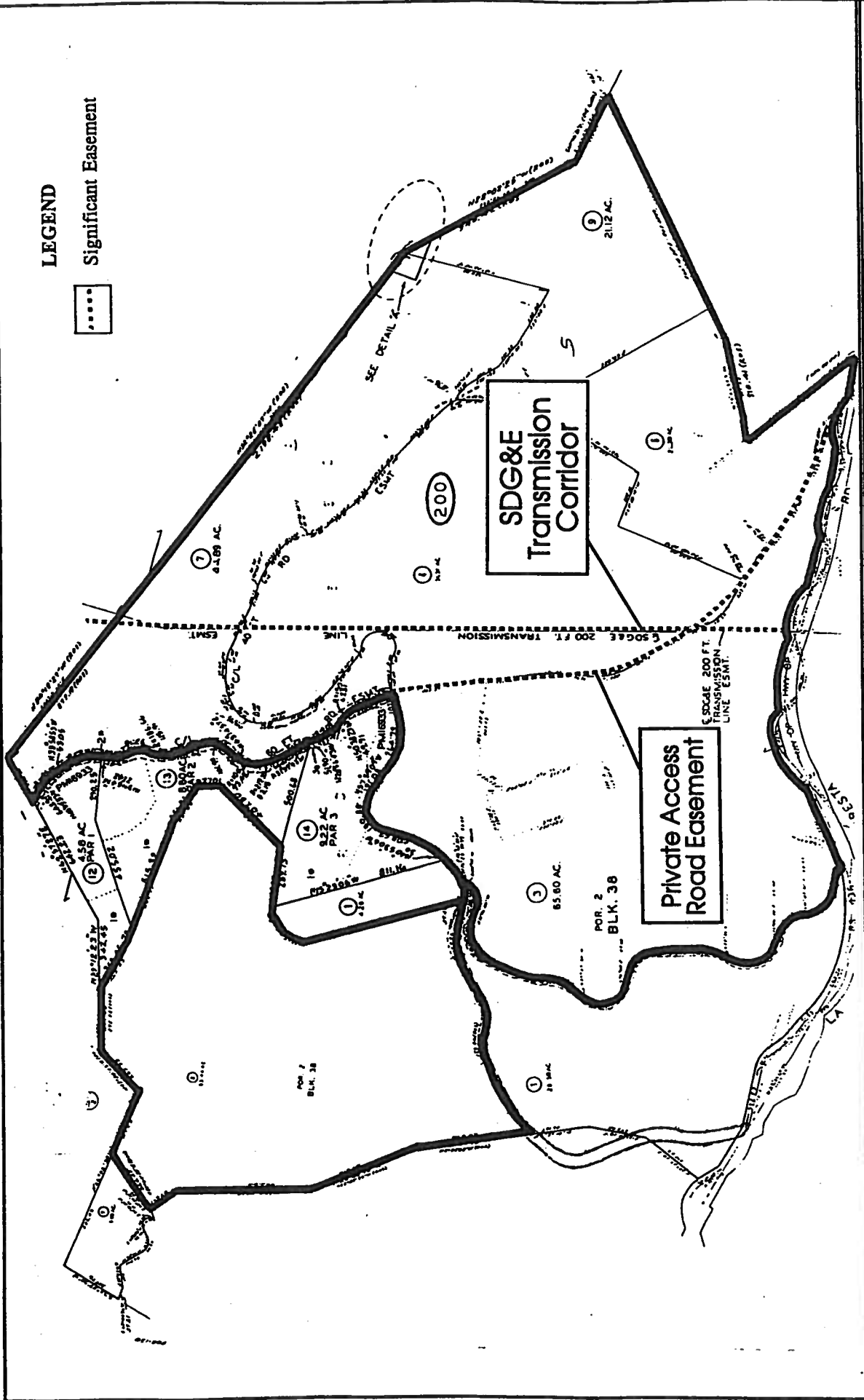


Figure 3. Crestridge Habitat Management Area Parcel Easement Map

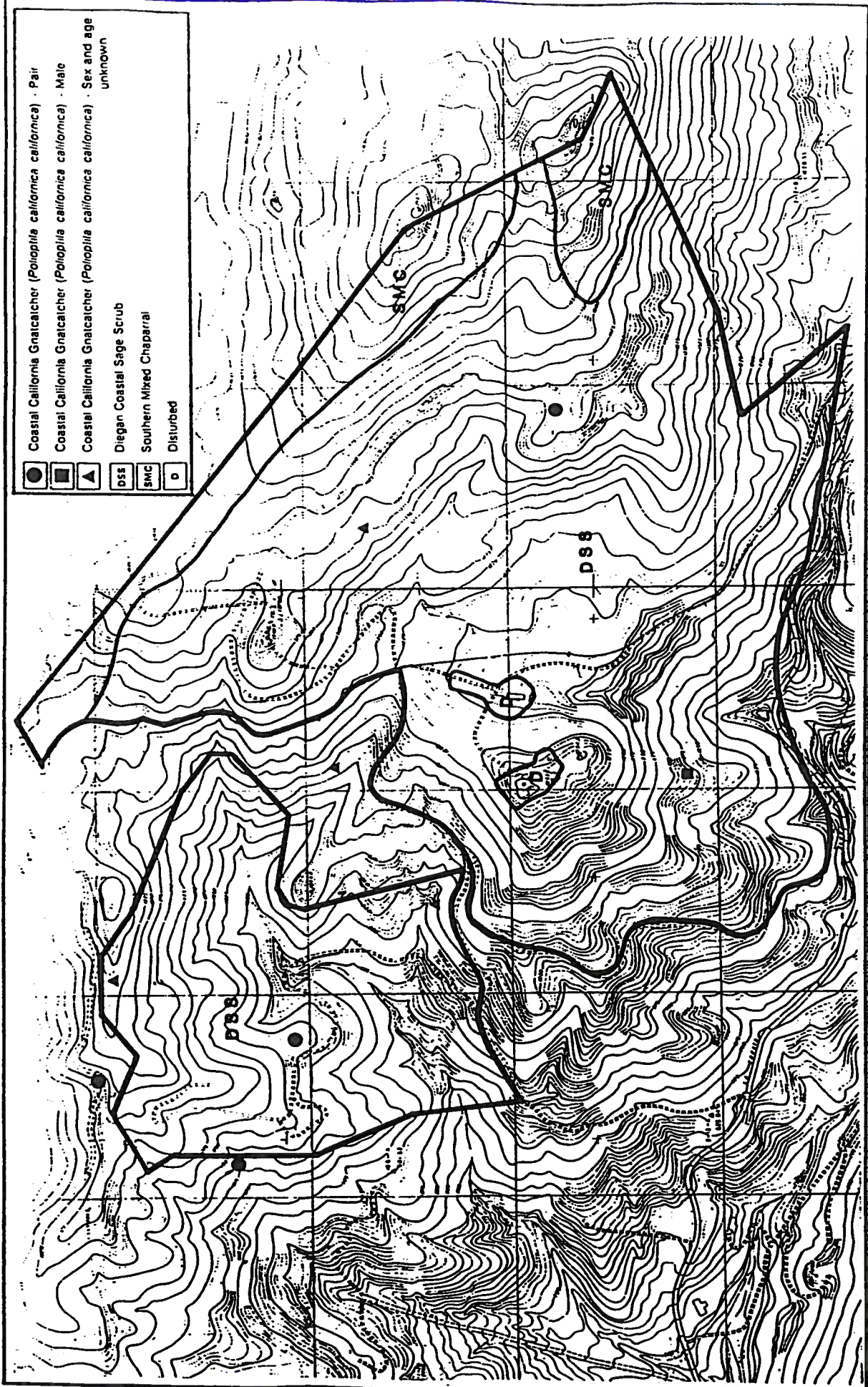


Figure 4. Crestridge Habitat Management Area Vegetation and 1993 Coastal California Gnatcatcher Location Map

not considered sensitive at the time of the survey no mention is given as to the location of observed individuals.

Numerous species of reptiles have been reported from the vicinity of the Crestridge HMA (Pacific Southwest 1981, 1986; Sweetwater Environmental Biologists 1993) including the Coronado skink (*Eumeces skiltonianus interparietalis*), San Diego horned lizard (*Phrynosoma coronatum blainvillei*), orangethroat whiptail (*Cnemidophorus hyperythrus*), and northern red diamond rattlesnake (*Crotalus ruber ruber*). All of these species can be expected to occur within the Crestridge HMA. The coastal whiptail (*Cnemidophorus tigris multiscutatus*) is also expected to occur on the site and a small abandoned stockpond may provide potential habitat for the western spadefoot (*Spea hammondi*).

Avian species detected within and adjacent to the Crestridge HMA are typical of those reported for other areas of sage scrub of similar quality. Sensitive avian species detected within the Crestridge HMA include the golden eagle (*Aquila chrysaetos*), Cooper's hawk (*Accipiter cooperii*), blue-gray gnatcatcher (*Polioptila caerulea*), coastal rufous-crowned sparrow (*Aimophila ruficeps canescens*), and Bell's sage sparrow (*Amphispiza belli belli*) (Pacific Southwest 1981, 1986; Sweetwater Environmental Biologists 1993; J. Harris, Pacific Southwest, pers. obs.). Both the loggerhead shrike (*Lanius ludovicianus*) and sharp-shinned hawk (*Accipiter striatus*) have been observed on adjacent lands and can be expected to make use of the HMA lands as well.

Several mammalian species have been reported from the Crestridge HMA or adjacent lands (Pacific Southwest 1981, 1986; Sweetwater Environmental Biologists 1993). Most notable among the species which have been reported from the region is the mountain lion (*Felis concolor*) which was detected in 1986 within the rugged chaparral hills to the north. The only sensitive mammal recently detected on the Crestridge HMA is the San Diego black-tailed jackrabbit (*Lepus californicus bennettii*) (Sweetwater Environmental Biologists 1993). There are however, several small rodent species which may potentially occur within the HMA including the northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*) and the Dulzura California pocket mouse (*Perognathus californicus femoralis*). Based on past survey experience in the region, these species would be expected to be captured in a focused trapping effort.

3.3. CALIFORNIA GNATCATCHERS

Recent focused surveys were conducted by Pacific Southwest (1993c) and Sweetwater Environmental Biologist (1993). These surveys indicate that four pair of coastal California gnatcatchers (three confirmed pairs and a male observed in remnant breeding plumage) make use of the Crestridge HMA (Figure 4). Also detected on-site were three individual gnatcatchers of unknown sex or age which may be associated with previously identified pairs or which may represent dispersing juveniles. An additional five to eight gnatcatcher pairs occur on lands surrounding the HMA. The majority of these birds are found in the lower-lying slopes to the west.

A calculated density of the 0.03 birds/acre of sage scrub habitat occurs in the subject HMA (7 birds on 233.65 acres considering only presumed pairs). However, due to the site's position at the eastern fringe and upper elevational limits of the coastal California gnatcatcher range, the site's population is expected to be more dynamic than populations found in more mild coastal regions. Winter cold-snaps or inclement weather may result in high mortality on an

irregular basis. Further, the larger Crestridge property has a history of small burns. This fire history is expected to continue over the Crestridge HMA at a reduced level. It is expected that future burns may result in a heterogeneous mix of successional vegetation and periodic temporary losses of gnatcatchers or gnatcatcher habitat from the site. Conversely, the site may support greater densities of birds for short periods when other regions suffer habitat losses. In past years, the site supported varying numbers of gnatcatchers. In 1981 surveys, nine gnatcatcher sightings (reported as nine pairs) were reported by H. Wier and T. Scott (Pacific Southwest 1981). In 1986, only four pairs of birds were noted on the site by Merkel (Pacific Southwest 1986). In all instances, birds were generally distributed in the same regions of the site as reported in the current survey. In both the 1981 and 1986 surveys, gnatcatchers were also noted to occur within and adjacent to the inholding parcels of the site.

4.0. HABITAT MANAGEMENT PROGRAM

4.1. INITIAL SITE PREPARATION

4.1.1. BOUNDARY SURVEY

The Crestridge HMA is to be surveyed to establish site boundaries. A portion of this work appears to have been completed by others in the past, however these points will need to be verified. This survey shall determine the boundaries of the Crestridge HMA and all corners shall be staked and flagged. In addition, sighting stakes and flags shall be positioned along the property boundaries to facilitate the fencing of the HMA.

4.1.2. FENCING AND GATING

Access control within the Crestridge HMA will require the construction of barrier fences and gates at access locations. Adjacent property owners and agencies will require access through the site in accordance with prior easements to SDG&E and adjacent inholding properties. These issues are discussed below.

Fencing

Barrier fencing shall be constructed at vehicular access locations on the perimeter of the HMA boundary. This fence shall consist of a four strand fence with a smooth bottom wire to reduce snagging wildlife and smooth or barbed wire on the upper three strands. The wire shall be of a heavy gage. Wire spacing will be 16, 22, 30, and 42 inches from the ground. Fence stays will be utilized to assure wire spacing and integrity between posts. Posts to be utilized will be metal senior "T" posts. Post spacing will be no greater than 16 feet. In areas of steep terrain, 12 foot centers will be utilized. Personnel installing fences will be instructed in the sensitivity of the site, its habitat, and installation methods to minimize impacts to habitat. To ensure that these methods are employed, the fence installation will be monitored and no greater than a 6 foot wide vegetation clearing corridor will be used to construct the fence. Numerous roads currently exist within the HMA which can be utilized to provide access to the majority of the site for the proposed work. No vehicles will be allowed to travel off-road within the Crestridge HMA.

The barrier fencing will include the currently undeveloped inholding designated as NAP (not a part) in Figure 5. This will require the cooperation of the inholding property owners and additional gating to allow access to inholding parcels. In the event that future development is initiated within this area, the Authority shall be required to fence the interior boundaries of the Crestridge HMA to exclude inholding parcels.

As proposed, the barrier fencing required is approximately 1,800 linear feet. Barrier fencing shall be extended as necessary around access points as a part of the on-going maintenance program described in section 5.0 of this management plan. Should additional perimeter fencing be required, the Authority shall provide up to 17,480 linear feet (if the inholding parcels are ultimately preserved) or 24,180 linear feet of fencing to be placed during not more than two periods of installation. Fencing may be placed at locations identified by the management board and Service to further the direct protection of the Crestridge HMA.

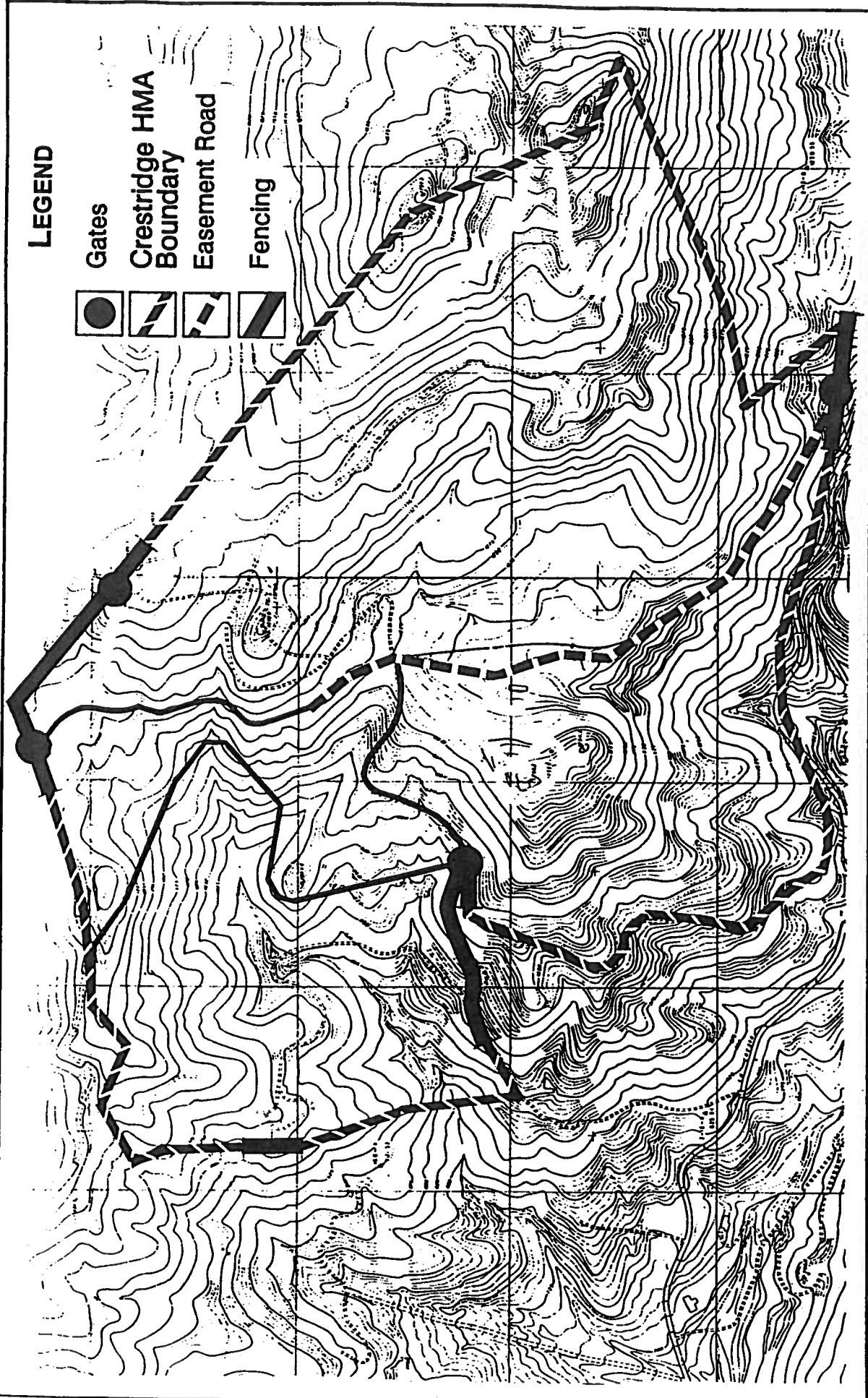
Gates

Under the management plan, four gates will be required. Location of the proposed gates are depicted in Figure 5. Gate design shall follow Authority specifications and shall be installed in conjunction with the fencing requirements. Notice of gate locations shall be given to easement holders (SDG&E, inholding property owners) and fire control agencies (California Department of Forestry), access needs will be coordinated, and separate locks will be included where necessary. As access to the site will be required by several agencies and private individuals, it is recommended that a multiple lock mechanism be utilized on the gates.

Access and Rights-of-way

Several unnecessary roads and trails occur within the Crestridge HMA. All non-essential roads shall be removed from the circulation system by a program of cross-ripping and seeding roadways with a native coastal sage scrub seed mix collected from the Crestridge HMA and applied during the early winter months. The barrier fencing will block most unnecessary roads at one end. The other end of these roads will persist on managed lands and should be staked to note their retirement from use. Earthen or rock barriers may be placed at some roadway intersections to further restrict use of these roads. These blockage points should be located in areas which would be difficult to circumvent.

As previously discussed, there are several agencies and property owners who require continued access through the Crestridge HMA. These include the Crestridge HMA site manager, SDG&E, local and/or state fire control agencies, and private land inholding owners. These agencies and groups will be contacted and allowed to place locks on the appropriate gates. Each key holder will also be given information on the HMA's biological resources and management efforts. A list of precautionary measures to be taken when crossing the site will be prepared and provided to the site users.



LEGEND

- Gates
- Crestridge HMA Boundary
- Easement Road
- Fencing



1" = 675'
Pacific Southwest Biological Services, Inc.

Figure 5. Crestridge Habitat Management Area Fencing and Gating Plan

4.1.3. INITIAL DEBRIS REMOVAL

Several abandoned cars, construction debris, and other trash currently occurs within the Crestridge HMA. Funds for property clean-up are to be left in escrow to allow the seller to contract for clean-up services. Such funds will be disbursed to the seller following successful removal and proper disposal of this material. Clean-up activities shall include precautionary measures and monitoring to ensure that native habitats are not excessively impacted by the debris removal.

Upon satisfactory acceptance of the initial debris removal, future debris removal will become the responsibility of the Authority. Once the site is fenced, all trash will be removed on a monthly basis by the site manager.

4.1.4. INITIAL BIOLOGICAL SURVEY

As part of the initial site preparation of the Crestridge HMA, a detailed biological survey of the site will be conducted to provide baseline biological information. This survey, or surveys should provide data on both the common and sensitive flora and fauna occurring within the HMA. Surveys conducted in the past are either out-dated (Pacific Southwest 1981 & 1986), did not cover the entire Crestridge HMA (Pacific Southwest 1981 & 1986; Sweetwater Environmental 1993), or were directed toward the detection of a specific species (Pacific Southwest 1993c). There are several sensitive species in addition to the gnatcatcher which may occur within the Crestridge HMA (section 3). The status of these species as well as the general flora and fauna needs to be determined for several reasons: 1) to provide sufficient biological data to successfully manage the HMA; and 2) to provide a better assessment of the habitat quality for future mitigation bank withdrawals. This is especially important if the bank is to be used to mitigate impacts under CEQA or for species present within the HMA other than the California Gnatcatcher.

Botanical surveys shall be conducted during the spring months to detect annual species. General avian surveys shall also be conducted at this time as will surveys for amphibians, reptiles, and mammals. A small mammal trapping survey will also be completed. All sensitive plant and wildlife species detected shall be mapped.

4.2. SITE MANAGER SELECTION AND RESPONSIBILITIES

A site manager or management group shall be identified and retained to implement the items identified in the Crestridge HMP. This individual or group, hereafter referred to as site manager, will provide a resident on-site manager to oversee the Crestridge HMA. The minimum qualifications for site management are as follows:

- 1) Site manager must have a degree in wildlife management, zoology, ecology or other related field and must be able to demonstrate that they have experience in habitat management issues. If a management group is chosen, personnel must be able to demonstrate that they have appropriate experience and training in habitat management. Under these circumstances it will not be necessary for the on-site manager to have all the required education and experience, although it

will be required that the personnel with identified qualifications tour the site on a monthly or more frequent basis.

- 2) Site manager must possess a current 10a permit which enables them to survey for the coastal California gnatcatcher utilizing taped recordings during the breeding season.

The site manager will be responsible for implementing the following measures:

- 1) The site manager shall provide a resident manager of the Crestridge HMA who will establish regular permanent residence on the site. The site must be occupied during all weekends and most evenings and nights.
- 2) Weekly perimeter checks of the property will be made to ensure the integrity of the fence lines and to note general site conditions.
- 3) The site manager shall provide site security. This work includes ensuring that all gates are kept locked, perimeter fences and signage is intact, confronting trespassers, conducting fire patrol, and documenting illegal activities such as dumping. The site manager shall be required to carry a cellular phone during site patrols.

Under no circumstances are the site manager or resident manager to place themselves in a situation which would jeopardize their safety. If any trespassers appear dangerous or act in a belligerent manner, the resident manager is to contact the San Diego County Sheriff's Department. Resident managers are not expected to provide fire protection for the HMA. They are however, responsible for the preparation of a wildfire response plan detailing roadway and gate access points and locations, distribution of sensitive resources, and areas of critical concern for protection. This plan is to be provided as an advisory document to the local fire management agencies. The site manager is also responsible for early detection and subsequent reporting of fires to local fire agencies and for assuring that fire agencies have access to the site. The HMA manager shall coordinate with the responding fire agencies as necessary to inform the agencies of important natural resources, but the HMA manager is not to direct or impede fire suppression actions in any way.

- 4) The as-needed, but no less frequently than monthly collection and proper disposal of any debris deposited within the Crestridge HMA, shall be the responsibility of the site manager. All work effort is to be documented as to location, date of detection, type of material dumped, and disposal method and date.
- 5) The site manager shall be responsible for the general maintenance of all fences, gates, signs, equipment, roads and other facilities located within the Crestridge HMA. This will specifically include the prompt repair of any damaged fences or gates and the repair or replacement of signs. Fence or gate repairs are to be initiated within 72 hours of detection. All repairs are to be completed within

one week unless unavailability of materials precludes such repairs. If permanent repairs cannot be made immediately, temporary measures to restrict access shall be taken.

Repairs to residence(s) will involve only minor repairs. Any required major repairs will be coordinated through the Authority.

- 6) The site manager is responsible for keeping logs on all noteworthy observations of ecological interest and observations of predatory species and sensitive species. In addition, the site manager shall be responsible for conducting biannual coastal California gnatcatcher surveys of the Crestridge HMA. Gnatcatcher survey results will be included within the annual summary report. Annual reports will include all information required under the gnatcatcher survey, Section 10a permit held by the site manager as well as other biological information of interest and value in assessing management needs. These are to include: methods, survey conditions, results, and maps indicating location of gnatcatchers and survey routes. Results of surveys will be submitted to the Authority and the Service within ten days of completion.
- 7) The site manager shall prepare and submit to the Authority an annual summary report containing the following items:
 - a) Summary of management actions taken during report period.
 - b) Summary of annual coastal California gnatcatcher survey as well as documentation and maps of any other sensitive species detected within the HMA.
 - c) Summary of the status of the mitigation bank credits.
 - d) Detailed summary of cost expenditures incurred during the report period.
 - e) Discussion of any management problems encountered within report period.
 - f) Maps indicating cumulative areas of trespass, dumping, fire, etc. for the management period.
 - g) Recommendations for future management periods.
 - h) A management action log shall be attached as an appendix to the report.

The duties of the site manager or management entity are more thoroughly discussed in Section 5.

5.0. ON-GOING MANAGEMENT PROGRAM

5.1. MANAGEMENT AUTHORITY AND OVERSIGHT

The management of the Crestridge HMA shall be directed by a Management Board which consists of representatives of the Authority, U.S. Fish and Wildlife Service, California Department of Fish and Game, the site manager, and any future land recipient or management area partners. The designated representatives of this board are currently proposed to include:

San Diego County Water Authority	Laurence Purcell (619) 682-4158
U.S. Fish and Wildlife Service	Nancy Gilbert (619) 431-9440
California Department of Fish and Game	Bill Tibbits (619) 688-4267
Crestridge HMA Site Manager (ex-officio)	to be determined

The Authority shall be responsible for the selection of the site management entity and all funding requirements of the management effort. The selection of a site manager shall be reviewed for approval by the Service. The site manager shall be responsible for all day to day management work undertaken in conformance with this management plan. The Management Board shall be responsible for reviewing the HMP and recommending amendments to the Authority Board as necessary to ensure achievement of the management goals. The Service shall be responsible for evaluating proposed amendments to the plan relative to potential special permitting needs under the ESA.

The Management Board shall also be responsible for considering use of mitigation credits, preparing preliminary recommendations to the Authority Board of Directors for transfer of management responsibility for the HMA, modifying bank credits or values, and approving proposed secondary uses. The board will act by unanimous consent on all items. The Authority shall retain full rights to the transfer of un-exhausted mitigation credits and may recover values for land and management of these credits.

5.2. ACCESS CONTROL MAINTENANCE AND SITE PATROL

Weekly patrols of the Crestridge HMA will be conducted by the site manager. These patrols will concentrate on boundary fences and gates; however, evidence of dumping or other unauthorized activities will be searched for. If fences or gates are found to be damaged then the site manager will be responsible for initiating repairs within 72 hours of detection. All repairs are to be completed within one week unless extenuating circumstances (e.g. unavailability of materials, contractors, etc.) require a longer period.

5.3. DEBRIS REMOVAL

The site manager will be responsible for the collection and proper disposal of any debris within the Crestridge HMA. Debris will be collected on a as-occurs basis but no less frequently than monthly. The site manager will be responsible for transporting debris to a proper disposal site.

5.4. HABITAT DISTURBANCES

The site currently supports a number of roadways and trails which are to be abandoned and reclaimed as natural habitat. To facilitate this effort, all non-essential trails and roadways will be blocked and a re-seeding program will be implemented during the early winter months. If future habitat disturbance occurs within the management area, the site manager is to review these disturbances with the Management Board to determine what, if any, actions should be taken.

The Crestridge area has an active fire history with the most recent fire occurring along the SDG&E alignment to the north of the HMA. This fire occurred during the summer of 1993. Periodic fire is a natural element of the sage scrub environment although sage scrub's resilience to fire is not completely understood. Fire occurrence intervals of 5-10 years may result in chaparral replacement by sage scrub while more frequent burning will likely eliminate sage scrub (O'Leary 1989). Fires effect on wildlife is varied. Fires may temporarily displace wildlife species; however, fire does not permanently destroy the animal community (Quinn 1990).

Due to the small size of the Crestridge HMA, an active fire management plan of prescribed burns is not recommended although it is recognized that fire may periodically occur within the HMA. Small fires of low heat intensity may actually be of long-term benefit to the habitat and species inhabiting the HMA even though these fires may temporary displace wildlife species, including the coastal California gnatcatcher. This displacement, however, is only expected to be temporary and not adversely effect long-term gnatcatcher population trends. Large, high intensity fires, which may consume large portions of the HMA are undesirable. In either case, fires, whether of natural or anthropogenic origin, are considered a natural element of the environment and will not negate the success of the HMA. Revegetation within burned areas will be allowed to occur naturally unless erosion control is deemed necessary by the Management Board. Changes in site conditions resulting from fire shall not impact mitigation values of the property. Nor shall such fire damage negate the responsibility for combined site management.

5.5. ANNUAL SUMMARY REPORT

Annual summary reports are to be prepared to provide a record of management actions and a status of on-site resources. These reports shall be prepared in December of each year and shall be issued in January of the following year. The annual summary report shall include the following information and be signed by both the site manager and Authority representative.

5.5.1. GENERAL OVERVIEW OF MANAGEMENT ISSUES

The summary report will include sections discussing the general management issues addressed during the report period. This will include discussions of maintenance performed during the report year and anticipated maintenance needs for future years. Costs incurred in the management of the Crestridge HMA will also be identified by a line-item breakdown of expenses.

5.5.2. HABITAT ASSESSMENT AND MITIGATION CREDIT SUMMARY

A general discussion concerning the condition of the Crestridge HMA habitat will be provided. An aerial photograph of 1" = 2000' scale shall be included in the report to document the site conditions and conditions of adjacent lands.

A discussion of any transactions within the mitigation bank will be provided in a cumulative tabular fashion as illustrated in Table 3 of Section 6.0. This will include a summary of the project, impacts, and required mitigation credit used. A summary of the remaining mitigation credits will be provided. If no action occurs within the mitigation bank then this will also be documented. The Authority shall prepare an annual inventory of impacts to Coastal Sage Scrub and gnatcatchers for its CIP projects operations, and maintenance. This summary shall be based on pre- and post-impact surveys and will be tabulated as required in the BO for the CIP.

5.5.3. ASSESSMENT OF CALIFORNIA GNATCATCHER STATUS

Biannual surveys to determine the number of gnatcatcher breeding pairs are to be conducted during the spring and fall seasons by biologists who are permitted by the Service to utilize tape recorded vocalizations to elicit gnatcatcher responses during the breeding season. Three site visits will be conducted over a three consecutive week period utilizing currently accepted protocols. Upon completion of the surveys a report will be submitted to the Authority and to the Service within ten days. This report will include a map indicating the location of gnatcatchers detected, survey routes from the current year as well as a map indicating gnatcatcher locations from previous years for comparison. Other items which shall be included in the annual gnatcatcher report include survey methodology, personnel involved, survey conditions, discussion of results, and documentation of any other sensitive species detected in the course of the surveys.

5.5.4. MANAGEMENT EVALUATION AND RECOMMENDATIONS

The annual report is to note the effectiveness of management efforts undertaken during the year and is to suggest alternative management efforts if appropriate. If the need for modification arises during the year, this should be immediately brought to the attention of the Authority, who will bring it to the attention of the Management Board, if appropriate. As a part of the evaluation, maps should be prepared indicating locations of all dumping, trespass, ORV disturbance, or fires such that potential modifications to the management program may be considered. In addition, the aerial photographs should be reviewed for year to year changes

in the site or vicinity. Such changes should be discussed relative to the site's resources and relationship to adjacent habitats.

The site manager shall maintain a management action log noting information regarding any actions taken by the site manager or observations made which may be pertinent to management of the site. This log should be attached as an appendix to the annual summary report.

5.6. FUNDING

The implementation of this management plan is to be funded by the Authority. The initial costs for establishing the HMA are to be funded as a capital expenditure under the Authority's CIP (Table 1). The annual recurring costs are to be funded as a line item in the annual operations and maintenance budget of the San Diego County Water Authority (Table 2). The budget shall be administered through the Water Resources Planning Department as an ongoing committed operating budget requirement. Within the operating budget, a management entity shall be funded to conduct all identified management actions as specified under sections 4.2 and 5 of this plan. Additional funds outlined in Table 2 are to be held in the Water Resources Planning Department annual budget and will be released as necessary throughout the fiscal year to accomplish the identified work effort. Within the budgeted estimates, funds may be shifted between various elements as required to achieve the management objectives.

TABLE 1 ESTIMATED ESTABLISHMENT COSTS FOR THE CRESTRIDGE HABITAT MANAGEMENT AREA

ITEM	DESCRIPTION	COST
Housing for On-site Manager	Repair existing housing to code or provide trailer if existing housing repair costs exceed budget amount	\$30,000
Boundary Survey	Confirm property boundaries and flag boundaries prior to fencing	\$42,000
Gates	Four heavy gage gates; estimated at \$1,500/gate and \$2,500/gate installation	\$16,000
Barrier Fencing	Would include barrier fencing at existing access points.	\$ 8,000
Perimeter Fencing	Future fencing may be required up to 24,180 linear feet. Fencing may be place during two periods at on- or off-site locations which directly benefit the protection of the Crestridge HMA. Fence type: 4 wire , 4 strand fence, sr. "T" posts, 12 - 16' centers (costs determined at 12' centers), stays, braces etc.	\$67,740*
Access Control	Removing roads	\$3,000
On-site Equipment	Welder, fencing repair equipment, general tools, etc.	\$5,000
Baseline Biological Survey	A one-time biological survey to establish a baseline for management purposes.	\$10,000
TOTAL		\$181,740

* includes additional funds for potential need of 24,180 linear feet of fence. Fencing budgets may be reduced to accommodate 17,480 linear feet if the inholding parcels are ultimately preserved.

TABLE 2 ESTIMATED ANNUAL OPERATING COSTS FOR CRESTRIDGE HABITAT MANAGEMENT AREA

ITEM	DESCRIPTION	COST
Annual Coastal California Gnatcatcher Monitoring	Conduct annual gnatcatcher surveys and reports. Surveys would consist of a spring breeding bird survey and a fall survey using 3 visit presence/absence survey protocols.	\$3,500
Access and Signage	Road maintenance, fence and sign repair, and closing unauthorized trails	\$5,000
Seed Materials	Revegetation seed materials	\$ 400
Debris Removal	Collect and remove garbage.	\$4,000
Facility Maintenance	Maintain housing, utilities, etc.	\$3,500
Management Costs	General management costs *	\$13,200
TOTAL	* includes contractor management and salaries for site manager employees	\$29,600

Management costs are to be evaluated annually to determine adequacy to implement necessary management actions. It is anticipated that management costs will require adjustments for inflation or unforeseen management actions.

5.7. SITE TRANSFER

In the event that the management of the site is transferred to an alternative management entity, the Authority shall ensure a mechanism for the long-term funding of the management program as a part of the transfer. Upon exercising a transfer approved by the Management Board, the Authority shall be permanently relieved of all on-going management obligations. Should un-exhausted mitigation credits remain in the transferred lands, these credits shall remain the property of the Authority and may be used as discussed in Section 6.2.

5.8. ALLOWABLE SECONDARY USES

The primary purpose of the Crestridge HMA is the preservation of coastal sage scrub habitat and coastal California gnatcatchers. However, other uses of the Crestridge HMA may be acceptable provided they are consistent with the goals and objectives of the Crestridge HMP. Furthermore, any secondary uses of the Crestridge HMA must be approved by the Management Board prior to initiation. Two potentially suitable secondary uses which may be anticipated are discussed below.

5.8.1. NON-CONSUMPTIVE SCIENTIFIC RESEARCH

Non-consumptive biological field research may be an acceptable secondary use of the Crestridge HMA. Any parties interested in conducting scientific research within the Crestridge HMA will be required to submit research proposals to the Authority, who will forward to the Management Board for review and approval.

5.8.2. HABITAT ENHANCEMENT

Habitat enhancement measures such as seeding disturbed areas or prescribed burns may also be acceptable secondary uses of the Crestridge HMA. Prior to conducting any enhancement measures, interested parties will be required to submit enhancement proposals to the

Authority, who will forward to the Management Board for review and approval. Through enhancement efforts, it may be possible to upgrade the mitigation credits or increase the mitigation credits available within the Crestridge HMA. These credit modifications will be determined by the Management Board. Only areas not included in the initial site preparation work discussed above may be considered for enhancement credit. Roadways proposed to be cross-ripped and reseeded as a part of the site preparation are not to be included in areas of enhancement potential.

6.0. MITIGATION CREDIT BANKING

The Crestridge HMA exceeds the Authority's current mitigation needs and excess land is being acquired to establish a mitigation bank. The Authority desires to hold and manage this excess land in conformance with the goals specified for the 180.9 acres of mitigation land currently required of the Authority. The excess land is to be used as mitigation for future projects as needed and as approved by the appropriate governing agencies and the Management Board.

In order to execute this mitigation banking element of the HMA, an accounting mechanism is required to monitor the use of mitigation lands. To simplify the accounting program, acres of a particular habitat are considered to be synonymous with mitigation credits of that habitat. The current status of the mitigation credit bank is presented in Table 3. The initial site acquisition is based on Trust Deed recorded January 1994 and held by the Authority.

TABLE 3 MITIGATION CREDIT ACCOUNTING FOR THE CRESTRIDGE HABITAT MANAGEMENT AREA

HABITAT TYPE	REMAINING CREDITS	CREDITS THIS TRANSACTION	TRANSACTION SUMMARY	DOCUMENTATION
Coastal Sage Scrub	233.65 ac.	None	Initial acquisition of the Crestridge HMA (January 1994).	Trust deeds and Record of Transfer (recorded January 1994 and held by SDCWA)
	232.25	-1.4	Existing 200 ft. SDG&E easement expected habitat losses from maintenance and potential expansion.	Crest-Electrical Transmission Easement, SDG&E (Book 5968 #560936, #56825)
	51.35 ac.	-180.90 ac.	Section 7 consultation on Pipeline 4BI and other CIP projects. Off-site mitigation requirement of BO.	BA (Pacific Southwest 1993a); BO (1-6-93-F-28) (Appendix 1)
Southern Mixed Chaparral	24.80 ac.	None	Initial acquisition of the Crestridge HMA (January 1994).	Trust deeds and Record of Transfer (recorded January 1994 and held by SDCWA)
Disturbed Lands	2.60 ac.	None	Initial acquisition of the Crestridge HMA (January 1994)	Trust deeds and Record of Transfer (recorded January 1994 and held by SDCWA)

6.1. STOCHASTIC EVENTS

As discussed in Section 3.3 of this document, the density of gnatcatchers at the Crestridge HMA is expected to fluctuate greatly as a result of natural environmental conditions and wildfires. These stochastic events are beyond the control of the Authority and will not affect the mitigation value of the lands acquired, even if gnatcatchers or gnatcatcher habitat is lost

from the site. However, the types of events which would be expected to remove habitat or birds from a managed reserve area are generally considered to be temporary and as such, the loss of these resources would not remove the responsibility for site management. In the event of a major change in site conditions, it is expected that the Management Board may review the current management strategy and make recommendations to modify the plan to address prevailing circumstances.

6.2. VALUATION OF MITIGATION CREDITS

The Crestridge HMA is to provide for in-kind habitat mitigation with potential for habitat enhancement and increased credit values as approved by unanimous consent of the Management Board. At the current time, the Crestridge HMA supports a calculated gnatcatcher density of 0.03 birds/acre (7 adult birds [4 pairs] on 233.65 acres). It is believed that bird densities may fall or rise as a result of both environmental circumstances and site management efforts. As a result, it is important to track the status of gnatcatchers within the HMA and to monitor long-term population trends. Over time it may be appropriate to adjust the credit values within the bank, either upward or downward based on these trends. In the event that the Management Board elects to make such a change, the density change would affect the status of all non-allocated credits. Those credits which had previously been used would remain fixed at their prior values.

6.3. MITIGATION CREDIT USE

It is difficult to predict the future mitigation needs of the Authority although it is certain that needs will arise. However, the types of projects for which banked credits are anticipated to be required in future years are extremely similar to those which have been evaluated under the most recent Section 7 consultation. In general, the future needs of the Authority will include mitigation of impacts associated with new pipelines and accessory structures, as well as new regulatory reservoirs and treatment plants. The Authority is also expected to require mitigation for maintenance or replacement of its existing older facilities. Future large projects, such as an emergency storage reservoir, are expected to develop project specific mitigation programs, although the use of banked credits may be incorporated as a part of these programs, as appropriate.

To withdraw credits from the mitigation bank, two alternatives are available. A determination as to the appropriate alternative for a given project is to be made by the Crestridge HMA Management Board. The approval of a project is a separate distinct action to be taken by the appropriate local, state, or federal agencies and the availability of the mitigation bank does not presume the acceptability of any impact. In evaluating the proposed use of the HMA, the Management Board is to consider the following:

- Type, quality, and extent of habitat which would be impacted.
- Population sizes, importance and relative sensitivity of species within the impact area.
- The degree of permanence of expected project impacts and the anticipated extent of impact edge effects.

- The regional values of the impact area relative to those values of the Crestridge HMA.

Based on these considerations, the Management Board will determine if it is appropriate to extract mitigation credits from the Crestridge HMA and how credits are to be extracted to ensure a reasonable mitigation for project impacts.

Alternative 1: Where the bank is to serve as mitigation for impacts to unoccupied sage scrub habitat, the use of credits is principally based on a habitat exchange (impacted areas are off-set by set aside of managed lands). A mitigation ratio of 1:1 (impact area : mitigation area) is to be used unless otherwise specified in the governing environmental documents. Species impacts which are considered significant and are not represented within the Crestridge HMA will not be mitigated by a straight habitat exchange. However, opportunities may exist for the banked lands to serve as a part of a more detailed multiple element mitigation program.

Alternative 2: Where the bank is to serve as mitigation of sage scrub occupied by California gnatcatchers, the appropriate mitigation rate is to be based on a density-area value formula. This exchange approach would allow for balancing the area of impact and the degree of occupancy with the mitigation credits held in the Crestridge HMA. The formula to be used is outlined below along with examples of its application:

$$MA \times MD = IA \times ID \quad \text{OR} \quad MA = \frac{IA \times ID}{MD}$$

WHERE:

- IA* = Total sage scrub habitat which would be impacted by an approved project (acres).
- ID* = Calculated density of occupancy by California gnatcatchers considering the impact footprint and contiguous habitat in the immediate area of the impact (birds/acre).*
- MA* = Total sage scrub habitat credits which would need to be extracted from the Crestridge HMA bank to off-set project impacts (acres).
- MD* = Calculated density of occupancy by California gnatcatchers within the Crestridge HMA (0.03 birds/acre).

The limitations on the application of this formula are that no less than a 1:1 area for area mitigation will be allowed.

- * Density calculations are to be based on consideration of patch sizes, local topography, probable territory shapes and project type. For pipelines an approximate corridor width for density calculation should be 500 to 1,000 feet.

Example Credit Exchange:

A 10 acre impact associated with a tank site or pipeline within an area of habitat supporting 4 pairs (8 breeding adult birds) on 100 acres (0.08 birds/ac.) would be mitigated at the Crestridge site at a rate of 26.7 acres under the current density of 0.03 birds/ac at the Crestridge HMA (7 adult birds [4 pairs] on 233.65 acres of sage scrub).

<i>IA</i>	=	10 acres
<i>ID</i>	=	0.08 birds/ac.
<i>MD</i>	=	0.03 birds/ac.
<i>MA</i>	=	acres of mitigation credit required

Solving for *MA* yields 26.7 acres of mitigation credit need. If the *ID* density had been lower than the *MD* density, then the mitigation need would equal *IA* based on the no less than 1:1 rule.

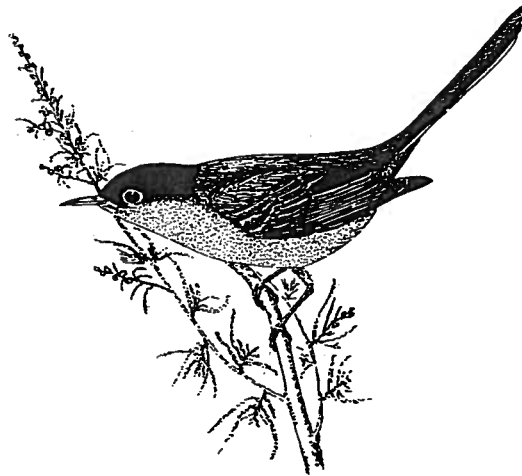
7.0. LITERATURE CITED

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APPENDIX 1

**Biological Opinion on the San Diego County Water Authority 4BI Pipeline Project on
Miramar Naval Air Station and the San Diego County Water Authority Capital
Improvement Program, San Diego, California
(1-6-93-F-28)**





United States Department of the Interior



FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

July 19, 1993

Ms. Merrily M. Severance
Manager, Natural Resources Branch
Department of the Navy
1220 Pacific Highway, RM 231
San Diego, CA 92132-5178

Attn: Dr. Jerry R. Boggs

Re: Biological Opinion on the San Diego County Water Authority 4BI Pipeline Project on Miramar Naval Air Station and the San Diego County Water Authority Capital Improvement Program, San Diego, California (1-6-93-F-28)

Dear Ms. Severance:

This Biological Opinion responds to your request for formal consultation with the Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was dated April 2, 1993. The Service received your request and the final "San Diego County Water Authority Capital Improvement Program Biological Assessment and Mitigation Program for the California Gnatcatcher" (Biological Assessment) on April 13, 1993. At issue are the impacts of the San Diego County Water Authority 4B Phase 1 Pipeline and the Capital Improvement Program on the California gnatcatcher, (*Polioptila californica californica*), a federally-listed threatened species.

Prior to the listing of the California gnatcatcher, and at the request of the Service, the San Diego County Water Authority (Authority) requested the United States Department of the Navy (Navy) to enter into a conference pursuant to Section 7(a)(4) of the Act, and 50 CFR Section 402.10. The conference would address not only the Authority's Pipeline 4B Phase I, which crosses Naval Air Station (NAS), Miramar along an expanded existing easement but also effects of the action that are interrelated and interdependent. Thus, the conference would cover the entire Authority Capital Improvement Program (CIP). The parameters of the conference were outlined in a series of correspondence between the Navy, the Service, and the Authority. A July 30, 1992, letter from the Service to the Navy outlined the scope of the proposed conference. These measures were agreed to in a letter from the Authority to the Service on July 31, 1992. With the listing of the gnatcatcher as a threatened species on March 25, 1993, the Navy formally requested that the conference convert to a consultation process.

This opinion was prepared using information: contained in your April 1993, Final San Diego County Water Authority Capital Improvement Program Biological Assessment and Mitigation Program for the California Gnatcatcher; obtained

during informal consultation between our staffs; contained in the Environmental Assessment for the San Diego County Water Authority Pipeline 4B at NAS, Miramar and Flow Regulatory Structure (1992); within the Environmental Impact Reports prepared for other segments of the CIP pipeline project; and within our files.

BIOLOGICAL OPINION

It is the opinion of the Service that the proposed project is not likely to jeopardize the continued existence of the California gnatcatcher. No critical habitat has been designated for this species. Therefore, the proposed action would not adversely modify critical habitat.

Description of the Proposed Action

The Authority's updated 1992/93 CIP currently includes 32 projects consisting of new pipelines, pump stations, and flow control facilities, as well as several facility upgrade activities designed to meet current and projected water demands in western San Diego County through 2010. Several of the CIP projects have already been completed, others are under construction, and still other CIP projects are in planning and environmental review stages. The CIP includes project construction, on-going operations, regular maintenance, and any necessary emergency and scheduled repair of project facilities. The impacts of project construction, maintenance and emergency repair are discussed and mitigation measures are included in the Biological Assessment (Pacific Southwest Biological Services 1993).

Three of the proposed CIP projects, the Emergency Storage Program, the North County Treatment Plant, and the Beeler Canyon Pipeline, are in preliminary feasibility and planning phases, and therefore cannot be reasonably evaluated at this time relative to potential effects on the California gnatcatcher. This opinion is intended to analyze impacts for projects approved by the Board of Directors for the 1992/1993 CIP. Of the remaining 29 CIP projects, 12 are considered to have an impact to habitat occupied or potentially occupiable by the California gnatcatcher.

This opinion addresses the 12 projects and alternative that are considered to have an impact on the California gnatcatcher. These projects include: 1) Ramona Pipeline; 2) Sweetwater Bypass and Flow/Pressure Control Facility; 3) San Marcus Pipeline (Pipeline 5 Extension, Phase I); 4) La Mesa/Lemon Grove Pipeline (Pipeline 4 Extension, Phase I); 5) Scripps Ranch Pipeline (Pipeline 4B, Phase II); 6) Lower Otay Pipeline (Pipeline 4 Extension, Phase II); 7) Mission Trails Pipeline (Pipeline 4B; Phase II); 8) Pipeline 2A and Pump Station; 9) San Diego Pipeline 6; 10) San Marcos Pipeline (Pipeline 5 Extension, Phase II); 11) Helix Treatment Plant Expansion; and 12) North County Distribution Pipeline. Project location is shown on the attached Figure 3.1-1A, 1B, and 1C. Project descriptions are included in the Biological Assessment (Pacific Southwest Biological Services 1993) and in project specific environmental documentation.

Pipeline Construction

Project components which could impact the California gnatcatcher include pipeline construction, which consists of clearing operations, trench excavation, pipe installation, and back fill. The total number of truck trips for this project is estimated to vary between 30-100 trips per day, depending on the amount of material removed. Sufficient room must be available for at least one vehicle to pass alongside the top of any trench. Average pipeline lay rates are estimated at 300 feet per day. This estimate is for those periods when construction is active and does not include delays due to weather or other unanticipated causes. The majority of construction impacts in any one location will range from 7 to 20 days. Specific information describing construction practices for the Authority's pipelines are discussed in chapter 3 of the Biological Assessment.

Project clearing activities would occur outside of the California gnatcatcher nesting season for all CIP projects. Construction impacts within occupied California gnatcatcher habitat during the nesting season will be minimized. With the exception of two of the CIP projects construction impacts during the nesting season will be fully avoided. Those project which cannot be constructed fully outside of the nesting season are the Pipeline 4B Flow Regulatory Structure and Pipeline 5EII.

Aboveground Facilities

Aboveground facilities consist of appurtenance and manway structures. These structures are typically flat-topped concrete structures approximately 1.5 to 8 feet in height above the ground surface. These structure would be located at all high and low points along the pipeline right-of-way. Other above ground structures may include flow control facilities, regulatory structures, and pump stations. Pump stations are generally small structures totalling 400 to 600 square feet located aboveground in masonry block buildings. Flow regulatory structures are large basins required to regulate pressures and distribute flows more evenly within the pipelines. The Pipeline 4B flow regulatory structure is a 18 million gallon buried reservoir located on an 8 acre site. This structure provide hydraulic control for treated water delivery lines and an increased flexibility of the various pipeline facilities. Two possible adjacent locations within Mission Trails Regional Park have been evaluated for this facility. Regulatory structures typically include fencing, piping, overflow drains, etc.

The regulatory structure would occupy approximately 2.5 acres and consists of a subterranean structure with a maximum depth of approximately 26 feet deep. In order to complete the facility, approximately 216,000 cubic yards of material would be excavated, of which 96,000 cubic yards would be stockpiled for use in filling around and over the structure. Following construction, a 2-foot cap of earth would be placed over the roof of the structure and the cap would be seeded with an appropriate coastal sage scrub mix. A small access building and a number of manways totalling less than 1600 square feet would be left for accessing various valve vaults (Mooney and Associates 1991).

Construction on the Flow Regulatory Structure is confined to an 8 acre site with continuous construction activity occurring over a 15-month period. Construction will occur during at least one breeding season of the California gnatcatcher. Construction access to the Federal Regulatory Structure would occur along an existing 1.25 mile long unpaved road extending from paved surface streets (Calle de Vida Drive). This unpaved road is currently being used by the U.S. Army Corps of Engineers as access for ordinance sweeping within Mission Trails Regional Park.

Multiple gnatcatcher territories (5) occur along this Calle la Vida Drive access route. In order to minimize travel within and adjacent to occupied territories, an alternative access route following Seda Drive has been investigated by the Authority. Access by this route has been rejected by the homeowners associations on the basis of the substantial increase in truck traffic, noise, roadway damage and safety concerns on the narrow roadway. The City has indicated they would only approve this route with concurrence of the homeowners association and local planning group.

Pipeline 5 Extension, Phase II

Pipeline 5EII project is a 10-mile long pipeline extending from Paint Mountain through Rancho Peñasquitos. Full avoidance of nesting season construction within occupied habitat is impracticable as a result of the wide distribution of coastal sage scrub along the project right-of-way and the inability to meet stringent project completion schedules due to constraints imposed by stream crossings and hilly terrain along the route. To construct the proposed 5EII project, the Authority proposes to utilize conventional construction with measures to minimize impacts to gnatcatchers. These measures include pre-clearing those alignment sections to be worked on during a given non-breeding season to avoid the possibility of directly impacting active nest sites. Start construction within these sections of the route prior to initiation of nest site selection to provide an opportunity for birds to acclimate or adjust their nest-site selection away from any potential construction activity.

To minimize impacts resulting from construction, work would be initiated immediately following the breeding season (August 1, 1994) to provide for the longest period of non-breeding season work. Work days may also be lengthened to increase rate of progression. Surveys along the project line would be conducted during the late winter of each year of construction to identify areas of probable breeding territories for the following season. Every effort will be made to accelerate construction within these areas without expanding impact areas.

Operations, Maintenance and Emergency Repair

The Authority maintains permanent maintenance and patrol roads along all of its facilities. These roadways generally run parallel to the pipelines within the Authority's right-of-way. In most cases, permanent patrol roads are the original construction access roads. The Authority maintains these roads on an as needed basis approximately every two years using a light grader. Minor turn-outs to valves and inspection structures would be expected to be the only new permanent roadway features for most of the CIP project lengths. In some

instances, new roadways will be required along portions of the pipelines which cross open lands. In these cases, the new roads would be 10-20 feet in width. The new access roads would extend over 5 to 7 linear miles (9 to 13 acres) a small portion of which would be in coastal sage scrub.

Routine patrol and inspection, maintenance and scheduled repair, and emergency repair is part of the operation and maintenance of the pipeline projects. Facilities maintenance responsibilities and emergency repair are discussed in chapter 3 of the Biological Assessment and are incorporated by reference into this project description.

Measures To Mitigate Impacts to Gnatcatchers

The Authority has proposed a number of mitigation measures to avoid and minimize take of California gnatcatchers. In addition, measures have been proposed to mitigate unavoidable take. These measures are proposed by the Authority to reduce or off-set direct and indirect impacts to gnatcatchers.

1. Except for portions of the SEII and Flow Regulatory Structure projects, no construction shall occur within occupied gnatcatcher habitat during the breeding or nest establishment season (1 February through 31 July). Traffic shall continue to traverse occupied habitat enroute to construction sites in unoccupied areas.
2. Construction activities shall proceed through sage scrub habitats in a continuous manner to restrict the duration of construction impacts.
3. All construction corridors within or adjacent to sage scrub habitat shall be temporarily fenced with single-strand construction fencing or chain-link fencing to prevent expansion of the disturbance footprint. Prior to a contractor initiating work within a segment of pipeline, the Authority will confirm that the route has been accurately identified and adequately flagged to preclude equipment from wandering off-site. Any violations of the corridor are to be documented and reported by the Authority. The final mitigation acreages will be based on the pre- and post-project mapping and a determination of actual project construction impacts.
4. Following construction, all sage scrub areas shall be hydroseeded with a locally appropriate coastal sage scrub seed mix. Seeding is to occur during the early portion of the winter rainy season to maximize seedling establishment. Seeding shall generally follow guidelines outlined in chapter 5 of the Biological Assessment. This habitat re-establishment is proposed to be conducted in a manner compatible with normal operational requirements of the facilities and is proposed to minimize erosion and weedy species invasion into adjacent lands. All compensatory mitigation measures are proposed to be accomplished through off-site acquisition.

The Authority proposes a management program which includes a native reseeded of areas of coastal sage scrub which are disturbed by specified and conditioned Authority construction and maintenance or

repair activities, provided that completion of such activities does not result in future requirements for additional mitigation measures resulting from the regular management of these facilities.

To implement the on-route reseeding program within areas of coastal sage scrub, the Authority shall conform to the following guidelines on CIP projects covered under this consultation.

- a. In areas of coastal sage scrub, topsoil consisting of the top 3-5 inches of A-horizon soil veneer shall be salvaged and stockpiled within a disturbed on-site location. Stockpiles shall not be greater than 6 feet high and shall not be mixed with other excavated materials.
- b. Following completion of construction within a given reach of pipeline, the stockpiled material is to be respread in a veneer over all portions of the construction corridor (except permanent roadways) which previously contained coastal sage scrub.
- c. The construction corridor within any areas previously supporting coastal sage scrub and additional areas at the Authority's discretion shall be hydroseeded with a cellulose based carrier no earlier than one month prior to expected rainfall (i.e., November). The seed mix to be used in this reseeding effort is to be based on the locally predominant native vegetation but should include the following species and application rates:

<u>Species</u>	<u>(lbs/acre)</u>
<u>Artemisia californica</u>	10.0
<u>Eriogonum fasciculatum</u>	20.0
<u>Lotus scoparius</u>	10.0
<u>Salvia apiana</u>	4.0

Other species and rates shall be based on local conditions and will be reviewed with the Service biologist prior to finalizing local project seed lists.

- d. In areas of potential for highly erosive soils or slopes, soil stabilizer species shall also be used in the hydroseeding. These stabilizers shall include Plantago insularis, Vulpia muralis, or Medicago polymorpha. The stabilizers combined should not exceed 5.0 lbs/acre. Other stabilizers shall be reviewed with the Service prior to making any substitutions.

- e. If monitoring indicates a necessity for reseeding as a result of erosion problems within the first two years, such reseeding shall be accomplished by hydroseeding or hand broadcast seeding as applicable to the extent of remedial action required. Because the proposed CIP mitigation is to be conducted as off-site acquisition, no success criteria are to be applied to on-route reseeding programs other than those noted above.
5. Where necessary, all roadway turn-outs and areas disturbed by construction shall be scarified prior to reseeded with a coastal sage scrub seed mix.
6. Where construction is to occur within occupied habitat for the Flow Regulatory Structure and Pipeline SEII, heavy construction activities shall be initiated at least one month prior to the initiation of the breeding season (1 February) to provide an opportunity for birds to acclimate or shift territories and select nest sites away from activities. For the Flow Regulatory Structure, construction activities shall make full use of the 1.25 mile access roadway during this pre-breeding season work.
7. Within areas of sage scrub habitat the SEII pipeline construction corridor and the 4B Flow Regulatory Structure site shall be flagged and fenced with a temporary single or multiple strand or chain-link construction fence and cleared at least one month prior to initiation of the nesting season. The access road shall be repaired through grading as necessary to minimize construction traffic damage, erosion, or roadway decay. The access road shall not be expanded beyond its existing width except as necessary to create not more than seven passing turn-outs no more than 100 feet in length and 20 feet wide. These are to be positioned in disturbed habitats only and are not to occur within occupied gnatcatcher territory areas as identified by Mooney and Associates (1992). The access road limits are to be clearly delineated to prevent any deviations from use or expansion of the roadway limits.
8. The Authority shall conduct a survey of gnatcatcher distribution prior to submittal of the initial construction schedule and prior to the start of each breeding season during the contract duration. Surveys are to be conducted by an independent biological consultant. The initial and subsequent construction schedules are to clearly identify areas which contain gnatcatchers. Based on the survey results, the contractor shall be required to perform all work (excavation to restoration) within 500 feet of a gnatcatcher nest site within a continuous 8 week period.
9. Construction roads and work areas shall be watered to control dust during work periods.
10. Personal construction vehicles shall be parked outside of areas supporting coastal sage scrub and crews will access the site via shuttle bus or work vehicles only.

11. Acquire and preserve off-site coastal sage scrub habitats totalling not less than 168.7 acres which support mean gnatcatcher population densities of not less than 0.03 birds/acre and which are considered to be viable as habitat for the long-term preservation of the species. This translates into the need for acquisition of lands supporting no less than 5 resident California gnatcatchers (3 pairs). Acquisition would be completed within 12 months of the date of the final Biological Opinion or within a mutually agreed upon extension period.
12. An additional 12.2 acres of coastal sage scrub habitat shall be acquired to off-set the indirect impacts resulting in the loss of viability in the nesting territory impacted by the Flow Regulatory Structure construction activities. This brings the total acreage for off-site acquisition to 180.9 acres.
13. Upon taking possession of mitigation lands, the Authority shall implement an interim management program. This program will be in effect from the time the selected mitigation site transfers ownership until the ultimate management program takes effect. Interim management shall consist of any necessary fencing, blocking of undesirable access roads and gating of desired access. In addition, interim access shall include posting of the site, weekly patrols, and any necessary repair of fencing as well as clean-up of dumped debris. In all probability, interim management will be performed directly by the Authority.
14. The Authority shall provide for the long-term maintenance and management of the identified and acquired mitigation site. The appropriate management mechanisms to be used are site specific and as such would be determined after the final site selection is made. The management measures to be employed will involve development of agreements between the Service and the Authority. Management measures and options will be based on those outlined in chapter 5 of the Biological Assessment. Financing the ultimate management of the reserve lands may include one of a number of strategies. These could range from inclusion as an annual budget allocation from the Authority's operations and maintenance budget, establishment of an endowment account, or through other means.
15. On an annual basis, routes under construction shall be examined during the month of December to ensure that all re-seeding which was to be performed during the winter wet season (i.e., those areas disturbed during the prior summer and fall) has been completed. By the end of December, the Authority shall submit a report to the resource agencies identifying the status of the route reseeded efforts. This time period would allow for early enough coordination to take corrective measures and complete route seeding for the year.
16. Because the bulk of the CIP is comprised of linear systems, which are at various levels of construction, design, or planning, it is anticipated that impacts will vary slightly from those identified in this assessment. To account for this variance, it is necessary to conduct monitoring by a qualified biologist at the time of construction to verify impacts and to balance exchange "credits" with impacted acres.

The biological resource monitor would report to the Authority. The reporting would be completed semi-annually and would document the anticipated degree of sage scrub impact, the actual impacted area, the net difference, and the total amount of sage scrub habitat which has been lost in association with the specific CIP project. At the end of each year, the Authority's Director of Water Resources Planning will submit a cumulative report of habitat losses to the resource agencies along with a summary comparison to the acreage which has been set aside in the CIP mitigation program.

The Authority has reviewed numerous off-site habitat areas for potential to meet its mitigation objectives. These sites are reviewed in chapter 5 and Appendix 3 of the Biological Assessment. Of the sites reviewed, the Authority has identified 7 sites which appear to meet or exceed the objectives outlined by the Service in its comments on the Pipeline 4B Environmental Assessment as well as the objectives of the gnatcatcher technical panel. Other sites are becoming increasingly available for consideration. The Authority has indicated a desire to pursue multiple options including the potential for acquisition or participation in a larger site acquisition to gain the greatest multiple-species and potential future mitigation benefits. This objective is considered to be potentially beneficial to the long-term survival of the gnatcatcher as well as other sensitive species, as well as the Authority and the region in general. Permanent protection would be provided for 180.9 acres with any residual acreage being made available for future CIP projects following similar analysis and avoidance, minimization, and mitigation standards as outlined above. Projects other than those listed in this document shall be subject to further consultation with the U.S. Fish and Wildlife Service.

EFFECTS OF PROPOSED ACTION ON LISTED SPECIES

Species Account

The coastal California gnatcatcher is a recognized subspecies of the California gnatcatcher (*Polioptila californica* [Brewster] and is endemic to coastal southern California and northwestern Baja California, Mexico (American Ornithologists' Union 1983, 1989: 535; Atwood 1980, 1988, 1990, 1991). The coastal race of the black-tailed gnatcatcher (*P. m. californica*) has been a Category 2 candidate species since 1982 due to concerns over local declines of coastal populations of this species. Taxonomic work completed during the late 1980's have indicated that the coastal form of this species is, in fact, a distinct species, *P. californica* (Atwood 1988).

The gnatcatcher, a small gray song bird, is an obligate resident of coastal sage scrub dominated plant communities from Los Angeles County generally south along the coast to the United States/Mexico border (Grinnell and Miller 1944; Garrett and Dunn 1981). The California gnatcatcher (*P. c. californica*), one of three subspecies, was historically found from Ventura County, California to about 30° N. latitude in Baja California. The southern limit of the California gnatcatcher coincides with the distributional limit of coastal sage

scrub. The taxonomy of birds south of 30° N. latitude has not been formally adopted. Today, the California gnatcatcher is found in only four counties in the United States (Los Angeles, Orange, Riverside, and San Diego). The species is no longer present in Ventura or San Bernardino Counties, although both of these counties are within the species' historic range.

The appropriate coastal sage scrub habitat occurs in patchy or mosaic distribution. The distribution and size of these patches of suitable habitat varies throughout the range of the species and from year to year. Typical coastal sage scrub habitat constituents are relatively low-growing, drought-deciduous, and succulent plant species. Representative plant taxa in this plant community include California sagebrush (Artemisia californica), several species of sage (Salvia spp.), California buckwheat (Eriogonum fasciculatum), California encelia (Encelia californica), various species of cactus and cholla (Opuntia spp.), and several species of Haplopappus spp. (Munz 1974; Kirkpatrick and Hutchinson 1980). Of the 11 subassociations of coastal sage scrub identified by Kirkpatrick and Hutchinson (1977), the gnatcatcher apparently routinely occupies only three of these.

The gnatcatcher is primarily insectivorous and defends territories ranging in size from approximately 2-40 acres (Atwood 1990; J. Konecny, personal communication). Atwood's comprehensive studies (1988, 1991) and status review (1990) further reveal that the breeding season of the species extends from February through July, and apparently peaks in April. Juveniles associate with their parents from several weeks or even months after fledging.

Although considered locally common fewer than 50 years ago (Grinnell and Miller 1944), Atwood (1990) has concluded that current United States populations are almost certainly less than 2,000 pairs. In 1990, Atwood provided an estimate of California gnatcatcher numbers totalling 1819 to 2262 pairs (Atwood 1990). Most recently the maximum population level of California gnatcatchers were evaluated based on sub-sampling density estimates and remote sensing techniques (Atwood 1992). This investigation, while lacking detailed field verification, provides a liberal estimate of 1811 to 2291 pairs of California gnatcatchers within the United States. Others have suggested similar numbers of 1645 to 1880 pairs as a minimum population level (Jones 1991). Because Atwood used liberal methods to derive his maximum population estimate, the Service has suggested that the actual number may be far less than the maximums estimated by Atwood (Salata 1991). The documented decline of the gnatcatcher undoubtedly is the result of numerous factors.

While the exact population number of California gnatcatchers remains undetermined, there is little argument that significant declines have occurred within the species. Further, there is strong agreement among experts that the actual numbers of birds are of secondary concern to the habitat with regard to long-term ecological management of this species (Atwood 1990, 1992; Salata 1991; Merkel et al. 1993).

Habitat loss through destruction, degradation, fragmentation, and modification is believed to be the principal reasons for the decline of the gnatcatcher (Atwood 1990, 1992; Salata 1991). Additional factors include nest depredation and brood parasitism by the essentially non-native brown-headed cowbird

(Molothrus ater). It has been estimated that as much as 90 percent of coastal sage scrub vegetation has been lost as a result of development and land conversion (Westman 1981 1987; Barbour and Major 1977), leaving coastal sage scrub as one of the most depleted habitat types in the United States (Kirkpatrick and Hutchinson 1977; Axelrod 1978; Klopatek et al. 1979; Westman 1987; O'Leary 1990).

Within the CIP region, three primary population centers of California gnatcatchers occur. The first is located in the vicinity of NAS, Miramar and extends south toward Mission Trails Regional Park. The second is located in the south county area of Salt Creek near the Lower Otay Reservoir. The third population center is in the region surrounding the Sweetwater River. The remainder of the CIP region supports sparsely scattered gnatcatcher populations. Substantial portions of the CIP region are further dominated by chaparral and grassland, as well as agricultural and urbanized environments, which lack gnatcatchers or suitable habitats for this species.

The coastal California gnatcatcher was federally-listed as threatened on March 25, 1993, throughout its historic range in southern California and in northwestern Baja California, Mexico. The gnatcatcher is threatened by habitat loss and fragmentation occurring in conjunction with urban and agricultural development (58 FR 16742, 1993).

Analysis of Impacts

Direct Impacts

Project associated impacts to California gnatcatchers may occur as a result of direct loss of birds, loss of occupied or potentially occupiable coastal sage scrub habitat, significantly impairing essential behavioral activity, such as breeding, feeding, or sheltering, and disruption of dispersal corridors. In addition, other potential adverse effects of construction activities include noise, dust, introduction of weedy species, or provision of new human access into scrubland habitats.

Coastal sage scrub or habitat types that could support the California gnatcatcher have been assessed and include the following for the purpose of this assessment: intact and disturbed Diegan sage scrub and Riversidean sage scrub, as well as gnatcatcher occupied habitats of baccharis shrubland and successional chaparral. This approach to habitat classification has been developed to provide a broad-basis for impact assessment and to include values of successional or non-optimal habitats to the species.

The CIP project includes 32 discreet projects, including new construction, upgrades of existing facilities, and several completed projects. The CIP projects are listed in Table 3-1 of the Biological Assessment. These projects are all existing and new pipelines and associated on-route facilities which would result in the direct removal of 168.7 acres of coastal sage scrub habitat with a mean gnatcatcher density of 0.03 gnatcatchers/acre (0.015 pairs/acre). These projects also produce short-term direct impacts associated with construction including dusting of adjacent habitat, noise effects, and human activity impacts. These short-term impacts are expected to be localized

around the construction region and would extend away from the project to a variable degree based on a number of factors including adjoining vegetation, topography, weather, and substrate in which work is being performed. Additional impacts may occur periodically throughout the life of each facility for maintenance and repairs of pipeline facilities which may involve a degradation or temporary disturbance of the restored coastal sage scrub habitat and/or gnatcatcher individuals.

To construct the proposed SEII project, the Authority proposes to utilize conventional construction with measures to minimize impacts to gnatcatchers. These measures include techniques to expedite construction to limit the duration of impact including: 1) work would be initiated immediately following the breeding season (August 1, 1994) to provide for the longest period of non-breeding season work; and 2) work days may also be lengthened to increase rate of progression. In completing work in this manner, approximately 40 percent of occupied coastal sage scrub in both the northern portion and the southern portion of the project would be avoided during the breeding season. This will result in the breeding season avoidance of 19.9 acres of habitat and will result in breeding season construction through 13.2 acres of habitat.

Direct impacts are likely to occur along the access roads and at the regulatory facility, it is anticipated that the results would be temporary and could range from an abandonment of territories and a short-term decline in reproductive success to a shift in use patterns of the existing territories and no reproductive costs. One gnatcatcher territory occurs over an extensive portion of the proposed regulatory site and would be substantially impacted by the proposed work. Due to the substantial disruption anticipated at the central portion of the gnatcatcher territory (MT1) in which the Flow Regulatory Structure occurs, it is assumed that this pair will fully abandon the site during construction.

The ultimate results of territory shifts and abandonment will depend upon a number of factors including the environmental conditions, community saturation, the degree of tolerance of individual birds, and the timing of disturbances. If abandonment occurs during the nesting season, an energetic investment in breeding and nesting may be lost. In addition, tenacious nesters may actually be killed during incubation or nest tending. The loss of habitat at the regulatory structure is anticipated to reflect a prolonged impact to California gnatcatcher use of the area. An estimated 7.8 acres of gnatcatcher habitat will be removed from near the central portion of a territory estimated at 20.0 acres (Mooney and Association. 1992). This reflects a 39 percent loss of breeding season territory area over a protracted construction period (15 months). Based on both the substantial degree of territory impact and the prolonged nature of the impact, the short-term viability of most, if not all, of territory MT1 will likely be lost as a result of the Flow Regulatory Structure construction activities. The construction area will be reseeded with sage scrub plant species to attempt to restore habitat values.

Multiple gnatcatcher territories (5) occur along Calle la Vida Drive access roadway to the Flow Regulatory Structure. California gnatcatchers are year round residents of coastal sage scrub habitats. They occupy the same general

area throughout the year, although the shapes and sizes of the home ranges may shift seasonally. A pair of California gnatcatchers use the same general area each year, but may re-adjust the boundaries of those territories on an annual basis (ERCE 1989, 1990a, 1990b; Pacific Southwest Biological Services 1989). It has been noted that elongation and spatial shifts of home ranges can occur on a seasonal basis. Home ranges tend to be at their smallest size during the nesting season. As dry season conditions develop and the drought deciduous vegetation decays, home ranges tend to expand and shift downslope or upslope to include riparian fringe or dense non-deciduous shrub vegetation. In some instances, fall home ranges may be completely disjunct, but proximate to defended breeding season territories.

While most researchers agree that California gnatcatchers are most vulnerable to disturbance during nest establishment and post-fledgling nurturing of young, no studies have been conducted to evaluate potential effects during these periods. Post-breeding monitoring was conducted during construction activities at the Amber Ridge project site within the Sweetwater River Valley (ERCE 1990). ERCE (1990) concluded that the noise associated with construction activities did not result in permanent abandonment of habitat. However, use of habitat may be altered during the construction period (ERCE 1990). Atwood (1990) suggested that because birds altered their behavior as a result of grading activity, disturbance during the critical breeding season may result in nest failure.

The temporary construction access route will be subject to approximately 100 truck trips per day. The heavy use of this road is expected to result in impacts associated with dust, noise, and a high level of human activity to five gnatcatcher pairs. Based on the above stated biological information, it is prudent to minimize any potential effects of road use on the California gnatcatcher. As a result, a number of applicable impact minimization measures have been identified in chapter 4 of the Biological Assessment and carried forward into the project description. An alternative route which would reduce impacts to the California gnatcatcher has also been assessed. This route consists of an existing dirt road running northerly from the north end of Seda Drive. It extends approximately 2000 feet to the approved Flow Regulatory Structure site. No gnatcatcher territories occur along this access route. As previously mentioned, one pair (MT1) has a territory which would be impacted by both the approved and the alternate Flow Regulatory Structure sites.

Indirect Impacts

The proposed project would implement a portion of the Water Distribution Plan to increase the capacity, reliability, operational flexibility, and yield of the existing aqueduct system. The Water Distribution Plan Environmental Impact Report (EIR) states that "The existing capacities of these pipelines (the First and Second San Diego Aqueducts) are rapidly being approached as average water demand increases. Peak demand in some areas currently exceeds pipeline capacities, . . . The objective of the Water Distribution Plan is to recommend measures to meet forecasted water demand requirements in 2010."

The Water Distribution Plan system will increase design capacity in San Diego County. This increased capacity would allow the Authority to import

sufficient quantities of water from Metropolitan Water District (MWD) to meet forecasted peak demand in the year 2010. Of primary concern to the Service is the growth-enabling secondary impacts resulting from the expansion of the capacity of the water pipelines. The Service believes that increasing the infrastructure necessary for future business and residential development might influence the amount, distribution, and nature of development, which correspondingly impacts biological resources including endangered species. Reserve capacity allows for, induces, enables, or accommodates additional growth, and is therefore considered a secondary or indirect impact of the subject project. Regional biological resources become more scarce as growth and development replace the natural habitat types.

Coordinated multiple species/habitat conservation efforts have been initiated in San Diego and Riverside Counties. The Authority is currently participating in both the City of San Diego's Multiple Species Conservation Plan (MSCP) and the North County Wildlife Forum's Multiple Species Habitat Conservation Plan (MHCP) in San Diego County. The purpose of the MSCP and MHCP is to develop a program designed for the conservation of federally endangered, threatened, or key candidate species and their habitats within western San Diego County. The program is proposed to provide a network of managed lands which would conserve habitat and provide for wildlife movement on a large scale. The MSCP will identify a system of wildlife preserves that are interconnected with each other and with contiguous planning areas to ensure the long-term viability of sensitive species. The Authority has agreed to join in these planning efforts, and plans to participate in the conservation efforts (Mooney and Associates 1993).

The MWD is cooperating with the Western Riverside County Multiple Species Habitat Conservation Plan efforts to establish large multi-species preserve in Riverside County. The Environmental Impact Report for San Diego Pipeline NO. 6 Project (MWD and Authority 1993) states that "Participation by Metropolitan and the Authority in these and other ecosystem habitat conservation planning efforts should ensure the continued existence of functioning, viable populations of native habitat and species in this rapidly urbanizing area of Southern California".

Based on the continued participation by the Authority and MWD in these multiple species planning efforts and the successful implementation of these plans, the secondary affects of the subject project would not be anticipated to result in additional adverse impacts on listed species. In the event that the multiple species planning efforts are not completed or are not implemented than the secondary affects of providing increased water capacity to the year 2010 on any federally listed and proposed species would need to be reevaluated by the Service.

CUMULATIVE IMPACTS

Cumulative effects are those impacts of future non-federal (State, local government, or private) activities affecting endangered and threatened species or critical habitat that are reasonably certain to occur in the course of the federal activity subject to consultation: Future federal actions will be subject to the consultation requirements established in section 7 of the

Endangered Species Act, private actions are covered by section 10 and, therefore, are not considered cumulative to the proposed action.

Within the action area several proposed as well as future Federal Highway Administration, Department of the Army, Corps of Engineers, and Department of the Navy projects or permitting actions fall within the identified range of the California gnatcatcher. Formal or informal consultation with each of these agencies is occurring and is expected to occur on future project as required.

Prohibitions against take and proactive planning have prompted efforts by the City of San Diego, San Diego Association of Governments and other local jurisdictions to develop the MSCP and the MHCP. In addition, the Resources Agency, State of California, Service, local governments, and landowners are developing a Natural Communities Conservation Planning Program. If successful, such efforts could preclude significant cumulative effects upon the gnatcatcher.

The vast majority of activities anticipated to effect this species within the foreseeable future are local urban development projects with no federal involvement. These projects could result in significant cumulative effects to the species. However, section 9 of the Act prohibits the unlawful "take" [e.g., harm, harass] of the California gnatcatcher. The section 9 prohibition has prompted efforts by the Service and State of California to work in cooperation in the development of a section 4(d) special rule to allow the use of the Natural Communities Conservation Planning (NCCP) program to develop regional multi-species conservation programs which have the goal of providing adequate protection of the California gnatcatcher through habitat conservation. In addition, several regional planning efforts including the City of San Diego's MSCP, the North County Wildlife Forum's MHCP, County of San Diego's Open Space and Wildlife Habitat Management Program and the Western Riverside County Multiple Species Habitat Conservation Plan have been initiated and are expected to be integrated into the NCCP process. The ultimate result of the NCCP process will be subject to Service review and allocation of take under section 4(d) of the Act.

INCIDENTAL TAKE

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is fully defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Under the terms of section 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take statement. The terms and conditions described below are non-discretionary, and must be undertaken by the agency or made a binding condition of any grant or permit, as appropriate.

The Service anticipates that 3 pair (5 individuals) of California gnatcatchers may be taken as a result of the construction of proposed CIP projects, in the form of harming through the destruction of 168.7 acres of occupied and unoccupied but suitable habitat. Direct and indirect losses are expected to result in an additional loss of one pair of birds (2 individuals) from the Flow Regulatory Structure

In addition, the Service anticipates that 1 pair of gnatcatchers (2 individuals) will be taken through harassment or temporary habitat loss on an annual basis as a result of normal operations, on-going maintenance, and emergency repairs and temporary loss of 28 acres of restored coastal sage scrub habitat, annually (18 acres resulting from maintenance and 10 acres resulting from potential emergency repairs).

If, during the course of the action, the amount or extent of the incidental take limit is reached, the Navy shall ensure that the Authority shall immediately notify the Service in writing. If the incidental take limit is exceeded, the Authority must immediately cease the activity resulting in take and reinitiate consultation with the Service immediately to avoid further violation of section 9 of the Act. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). The Authority should provide an explanation of the taking.

Reasonable and Prudent Measures

The Service believes that the following Reasonable and Prudent Measures are necessary and appropriate to minimize incidental take.

- a. The Authority shall provide the biological mitigation or assurances as described, implied, or suggested in the Biological Assessment and numbered 1 through 16 in the project description above, except as modified in the listed terms and conditions, to minimize incidental take and to compensate for unavoidable impacts to the species.
- b. The Authority shall minimize, to the extent possible, the killing, harming, or harassing of gnatcatchers and removal of coastal sage scrub habitat in conjunction with construction or other site development activities. Indirect impacts of construction on gnatcatchers shall be minimized and direct impacts shall be off-set through provision of off-site compensatory habitat.
- c. The Authority shall acquire, preserve and manage 180.9 acres of off-site coastal sage scrub habitat which supports at least 3 pair of California gnatcatchers. The site must be acceptable to the Service. The seven sites identified in the Biological Assessment as possible acquisition are acceptable to the Service as mitigation sites provided final bird densities and habitat acreages are adequately documented. Should any site other than the identified 7 sites be proposed reinitiation of this consultation may be necessary.

- d. The Authority shall continued to participate in the planning and implementation of the on-going MSCP, and MHCP effort in San Diego County. The Metropolitan Water District shall continue to participate in on-going Multiple Species Planning efforts in Riverside County. In the event that the multiple species planning efforts are not completed or are not implemented than the secondary affects of providing increased water capacity to the year 2010 on any federally listed and proposed species may need to be reevaluated by the Service in a reinitiated consultation.

- Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Authority and its agents shall at a minimum provide mitigation as described in the Biological Assessment. The Navy shall ensure that the Authority is responsible for compliance with the following mandatory terms and conditions, which implement the reasonable and prudent measures described above.

1. The Authority shall provide the biological mitigation or assurances as described, implied, or suggested in the Biological Assessment and numbered 1 through 16 in the project description, pages 5-9, of this Biological Opinion.
2. The Authority shall seek and acquire a 180.9 acre mitigation parcel within 12 months of the date of the finalization of this Biological Opinion. The final selection of a mitigation site shall be approved by the Service. A conservation management plan shall be prepared by the Authority and approved by the Service to ensure long-term viability of the site. The long-term manager shall also be subject to the approval of the Service.
3. No construction shall occur within occupied gnatcatcher habitat from February 1 through 31 July, except for the Flow Regulatory Structure and portions of the SEII pipeline. The take of California gnatcatchers shall be further minimized to the extent practicable during subsequent design and implementation phases of all future CIP projects.
4. Maintenance and emergency repairs on the subject project that are determined to adversely affect federally listed species shall be fully coordinated with the Service to ensure minimization of impacts.
5. Typical annual maintenance which will physically disturb coastal sage scrub habitat shall, to the maximum extent practicable, be carried out in the non-breeding season (August 1- January 31).
7. The Seda Drive alternative access route to the Flow Regulatory Structure shall be utilized during the breeding season of the California gnatcatcher (February 1 - July 31). Calle la Vida Drive access may be used during the non-breeding season.
8. The Authority shall continued to participate in the planning and implementation of the on-going MSCP, and MHCP effort in San Diego

County. The Metropolitan Water District shall continue to participate in on-going Multiple Species Planning efforts in Riverside County.

Disposition of Sick, Injured, or Dead Individuals

The Service's Carlsbad office must be notified within three working days should any listed species be found dead or injured in or adjacent to exchanged lands owned, exchanged, administered, or procured by the Authority. Notification must include the date, time, and location of the carcass, cause of death or injury, and any other pertinent information. If necessary, the Service will provide a protocol for the handling of dead or injured, listed animals. In contravention of any federal state, or local law, all relevant information shall be reported within 24 hours to the Service Carlsbad Ecological Service Office at (619) 431-9440 and to the Service Division of Law Enforcement, Torrance, California at (310) 297-0062.

Conservation Recommendations

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as Service suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibility for these species.

1. The Navy could fully participate in regional multi-species planning efforts throughout southern California.
2. The Navy could fully evaluate all its programs within areas containing suitable habitat for the California gnatcatcher. Ongoing actions should be evaluated to determine whether they may affect the federally listed California gnatcatcher. The Navy could informally consult with the Service pursuant to section 7 of the Endangered Species Act for any action, which may potentially affect any federally listed species, proposed species, candidate or sensitive species.
3. The Authority should reseed other native vegetation, as appropriate on non-coastal sage scrub areas that are disturbed by pipeline construction.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Conclusion

This concludes formal consultation on the San Diego County Water Authority's Capital Improvement Program. Pursuant to 50 CFR 402.16, reinitiation of formal consultation is required if the action is, significantly modified in a

Ms. Merrily M. Severance (1-6-93-F-28)

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manner not discussed above, if new information becomes available on listed species or impacts to listed species, or if the incidental take limit is met or exceeded. We would appreciate notification of your final decision on this matter. Any questions or comments should be directed to me or Nancy Gilbert of my staff at (619) 431-9440.

Sincerely,

A handwritten signature in cursive script that reads "Cynthia U. Barry". The signature is written in black ink and is positioned above the typed name and title.

Cynthia U. Barry
Acting Field Supervisor

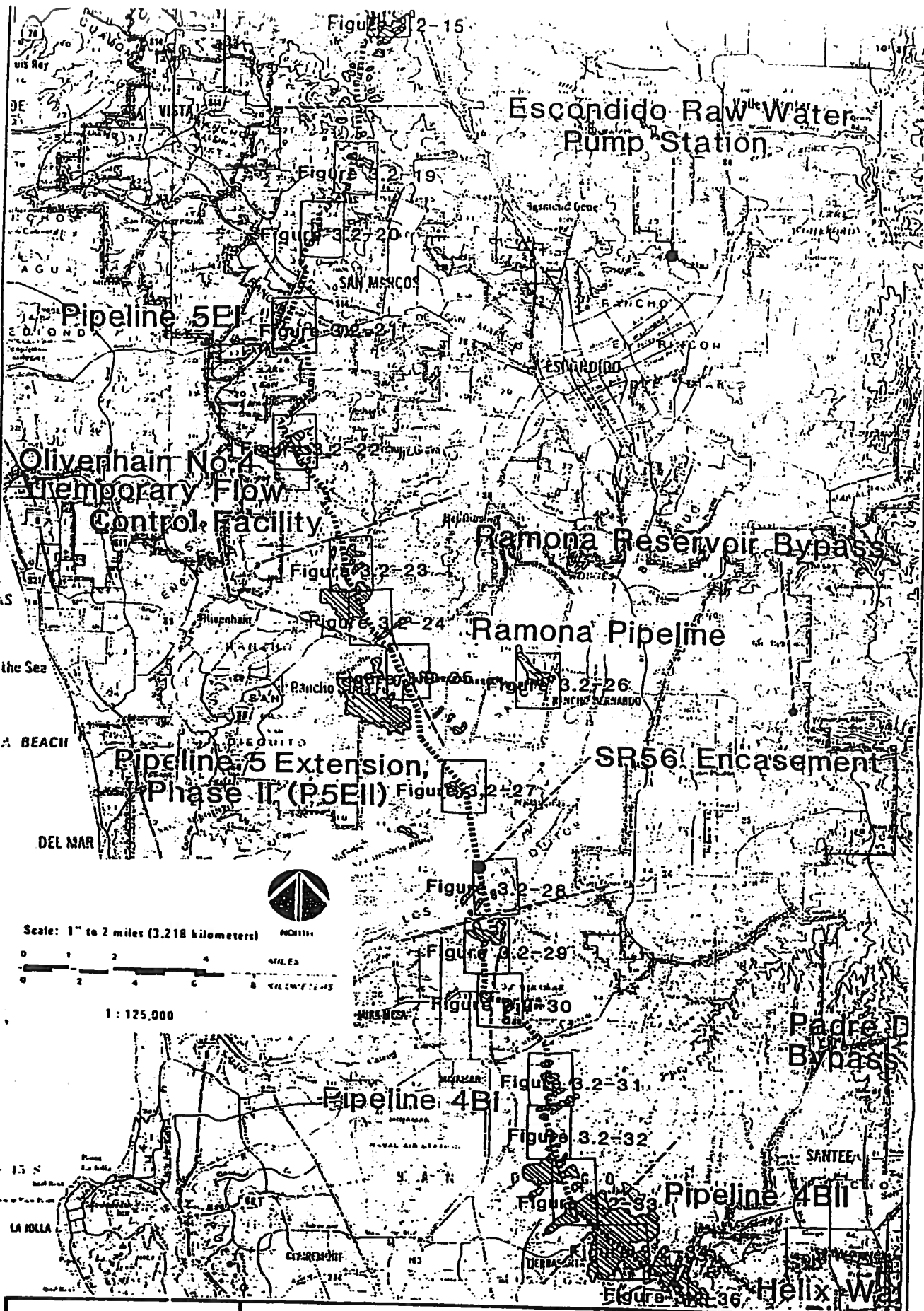
Enclosure

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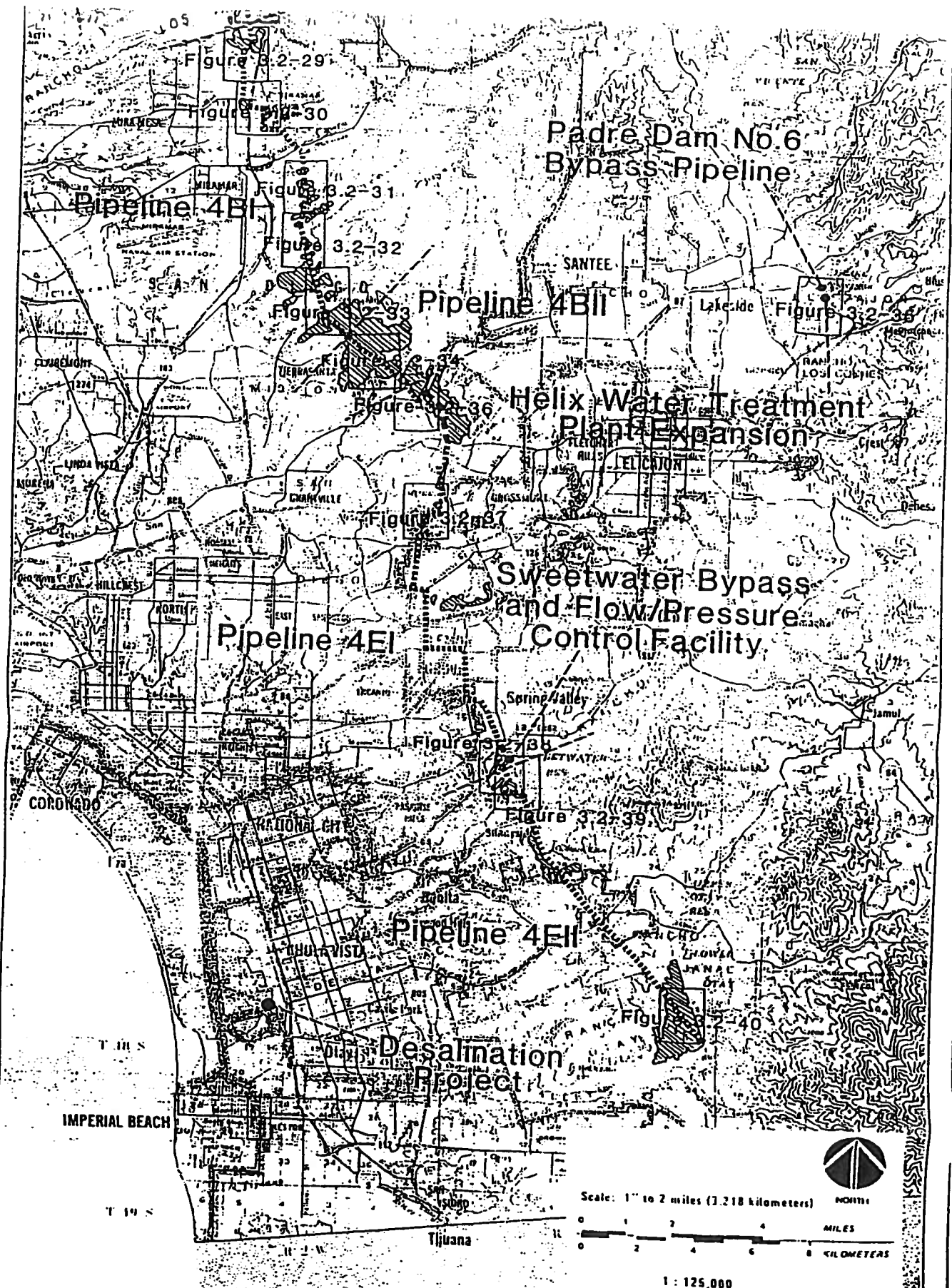
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CIP Sage Scrub Regional Distribution
and
Locator Map

FIGURE 3.1-1B



CIP Sage Scrub Regional Distribution
and
Locator Map

FIGURE 3.1-1C

APPENDIX 2

**Legal Description for properties included
within the Crestridge Habitat Management Area.**



SCHEDULE A (continued)

Parcel 1:

That portion of Lot 2 in Block 38 of the Subdivision of the "S" Tract of Rancho El Cajon, in the County of San Diego, State of California, according to Map thereof in Book 170, Page 71 of Deeds, recorded of San Diego County, described as follows:

Beginning at the most Easterly corner of Parcel 14 as shown on Record of Survey Map No. 3906, filed in the Office of the County Recorder of San Diego County, April 24, 1956; thence along the Easterly boundary of said Record of Survey Map No. 3906 North $36^{\circ}53'40''$ West, 139.60 feet; thence North $58^{\circ}58'50''$ East, 324.55 feet to the Northerly boundary of said Lot 2; thence along said boundary South $66^{\circ}02'30''$ East, 317.23 feet, North $49^{\circ}26'50''$ East, 263.33 feet and South $89^{\circ}30'50''$ East, 277.06 feet; thence leaving said boundary South $58^{\circ}47'10''$ East, 265.43 feet; thence South $69^{\circ}30'$ East, 585.99 feet; thence South $56^{\circ}06'10''$ East, 251.88 feet; thence South $2^{\circ}51'$ East, 101.40 feet, thence South $47^{\circ}45'20''$ West, 407.98 feet; North $82^{\circ}21'50''$ West, 349.75 feet; thence South $59^{\circ}26'40''$ West, 100.65 feet; thence South $25^{\circ}27'$ West, 77.63 feet; thence South $14^{\circ}42'40''$ East, 820.90 feet to a point on the arc of a 200.00 foot radius curve concave Northerly the center of which bears North $4^{\circ}40'10''$ East from said point; thence Westerly along said curve through an angle of $16^{\circ}24'50''$, a distance of 57.41 feet; thence tangent to said curve through an angle of 113.26 feet to the beginning of a tangent 150.00 foot radius curve concave Southerly; thence Westerly along said curve through a central angle of $48^{\circ}36'40''$, a distance of 127.26 feet; thence tangent to said curve, South $62^{\circ}30'20''$ West, 239.26 feet to the beginning of a tangent 177.05 foot radius curve concave Northerly; thence Westerly along said curve through a central angle of $45^{\circ}08'40''$, a distance of 139.50 feet to the beginning of a reverse curve concave Southerly having a radius of 200.00 feet; thence Westerly along said curve through a central angle of $44^{\circ}36'$, a distance of 155.68 feet; thence tangent to said curve South $63^{\circ}13'$ West, 259.61 feet to the beginning of a tangent 400.00 foot radius curve concave Southeasterly; thence Southwesterly along said curve through a central angle of $19^{\circ}42'50''$, a distance of 137.63 feet to the Easterly boundary of the aforementioned Record of Survey Map No. 3906; thence along said boundary North $6^{\circ}39'10''$ West, 560.07 feet; thence North $23^{\circ}06'10''$ West, 519.07 feet; thence North $0^{\circ}04'50''$ East, 663.65 feet to the Point of Beginning.

Parcel 2:

An easement and right of way for road and utility purposes, over those certain appurtenant easements 30 feet and 60 feet wide, as reserved and described under Parcel 1 in deed to Lawrence Terence Moore, et al, recorded November 2, 1959 in Book 7971, Page 147 of Official Records.

Parcel 3:

All that portion of Lot 2 in Block 38 of the Subdivision of the "S" Tract of Rancho El Cajon, in the City of San Diego, County of San Diego, State of California, according to

SCHEDULE A (continued)

Map thereof recorded in Book 170, Page 71 of Deeds, filed in the office of the County Recorder of San Diego County, described as follows:

Beginning at the corner common to Blocks 43 and 44 of said Subdivision of the "S" Tract, which is also an angle point in the Northeasterly boundary of said Lot 2 of Block 38; thence along the Northeasterly and Northerly boundary of said lot as follows:

North $54^{\circ}19'20''$ West, 878.84 feet (Record of Survey No. 4999 - North $54^{\circ}28'$ West, 880.00 feet); South $62^{\circ}40'40''$ West, 256.68 feet; thence South $68^{\circ}26'20''$ East, 64.23 feet to the beginning of a tangent curve, concave Southwesterly having a radius of 250.00 feet; thence Southeasterly along the arc of said curve, through a central angle of $29^{\circ}10'40''$, a distance of 127.31 feet; thence tangent to said curve South $39^{\circ}15'40''$ East, 53.04 feet to the beginning of a tangent curve, concave Westerly having a radius of 200 feet; thence Southerly along the arc of said curve, through a central angle of $52^{\circ}14'10''$, a distance of 182.33 feet; thence tangent to said curve South $12^{\circ}59'$ West, 27.42 feet to the beginning of a tangent curve, concave Easterly having a radius of 130.00 feet; thence Southerly along the arc of said curve, through a central angle of $41^{\circ}24'$, a distance of 93.93 feet to the beginning of a reverse curving having a radius of 110 feet; thence Southerly along the arc of said curve, through a central angle of $48^{\circ}51'40''$, a distance of 93.81 feet to the beginning of a reverse curve having a radius of 186.66 feet; thence Southerly along the arc of said curve, through a central angle of $35^{\circ}34'40''$, a distance of 115.91 feet; thence tangent to said curve South $15^{\circ}27'50''$ East, 175.42 feet to the beginning of a tangent curve, concave Northwesterly having a radius of 100 feet; thence Southwesterly along the arc of said curve, through a central angle of $58^{\circ}26'$, a distance of 101.99 feet thence tangent to said curve South $42^{\circ}58'10''$ West, 96 feet to the beginning of a tangent curve, concave Southeasterly having a radius of 100 feet; thence Southerly along the arc of said curve, through a central angle of $53^{\circ}31'30''$, a distance of 93.42 feet to the beginning of a compound curve, having a radius of 219.35 feet; thence Southeasterly along the arc of said curve, through a central angle of $21^{\circ}43'10''$, a distance of 83.15 feet; thence tangent to said curve South $32^{\circ}16'30''$ East, 66.07 feet to the beginning of a tangent curve, concave Southwesterly having a radius of 500 feet; thence Southeasterly along the arc of said curve, through a central angle of 96.43 feet; thence tangent to said curve South $21^{\circ}13'30''$ East, 51.90 feet to the beginning of a tangent curve, concave Northeasterly having a radius of 200 feet; thence Southeasterly along the arc of said curve 103.65 feet; thence tangent to said curve South $50^{\circ}55'10''$ East, 50.42 feet to the beginning of a tangent curve, concave Southwesterly having a radius of 150 feet; thence Southeasterly along the arc of said curve, through a central angle of $25^{\circ}25'10''$, a distance of 66.55 feet; thence tangent to said curve South $25^{\circ}30'$ East, 210.83 feet to an angle point in the Southwesterly boundary of land described in deed to Parlay Investment Club recorded August 3, 1959 as File/Page No. 156717 of Official Records of San Diego County; thence North $85^{\circ}39'$ East, 128 feet to the beginning of a tangent 100 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of $33^{\circ}46'$, a distance of 58.93 feet to the beginning of a reverse curve, concave Westerly, having a radius of 60 feet; thence counterclockwise, along said curve through an angle of $204^{\circ}26'10''$, a distance of 285.45 feet to the beginning of a reverse curve, concave Northeasterly having a radius of 100 feet; thence Northeasterly along said curve through an angle of $33^{\circ}22'20''$, a distance of 58.25 feet; thence tangent to said curve North

SCHEDULE A (continued)

51°18'50" West, 231.58 feet to the beginning of a tangent 300 foot radius curve, concave Northeasterly; thence Northwesterly along said curve through a central angle of 26°28'10" a distance of 138.19 feet; thence North 24°50'40" West, 79.88 feet to the beginning of a tangent 250 foot radius curve, concave Northeasterly; thence Northwesterly along the arc of said curve, through a central angle of 19°41'50", a distance of 85.94 feet; thence North 5°08'50" West, 44.37 feet to the beginning of a tangent 100 foot radius curve, concave Easterly; thence Northerly along the arc of said curve, through a central angle of 30°29'40", a distance of 53.22 feet; thence North 25°20'50" East, 19.72 feet to the beginning of a tangent 100 foot radius curve, concave Southeasterly; thence Northeasterly along said curve through an angle of 38°06'10" a distance of 66.50 feet; thence North 63°27' East, 62.09 feet to the beginning of a tangent 180 foot radius curve, concave Southerly; thence Easterly along said curve through an angle of 29°04'20", a distance of 91.33 feet; thence South 87°28'40" East, 97.64 feet to the beginning of a tangent 180 foot radius curve, concave Southerly; thence Easterly along said curve through an angle of 21°32'40", a distance of 67.68 feet; thence South 65°56' East, 217.48 feet to the beginning of a tangent 800 foot radius curve, concave Northeasterly; thence Southeasterly along said curve through an angle of 7°47'20", a distance of 108.75 feet; thence South 73°43'20" East, 41.98 feet to the beginning of a tangent 200 foot radius curve, concave Southwesterly; thence Southeasterly along the arc of said curve, through a central angle of 20°05'50", a distance of 70.25 feet; thence South 53°37'30" East, 127.51 feet to the beginning of a tangent 150 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of 45°04', a distance of 117.98 feet; thence South 8°33'30" East, 28.78 feet to the beginning of a tangent 150 foot radius curve, concave Northeasterly; thence Southeasterly along said curve through an angle of 31°42', a distance of 82.99 feet; thence South 40°15'30" East, 171.10 feet to the beginning of a tangent 500 foot radius curve, concave Northeasterly; thence Southeasterly along the arc of said curve, through a central angle of 13°03'30" a distance of 113.95 feet; thence South 53°19' East, 129.60 feet to the beginning of a tangent 500 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of 8°01'20", a distance of 76.01 feet; thence South 45°17'40" East, 342.61 feet to the beginning of a tangent 100 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of 48°34'30", a distance of 84.78 feet; thence South 3°16'50" West, 117.42 feet to the beginning of a tangent 200 foot radius curve, concave Westerly; thence Southerly along said curve through an angle of 15°24'40", a distance of 53.79 feet; thence South 18°41'30" West, 89.46 feet to the beginning of a tangent 150 foot radius curve, concave Easterly; thence Southerly along said curve through an angle of 28°24'10", a distance of 74.36 feet; thence South 9°42'40" East, 33.31 feet to the beginning of a tangent 100 foot radius curve, concave Northwesterly; thence radially to said curve North 80°17'20" East, 20 feet; thence South 29°45' East to an intersection with the Southeasterly line of land described in deed to Parlay Investment Club, recorded August 3, 1959 as File/Page No. 156717 of Official Records of said County, said line having the course of North 65°55'30" East, 1283.34 feet; thence North 65°55'30" East along said Southeasterly line to the most Easterly corner of said land; thence along the Northeasterly boundary of said land being the Northeasterly boundary of said Block 38, as follows:

North 64°06'20" West 338.69 feet (Record of Survey Map No. 4999 - North 64°15' West),

SCHEDULE A (continued)

North 28°06'20" West, 940 feet (Record of Survey Map No. 4999 - North 28°15' West); North 52°27'20" West 2200 feet (Record of Survey Map No. 4999 - North 52°36' West) to the Point of Beginning.

Excepting therefrom that portion described as follows:

Beginning at the Northerly terminus of that certain course designated as North 27°47'10" West 939.67 feet on Sheet 15 of Record of Survey Map No. 8013 on file in the Office of the County Recorder of San Diego County; thence along the boundary of said Record of Survey Map No. 8013 South 27°48'33" East (South 27°47'10" East Record) 164.46 feet; thence leaving said boundary North 67°40'00" West 221.73 feet; thence North 22°20'00" East 131.89 feet to a point in the boundary of said Record of Survey Map No. 8013; thence along said boundary South 52°09'25" East 99.09 feet to the Point of Beginning.

Parcel 4:

An easement for ingress and egress for road purposes over those certain 40 foot and 60 foot strips of land as designated "Easement reserved for road purposes" and "Existing easement reserved for road purposes" on Record of Survey Map No. 6180 filed in the Office of the County Recorder of San Diego County.

Excepting that portion lying within Parcel 1 of this description.

Parcel 5:

All that portion of Lot 2 in Block 38 of the Subdivision of the "S" Tract of Rancho El Cajon, in the County of San Diego, State of California, according to Map thereof recorded in Book 170, Page 71 of Deeds, filed in the Office of the County Recorder of San Diego County, described as follows:

Beginning at the corner common to Blocks 43 and 44 of said Subdivision of the "S" Tract, which is also an angle point in the Northeasterly boundary of said Lot 2 of Block 38; thence along the Northeasterly and Northerly boundary of said lot as follows:

North 54°19'20" West, 878.84 feet (Record of Survey No. 4999 - North 54°28' West, 880 feet); South 62°40'40" West, 256.68 feet; thence South 68°26'20" East, 64.23 feet to the beginning of a tangent curve, concave Southwesterly having a radius of 250 feet; thence Southeasterly along the arc of said curve, through a central angle of 29°10'40", a distance of 127.31 feet; thence tangent to said curve South 39°15'40" East, 53.04 feet to the beginning of a tangent curve, concave Westerly having a radius of 200 feet; thence Southerly along the arc of said curve, through a central angle of 52°14'10", a distance of 182.33 feet; thence tangent to said curve South 12°59' West, 27.42 feet to the beginning of a tangent curve, concave Easterly having a radius of 130 feet; thence Southerly along the arc of said curve, through a central angle of 41°24', a distance of 93.93 feet to the beginning of a reverse curve having a radius of 110 feet; thence Southerly along the arc of said curve, through a central angle of 48°51'40", a distance of 93.81 feet to the beginning of a reverse curve having a radius of 186.66 feet; thence Southerly along the

SCHEDULE A (continued)

arc of said curve, through a central angle of $35^{\circ}34'40''$, a distance of 115.91 feet; thence tangent to said curve South $15^{\circ}27'50''$ East, 175.42 feet to the beginning of a tangent curve, concave Northwesterly having a radius of 100 feet; thence Southwesterly along the arc of said curve, through a central angle of $58^{\circ}26'$, a distance of 101.99 feet; thence tangent to said curve South $42^{\circ}58'10''$ West, 96 feet to the beginning of a tangent curve, concave Southeasterly having a radius of 100 feet; thence Southerly along the arc of said curve, through a central angle of $53^{\circ}31'30''$, a distance of 93.42 feet to the beginning of a compound curve, having a radius of 219.35 feet; thence Southeasterly along the arc of said curve, through a central angle of $21^{\circ}43'10''$, a distance of 83.15 feet; thence tangent to said curve South $32^{\circ}16'30''$ East, 66.07 feet to the beginning of a tangent curve, concave Southwesterly having a radius of 500 feet; thence Southeasterly along the arc of said curve, a distance of 96.43 feet; thence tangent to said curve South $21^{\circ}13'30''$ East, 51.90 feet to the beginning of a tangent curve, concave Northeasterly having a radius of 200 feet; thence Southeasterly along the arc of said curve 103.65 feet; thence tangent to said curve South $50^{\circ}55'10''$ East, 50.42 feet to the beginning of a tangent curve, concave Southwesterly having a radius of 150 feet; thence Southeasterly along the arc of said curve, through a central angle of $25^{\circ}25'10''$, a distance of 66.55 feet; thence tangent to said curve South $25^{\circ}30'$ East, 210.83 feet to an angle point in the Southwesterly boundary of land described in deed to Parlay Investment Club, recorded August 3, 1959 as File/Page No. 156717 of Official Records of San Diego County, being the True Point of beginning; thence North $85^{\circ}59'$ East, 128 feet to the beginning of a tangent 100 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of $33^{\circ}46'$, a distance of 58.93 feet to the beginning of a reverse curve, concave Westerly, having a radius of 60 feet; thence counterclockwise, along said curve through an angle of $204^{\circ}26'10''$, a distance of 285.45 feet to the beginning of a reverse curve, concave Northeasterly having a radius of 100 feet; thence Northwesterly along said curve through an angle of $33^{\circ}22'20''$, a distance of 58.25 feet; thence tangent to said curve North $51^{\circ}18'50''$ West, 231.58 feet to the beginning of a tangent 300 foot radius curve, concave Northeasterly; thence Northwesterly along said curve, through a central angle of $26^{\circ}28'10''$ a distance of 138.59 feet; thence North $24^{\circ}50'40''$ West, 79.88 feet to the beginning of a tangent 250 foot radius curve, concave Northeasterly; thence Northwesterly along said curve, through a central angle of $19^{\circ}41'50''$, a distance of 85.94 feet; thence North $5^{\circ}08'50''$ West, 44.37 feet to the beginning of a tangent 100 foot radius curve, concave Easterly; thence Northerly along said curve, through a central angle of $30^{\circ}29'40''$, a distance of 53.22 feet; thence North $25^{\circ}20'50''$ East, 19.72 feet to the beginning of a tangent 100 foot radius curve, concave Southeasterly; thence Northeasterly along said curve through an angle of $38^{\circ}06'10''$ a distance of 66.50 feet; thence North $63^{\circ}27'$ East, 62.09 feet to the beginning of a tangent 180 foot radius curve, concave Southerly; thence Easterly along said curve through an angle of $29^{\circ}04'20''$, a distance of 91.33 feet; thence South $87^{\circ}28'40''$ East, 97.64 feet to the beginning of a tangent 180 foot radius curve, concave Southerly; thence Easterly along said curve through an angle of $21^{\circ}34'40''$, a distance of 67.68 feet; thence South $65^{\circ}56'$ East, 217.48 feet to the beginning of a tangent 800 foot radius curve, concave Northeasterly; thence Southeasterly along said curve through an angle of $7^{\circ}47'20''$, a distance of 108.75 feet; thence South $73^{\circ}43'20''$ East, 41.98 feet to the beginning of a tangent 200 foot radius curve, concave Southwesterly; thence Southeasterly along said curve, through a central angle of $20^{\circ}05'50''$, a distance of 70.15 feet; thence South $53^{\circ}37'30''$ East, 127.51 feet to the

SCHEDULE A (continued)

beginning of a tangent 150 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of $45^{\circ}04'$, a distance of 117.98 feet; thence South $8^{\circ}33'30''$ East, 28.78 feet to the beginning of a tangent 150 foot radius curve, concave Northeasterly; thence Southeasterly along said curve through an angle of $31^{\circ}42'$, a distance of 82.99 feet; thence South $40^{\circ}15'30''$ East, 171.10 feet to the beginning of a tangent 500 foot radius curve, concave Northeasterly; thence Southeasterly along the arc of said curve, through a central angle of $13^{\circ}03'30''$ a distance of 113.95 feet; thence South $53^{\circ}19'$ East, 129.60 feet to the beginning of a tangent 500 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of $8^{\circ}01'20''$, a distance of 70.01 feet; thence South $45^{\circ}17'40''$ East, 342.61 feet to the beginning of a tangent 100 foot radius curve, concave Southwesterly; thence Southeasterly along said curve through an angle of $48^{\circ}34'30''$, a distance of 84.78 feet; thence South $3^{\circ}16'50''$ West, 117.42 feet to the beginning of a tangent 200 foot radius curve, concave Westerly; thence Southerly along said curve through an angle of $15^{\circ}24'40''$ a distance of 53.79 feet; thence South $18^{\circ}41'30''$ West, 89.46 feet to the beginning of a tangent 150 foot radius curve, concave Easterly; thence Southerly along said curve through an angle of $28^{\circ}24'10''$, a distance of 74.36 feet; thence South $9^{\circ}42'40''$ East, 33.81 feet to the beginning of a tangent 100 foot radius curve, concave Northwesterly; thence radial to said curve North $80^{\circ}17'20''$ East, 20 feet; thence South $29^{\circ}45'$ East to an intersection with the Southeasterly line of land described in deed to Parlay Investment Club, recorded August 3, 1959 as File/Page No. 156717 of Official Records of said County, said line having the course of North $65^{\circ}55'30''$ East, 1,283.34 feet; thence South $65^{\circ}55'30''$ West along said Southeasterly line of the Southwesterly terminus thereof; thence continuing along the boundary of said land as follows:

South $77^{\circ}40'50''$ West, 511.55 feet, South $39^{\circ}25'20''$ East, 686.02 feet to a point in the center line of County Road Survey No. 435-B as shown on Record of Survey Map No. 6180, filed in the Office of the County Recorder of San Diego County; thence continuing along said boundary South $39^{\circ}25'20''$ East, 263.98 feet more or less to the most Southerly corner of said Parlay Investment Club land being a point in the center line of Road Survey 435 as shown on Record of Survey 5529, filed in the Office of the County Recorder of San Diego County; thence along the Southwesterly boundary of said land Northwesterly along last said center line to an angle point in said Southwesterly boundary being the Southeasterly terminus of that course South $25^{\circ}33'30''$ East, 43 feet, more or less, described in said deed; thence leaving said center line and continuing along the boundary of said Parlay Investment Club; and as follows:

North $25^{\circ}33'30''$ West, 43 feet, more or less, to the beginning of a tangent 80 foot radius curve, concave Southwesterly; Northwesterly along said curve through an angle of 53° , a distance of 74 feet; North $78^{\circ}33'30''$ West, 83.61 feet to the beginning of a tangent 500 foot radius curve, concave Northeasterly; Northwesterly along said curve through an angle of $15^{\circ}15'$, a distance of 133.08 feet; North $63^{\circ}18'30''$ West, 272.80 feet to the beginning of a tangent 300 foot radius curve, concave Northeasterly; Northwesterly along said curve through an angle of $21^{\circ}02'$ a distance of 110.13 feet; North $42^{\circ}16'30''$; West 23.22 feet to the beginning of a tangent 300 foot radius curve, concave Southwesterly; Northwesterly along said curve through an angle of $18^{\circ}30'10''$, a distance of 96.88 feet; North $60^{\circ}46'40''$ West, 237.61 feet to the beginning of a tangent 200 foot radius curve, concave

SCHEDULE A (continued)

Northeasterly; Northwesterly along said curve through an angle of $36^{\circ}45'20''$, a distance of 128.30 feet; North $24^{\circ}01'20''$ West, 105.27 feet to the beginning of a tangent 800 foot radius curve, concave Southwesterly; Northwesterly along said curve through an angle of $9^{\circ}28'40''$, a distance of 132.33 feet; North $33^{\circ}30'$ West, 185.92 feet to the beginning of a tangent 316.24 feet (Record 300 feet) radius curve, concave Easterly; Northerly along said curve through an angle of $40^{\circ}34'50''$, a distance of 223.98 feet (Record 212.48 feet) North $7^{\circ}04'50''$ East, 76.24 feet to the beginning of a tangent 800 foot radius curve, concave Westerly; Northerly along said curve through an angle of $13^{\circ}43'50''$, a distance of 191.71 feet; North $6^{\circ}39'$ West, 664.36 feet to the True Point of Beginning.

Excepting therefrom any portion thereof lying Southerly of the center line of County Road Survey No. 435-B as shown on Record of Survey No. 6180.

Parcel 6:

An easement for ingress and egress for road purposes over those certain 40 foot and 60 foot strips of land as designated "Easement Reserved for Road Purposes" and "Existing Easement Reserved for Road Purposes" on Record of Survey Map No. 6180 filed in the Office of the County Recorder of San Diego County.

Excepting that portion lying within Parcel 5 of this description.

Parcel 7:

All that portion of Lot 2 in Block 38 of the Subdivision of the "S" Tract of the Rancho E. Cajon, in the County of San Diego, State of California, according to Map thereof recorded in Book 170, Page 71 of Deeds, filed in the Office of the County Recorder of San Diego County, described as follows:

Beginning at the corner common to Blocks 43 and 44 of said Subdivision of the "S" Tract, which is also an angle point in the Northeasterly boundary of said Lot 2 of Block 38; thence along the Northeasterly and Northerly boundary of said Lot as follows:

North $54^{\circ}19'20''$ West, 878.84 feet (Record of Survey Map No. 4999 equals North $54^{\circ}28'$ West 880.00 feet); South $62^{\circ}40'40''$ West, 899.26 feet, and North $89^{\circ}30'50''$ West, 342.51 feet to an angle point in the boundary of the land described in Deed to Oril S. Harbaugh, et ux, recorded November 5, 1958 in Book 7335, Page 317 of Official Records; thence along the boundary thereof as follows:

South $58^{\circ}47'10''$ East, 265.43 feet, South $69^{\circ}30'$ East, 585.99 feet; South $56^{\circ}06'10''$ East, 251.88 feet, South $2^{\circ}51'$ East, 101.40 feet, South $47^{\circ}45'20''$ West, 407.98 feet, North $82^{\circ}21'50''$ West, 349.75 feet South $57^{\circ}26'40''$ West, 100.65 feet, South $25^{\circ}27'$ West, 77.63 feet, and South $14^{\circ}42'40''$ East, 820.90 feet to the Westerly terminus of a 200.00 foot radius curve, concave Northerly a radial line of said curve bears South $4^{\circ}40'10''$ West to the Westerly terminus of said curve; thence Easterly along the arc of said curve, through a central angle of $18^{\circ}16'40''$ a distance of 63.80 feet to the beginning of a compound curve having a radius of 174.65 feet, being the True Point of Beginning; thence Northeasterly

SCHEDULE A (continued)

along the arc of said curve, through a central angle of $27^{\circ}42'20''$ a distance of 84.61 feet; thence tangent to said curve, North $48^{\circ}41'10''$ East, 95.62 feet to the beginning of a tangent curve concave Northwesterly having a radius of 250.00 feet; thence Northeasterly along the arc of said curve, through a central angle of $30^{\circ}28'50''$ a distance of 133.00 feet; thence tangent to said curve, North $18^{\circ}12'20''$ East, 208.77 feet to the beginning of a tangent curve concave Southerly having a radius of 100.00 feet; thence Northeasterly, Easterly and Southeasterly along the arc of said curve, through a central angle of $103^{\circ}27'$ a distance of 180.55 feet; thence tangent to said curve, South $58^{\circ}20'40''$ East, 191.01 feet to the beginning of a tangent curve concave Northerly having a radius of 350.00 feet; thence Southeasterly along the arc of said curve, through a central angle of $43^{\circ}21'50''$ a distance of 264.89 feet; thence tangent to said curve, North $78^{\circ}17'30''$ East, 107.65 feet to a point hereinafter referred to as Point "A"; thence South $6^{\circ}39'$ East, 664.36 feet to the beginning of a tangent curve concave Westerly having a radius of 800.00 feet; thence Southerly along the arc of said curve, through a central angle of $13^{\circ}43'50''$ a distance of 191.71 feet; thence tangent to said curve, South $7^{\circ}04'50''$ West, 76.24 feet to the beginning of tangent curve concave Easterly having a radius of 300.00 feet; thence Southeasterly along the arc of said curve, through a central angle of $40^{\circ}34'50''$ a distance of 212.48 feet; thence tangent to said curve, South $33^{\circ}30'$ East, 185.92 feet to the beginning of a tangent curve concave Southwesterly having a radius of 800.00 feet; thence Southeasterly along the arc of said curve, through a central angle of $9^{\circ}28'40''$ a distance of 132.33 feet; thence tangent to said curve, South $24^{\circ}01'20''$ East, 105.27 feet to the beginning of a tangent curve concave Northeasterly having a radius of 200.00 feet; thence Southeasterly along the arc of said curve, through a central angle of $36^{\circ}45'20''$ a distance of 128.30 feet; thence tangent to said curve, South $60^{\circ}46'40''$ East, 237.61 feet to the beginning of a tangent curve concave Southwesterly having a radius of 300.00 feet; thence Southeasterly along the arc of said curve, through a central angle of $18^{\circ}30'10''$ a distance of 96.88 feet; thence tangent to said curve South $42^{\circ}16'30''$ East, 23.22 feet to the beginning of a tangent curve concave Northeasterly having a radius of 300 feet; thence Southeasterly along the arc of said curve, through a central angle of $21^{\circ}02'$ a distance 110.13 feet; thence tangent to said curve, South $63^{\circ}18'30''$ East, 272.80 feet to the beginning of a tangent curve concave Northeasterly having a radius of 500 feet; thence Southeasterly along the arc of said curve, through a central angle of $15^{\circ}15'$ a distance of 133.08 feet; thence tangent to said curve, South $73^{\circ}33'30''$ East, a distance of 83.61 feet to the beginning of a tangent curve concave Southwesterly having a radius of 80 feet; thence Southeasterly along the arc of said curve, through a central angle of $53^{\circ}00'$ a distance of 74.00 feet; thence tangent to said curve, South $25^{\circ}33'30''$ East, 43.00 feet more or less, to the intersection with the center line of the County Road known as Road Survey No. 435, a Plat of which is on file in the Office of County Surveyor of San Diego County as said road existed prior to 1959; thence Southeasterly along said Road Survey No. 435 to an intersection with the center line of easement for County Highway described in Deed to County of San Diego recorded January 25, 1960 as File/Page No. 15330 of Official Records; thence Westerly along said center line described in said Document No. 15330 to an intersection with the Easterly boundary of land described in Deed to Lawrence Terence Moore, et al, recorded November 2, 1959 as File/Page No. 226805 of Official Records; thence Northwesterly along said boundary to the Southeasterly terminus of that certain course described as North $76^{\circ}02'20''$ West, 151.65 feet; thence continuing along said boundary North $79^{\circ}02'20''$ West, 151.65 feet to the beginning of a tangent 100 foot radius

SCHEDULE A (continued)

curve, concave Northeasterly; Northwesterly along said curve, 115.04 feet; tangent to said curve, North 10°07'30" West, 44.52 feet to the beginning of a tangent 150 foot radius curve, concave Southwesterly; Northwesterly along said curve 162.27 feet; tangent to said curve, North 72°06'30" West, 33.48 feet to the beginning of a tangent 150 foot radius curve, concave Easterly; Northwesterly along said curve, 263.68 feet; tangent to said curve, North 28°36'40" East, 47.20 feet to the beginning of a tangent 200 foot radius curve, concave Westerly; Northerly along said curve 106.05 feet; tangent to said curve, North 1°46'10" West, 213.96 feet to the beginning of a tangent 150 foot radius curve, concave Southwesterly; Northwesterly along said curve, 194.68 feet; thence to said curve, North 76°08' West, 49.08 feet to the beginning of a tangent 110 foot radius curve, concave Easterly, Northerly along said curve 222.30 feet; tangent to said curve, North 39°39'30" East, 75.40 feet to the beginning of a tangent 200 foot radius curve, concave Westerly; Northerly along said curve 120.03 feet; tangent to said curve, North 5°16'20" East, 108.2 feet to the beginning of a tangent 200 foot radius curve, concave Easterly; Northerly along said curve, 77.96 feet; tangent to said curve, North 27°36'20" East, 163.04 feet to the beginning of a tangent 125 foot radius curve, concave Southerly, clockwise along said curve, 174.78 feet; tangent to said curve, South 72°16'50" East, 105.81 feet to the beginning of a tangent 100 foot radius curve, concave Northerly; Easterly along said curve, 110.8 feet, and tangent to said curve, North 44°14' East, 48.89 feet; thence South 76°23'30" West, 43.07 feet to the True Point of Beginning.

Exhibit "C"

RECORDING REQUESTED BY
FIRST AMERICAN TITLE INS. CO.
AND WHEN RECORDED MAIL TO:
STATE OF CALIFORNIA

Space Above This Line for Recorder's Use Only

A.P.N.:

Order No.: 1265600-20

Escrow No.: 01-1598AS

GRANT DEED

THE UNDERSIGNED GRANTOR(S) DECLARE(S) THAT DOCUMENTARY TRANSFER TAX IS: COUNTY Non-disclosure
 computed on full value of property conveyed, or
 computed on full value less value of liens or encumbrances remaining at time of sale,
 unincorporated area; City of San Diego, and

FOR A VALUABLE CONSIDERATION, Receipt of which is hereby acknowledged,

SAN DIEGO COUNTY WATER AUTHORITY, a California county water authority

hereby GRANT(S) to
STATE OF CALIFORNIA

the following described property in the City of San Diego, County of San Diego State of California;

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF FOR COMPLETE LEGAL DESCRIPTION

January 29, 2002

SAN DIEGO COUNTY WATER AUTHORITY, a
California county water authority

By: _____
Print name: _____
Title: _____

By: _____
Print name: _____
Title: _____

STATE OF CALIFORNIA
COUNTY OF _____

)SS

)

before me, _____

On _____
personally appeared _____

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

This area for official notarial seal.



EXHIBIT "A"

ORDER NO. 1265600-20

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN IS SITUATED IN THE STATE OF CALIFORNIA, COUNTY OF SAN DIEGO, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1:

THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF RANCHO EL CAJON, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF IN BOOK 170, PAGE 71 OF DEEDS, RECORDED OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST EASTERLY CORNER OF PARCEL 14 AS SHOWN ON RECORD OF SURVEY MAP NO. 3906, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 24, 1956; THENCE ALONG THE EASTERLY BOUNDARY OF SAID RECORD OF SURVEY MAP NO. 3906 NORTH $36^{\circ}53'40''$ WEST, 139.60 FEET; THENCE NORTH $58^{\circ}58'50''$ EAST, 324.55 FEET TO THE NORTHERLY BOUNDARY OF SAID LOT 2; THENCE ALONG SAID BOUNDARY SOUTH $66^{\circ}02'30''$ EAST, 317.23 FEET, NORTH $49^{\circ}26'50''$ EAST, 263.33 FEET AND SOUTH $89^{\circ}30'50''$ EAST, 277.06 FEET; THENCE LEAVING SAID BOUNDARY SOUTH $58^{\circ}47'10''$ EAST, 265.43 FEET; THENCE SOUTH $69^{\circ}30'$ EAST, 585.99 FEET; THENCE SOUTH $56^{\circ}06'10''$ EAST, 251.88 FEET; THENCE SOUTH $2^{\circ}51'$ EAST, 101.40 FEET; THENCE SOUTH $47^{\circ}45'20''$ WEST, 407.98 FEET; NORTH $82^{\circ}21'50''$ WEST, 349.75 FEET; THENCE SOUTH $59^{\circ}26'40''$ WEST, 100.65 FEET; THENCE SOUTH $25^{\circ}27'$ WEST, 77.63 FEET; THENCE SOUTH $14^{\circ}42'40''$ EAST, 820.90 TO A POINT ON THE ARC OF A 200.00 FOOT RADIUS CURVE CONCAVE NORTHERLY THE CENTER OF WHICH BEARS NORTH $4^{\circ}40'10''$ EAST FROM SAID POINT; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $16^{\circ}24'50''$, A DISTANCE OF 57.41 FEET; THENCE TANGENT TO SAID CURVE, NORTH $68^{\circ}53'$ WEST, 113.26 FEET TO THE BEGINNING OF A TANGENT 150.00 FOOT RADIUS CURVE CONCAVE SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $48^{\circ}36'40''$, A DISTANCE OF 127.26 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $62^{\circ}30'20''$ WEST, 239.26 FEET TO THE BEGINNING OF A TANGENT 177.05 FOOT RADIUS CURVE CONCAVE NORTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $45^{\circ}08'40''$, A DISTANCE OF 139.50 FEET TO THE BEGINNING OF A REVERSE CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 200.00 FEET; THENCE WESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $44^{\circ}36'$, A DISTANCE OF 155.68 FEET; THENCE TANGENT TO SAID CURVE SOUTH $63^{\circ}13'$ WEST, 259.61 FEET TO THE BEGINNING OF A TANGENT 400.00 FOOT RADIUS CURVE CONCAVE SOUTHEASTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF $19^{\circ}42'50''$, A DISTANCE OF 137.63 FEET TO THE EASTERLY BOUNDARY OF THE AFOREMENTIONED RECORD OF SURVEY MAP NO. 3906; THENCE ALONG SAID BOUNDARY NORTH $6^{\circ}39'10''$ WEST, 560.07 FEET; THENCE NORTH $23^{\circ}06'10''$ WEST, 519.07 FEET; THENCE NORTH $0^{\circ}04'50''$ EAST, 663.65 FEET TO THE POINT OF BEGINNING.

PARCEL 2:

AN EASEMENT AND RIGHT OF WAY FOR ROAD AND UTILITY PURPOSES, OVER THOSE CERTAIN APPURTENANT EASEMENTS 30 FEET AND 60 FEET WIDE, AS RESERVED AND DESCRIBED UNDER PARCEL 1 IN DEED TO LAWRENCE TERENCE MOORE, ET AL, RECORDED NOVEMBER 2, 1959 IN BOOK 7971, PAGE 147 OF OFFICIAL RECORDS.



PARCEL 3:

ALL THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF RANCHO EL CAJON, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF RECORDED IN BOOK 170, PAGE 71 OF DEEDS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO BLOCKS 43 AND 44 OF SAID SUBDIVISION OF THE "S" TRACT, WHICH IS ALSO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF SAID LOT 2 OF BLOCK 38; THENCE ALONG THE NORTHEASTERLY AND NORTHERLY BOUNDARY OF SAID LOT AS FOLLOWS:

NORTH 54°19'20" WEST, 878.84 FEET (RECORD OF SURVEY NO. 4999 - NORTH 54°28' WEST, 880.00 FEET); SOUTH 62°40'40" WEST, 256.68 FEET; THENCE SOUTH 68°26'20" EAST, 64.23 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 250.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 29°10'40", A DISTANCE OF 127.31 FEET; THENCE TANGENT TO SAID CURVE SOUTH 39°15'40" EAST, 53.04 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE WESTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 52°14'10", A DISTANCE OF 182.33 FEET; THENCE TANGENT TO SAID CURVE SOUTH 12°59' WEST, 27.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE EASTERLY HAVING A RADIUS OF 130.00 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 41°24', A DISTANCE OF 93.93 FEET TO THE BEGINNING OF A REVERSE CURVING HAVING A RADIUS OF 110 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 48°51'40", A DISTANCE OF 93.81 FEET TO THE BEGINNING OF A REVERSE CURVE HAVING A RADIUS OF 186.66 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 35°34'40", A DISTANCE OF 115.91 FEET; THENCE TANGENT TO SAID CURVE SOUTH 15°27'50" EAST, 175.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHWESTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 58°26', A DISTANCE OF 101.99 FEET; THENCE TANGENT TO SAID CURVE SOUTH 42°58'10" WEST, 96 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 53°31'30", A DISTANCE OF 93.42 FEET TO THE BEGINNING OF A COMPOUND CURVE, HAVING A RADIUS OF 219.35 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 21°43'10", A DISTANCE OF 83.15 FEET; THENCE TANGENT TO SAID CURVE SOUTH 32°16'30" EAST, 66.07 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 500 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 96.43 FEET; THENCE TANGENT TO SAID CURVE SOUTH 21°13'30" EAST, 51.90 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE 103.65 FEET; THENCE TANGENT TO SAID CURVE SOUTH 50°55'10" EAST, 50.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 150 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF



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25°25'10", A DISTANCE OF 66.55 FEET; THENCE TANGENT TO SAID CURVE SOUTH 25°30' EAST, 210.83 FEET TO AN ANGLE POINT IN THE SOUTHWESTERLY BOUNDARY OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAN DIEGO COUNTY; THENCE NORTH 85°39' EAST, 128 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 33°46', A DISTANCE OF 58.93 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 60 FEET; THENCE COUNTERCLOCKWISE, ALONG SAID CURVE THROUGH AN ANGLE OF 204°26'10", A DISTANCE OF 285.45 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 33°22'20", A DISTANCE OF 58.25 FEET; THENCE TANGENT TO SAID CURVE NORTH 51°18'50" WEST, 231.58 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 26°28'10" A DISTANCE OF 138.19 FEET; THENCE NORTH 24°50'40" WEST, 79.88 FEET TO THE BEGINNING OF A TANGENT 250 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 19°41'50", A DISTANCE OF 85.94 FEET; THENCE NORTH 5°08'30" WEST, 44.37 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE NORTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 30°29'40", A DISTANCE OF 53.22 FEET; THENCE NORTH 25°20'50" EAST, 19.72 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY; THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 38°06'10" A DISTANCE OF 66.50 FEET; THENCE NORTH 63°27' EAST, 62.09 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 29°04'20", A DISTANCE OF 91.33 FEET; THENCE SOUTH 87°28'40" EAST, 97.64 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 21°32'40", A DISTANCE OF 67.68 FEET; THENCE SOUTH 65°56' EAST, 217.48 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 7°47'20", A DISTANCE OF 108.75 FEET; THENCE SOUTH 73°43'20" EAST, 41.98 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 20°05'50", A DISTANCE OF 70.25 FEET; THENCE SOUTH 53°37'30" EAST, 127.51 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 45°04', A DISTANCE OF 117.98 FEET; THENCE SOUTH 8°33'30" EAST, 28.78 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 31°42', A DISTANCE OF 82.99 FEET; THENCE SOUTH 40°15'30" EAST, 171.10 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 13°03'30" A DISTANCE OF 113.95 FEET; THENCE SOUTH 53°19' EAST, 129.60 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 8°01'20", A DISTANCE OF 76.01 FEET; THENCE SOUTH 45°17'40" EAST, 342.61 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE



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OF 48°34'30", A DISTANCE OF 84.78 FEET; THENCE SOUTH 3°16'50" WEST, 117.42 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 15°24'40", A DISTANCE OF 53.79 FEET; THENCE SOUTH 18°41'30" WEST, 89.46 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 28°24'10", A DISTANCE OF 74.36 FEET; THENCE SOUTH 9°42'40" EAST, 33.31 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE RADially TO SAID CURVE NORTH 80°17'20" EAST, 20 FEET; THENCE SOUTH 29°45' EAST TO AN INTERSECTION WITH THE SOUTHEASTERLY LINE OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB, RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAID COUNTY, SAID LINE HAVING THE COURSE OF NORTH 65°55'30" EAST, 1283.34 FEET; THENCE NORTH 65°55'30" EAST ALONG SAID SOUTHEASTERLY LINE TO THE MOST EASTERLY CORNER OF SAID LAND; THENCE ALONG THE NORTHEASTERLY BOUNDARY OF SAID LAND BEING THE NORTHEASTERLY BOUNDARY OF SAID BLOCK 38, AS NORTH 64°06'20" WEST 338.69 FEET (RECORD OF SURVEY MAP NO. 4999 - NORTH 64°15' WEST), NORTH 28°06'20" WEST, 940 FEET (RECORD OF SURVEY MAP NO. 4999 - NORTH 28°15' WEST); NORTH 52°27'20" WEST, 2200 FEET (RECORD OF SURVEY MAP NO. 4999 - NORTH 52°36' WEST) TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHERLY TERMINUS OF THAT CERTAIN COURSE DESIGNATED AS NORTH 27°47'10" WEST 939.67 FEET ON SHEET 15 OF RECORD OF SURVEY MAP NO. 8013 ON FILE IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY; THENCE ALONG THE BOUNDARY OF SAID RECORD OF SURVEY MAP NO. 8013, SOUTH 27°48'33" EAST (SOUTH 27°47'10" EAST RECORD) 164.46 FEET; THENCE LEAVING SAID BOUNDARY NORTH 67°40'00" WEST 221.73 FEET; THENCE NORTH 22°20'00" EAST 131.89 FEET TO A POINT IN THE BOUNDARY OF SAID RECORD OF SURVEY MAP NO. 8013; THENCE ALONG SAID BOUNDARY SOUTH 52°09'25" EAST 99.09 FEET TO THE POINT OF BEGINNING.

PARCEL 4:

AN EASEMENT FOR INGRESS AND EGRESS FOR ROAD PURPOSES OVER THOSE CERTAIN 40 FOOT AND 60 FOOT STRIPS OF LAND AS DESIGNATED "EASEMENT RESERVED FOR ROAD PURPOSES" AND "EXISTING EASEMENT RESERVED FOR ROAD PURPOSES" ON RECORD OF SURVEY MAP NO. 6180, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

EXCEPTING THAT PORTION LYING WITHIN PARCEL 3 OF THIS DESCRIPTION.

PARCEL 5:

ALL THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF RANCHO EL CAJON, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF RECORDED IN BOOK 170, PAGE 71 OF DEEDS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:



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BEGINNING AT THE CORNER COMMON TO BLOCKS 43 AND 44 OF SAID SUBDIVISION OF THE "S" TRACT, WHICH IS ALSO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF SAID LOT 2 OF BLOCK 38; THENCE ALONG THE NORTHEASTERLY AND NORTHERLY BOUNDARY OF SAID LOT AS FOLLOWS:

NORTH $54^{\circ}19'20''$ WEST, 878.84 FEET (RECORD OF SURVEY NO. 4999 - NORTH $54^{\circ}28'$ WEST, 880 FEET); SOUTH $62^{\circ}40'40''$ WEST, 256.68 FEET; THENCE SOUTH $68^{\circ}26'20''$ EAST, 64.23 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 250 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $29^{\circ}10'40''$, A DISTANCE OF 127.31 FEET; THENCE TANGENT TO SAID CURVE SOUTH $39^{\circ}15'40''$ EAST, 53.04 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE WESTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $52^{\circ}14'10''$, A DISTANCE OF 182.33 FEET; THENCE TANGENT TO SAID CURVE SOUTH $12^{\circ}59'$ WEST, 27.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE EASTERLY HAVING A RADIUS OF 130 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $41^{\circ}24'$, A DISTANCE OF 93.93 FEET TO THE BEGINNING OF A REVERSE CURVE HAVING A RADIUS OF 110 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $48^{\circ}51'40''$, A DISTANCE OF 93.81 FEET TO THE BEGINNING OF A REVERSE CURVE HAVING A RADIUS OF 186.66 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $35^{\circ}34'40''$, A DISTANCE OF 115.91 FEET; THENCE TANGENT TO SAID CURVE SOUTH $15^{\circ}27'50''$ EAST, 175.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHWESTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHWESTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $58^{\circ}26'$, A DISTANCE OF 101.99 FEET; THENCE TANGENT TO SAID CURVE SOUTH $42^{\circ}58'10''$ WEST, 96 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $53^{\circ}31'30''$, A DISTANCE OF 93.42 FEET TO THE BEGINNING OF A COMPOUND CURVE, HAVING A RADIUS OF 219.35 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $21^{\circ}43'10''$, A DISTANCE OF 83.15 FEET; THENCE TANGENT TO SAID CURVE SOUTH $32^{\circ}16'30''$ EAST, 66.07 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 500 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, A DISTANCE OF 96.43 FEET; THENCE TANGENT TO SAID CURVE SOUTH $21^{\circ}13'30''$ EAST, 51.90 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 200 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE 103.65 FEET; THENCE TANGENT TO SAID CURVE SOUTH $50^{\circ}55'10''$ EAST, 50.42 FEET TO THE BEGINNING OF A TANGENT CURVE, CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 150 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $25^{\circ}25'10''$, A DISTANCE OF 66.55 FEET; THENCE TANGENT TO SAID CURVE SOUTH $25^{\circ}30'$ EAST, 210.83 FEET TO AN ANGLE POINT IN THE SOUTHWESTERLY BOUNDARY OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB, RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAN DIEGO COUNTY, BEING THE TRUE POINT OF BEGINNING; THENCE NORTH $85^{\circ}59'$ EAST, 128 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $33^{\circ}46'$, A DISTANCE OF 58.93 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE WESTERLY, HAVING A RADIUS OF 60 FEET; THENCE COUNTERCLOCKWISE, ALONG SAID



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CURVE THROUGH AN ANGLE OF $204^{\circ}26'10''$, A DISTANCE OF 285.45 FEET TO THE BEGINNING OF A REVERSE CURVE, CONCAVE NORTHEASTERLY HAVING A RADIUS OF 100 FEET; THENCE NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $33^{\circ}22'20''$, A DISTANCE OF 58.25 FEET; THENCE TANGENT TO SAID CURVE NORTH $51^{\circ}18'50''$ WEST, 231.58 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $26^{\circ}28'10''$ A DISTANCE OF 138.59 FEET; THENCE NORTH $24^{\circ}50'40''$ WEST, 79.88 FEET TO THE BEGINNING OF A TANGENT 250 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE NORTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $19^{\circ}41'50''$, A DISTANCE OF 85.94 FEET; THENCE NORTH $5^{\circ}08'50''$ WEST, 44.37 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE NORTHERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $30^{\circ}29'40''$, A DISTANCE OF 53.22 FEET; THENCE NORTH $25^{\circ}20'50''$ EAST, 19.72 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY; THENCE NORTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $38^{\circ}06'10''$ A DISTANCE OF 66.50 FEET; THENCE NORTH $63^{\circ}27'$ EAST, 62.09 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $29^{\circ}04'20''$, A DISTANCE OF 91.33 FEET; THENCE SOUTH $87^{\circ}28'40''$ EAST, 97.64 FEET TO THE BEGINNING OF A TANGENT 180 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE EASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $21^{\circ}34'40''$, A DISTANCE OF 67.68 FEET; THENCE SOUTH $65^{\circ}56'$ EAST, 217.48 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $7^{\circ}47'20''$, A DISTANCE OF 108.75 FEET; THENCE SOUTH $73^{\circ}43'20''$ EAST, 41.98 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF $20^{\circ}05'50''$, A DISTANCE OF 70.15 FEET; THENCE SOUTH $53^{\circ}37'30''$ EAST, 127.51 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $45^{\circ}04'$, A DISTANCE OF 117.98 FEET; THENCE SOUTH $8^{\circ}33'30''$ EAST, 28.78 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $31^{\circ}42'$, A DISTANCE OF 82.99 FEET; THENCE SOUTH $40^{\circ}15'30''$ EAST, 171.10 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $13^{\circ}03'30''$ A DISTANCE OF 113.95 FEET; THENCE SOUTH $53^{\circ}19'$ EAST, 129.60 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $8^{\circ}01'20''$, A DISTANCE OF 70.01 FEET; THENCE SOUTH $45^{\circ}17'40''$ EAST, 342.61 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHEASTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $48^{\circ}34'30''$, A DISTANCE OF 84.78 FEET; THENCE SOUTH $3^{\circ}16'50''$ WEST, 117.42 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF $15^{\circ}24'40''$ A DISTANCE OF 53.79 FEET; THENCE SOUTH $18^{\circ}41'30''$ WEST, 89.46 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF $28^{\circ}24'10''$, A DISTANCE OF 74.36 FEET; THENCE SOUTH $9^{\circ}42'40''$ EAST, 33.81 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE RADIAL TO SAID CURVE NORTH $80^{\circ}17'20''$ EAST, 20 FEET;



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THENCE SOUTH $29^{\circ}45'$ EAST TO AN INTERSECTION WITH THE SOUTHEASTERLY LINE OF LAND DESCRIBED IN DEED TO PARLAY INVESTMENT CLUB, RECORDED AUGUST 3, 1959 AS FILE NO. 156717 OF OFFICIAL RECORDS OF SAID COUNTY, SAID LINE HAVING THE COURSE OF NORTH $65^{\circ}55'30''$ EAST, 1,283.34 FEET; THENCE SOUTH $65^{\circ}55'30''$ WEST ALONG SAID SOUTHEASTERLY LINE OF THE SOUTHWESTERLY TERMINUS THEREOF; THENCE CONTINUING ALONG THE BOUNDARY OF SAID LAND AS FOLLOWS:

SOUTH $77^{\circ}40'50''$ WEST, 511.55 FEET, SOUTH $39^{\circ}25'20''$ EAST, 686.02 FEET TO A POINT IN THE CENTER LINE OF COUNTY ROAD SURVEY NO. 435-B AS SHOWN ON RECORD OF SURVEY MAP NO. 6180, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY; THENCE CONTINUING ALONG SAID BOUNDARY SOUTH $39^{\circ}25'20''$ EAST, 263.98 FEET MORE OR LESS TO THE MOST SOUTHERLY CORNER OF SAID PARLAY INVESTMENT CLUB LAND BEING A POINT IN THE CENTER LINE OF ROAD SURVEY 435 AS SHOWN ON RECORD OF SURVEY 5529, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY; THENCE ALONG THE SOUTHWESTERLY BOUNDARY OF SAID LAND NORTHWESTERLY ALONG LAST SAID CENTER LINE TO AN ANGLE POINT IN SAID SOUTHWESTERLY BOUNDARY BEING THE SOUTHEASTERLY TERMINUS OF THAT COURSE SOUTH $25^{\circ}33'30''$ EAST, 43 FEET, MORE OR LESS, DESCRIBED IN SAID DEED; THENCE LEAVING SAID CENTER LINE AND CONTINUING ALONG THE BOUNDARY OF SAID PARLAY INVESTMENT CLUB; AND AS FOLLOWS:

NORTH $25^{\circ}33'30''$ WEST, 43 FEET, MORE OR LESS, TO THE BEGINNING OF A TANGENT 80 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 53° , A DISTANCE OF 74 FEET; NORTH $78^{\circ}33'30''$ WEST, 83.61 FEET TO THE BEGINNING OF A TANGENT 500 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $15^{\circ}15'$, A DISTANCE OF 133.08 FEET; NORTH $63^{\circ}18'30''$ WEST, 272.80 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $21^{\circ}02'$, A DISTANCE OF 110.13 FEET; NORTH $42^{\circ}16'30''$, WEST 23.22 FEET TO THE BEGINNING OF A TANGENT 300 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $18^{\circ}30'10''$, A DISTANCE OF 96.88 FEET; NORTH $60^{\circ}46'40''$ WEST, 237.61 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $36^{\circ}45'20''$, A DISTANCE OF 128.30 FEET; NORTH $24^{\circ}01'20''$ WEST, 105.27 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF $9^{\circ}28'40''$, A DISTANCE OF 132.33 FEET; NORTH $33^{\circ}30'$ WEST, 185.92 FEET TO THE BEGINNING OF A TANGENT 316.24 FEET (RECORD 300 FEET) RADIUS CURVE, CONCAVE EASTERLY; NORTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF $40^{\circ}34'50''$, A DISTANCE OF 223.98 FEET (RECORD 212.48 FEET) NORTH $7^{\circ}04'50''$ EAST, 76.24 FEET TO THE BEGINNING OF A TANGENT 800 FOOT RADIUS CURVE, CONCAVE WESTERLY; NORTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF $13^{\circ}43'50''$, A DISTANCE OF 191.71 FEET; NORTH $6^{\circ}39'$ WEST, 664.36 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM ANY PORTION THEREOF LYING SOUTHERLY OF THE CENTER LINE OF COUNTY ROAD SURVEY NO. 435-B AS SHOWN ON RECORD OF SURVEY NO. 6180.



PARCEL 6:

AN EASEMENT FOR INGRESS AND EGRESS FOR ROAD PURPOSES OVER THOSE CERTAIN 40 FOOT AND 60 FOOT STRIPS OF LAND AS DESIGNATED "EASEMENT RESERVED FOR ROAD PURPOSES" AND "EXISTING EASEMENT RESERVED FOR ROAD PURPOSES" ON RECORD OF SURVEY MAP NO. 6180 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

EXCEPTING THAT PORTION LYING WITHIN PARCEL 6 OF THIS DESCRIPTION.

PARCEL 7:

ALL THAT PORTION OF LOT 2 IN BLOCK 38 OF THE SUBDIVISION OF THE "S" TRACT OF THE RANCHO EL CAJON, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF RECORDED IN BOOK 170, PAGE 71 OF DEEDS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER COMMON TO BLOCKS 43 AND 44 OF SAID SUBDIVISION OF THE "S" TRACT, WHICH IS ALSO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF SAID LOT 2 OF BLOCK 38; THENCE ALONG THE NORTHEASTERLY AND NORTHERLY BOUNDARY OF SAID LOT AS FOLLOWS:

NORTH 54°19'20" WEST, 878.84 FEET (RECORD OF SURVEY MAP NO. 4999 EQUALS NORTH 54°28' WEST, 880.00 FEET); SOUTH 62°40'40" WEST, 899.26 FEET, AND NORTH 89°30'50" WEST, 342.51 FEET TO AN ANGLE POINT IN THE BOUNDARY OF THE LAND DESCRIBED IN DEED TO ORIL S. HARBAUGH, ET UX, RECORDED NOVEMBER 5, 1958 IN BOOK 7335, PAGE 317 OF OFFICIAL RECORDS; THENCE ALONG THE BOUNDARY THEREOF AS FOLLOWS:

SOUTH 58°47'10" EAST, 265.43 FEET, SOUTH 69°30' EAST, 585.99 FEET; SOUTH 56°06'10" EAST, 251.88 FEET, SOUTH 2°51' EAST, 101.40 FEET, SOUTH 47°45'20" WEST, 407.98 FEET, NORTH 82°21'50" WEST, 349.75 FEET SOUTH 57°26'40" WEST, 100.65 FEET, SOUTH 25°27' WEST, 77.63 FEET, AND SOUTH 14°42'40" EAST, 820.90 FEET TO THE WESTERLY TERMINUS OF A 200.00 FOOT RADIUS CURVE, CONCAVE NORTHERLY A RADIAL LINE OF SAID CURVE BEARS SOUTH 4°40'10" WEST TO THE WESTERLY TERMINUS OF SAID CURVE; THENCE EASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 18°16'40" A DISTANCE OF 63.80 FEET TO THE BEGINNING OF A COMPOUND CURVE HAVING A RADIUS OF 174.65 FEET, BEING THE TRUE POINT OF BEGINNING; THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 27°42'20" A DISTANCE OF 84.61 FEET; THENCE TANGENT TO SAID CURVE, NORTH 48°41'10" EAST, 95.62 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY HAVING A RADIUS OF 250.00 FEET; THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 30°28'50" A DISTANCE OF 133.00 FEET; THENCE TANGENT TO SAID CURVE, NORTH 18°12'20" EAST, 208.77 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHERLY HAVING A RADIUS OF 100.00 FEET; THENCE NORTHEASTERLY, EASTERLY AND SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 103°27' A DISTANCE OF 180.55 FEET; THENCE TANGENT TO SAID CURVE, SOUTH 58°20'40" EAST 191.01 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 350.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A



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CENTRAL ANGLE OF $43^{\circ}21'50''$ A DISTANCE OF 264.89 FEET; THENCE TANGENT TO SAID CURVE; NORTH $78^{\circ}17'30''$ EAST, 107.65 FEET TO A POINT HEREINAFTER REFERRED TO AS POINT "A"; THENCE SOUTH $6^{\circ}39'$ EAST, 664.36 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE WESTERLY HAVING A RADIUS OF 800.00 FEET; THENCE SOUTHERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $13^{\circ}43'50''$ A DISTANCE OF 191.71 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $7^{\circ}04'50''$ WEST, 76.34 FEET TO THE BEGINNING OF TANGENT CURVE CONCAVE EASTERLY HAVING A RADIUS OF 300.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $40^{\circ}34'50''$ A DISTANCE OF 212.48 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $33^{\circ}30'$ EAST, 185.92 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 800.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $9^{\circ}28'40''$ A DISTANCE OF 132.33 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $24^{\circ}01'20''$ EAST, 105.27 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY HAVING A RADIUS OF 200.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $36^{\circ}45'20''$ A DISTANCE OF 128.30 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $60^{\circ}46'40''$ EAST, 237.61 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 300.00 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $18^{\circ}30'10''$ A DISTANCE OF 96.88 FEET; THENCE TANGENT TO SAID CURVE SOUTH $42^{\circ}16'30''$ EAST, 23.22 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY HAVING A RADIUS OF 300 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $21^{\circ}02'$ A DISTANCE OF 110.13 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $63^{\circ}18'30''$ EAST, 272.80 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHEASTERLY HAVING A RADIUS OF 500 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $15^{\circ}15'$ A DISTANCE OF 133.08 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $73^{\circ}33'30''$ EAST, A DISTANCE OF 83.61 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHWESTERLY HAVING A RADIUS OF 80 FEET; THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF $53^{\circ}00'$ A DISTANCE OF 74.00 FEET; THENCE TANGENT TO SAID CURVE, SOUTH $25^{\circ}33'30''$ EAST, 43.00 FEET, MORE OR LESS, TO THE INTERSECTION WITH THE CENTER LINE OF THE COUNTY ROAD KNOWN AS ROAD SURVEY NO. 435, A PLAT OF WHICH IS ON FILE IN THE OFFICE OF THE COUNTY SURVEYOR OF SAN DIEGO COUNTY AS SAID ROAD EXISTED PRIOR TO 1959; THENCE SOUTHEASTERLY ALONG SAID ROAD SURVEY NO. 435 TO AN INTERSECTION WITH THE CENTER LINE OF EASEMENT FOR COUNTY HIGHWAY DESCRIBED IN DEED TO COUNTY OF SAN DIEGO RECORDED JANUARY 25, 1960 AS FILE NO. 15330 OF OFFICIAL RECORDS; THENCE WESTERLY ALONG SAID CENTER LINE DESCRIBED IN SAID DOCUMENT NO. 15330 TO AN INTERSECTION WITH THE EASTERLY BOUNDARY OF LAND DESCRIBED IN DEED TO LAWRENCE TERENCE MOORE, ET AL, RECORDED NOVEMBER 2, 1959 AS FILE NO. 226895 OF OFFICIAL RECORDS; THENCE NORTHWESTERLY ALONG SAID BOUNDARY TO THE SOUTHEASTERLY TERMINUS OF THAT CERTAIN COURSE DESCRIBED AS NORTH $76^{\circ}02'20''$ WEST, 151.65 FEET; THENCE CONTINUING ALONG SAID BOUNDARY NORTH $79^{\circ}02'20''$ WEST, 151.65 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHEASTERLY; NORTHWESTERLY ALONG SAID CURVE, 115.04 FEET; TANGENT TO SAID CURVE, NORTH $10^{\circ}07'30''$ WEST, 44.52 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE 162.27 FEET, TANGENT TO SAID CURVE, NORTH $72^{\circ}06'30''$ WEST, 33.48 FEET TO THE BEGINNING OF A



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TANGENT 150 FOOT RADIUS CURVE, CONCAVE EASTERLY; NORTHWESTERLY ALONG SAID CURVE; 263.68 FEET; TANGENT TO SAID CURVE, NORTH 28°36'40" EAST, 47.20 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; NORTHERLY ALONG SAID CURVE 106.05 FEET; TANGENT TO SAID CURVE, NORTH 1°46'10" WEST, 213.96 FEET TO THE BEGINNING OF A TANGENT 150 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; NORTHWESTERLY ALONG SAID CURVE, 194.68 FEET; THENCE TO SAID CURVE, NORTH 76°08' WEST, 49.08 FEET TO THE BEGINNING OF A TANGENT 110 FOOT RADIUS CURVE, CONCAVE EASTERLY, NORTHERLY ALONG SAID CURVE 222.30 FEET; TANGENT TO SAID CURVE, NORTH 39°39'30" EAST, 75.40 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE WESTERLY; NORTHERLY ALONG SAID CURVE 120.03 FEET; TANGENT TO SAID CURVE, NORTH 5°16'20" EAST, 108.23 FEET TO THE BEGINNING OF A TANGENT 200 FOOT RADIUS CURVE, CONCAVE EASTERLY; NORTHERLY ALONG SAID CURVE; 77.96 FEET; TANGENT TO SAID CURVE, NORTH 27°36'20" EAST, 163.04 FEET TO THE BEGINNING OF A TANGENT 125 FOOT RADIUS CURVE, CONCAVE SOUTHERLY, CLOCKWISE ALONG SAID CURVE, 174.78 FEET;; TANGENT TO SAID CURVE, SOUTH 72°16'50" EAST, 105.81 FEET TO THE BEGINNING OF A TANGENT 100 FOOT RADIUS CURVE, CONCAVE NORTHERLY; EASTERLY ALONG SAID CURVE, 110.8 FEET, AND TANGENT TO SAID CURVE, NORTH 44°14' EAST, 48.89 FEET; THENCE SOUTH 76°23'30" WEST, 43.07 FEET TO THE TRUE POINT OF BEGINNING.

CRESTRIDGE HMA MITIGATION ACCOUNTING

EXHIBIT A

Project Name	Coastal Sage Scrub			Chaparral			Project Status
	Expected Impacts (1)	Actual Impacts (2)	Available Credits	Expected Impacts	Actual Impacts	Available Credits	
Initial Acquisition			233.65			24.80	
SDG&E easement	0.00	1.40	232.25				Existing powerline easement
Ramona Pipeline	10.80	10.80	221.45				Completed; 3/89-10/90
Sweetwater Bypass	1.20	1.20	220.25				Completed; 9/90-11/91
Pipeline 5EI	21.90	46.80	173.45				Completed; 9/90-1/94
Pipeline 4BI	10.60	10.60	162.85				Completed; 9/91-3/94
Pipeline 4EII	16.90	15.90	146.95				Completed; 7/92-5/94
Pipeline 4EI	10.30	13.70	133.25				Completed; 8/91-7/94
North County Distribution Pipeline	5.80	15.30	117.95				Completed; 4/95-12/96
Pipeline 4BII & FRS	20.00	26.30	91.65				Completed; 8/94-11/97
Pipeline 4BII indirects	12.20	12.20	79.45				Completed; 8/94-11/97
Pipeline 2A	3.90	2.70	76.75				Completed; 10/96-11/97
Levy Water Treatment Plant Expansion	4.40	4.40	72.35				Completed; 2/98
Pipeline 5EII	33.10	40.30	32.05				Completed; 1/97-6/98
P3&4, Blk Mtn Vent to Miramar Hill Reline (indirect)	6.00	3.99	28.06				Completed 10/03-10/04
Moreno Lakeside Pipeline/FCF	3.40	3.23	24.83				Completed; 7/02-3/05
P4, Pomerado to SR52 Reline	0.00	0.00	24.83				Completed; 10/04-8/05
P4, Del Dios to Blk Mtn Rch Reline (indirect)	0.00	0.12	24.71				Completed; 10/05-06/06
P4, Blk Mtn Rch to Blk Mtn Vent Reline (indirect)	0.64	0.44	24.27				Completed; 10/05-06/06
Pipeline 5EII PCHF	6.79	6.30	17.97				Completed; 4/04-5/07
P4, Paint Mtn to Del Dios Reline	1.23	1.03	16.94				Completed; 09/07-2/09
P3, SR52 to Lake Murray Reline (indirect)	7.86	7.86	9.08				Completed; 7/08-5/09
Mission Trails FRSII & Vent Demolition (Tier II)	0.73		8.35				Construction 1/09 -
P3&P4, Miramar Hill to SR52 Reline (direct/temp.)	2.20		6.15				Future
P3&P4, Miramar Hill to SR52 Reline (indirect)	2.40		3.75				Future
Pipeline 6	29.80						Future; to be reassessed
Totals	212.15	224.57	0.00	0.00	0.00	24.80	

NOTES

1. Expected Impacts are based on CEQA document(s)/assessment
2. Actual Impacts are based on post construction surveys
3. Credits are dedicated at CEQA project approval and debited when the Notice of Completion is issued.
4. 2.6 acres of disturbed lands were reseeded with CSS, will be added to bank when successful

as of 11/15/09

AGREEMENT TO ASSIGN CONSERVATION BANK AGREEMENT

THIS AGREEMENT TO ASSIGN CONSERVATION BANK AGREEMENT (“**Agreement**”) is dated as of _____, 2003, by and between EMERALD PROPERTIES CORP., a New York corporation (the “**Assignor**”), and SAN DIEGO COUNTY WATER AUTHORITY, a county water authority duly organized pursuant to the County Water Authority Act (the “**Assignee**”).

Recitals:

A. Assignor has entered into that certain San Miguel Conservation Bank Agreement (“**Conservation Bank Agreement**”) dated August 27, 1997, by and among Assignor, the California Department of Fish and Game (“**CDFG**”), and the United States Fish and Wildlife Service (“**USFWS**”) (CDFG and USFWS are referred to collectively hereafter as the “**Wildlife Agencies**”). A true and correct copy of the Conservation Bank Agreement is attached hereto as Exhibit A. All capitalized terms used herein and not otherwise defined shall have the meanings set forth in the Conservation Bank Agreement.

B. Pursuant to the Conservation Bank Agreement, Assignor and the Wildlife Agencies established a conservation bank with respect to approximately 1186 acres in the County of San Diego, California (the “**Bank Property**”) in order to provide for conservation in perpetuity of the Bank Property, the use of such land as mitigation for impacts to certain endangered, threatened, and sensitive species (“**Sensitive Species**”) and related habitat (“**Sensitive Species Habitat**”), and the sale of conservation bank credits (“**Conservation Credits**”) by Assignor to third party purchasers in need of such mitigation.

C. CDFG, which has certain concurrence rights with respect to the assignment of the Conservation Bank Agreement, has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of certain species under the California Endangered Species Act, California Fish and Game Code § 2050 *et seq.*, and other State laws. CDFG is also the manager and trustee of fish and wildlife resources and their habitat pursuant to California Fish and Game Code § 1802.

D. USFWS, which also has certain concurrence rights with respect to the assignment of the Conservation Bank Agreement, has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species under the Endangered Species Act, 16 U.S.C. § 1531 *et seq.*, and the Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-666c, and the Fish and Wildlife Act of 1956, 16 U.S.C. § 742(f) *et seq.*, and other Federal laws.

E. Assignee is desirous of purchasing and Assignor is willing to convey and assign to Assignee all of Assignor’s right, title, and interest under the Conservation Bank Agreement, including all of its remaining interest in the Conservation Bank, in accordance with the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

1. Assignment. Subject to Sections 3, 4, and 5 below, Assignor hereby agrees to assign, set over and transfer to Assignee, all of Assignor's legal and beneficial right, title, interest, and estate arising under or by virtue of the Conservation Bank Agreement, and any other right, title, interest, and estate now owned or hereafter acquired by Assignor with respect to the San Miguel Conservation Bank, including, without limitation, all rights to any remaining Conservation Credits (the foregoing are collectively referred to hereinafter to the "**Assigned Interests**").

2. Acceptance of Assignment. Subject to Section 3 and 5 below, Assignee hereby agrees to accept the assignment of the Assigned Interests and, from and after the Closing, to assume and agree to be bound by all of the terms, covenants and conditions to be performed by the "Bank Property Owner" as defined in and in accordance with the Conservation Bank Agreement, including, without limitation, the unfunded obligations set forth in Sections 4 and 5 of the Conservation Bank Agreement (as and when conservation credits are used or sold to third parties).

3. Consent by the Wildlife Agencies.

(a) The parties acknowledge that pursuant to Section 17 of the Conservation Bank Agreement, no assignment of the Assigned Interests shall be effective without the prior written concurrence of the Wildlife Agencies (the "**Wildlife Agencies' Consent**"), which shall not be unreasonably withheld so long as the assignee: (i) assumes all Conservation Bank obligations under the Conservation Bank Agreement; (ii) has sufficient capacity to carry out any unfunded obligations under Sections 4 and 5 of the Conservation Bank Agreement; and (iii) Assignee obtains at Assignee's option concurrence from the Wildlife Agencies that the use of the credits will be applied to Assignee's projects within Assignee's Natural Communities Conservation Plan ("NCCP") area. The parties hereby agree to use their commercially reasonable efforts to obtain the Wildlife Agencies' Consent as soon as possible and in any event prior to 5:00 p.m. California time on February 28, 2003 (as the same may be extended as provided below, the "**Termination Date**").

(b) In the event the Wildlife Agencies' Consent is not obtained prior to the Termination Date, the following provisions shall apply: (i) either party (so long as it is not then in default hereunder) shall have the right to extend this Agreement for an additional 14 calendar days upon written notice to the other party prior to the expiration of the then applicable Termination Date, in which event the Termination Date shall be so extended; (ii) if neither party has timely elected to extend the Termination Date, this Agreement shall terminate (except for those provisions in Section 9 which, by their express terms, survive such termination (such provisions, the "**Survival Obligations**")) and Assignor shall promptly return the Deposit to Assignee.

4. Payment of Purchase Price. The Purchase Price for the Assigned interests shall be \$2,463,000 and shall be paid as follows:

(1) Upon full execution of this Agreement, Assignee shall deliver to Assignor the sum of \$45,000 (the "**Deposit**") in immediately available funds. The Deposit shall be nonrefundable except as follows: (a) in the event the Board of Directors of Assignee rejects the transaction and Assignee elects in writing to terminate the agreement prior to 5:00 p.m. on January 28, 2003 ("**Deposit Refund Date**"), the Deposit shall be fully refunded to Assignee and this Agreement (other than the Survival Obligations) shall terminate; (b) as otherwise expressly provided in this subsection (1). The Deposit shall be credited towards Assignee's payment of the Purchase Price upon the Closing. In the event the Wildlife Agencies' Consent as identified in section 3(a)(i) and (ii) is not obtained prior to the Termination Date, or Assignor otherwise unilaterally defaults under this Agreement (and Assignee does not waive such default in writing), the Deposit shall be promptly returned to Assignee and upon such payment this Agreement shall terminate (except for the Survival Obligations). In the event Assignee defaults under this Agreement (and Assignor does not waive such default in writing), Assignor shall retain the Deposit as liquidated damages, and this Agreement shall terminate (except for the Survival Obligations). Assignor and Assignee agree (and by their initials below further acknowledge) that: (i) the Deposit is a fair and reasonable amount to be retained by Assignor as agreed and liquidated damages in light of Assignor's removal of the Assigned Interests from the market and the costs incurred by Assignor; (ii) it would be impracticable to fix the actual damage incurred by Assignor as a result of Assignee's breach; and (iii) the liquidated damages assessed hereunder shall not constitute a penalty or a forfeiture.

Assignor _____

Assignee _____

(2) Subject to Section 5 below, the balance of the Purchase Price in the amount of \$2,418,000 ("**Remaining Purchase Price**") shall be paid by Assignee to Assignor in immediately available funds on the Closing Date as provided in Section 5 below.

5. Closing. Payment of the Purchase Price and the delivery of the documents necessary to consummate the transaction hereunder (the "**Closing**") will take place by 5:00 p.m. California time on the date 14 calendar days after receipt of the Wildlife Agencies' Consent, or such earlier date as the parties may agree in writing (the "**Closing Date**"); provided, however, that in no event shall the Closing Date occur prior to the Deposit Refund Date, and in no event no later than March 14, 2003. On the Closing Date:

(a) Assignor shall deliver to Assignee a duly executed counterpart to the Assignment and Assumption Agreement attached hereto as **Exhibit B** (the "**Assignment**"); provided, however, that the delivery of Assignor's counterpart to the Assignment shall be expressly conditioned upon Assignee's performance under Section 5(b) below and shall be deemed null and void in the event the items described in Section 5(b) are not received by Assignor on the Closing Date.

(b) Upon the conditional delivery to Assignee of Assignor's counterpart to the Assignment, Assignee shall (i) pay Assignor the Remaining Purchase Price; (ii) deliver to Assignor a duly executed counterpart to the Assignment.

6. As Is Agreement. Assignee acknowledges and agrees that: (a) the purchase and sale of the Assigned Interests shall be made on an "AS IS, WHERE IS, WITH ALL FAULTS" basis; and (b) no representations or warranties have been made or are made and no responsibility has been or is assumed by Assignor or by any officer, agent, affiliate, or representative acting or purporting to act on behalf of Assignor as to: (i) the conservation or mitigation value of the Bank Property or the Conservation Bank, including the availability of the Conservation Bank to mitigate impacts to specific Sensitive Species or Sensitive Species Habitat (ii) the Wildlife Agencies' Agencies or any other governmental agency's future acceptance of the Conservation Bank or Conservation Credits as mitigation for the loss of habitat values associated with any particular property, or (iii) any other fact or circumstance which might affect the Conservation Bank, the Assignee's property, or the Assigned Interests, except as expressly provided in Section 7 below. The parties agree that all understandings and agreements heretofore made between them or their respective agents or representatives are merged in this Agreement and the Exhibits hereto annexed, which alone fully and completely express their agreement, and that this Agreement has been entered into after full investigation, or with the parties satisfied with the opportunity afforded for investigation, neither party relying upon any statement or representation by the other unless such statement or representation is specifically embodied in this Agreement or the Exhibits annexed hereto.

7. Representations and Warranties of Assignor. Assignor hereby represents and warrants to Assignee as follows: (i) other than this Agreement, Assignor has not assigned, hypothecated, or otherwise transferred (whether as security for an obligation or otherwise) any of its right, title, interest, or estate in or to the Assigned Interests; provided that Assignor has previously sold a total of 365.15 Conservation Credits (attached hereto as Exhibit C is a summary of the Conservation Credits sold to date); and (ii) this Agreement has been duly authorized, executed, and delivered by Assignor, constitutes the legal, valid, and binding obligations of Assignor, and does not violate any provisions of any agreement or judicial order to which Assignor is a party or to which Assignor or the Assigned Interests is subject.

8. Representations and Warranties of Assignee. Assignee hereby represents and warrants to Assignor as follows: (i) Assignee is a county water authority duly organized pursuant to the County Water Authority Act and is in good standing under the laws of the State of California; and (ii) this Agreement has been duly authorized, executed, and delivered by Assignee, constitutes the legal, valid, and binding obligations of Assignee, and does not violate any provisions of any agreement or judicial order to which Assignee is a party or to which it is subject.

9. Financial Advisor. Neither party has had any contract or dealings regarding the Assigned Interests, or any communication in connection with the subject matter of this transaction, through any licensed real estate broker or other person who can

claim a right to a commission or finder's fee as a procuring cause of the sale contemplated herein, except Richard Worthington, Financial Advisor to Emerald Properties Corp. ("**Financial Advisor**"), whose fees, if any is due, shall be the responsibility of Assignor in accordance with Assignor's separate agreement with Financial Advisor. In the event that any other broker or finder perfects a claim for a commission or finder's fee based upon any such contract, dealings or communication, the party through whom the broker or finder makes its claim shall be responsible for said commission or fee and all costs and expenses (including, without limitation, reasonable attorneys' fees) incurred by the other party in defending against the same. Without limitation on the foregoing, Assignee shall have no responsibility for any commission or fees payable to Broker in connection with the Conservation Bank Agreement. The provisions of this paragraph shall survive the Closing and the termination of this Agreement.

10. Miscellaneous.

(a) Notices. Any notice required or permitted to be given hereunder shall be deemed to be given when (i) personally delivered or (ii) one (1) business day after pickup by UPS, Federal Express, or similar overnight express service, or (iii) two business days after sent by registered or certified mail, postage prepaid, return receipt requested; or (iv) on the day of confirmation of receipt by telefacsimile (provided that a duplicate copy of the information sent by telefacsimile has also been mailed on the same day), in all cases addressed to the parties at their respective addresses referenced below:

Assignor: Emerald Properties Corp.
c/o Deutsche Bank Trust Company Americas
1251 Avenue of the Americas, 9th Floor
New York, New York 10020
Attn: James D. Egan
Phone: (646) 324-3014
Fax: (646) 324-7934

With a copy to: Morrison & Foerster LLP
555 West Fifth Street
Suite 3500
Los Angeles, California 90013-1024
Attn: Donald I. Berger, Esq.
Phone: 213 892-5219
Fax: 213 892-5454

If to Assignee: San Diego County Water Authority
4677 Overland Avenue
San Diego, California 92123
Attn: William J. Rose, Director ROW Dept.
Phone: 858-522-6904
Fax: 858-522-6563

or such other address as either party may from time to time specify in writing to the other. Duly mailed notices as aforesaid shall be effective upon the earlier of actual receipt or 72 hours after deposit in the mail.

(b) Counterparts. This Agreement may be executed in one or more counterparts, each of which shall constitute an original, and all of which together shall constitute one and the same agreement.

(c) Successors and Assigns. This Agreement shall be binding upon, and inure to the benefit of, the parties hereto and their respective successors, heirs, administrators and assigns.

(d) Amendments. Except as otherwise provided herein, this Agreement may be amended or modified only by a written instrument executed by Assignor and Assignee.

(e) Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of California.

(f) Merger of Prior Agreements. This Agreement and the exhibits hereto constitute the entire agreement between the parties with respect to the purchase and sale of the Assigned Interests and supersedes all prior agreements and understandings between the parties hereto relating to the subject matter hereof.

(g) Enforcement. In the event either party hereto fails to perform any of its obligations under this Agreement or in the event a dispute arises concerning the meaning or interpretation of any provision of this Agreement, the defaulting party or the party not prevailing in such dispute, as the case may be, shall pay any and all costs and expenses incurred by the other party in enforcing or establishing its rights hereunder, including, without limitation, court costs and reasonable attorneys' fees.

(h) Time of the Essence. Time is of the essence in this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first above written.

Assignee: SAN DIEGO COUNTY WATER
AUTHORITY,
a county water authority

By: _____
Name: _____
Title: _____

Assignor: EMERALD PROPERTIES CORP.,
a New York corporation

By: _____
Name: James D. Egan
Title: President

Exhibit A

San Miguel Conservation Bank Agreement

[see attached]

Copy of Executed Version

SAN MIGUEL CONSERVATION BANK AGREEMENT

THIS SAN MIGUEL CONSERVATION BANK IMPLEMENTATION AGREEMENT (the "Conservation Bank Agreement") is made and entered into this 27th day of August 1997; by and between Emerald Properties, Corp., a New York corporation ("~~Bank Property~~ Owner"), the California Department of Fish and Game ("CDFG"), and the United States Fish and Wildlife Service ("USFWS") (CDFG and USFWS are referred to collectively hereinafter as the "Wildlife Agencies").

RECITALS

A. Bank Property Owner is the owner of certain real estate located in the sphere of influence of the City of Chula Vista, County of San Diego, California, consisting of a 738 acre southern parcel (the "South Parcel") and a 1,852 acre northern parcel (the "North Parcel") (the South Parcel and the North Parcel referred to collectively as the "San Miguel Ranch") and is located regionally as shown on the map attached hereto as Exhibit A. The North Parcel includes: (i) an approximately 500 acre parcel described in Exhibit D attached hereto (the "500 Acre Parcel"); (ii) an approximately 166 acre parcel described in Exhibit E attached hereto (the "North Mitigation Parcel"); and (iii) approximately 1,186 acres described in Exhibit C attached hereto (the "Bank Property"). The South Parcel includes approximately 146 acres depicted in Exhibit F attached hereto (the "South Mitigation Parcel"). Substantially concurrently herewith, Bank Property Owner and USFWS have entered into an Agreement for the Acquisition of Lands with respect to the 500 Acre Parcel and the Bank Property (the "500 Acre Purchase Agreement").

B. Pursuant to the California Endangered Species Act, California Fish and Game Code §2050 et. seq. ("CESA"), and other State laws, CDFG has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of certain species set forth in such laws. CDFG is also the manager and trustee of fish and wildlife resources and their habitat pursuant to California Fish and Game Code § 1802.

C. USFWS has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species under the Endangered Species Act, 16 U.S.C. 1531, et seq. ("ESA"), and the Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c, and Fish and Wildlife Act of 1956, 16 U.S.C. 742(f) et. seq. and other Federal law.

D. As illustrated in Exhibit B (Biological Resource Inventory), the North Parcel of the San Miguel Ranch supports a variety of native plant communities and comprises habitat which may be suitable for a variety of endangered, threatened and sensitive species including the Otay Tarplant, Diegan coastal sage scrub, Orange-throated Whiptail, California Gnatcatcher, the Golden Eagle, the Northern Harrier, the Cooper's Hawk and the Coastal Cactus Wren. The Multiple Species Conservation Plan ("MSCP") proposed for portions of San Diego County recognizes the North Parcel as consisting of "Very High Quality Multi-Species Habitat Values"

including coastal sage scrub consisting predominantly of "Very High Quality Habitat", and further recognizes the North Parcel as providing core gnatcatcher populations at a high density. The North Parcel also includes lesser acreage of other habitat types including chamise and mixed chaparral, perennial grasslands, and riparian scrub, freshwater marsh, and seasonal ponds that further promote the multi-species values of the property (see Exhibit B). The North Parcel is an integral linkage parcel to the Sweetwater River Corridor and South County Segment of the County of San Diego's Subarea Plan.

E. The Bank Property Owner wishes to develop portions of the San Miguel Ranch and wishes to conserve the Bank Property and other portions of the San Miguel Ranch for habitat purposes. The Bank Property is particularly appropriate for conservation. Establishment of the San Miguel Conservation Bank represents an excellent opportunity to implement the ongoing regional biological resource planning efforts in Southwest San Diego County by conserving highly valuable resources within an area which is recognized as an essential part of a regional biological preserve system.

F. It is anticipated that construction and development activity in portions of San Diego County as further depicted in Exhibit G, including all non-coastal areas of San Diego County and, on a case-by-case basis, as determined by the Wildlife Agencies, coastal areas of San Diego County (referred to as the "Credit Area"), will necessitate the mitigation of impacts to endangered, threatened and sensitive species and biologically sensitive habitats through the preservation of off-site lands which possess similar or comparable habitat values. (See Exhibit B, Biological Resources Inventory, for habitat values associated with the Bank Property).

G. On the terms and conditions hereinafter provided, the parties hereto desire to establish a conservation bank with respect to the Bank Property (the "San Miguel Conservation Bank") in order to provide for conservation in perpetuity of the Bank Property, the use of such land as mitigation as provided in Recital F above, and the sale of conservation bank credits by Bank Property Owner to third party purchasers in need of such mitigation ("Credit Purchasers").

H. The parties desire to enter into this Conservation Bank Agreement to set forth the terms and conditions pursuant to which the San Miguel Conservation Bank will be established and implemented.

CONSERVATION BANK AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

1. Establishment of San Miguel Conservation Bank. The Bank Property shall be established as the San Miguel Conservation Bank in a single phase. The San Miguel Conservation Bank shall be established when the Bank Property Owner conveys the Bank Property for conservation as provided in Section 3, below. Upon conveyance of the Bank Property, as provided below, in exchange for the permanent conservation and management

thereof, Bank Property Owner shall be entitled to receive Conservation Credits as provided (and defined) in Section 4, below.

2. Conservation Bank Evaluation and Acceptance.

(a) Representatives of the Wildlife Agencies have inspected and evaluated the Bank Property for purposes of determining its biological values in connection with the sale of Conservation Credits. On the basis of such inspection and evaluation, and as a result of the benefits accruing to wildlife resources, including sensitive, endangered, and threatened species and their habitat, upon the establishment and the conveyance of San Miguel Conservation Bank for conservation purposes, the Wildlife Agencies acknowledge and agree that, subject to Section 4(c), below, the Bank Property possesses biological values which support the Conservation Credits acknowledged in Section 4.

(b) The Wildlife Agencies have determined that the Bank Property is generally suitable to mitigate for impacts of certain sensitive and declining vegetation types, habitat for certain species designated endangered or threatened under CESA or ESA, certain rare or sensitive species and multi-species habitat values within the Credit Area as described in Recital F and **Exhibit B** ("**Biological Resources Inventory**") for habitat values associated with the Bank Property. Highly sensitive habitats that are unrepresented on the Bank Property (e.g., southern maritime chaparral and maritime succulent scrub), coastal obligate species and certain rare or endemic species as identified by the Wildlife Agencies, may not have similar or comparable habitat values and, therefore, may not be appropriately mitigated, at the San Miguel Conservation Bank.

(c) Upon the request of a project proponent or a lead agency, the Wildlife Agencies will determine the necessary mitigation for potential adverse environmental impacts to biological resources of specific proposed projects during environmental review of the project pursuant to the California Environmental Quality Act, Public Resources Code Section 21000, et seq., the National Environmental Policy Act, 42 U.S.C. Section 4321, et seq., or the Endangered Species Act, and, as appropriate, under the Clean Water Act and other applicable law.

(d) The Parties acknowledge that various Natural Community Conservation Planning Act (Fish & Game Code Section 2800, et seq.) plans ("NCCP's") and Endangered Species Act Section 10(a)(2)(A) Habitat Conservation Plans ("HCP's") covering all or part of the Credit Area (collectively or individually referred to hereinafter as "NCCP/HCP") may be adopted or approved by the applicable Wildlife Agencies. As used herein, the term "NCCP/HCP" specifically includes the proposed MSCP, as implemented by one or more of the subarea plans contemplated in the MSCP, any proposed Multiple Habitat Conservation Plan for the northern portion of San Diego County ("MHCP"), as implemented by one or more subarea plans contemplated in the MHCP, and other subarea plans now or hereafter proposed (each such subarea plan is referred to hereinafter as a "Subarea Plan"). Once an NCCP/HCP is approved, and for so long as it is in effect, the NCCP/HCP shall, for Development Projects within its ambit that are within the Credit Area, govern the offsite mitigation requirements of all habitats and species covered by that NCCP/HCP.

(e) It is agreed that one Conservation Credit represents one acre of suitable mitigation land for biological impacts within the Credit Area, subject to the following requirements:

(i) For development projects ("Development Projects") located outside the ambit of a Wildlife Agency approved NCCP/HCP, but within San Diego County, the Wildlife Agencies, consistent with their legal authority, shall, subject to section 2(b), establish the amount and type of mitigation required to mitigate biological impacts to endangered, threatened or sensitive species and habitats.

(ii) For Development Projects located within the ambit of a Wildlife Agency approved NCCP/HCP within San Diego County, the NCCP/HCP mitigation requirements will control the appropriate amount and type of mitigation required to mitigate biological impacts to covered endangered, threatened or sensitive species and habitats; and

(iii) Development Projects impacting wetland areas shall be subject to permitting as described in Section 4(g) below.

(f) Once the Bank Property is conveyed as the San Miguel Conservation Bank in accordance with the procedures set forth herein, no further evaluation or assessment by the Wildlife Agencies shall be required as a prerequisite to the sale of the Conservation Credits, or the Wildlife Agencies' acknowledgment and acceptance thereof, except as provided in Section 4, below.

(g) Notwithstanding anything to the contrary contained in this Agreement, including the definition of Credit Area in Recital F above, the Wildlife Agencies agree to consider allowing Conservation Credits to be used as mitigation for impacts within the coastal areas identified in Exhibit G attached hereto, on a case-by-case basis, so long as the Wildlife Agencies can determine that the impacts to biological resources can, on the basis of similar or comparable habitat values, appropriately be mitigated by the Bank Property.

(h) The parties recognize that there may be circumstances when the San Miguel Conservation Bank may not be suitable to offset certain project impacts, including but not limited to: (a) impacts that threaten a Subarea Plan outside of the Subarea Plan in which the Bank Property is located, in which case mitigation must occur within the Subarea Plan impacted, (b) designated important habitat linkage areas; or (c) where habitat or species impacted requires like-kind mitigation. If the San Miguel Conservation Bank meets the Wildlife Agency mitigation requirements for project impacts, the Wildlife Agencies shall not unreasonably object to its use.

3. Conveyance of the Bank Property.

(a) The conveyance of the Bank Property shall be made in accordance with that certain Agreement for the Acquisition of Lands executed by Bank Property Owner and the

United States of America and dated substantially concurrently herewith (the "Acquisition Agreement").

(b) The level of Conservation Credits provided to Bank Property Owner hereunder have been negotiated by the parties with the express understanding that no enhancement of the San Miguel Conservation Bank lands to maintain or increase Conservation Credits shall be required by Property Owner (although Property Owner may voluntarily enhance such lands as contemplated in Section 4(a) below).

4. Conservation Credits. As a result of the benefits accruing to endangered, threatened, and sensitive species and their habitat upon the establishment of the San Miguel Conservation Bank and the conveyance and management of the Bank Property for conservation purposes, the San Miguel Conservation Bank shall have a total of 1,186 Conservation Credits which shall be established as follows:

(a) Except as otherwise provided in Section 2, the Wildlife Agencies agree to accept each acre of land within the San Miguel Conservation Bank as an equivalent acre of mitigation credit (each acre, a "Conservation Credit," and all such acres "Conservation Credits") subject to the following:

(i) The Conservation Credits may only be used as mitigation with respect to Development Projects located within the Credit Area.

(ii) Subject to Section 2(b), for Development Projects located outside the ambit of a Wildlife Agency approved NCCP/HCP, after the Wildlife Agencies have established the amount and type of mitigation pursuant to section 2(e)(i), Conservation Credits shall be available for mitigation on a one credit for one acre basis for all species and habitats described in the Biological Resources Inventory. For example, in the event a Credit Purchaser is required to mitigate the impact of the loss of coastal sage scrub habitat through a 20 acre off-site mitigation requirement, the Wildlife Agencies agree to accept 20 Conservation Credits from the San Miguel Conservation Bank as adequate mitigation for the 20-acre mitigation obligation.

(iii) For Development Projects located within the ambit of a Wildlife Agency-approved NCCP/HCP, the amount and type of mitigation established in accordance with Section 2(e)(ii) shall be used to determine the suitability of Conservation Credits. To the extent the NCCP/HCP does not preclude use of the Bank Property as mitigation for Development Projects within the jurisdiction of such NCCP/HCP, one Conservation Credit shall be accepted by the Wildlife Agencies for each acre of mitigation required in accordance with Section 2(e)(ii) regardless of whether the habitat or species to be mitigated are included within the Biological Resources Inventory.

(iv) Conservation Credits shall be subject to adjustment as provided in Section 4(e) below.

(b) Concurrently with the conveyance of the Bank Property in accordance with the Acquisition Agreement, 1,186 Conservation Credits will be created, acknowledged, and

accepted by the Wildlife Agencies, subject to the provisions of this Section 4. Bank Property Owner shall be entitled to sell Conservation Credits to Credit Purchasers requiring mitigation, or apply such Conservation Credits against any biological resources mitigation applicable to other properties owned by Bank Property Owner in the Credit Area, subject to the other terms of this Agreement, including, without limitation, the South Parcel. Subject to Bank Property Owner's obligations under Section 5, below, Bank Property Owner shall have the exclusive right to determine the price for any and all Conservation Credits offered for sale or conveyance.

(c) Nothing contained in this Conservation Bank Agreement shall be deemed to limit the Wildlife Agencies' respective jurisdiction over impacts and applicable mitigation of endangered, threatened, and sensitive species and biological resources, or to restrict the ability of CDFG and USFWS to fully discharge their respective responsibilities under applicable law, including, without limitation, CESA and ESA, respectively; provided, however, that except as provided in Sections 2 and 4(a) above, the Wildlife Agencies will not withhold their consent to the use of Conservation Credits as mitigation on a one acre-for-one credit basis (as adjusted pursuant to Section 4(e)) for mitigation in a manner consistent with the terms of this Agreement.

(d) The sale or conveyance of Conservation Credits shall be accounted for in accordance with Section 6, below. Once all Conservation Credits for the Bank Property have been conveyed, no further Conservation Credits shall be acknowledged by the Wildlife Agencies.

(e) In the event the City of Chula Vista has granted discretionary entitlements to Bank Property Owner permitting the development of in excess of 1262 residential units within the South Parcel, the aggregate number of Conservation Credits acknowledged under this Conservation Bank Agreement shall be reduced as follows: (i) in the event the City approves development within the South Parcel in accordance with Exhibit H attached hereto CAC Alignment, the aggregate number of Conservation Credits shall be reduced by 1.0 Conservation Credit for each unit approved in excess of 1262; and (ii) in the event the City has approved development within the South Parcel in accordance with Exhibit I attached hereto the Proctor Valley West Alignment, the aggregate number of Conservation Credits shall be reduced by 1.1 Conservation Credit for each residential unit approved in excess of 1262.

(f) The number of Conservation Credits available for future sale or transfer shall be further reduced pursuant to the procedures set forth in Section 9(a) below.

(g) The use of any wetlands areas within the Bank Property as mitigation for impacts to wetlands within the Credit Area will be subject to permitting and mitigation requirements of Section 404 of the Federal Clean Water Act and Section 1600 of the Fish & Game Code, and shall be "in-kind" mitigation resulting in no net loss of wetland areas, function and values.

(h) If the Wildlife Agencies approve an NCCP/HCP or other habitat conservation plans covering all or any part of the Credit Area and that plan uses habitat categories different than those set forth herein, then, at the request of the Bank Property Owner, the remaining Conservation Credits held by the Bank Property Owner will be reallocated in

accordance with such different habitat categories. The Wildlife Agencies agree to act reasonably in approving any such reallocation.

5. Management and Endowment.

(a) Upon the conveyance of the Bank Property pursuant to Section 3, USFWS shall be designated owner/manager of the Bank Property.

(b) The lands comprising the San Miguel Conservation Bank, along with the North Mitigation Parcel, if and when such parcel has been conveyed to the United States of America, shall be owned and managed by the USFWS as a unit of the National Wildlife Refuge System. The Bank Property shall be acquired by the United States of America through the USFWS subject to the purchase of the 500 Acre Parcel from the Bank Property Owner by the United States of America through the USFWS. Upon conveyance, USFWS shall oversee, manage, and maintain the North Parcel lands in perpetuity, in accordance with the terms and obligations of this Agreement and applicable Federal law.

(c) USFWS will prepare a management plan consistent with the National Wildlife Refuge System Administration Act of 1966, Refuge Recreation Act of 1962, Executive Order 12996 (Management and General Public Use of the National Wildlife Refuge System) for the North Parcel. National Wildlife Refuge lands are managed primarily for the benefit of fish, wildlife, and their habitats and secondarily for other uses that are compatible with the purpose for which the refuge was established. A Comprehensive Management Plan and step down refuge management plan will be prepared by the USFWS and will specify the types and locations of any public use activities, and monitoring, recovery, and fire management actions. This plan will include a detailed environmental analysis, and will identify compatible public uses that will be permitted within the San Diego Refuge. Public involvement will be solicited in the development of the plan.

(d) Subject to the remaining provisions of this Section 5, conservation and restoration shall be funded through Bank Property Owner's contributions as set forth in this paragraph. Bank Property Owner shall deposit with the National Fish and Wildlife Foundation ("NFWF") the amount of One Hundred Thousand Dollars (\$100,000) (the "Initial Deposit") upon conveyance of the Bank Property. Bank Property Owner shall further deposit with the NFWF the amount of \$500 (the "Endowment Deposit") for each Conservation Credit conveyed pursuant to Section 4; provided, however, that in consideration of the Initial Deposit, no Endowment Deposit shall be due with respect to the first 140 Conservation Credits sold. The aggregate of the Initial Deposit and all Endowment Deposits shall be referred to hereinafter as the "Endowment Fund," and shall be used for the conservation and restoration of the Bank Property in accordance with a cooperative agreement to be executed by the USFWS and NFWF. Upon conveyance of the North Mitigation Parcel, Bank Property Owner shall contribute to the Endowment Fund an additional \$500 for each acre comprising the North Mitigation Parcel and such contribution shall fully satisfy any and all of Bank Property Owner's management obligations with respect to such parcel.

(e) The Bank Property Owner's sole obligation with respect to the management of the North Parcel shall be its obligation to establish the Endowment Fund as set forth herein.

(f) Upon each conveyance of Conservation Credits by Bank Property Owner pursuant to Section 4, Bank Property Owner shall deliver the requisite Endowment Deposit to the NFWF, and Bank Property Owner shall deliver to each of the Wildlife Agencies a copy of the receipt of such Endowment Deposit executed by such entity (the "Endowment Receipt").

(g) To the extent the Bank Property Owner secures permanent alternative management funding which provides equivalent or better management of bank lands, the Wildlife Agencies agree that the management Endowment Fund can be reduced or eliminated in a manner acceptable to the Wildlife Agencies. Nothing contained in this Agreement shall be deemed to prohibit Bank Property Owner from participating in regional or local habitat management programs generally applicable to property dedicated or conserved as mitigation for biological resource impacts.

6. Database for Conservation Bank Transactions. Until such time as the Wildlife Agencies have been notified in writing that all Conservation Credits have been conveyed, Bank Property Owner (or any successor in interest) shall be responsible for maintaining a numerical accounting of the Conservation Credits conveyed to Credit Purchasers and the application of such Conservation Credits to development projects during any calendar year and the current amounts contributed to the Endowment Fund in a database format ("Ledger"). Bank Property Owner's Ledger maintenance obligation shall continue until the issuance of the final annual report to the Wildlife Agencies described in this section. The Ledger maintained by Bank Property Owner shall include (i) the number of Conservation Credits sold; (ii) the name, telephone number and address of the entity receiving the Conservation Credits; (iii) the effective date of the transfer; (iv) the name of the development project and jurisdiction in which it occurs; (v) the endowment received and the total endowment received to date; and (vi) the balance of the Conservation Credits remaining to be transferred. The Bank Property Owner shall make the Ledger available to the Wildlife Agencies upon written request, and, in any event, shall provide the Wildlife Agencies an updated Ledger summary annually. Such annual report shall cover a calendar year, and shall be provided by March 1 following the close of each year. Upon each consummation of a transfer of Conservation Credits, Bank Property Owner shall provide the Wildlife Agencies with a description of the transaction, including the information set forth in items (i) through (vi) above.

7. Term of Conservation Bank Agreement: Termination Rights.

(a) Except for USFWS's management obligations as set forth in Section 5 and its ongoing maintenance of the Endowment Fund, which obligation shall continue in perpetuity, unless sooner terminated in accordance with the provisions of this Section 7, this Conservation Bank Agreement shall terminate on the earlier to occur of: (i) the date all Conservation Credits have been conveyed and Endowment Fund deposits have been made pursuant to Section 5 by

Bank Property Owner; and (ii) the date 30 years from the date of this Conservation Bank Agreement.

(b) Notwithstanding anything to the contrary contained in this Conservation Bank Agreement, once the Bank Property Owner has unconditionally delivered the conveyance documents in accordance with Section 3(a), above, Bank Property Owner shall be entitled to the Wildlife Agencies' acknowledgment and acceptance of the Conservation Credits created thereby in accordance with Section 4.

8. Cooperation. The Wildlife Agencies and the Bank Property Owner agree to reasonably cooperate in the implementation of this Conservation Bank Agreement. Such cooperation shall include, without limitation:

(a) The Wildlife Agencies shall confirm in writing to prospective Credit Purchasers that Conservation Credits are available for mitigation as provided in Sections 2 and Section 4 above and that the San Miguel Conservation Bank is in full force and effect and is "approved" by the Wildlife Agencies;

(b) The Wildlife Agencies acknowledge the delivery of Endowment Deposits when actually delivered in accordance with Section 5, above;

(c) The Wildlife Agencies shall: acknowledge that the San Miguel Conservation Bank is a conservation bank "approved" by the Wildlife Agencies; include the San Miguel Conservation Bank on a list to be maintained by the Wildlife Agencies of all such approved conservation banks; and make such lists available to prospective Credit Purchasers at such time as the need for such Credit Purchaser's mitigation is disclosed to the Wildlife Agencies;

(d) The Wildlife Agencies and the Bank Property Owner agree to meet annually, if requested, following the delivery of the annual report provided by Bank Property Owner to the Wildlife Agencies to coordinate the Ledger and the Endowment Fund;

9. South Parcel Mitigation. In connection with the establishment of the San Miguel Conservation Bank and the conveyance of the 500 Acre Parcel in accordance with the Acquisition Agreement, Bank Property Owner has reserved, and the Wildlife Agencies have agreed to acknowledge and accept, the right to apply certain mitigation values associated with the North Parcel to offset certain biological impacts associated with the development of the South Parcel ("South Parcel Mitigation Rights") as follows:

(a) The Wildlife Agencies agree that notwithstanding the conveyance of the 500 Acre Parcel pursuant to the Acquisition Agreement, certain habitat or species within the 500 Acre Parcel shall be available for mitigation for impacts to like species within the South Parcel. The habitat and species available for such mitigation and the mitigation values which shall be acknowledged by the Wildlife Agencies are described in Exhibit J attached hereto (the "500 Acre Mitigation Values"). In the event Bank Property Owner seeks take authorization with respect to the South Parcel, or any portion thereof, independently of the Chula Vista Subarea

Plan and/or the MSCP, the 500 Acre Mitigation Values shall be available as mitigation for impacts to the species identified in Exhibit J ("South Parcel Designated Species") once the Wildlife Agencies determine the amount of such mitigation required with respect to the South Parcel. To the extent the 500 Acre Mitigation Values are applied as mitigation to the South Parcel, or any portion thereof, for each acre (or fractional portion thereof) accepted as mitigation for impacts from development of the South Parcel, one Conservation Credit (or corresponding fractional portion thereof) shall be deducted and permanently eliminated from the aggregate Conservation Credits available for sale or transfer from the San Miguel Conservation Bank. For example, in the event the 500 Acre Parcel was determined to have 20 acres of Otay Tarplant-occupied habitat, after the Wildlife Agencies establish the aggregate mitigation requirements of the South Parcel with respect to Otay Tarplant, Bank Property Owner may apply, and the Wildlife Agencies shall accept, 20 acres toward such mitigation requirement and the number of Conservation Credits within the San Miguel Conservation Bank shall be reduced by 20.

(b) Notwithstanding the conveyance of the 500 Acre Parcel, Bank Property Owner hereby reserves the right to enter upon the 500 Acre Parcel for the purpose of implementing an enhancement program ("**Enhancement Program**") with respect to the South Parcel Designated Species; provided, however, that such Enhancement Program shall be subject to approval by the Wildlife Agencies, and Bank Property Owner shall only be permitted to apply any enhanced acreage within the 500 Acre Parcel as mitigation for impacts to the South Parcel Designated Species pursuant to the terms of such approved Enhancement Program. Any mitigation arising from implementation of the Enhancement Program shall not result in reduction of any Conservation Credits.

10. Entire Conservation Bank Agreement. This Conservation Bank Agreement and the accompanying Agreement for Acquisition of Lands and their related Exhibits contain the entire Conservation Bank Agreement of the parties with respect to the matters covered by this Conservation Bank Agreement, and no other Conservation Bank Agreement, statement, or promise made by any party, or to any employee, officer, or agent of any party, which is not contained in this Conservation Bank Agreement shall be binding or valid.

11. Interpretation and Headings. The language in all parts of this Conservation Bank Agreement shall in all cases be simply construed according to its fair meaning and not strictly for or against any party. Headings of the paragraphs of this Conservation Bank Agreement are for the purposes of convenience only and the words contained in such headings shall in no way be held to explain, modify, amplify, or aid in the interpretation, construction, or meaning of the provisions of this Conservation Bank Agreement.

12. Modification. This Conservation Bank Agreement is not subject to modification except in a writing signed by all parties and any attempted modification not in compliance with this requirement shall be void. The parties shall use their good faith efforts to complete such modifications within ninety (90) days after the initial request is made for a modification by the requesting party.

13. Notices. All notices, demands, or requests from one party to another may be personally delivered, sent by facsimile, sent by recognized overnight delivery service, or sent by mail, certified or registered, postage prepaid, to the addresses stated in this paragraph and shall be effective at the time of personal delivery, facsimile transmission, or mailing.

Bank Property Owner: Emerald Properties Corp.
c/o Bankers Trust Company
130 Liberty Street
New York, NY 10006
Attn.: Garrett W. Thelander
Phone: 212-250-2550
Fax: 212-669-0743

With a copy to: Morrison & Foerster LLP
555 West Fifth Street, Suite 3500
Los Angeles, California 90013-1024
Attn.: Donald I. Berger, Esq.
Phone: 213-892-5602
Fax: 213-892-5454

CDFG: General Counsel
California Department of Fish and Game
1416 9th Street, 12th Floor
Sacramento, California 95814
Phone: 916-654-3821
Fax: 916-654-3805

With a copy to: Regional Manager
California Department of Fish and Game
330 Golden Shore, Suite 50
Long Beach, California 90802
Phone: 310-590-5113
Fax: 310-590-5193

USFWS: United States Fish and Wildlife Service
911 N.E. 11th Ave.
Portland, Oregon 97232
Attn.: Regional Director
Phone: 503-231-6118
Fax: 503-872-2716

With a copy to: United States Fish and Wildlife Service
2730 Loker Avenue West
Carlsbad, California 92008
Attn.: Field Office Supervisor
Phone: 619-431-9440
Fax: 619-431-9618

Any party may change the address to which such notices, payments, or other communications may be sent by giving the other parties written notice of such change. The parties agree to accept facsimile-transmitted signed documents and agree to rely upon such documents as if they bore original signatures. Each party agrees to provide to the other parties, within seventy-two (72) hours after transmission, such documents bearing the original signatures.

14. Exhibits. All Exhibits referred to in this Conservation Bank Agreement are attached to this Conservation Bank Agreement and are incorporated herein by this reference.

15. Counterparts. This Conservation Bank Agreement may be executed by the parties in several counterparts, all of which together shall constitute a single executed Agreement. This Conservation Bank Agreement shall become binding upon a Wildlife Agency immediately upon execution by such entity and Bank Property Owner, and shall not require the execution of all Wildlife Agencies in order to be a binding Conservation Bank Agreement; provided that, this Conservation Bank Agreement shall only be binding upon those parties which have executed the Conservation Bank Agreement. Any Wildlife Agency which has not executed the Conservation Bank Agreement shall not be obligated to accept any Conservation Credits as mitigation for impacts to species and habitats under its jurisdiction.

16. Governing Law. This Conservation Bank Agreement shall be governed and construed in accordance with the laws of the State of California and applicable federal law.

17. Binding on Successors. This Agreement shall be binding upon and inure to the benefit of the Parties and their successors and assigns, provided that no assignment of any portion of, or interest in, the San Miguel Conservation Bank shall be made without prior written concurrence of the Wildlife Agencies, which concurrence shall require that the successor or assign assume all Conservation Bank obligations under this agreement and have sufficient capacity to carry out any unfunded obligations under Section 4 and 5, in which event, said concurrence shall not be unreasonably withheld or delayed. Upon any assignment or delegation of the rights and duties of this Agreement by Bank Property Owner, and subject to the prior written concurrence of the Wildlife Agencies of the proposed assignee or delegatee as set forth above, the assignee shall be deemed the current Bank Property Owner for all purposes and the assignor shall be released from and shall no longer have any obligations, responsibilities, liabilities, right or duty under this Agreement with respect to the assigned obligations following such assignment.

18. Authority. Nothing contained in this Agreement shall be deemed to affect CDFG's and USFWS' respective authorities under applicable law, including, without limitation, CESA and ESA.

19. Federal and State Appropriations. The duty of USFWS and CDFG to carry out their respective obligations under this Agreement shall be subject to the availability of appropriated funds.

20. Elected Officials. No member of Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

IN WITNESS HEREOF, the parties hereto have executed and delivered this Conservation Bank Agreement as of the date first set forth above.

BANK PROPERTY OWNER: EMERALD PROPERTIES CORP., a New York corporation

By: *Carrett W. Melander*
Name: Carrett W. Melander
Its: Vice President

CDFG: CALIFORNIA DEPARTMENT OF FISH AND GAME

By: _____
Name: _____
Its: _____

USFWS: - UNITED STATES FISH AND WILDLIFE SERVICE

By: _____
Name: _____
Its: _____

IN WITNESS HEREOF, the parties hereto have executed and delivered this Conservation Bank Agreement as of the date first set forth above.

BANK PROPERTY OWNER: EMERALD PROPERTIES CORP., a New York corporation

By: _____
Name: _____
Its: _____

CDFG: CALIFORNIA DEPARTMENT OF FISH AND GAME

By: Patricia Wolf
Name: Patricia Wolf
Its: Regional Manager

USFWS: - UNITED STATES FISH AND WILDLIFE SERVICE

By: _____
Name: _____
Its: _____

IN WITNESS HEREOF, the parties hereto have executed and delivered this Conservation Bank Agreement as of the date first set forth above.

BANK PROPERTY OWNER:

EMERALD PROPERTIES CORP., a New York corporation

By: _____
Name: _____
Its: _____

CDFG:

CALIFORNIA DEPARTMENT OF FISH AND GAME

By: _____
Name: _____
Its: _____

USFWS: -

UNITED STATES FISH AND WILDLIFE SERVICE

By: Gail C. Kobetich
Name: Gail C. Kobetich
Its: Field Supervisor

EXHIBIT A

EXHIBIT A

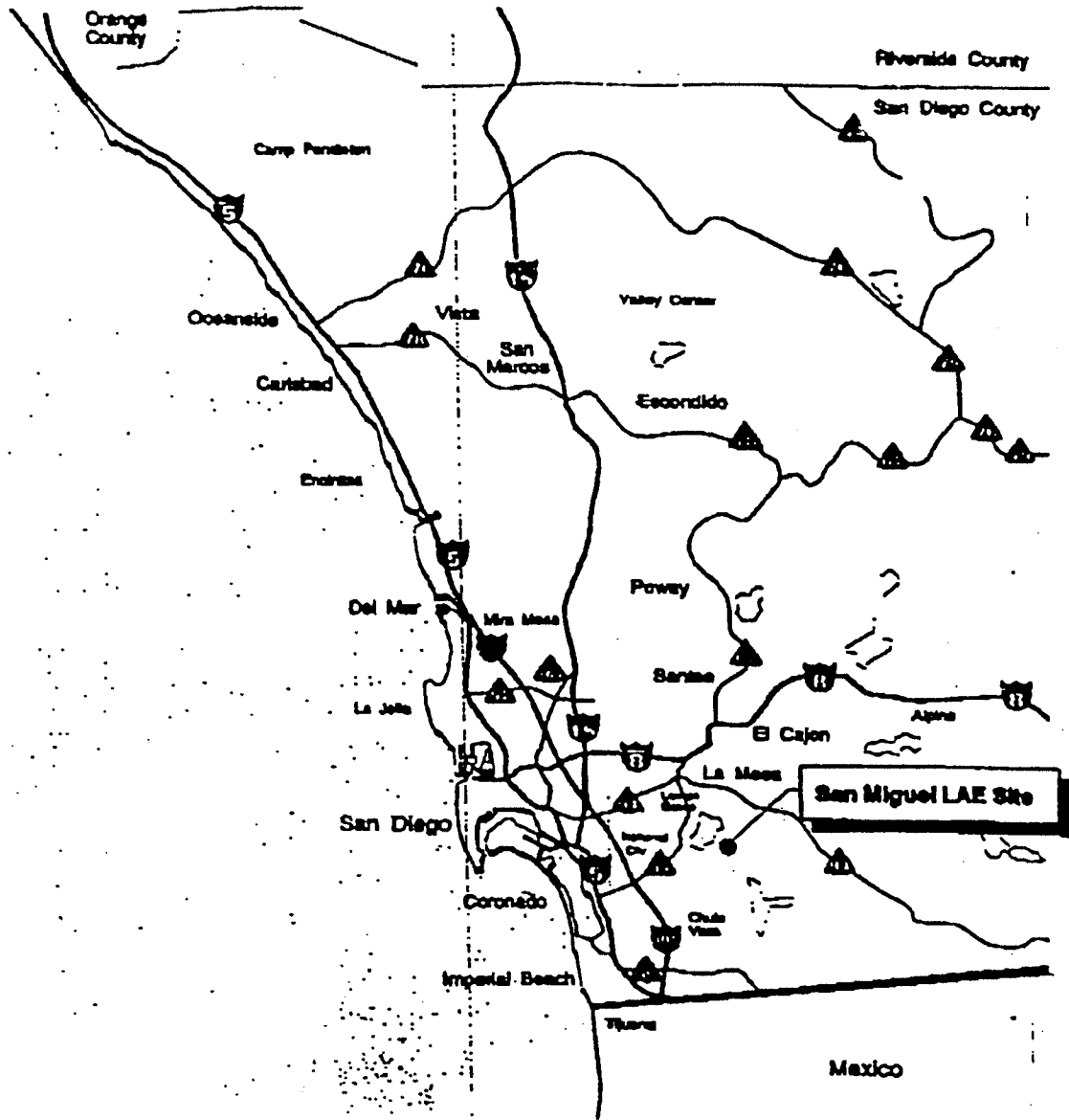


Exhibit 1 Regional Location Map

EXHIBIT B

**GENERAL DESCRIPTION AND OVERVIEW OF
BIOLOGICAL FEATURES OF THE
SAN MIGUEL CONSERVATION BANK AND ASSOCIATED 500 ACRE
ACQUISITION PARCEL AND 166 ACRE MITIGATION SITE**

Merkel & Associates, Inc.

August 19, 1997

General Considerations

The subject parcel consists of 1,852 acres, the majority of which (approximately 1,575 acres) is covered by Diegan Coastal Sage Scrub. The specific plant compositions, canopy height, and coverage varies considerably depending upon topography, slope exposure, and history of disturbance. The majority of the lower slopes is composed of an open sage scrub vegetation dominated by California Sagebrush (*Artemisia californica*), Flat-top Buckwheat (*Eriogonum fasciculatum*), and San Diego County Viguiera (*Viguiera laciniata*), with locally common plants including Broom Baccharis (*Baccharis sarothroides*), Laurel Sumac (*Malosma laurina*), Lemonade-berry (*Rhus integrifolia*), Coast Prickly-pear (*Opuntia littoralis* var. *littoralis*), and Cholla Cactus (*Opuntia parryi* var. *parryi*). This habitat also supports a number of species identified as sensitive by various resource agencies and conservation groups. Most notably among these are the Coastal California Gnatcatcher (*Polioptila californica californica*), listed as Threatened by the USFWS; the San Diego Cactus Wren (*Campylorhynchus brunneicapillus sandiegensis*), a species which has experienced dramatic reductions and now has a very limited distribution in San Diego County; Otay Tarplant (*Hemizonia conjugens*), a plant listed as endangered by the State of California; and substantial populations of numerous species of lower sensitivity.

The San Miguel Ranch site supports a very high diversity of plant and wildlife species in general. This is attributed to the large amount of undeveloped land, highly variable topography, the relatively low amount of disturbance, and several on and off-site regional features including Sweetwater Reservoir, Sweetwater River, and Mother Miguel and San Miguel mountains. Furthermore, the San Miguel Ranch property contains several unique physical features which are an integral part of its functioning as wildlife habitat. One of particular importance is its regional setting adjacent to the southeast of Sweetwater Reservoir and south of the Sweetwater River. Several wildlife movement corridors have been identified on the site and provide for regular passage between areas of the San Miguel and Jamul mountains and the wetlands surrounding the Sweetwater Reservoir and Sweetwater River corridors.

A very important consideration in the regional wildlife value on the site is its connectivity to adjacent undeveloped lands. These include the Sweetwater Authority lands to the west and north, the San Diego National Wildlife Refuge parcel bordering to the north, the Otay Water District's San Miguel Habitat Management Area to the east, and the adjoining San Miguel Mountain to the northeast. Also of contributing value are the National Wildlife Refuge lands of Rancho San Diego, as well as the open space lands of The Pointe and Hidden Valley Estates specific plans; all of these lie generally to the northeast or east of the San Miguel Ranch site. These combine to form several square miles of contiguous open space. While all of these properties contribute valuable features, San Miguel Ranch site is viewed as an integral part of a regional habitat conservation program. This is due to its position adjacent to the reservoir, the high quality of sage scrub habitat present, and its support of significant populations of numerous individual sensitive plant and animal species.

The North Ranch lands have been recognized as consisting of High Quality Multi-species Habitat Values including CSS predominantly classified as Very High Quality in accordance with MHCP/MSCP Habitat Evaluation Model Results. In addition, the site is recognized as providing Core gnatcatcher populations at a high density as evaluated by MSCP.

Although the site suffers in some areas due to range fires and both historic and current grazing practices; most of the habitat has recovered or is continuing to recover to the point of supporting even higher numbers of both common and sensitive species.

Vegetation and Wildlife

Diegan Sage Scrub dominates the site, with the lower slopes displaying a more open profile while those at higher elevations show a more dense and diverse canopy. Other vegetation/habitat types present include Non-native Grassland, Perennial (native) Grassland, Southern Mixed Chaparral, Chamise Chaparral, and several stock ponds. Also present are a number of drainages containing intermittent water flow and seasonal marsh vegetation.

Numerous sensitive plant species are found on the subject property (Table 1). Common to abundant are San Diego County Viguiera (*Viguiera laciniata*), San Diego Barrel Cactus (*Ferocactus viridescens*), California Adolphia (*Adolphia californica*), Munz's Sage (*Salvia munzii*), and Ashy Spike-moss (*Selaginella cinerascens*). Within scattered drainages, San Diego Marsh Elder (*Iva hayesiana*) is abundant and Southwestern Spiny Rush (*Juncus acutus*) can be common. High numbers of Otay Tarplant also occur. Other sensitive plants on the property include Palmer's Grappling Hook (*Harpagonella palmeri*), Variegated Dudleya (*Dudleya variegata*), Cleveland's Golden Star (*Muilla clevelandia*), San Diego Sagewort (*Artemisia palmeri*), San Diego Needle Grass (*Achnatherum diegoensis*), and Western Dichondra (*Dichondra occidentalis*).

A regionally representative fauna of amphibians, reptiles, and mammals is represented on-site. This includes high numbers of the sensitive Western Spadefoot (*Scaphiopus hammondi*), and moderate numbers of three sensitive species of lizards: the San Diego Horned Lizard (*Phrynosoma coronatum blainvillei*), the Orangethroat Whiptail (*Cnemidophorus hyperythrus*) and the similar Coastal Whiptail (*C. tigris multiscutatus*) (Table 1). Sensitive snake species known to be present include the Red Diamond Rattlesnake (*Crotalus ruber*), Two-striped Garter Snake (*Thamnophis hammondi*), and Rosy Boa (*Lichanura trivirgata*). An abundance of Desert Cottontail (*Sylvilagus audubonii*), California Ground Squirrel (*Spermophilus beecheyi*), woodrats (*Neotoma* spp.), and a diversity of other small rodents provide an important prey base for raptorial birds, snakes, and mammalian predators (coyote, bobcat). Regionally common forms such as the Striped Skunk (*Mephitis mephitis*), Black-tailed Jackrabbit (*Lepus californicus*), Gray Fox (*Urocyon cinereoargenteus*), and Mule Deer (*Odocoileus hemionus*) also are regular inhabitants. Mountain Lions (*Felis concolor*) also make use of the property.

Over 120 species of birds have been observed on the San Miguel Ranch property. This encompasses many species known to use the site's shrublands either as breeding, foraging, and/or wintering habitat. Further, many of these species are recognized as sensitive or occur in very patchy distributions. Among the more noteworthy species are the California Gnatcatcher, San Diego Cactus Wren, Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*), Bell's Sage Sparrow (*Amphispiza belli belli*), Grasshopper Sparrow (*Ammodramus savannarum*), and a diverse assemblage of raptors. The breeding bird fauna of the site is particularly impressive with over 30 species being represented in the site's shrublands. Of note is the historic nesting of Golden Eagles immediately adjacent to the eastern boundary and also in rocky cliff habitat along the northeastern border of the site; however, recent nesting is only known from San Miguel Mountain to the east.

California Gnatcatcher

The number of California Gnatcatchers on the subject parcel and its immediately adjacent lands is approximately 85 pairs. Counts have ranged from 69 pairs to as high as 92 pairs. Differences have been attributed to the difference in survey years and season, site conditions, and time/level of focused effort under which surveys were conducted. Approximately 63 pairs are attributed to territories on the property with 22 pairs occurring predominantly off-site but having use areas which are believed to extend onto the property either continuously or seasonally. These territories are generally located along the western boundary and the southeastern boundary of the northern San Miguel Ranch.

While population numbers vary somewhat, San Miguel Ranch appears to support one of the most dense, yet stable, and largest population known for this species. The site is considered to be extremely important to the long-term preservation of the species.

San Diego Cactus Wren

Between 8 and 11 pairs of Cactus Wrens are known to occupy the subject property and the adjoining lands surrounding the Sweetwater Reservoir. Five pairs are confirmed to occur completely on the San Miguel North Parcel and current population levels may in fact exceed this as subsequent site visits have identified this species in a previously uninhabited location, as many as 7 individuals have been noted in a small portion of the higher quality habitat located in the northwest corner of the site. Several moderate to seemingly high quality cactus stands are currently unoccupied by this species and it is believed that with management these areas may become occupied in the future.

Raptorial Birds

A diverse assemblage of raptors has been observed on-site. Some of these occur in either a sporadic or transient nature, such as the Sharp-shinned Hawk (*Accipiter striatus*), Peregrine Falcon (*Falco peregrinus*), Prairie Falcon (*Falco mexicanus*), and possibly Burrowing Owl (*Athene cunicularia*). The site is regularly used by the Golden Eagle, Cooper's Hawk (*Accipiter cooperii*), Northern Harrier (*Circus cyaneus*), Red-shouldered Hawk (*Buteo lineatus*), Red-tailed Hawk (*Buteo jamaicensis*), and American Kestrel (*Falco sparverius*). The open lands on-site are particularly valuable foraging habitat and Golden Eagles have historically nested on the site.

Another noteworthy feature of the property is that it lies in close proximity to the Sweetwater River to the north. This off-site stretch of very high quality willow riparian woodland supports one of the largest populations of the state and federally listed endangered Least Bell's Vireo (*Vireo bellii pusillus*). Also known from this habitat are numerous Yellow-breasted Chat (*Icteria virens*), Yellow Warbler (*Dendroica petechia*), and Blue Grosbeak (*Guiraca caerulea*).

TABLE 1. SUMMARY OF VEGETATION AND SENSITIVE SPECIES RESOURCES ON THE NORTHERN PARCEL OF SAN MIGUEL RANCH

VEGETATION / SPECIES	LISTING	DISTRIBUTION	ABUNDANCE	DENSITY	COMMENTS
Vegetation					
Diegan Coastal Sage Scrub	n/a	Throughout property	1575 acres	n/a	Total acreage includes: 375 acres in Acquisition Parcel; 166 acres in No. Mitigation Parcel; and 1034 acres in Mitigation Bank
Southern Mixed Chaparral	n/a	Trout Hill, Mother Miguel Min., northeast boundary	109 acres	n/a	Includes 109 acres in Mitigation Bank
Chamise Chaparral	n/a	Trout Hill	23 acres		Includes 23 acres in Mitigation Bank
Perennial Grassland	n/a	north central of parcel	16 acres	n/a	Includes 16 acres in Mitigation Bank
Non-native Grassland, Disturbed Perennial Grasslands, and Heavily Grazed Sage Scrub	n/a	Southwestern pastures and areas around ranch house complex	118 acres	n/a	Includes 118 acres in Acquisition Parcel
Dry Marsh/Riparian Scrub	n/a	Widely distributed predominantly in Coon Cyn., and Wildman's Cyn.	6 acres	n/a	Total acreage includes: 3 acres in Acquisition Parcel; 3 acres in Mitigation Bank lands
Mule Fat Scrub Riparian	n/a	Found in Wildman's Cyn. and at upper ends of Coon Cyn. stockpond and below dams	2 acre		Includes 2 acres in Acquisition Parcel
Seasonal Stock Pond	n/a	Five small stock ponds occur on the North Parcel	3 acre	n/a	Total acreage includes: 2 acres in Acquisition Parcel; 1 acre in Mitigation Bank lands
Plants					
San Diego Thorn-mint (<i>Acanthomintha ilicifolia</i>)	Federal: none State: CE CNPS R-E-D 2-3-2	n/a	n/a	potential	Diablo Clay in vicinity of site supports populations of this plant. If present its numbers are expected to be very low.
San Diego County Needlegrass (<i>Achnatherum diegoense</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Found in northern portion of Mitigation Bank lands	uncommon	unknown	Primarily restricted to gabbroic and metavolcanic soils. Populations generally are colonial and occupy a considerable expanse of habitat. Highest densities are found from San Miguel Mountain south to Otay Mountain and inland to the lower foothills.
California Adolphia (<i>Adolphia californica</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Occurs sporadically on clay loam slopes above major drainage courses	uncommon with total of approximately 350 plants; all within the 500 acre Acquisition Parcel	high in isolated stands within the sage scrub	Occurs at numerous coastal San Diego sites. Most populations are on the coastal plain south of the San Luis Rey River, and generally in arid sage scrub habitat. Abundant within lands of Rancho San Diego along the Sweetwater River.
San Diego Sagewort (<i>Artemisia palmeri</i>)	Federal: none State: none CNPS R-E-D 2-2-1	Along several of the larger drainages	uncommon	low	Found at a variety of locations in San Diego County, primarily along coastal creeks and drainages; in the foothills it occurs on moist, north-facing chaparral slopes.
Western Diehondra (<i>Dichondra occidentalis</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Single population detected on slopes of Mother Miguel Mountain, other occurrences on-site are likely	uncommon	high in isolated stands	This cryptic species can be locally common on slopes within twenty miles of the ocean such as at Torrey Pines State Park. Still widely distributed in the region.

VEGETATION / SPECIES	LISTING	DISTRIBUTION	ABUNDANCE	DENSITY	COMMENTS
Variegated Dudleya (<i>Dudleya variegata</i>)	Federal: none State: none CNPS R-E-D 2-2-2	Rare in suitable habitat found in perennial grassland near northern boundary. Also found on south facing slope in 166 acre mitigation parcel	uncommon	low to moderate for the species	Found in openings in sage scrub, chaparral, grasslands, and on Mima Mounds near vernal pools. Range is primarily from Poway westward and south to the Mexican border.
San Diego Barrel Cactus (<i>Ferocactus viridescens</i>)	Federal: none State: none CNPS R-E-D 1-3-1	Found on south and west facing slopes and along flat saddles within the sage scrub	Approx. 8,656 plants: 7,855 plants are in the Acquisition Area; approximately 376 plants in mit. bank, 425 in North mit. area	widespread in small numbers also represented by very dense stands of cactus in some areas	Well distributed throughout western portion of the County with substantial populations still present on Otay Mesa, in Penasquitos Canyon, and a number of locations within twenty miles of the beach.
Palmer's Grapplinghook (<i>Harpegonella palmeri</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Rare within suitable clay lens habitat	Occurs in two known stands totalling 1,000+ plants; all within Acquisition Parcel	few stands of high density occurrence	Found at a relatively substantial number of sites in coastal and inland valley areas of southern California
Otay Tarplant (<i>Hemizonia conjugens</i>)	Federal: none State: CE CNPS R-E-D 3-3-2	Found where suitable clay lenses occur; but may be excluded from some of the grasslands in Acquisition Parcel by dense annual grass, and thistle.	20,000 plants on 7.7 acres in Mitigation Bank; and 12,260 plants on 25.5 acres in Acquisition Parcel	restricted to very dense populations in small clay lenses	Primarily restricted to clay substrates in grasslands and concentrated within a relatively limited region in eastern Chula Vista, Spring Valley, and Otay Valley.
Decumbent Goldenbush (<i>Isocoma menziesii</i> var. <i>decumbens</i>)	Federal: none State: none CNPS R-E-D 2-2-2	Found within sage scrub throughout the site	fairly common in suitable habitat	present at mod. to high densities for the local region	Typically found in disturbed grasslands such as around Proctor Valley and Mount San Miguel. Primarily a plant of the interior coastal plain and lower foothills, with highest numbers in southern San Diego County.
San Diego Marsh-elder (<i>Iva hayesiana</i>)	Federal: none State: none CNPS R-E-D 2-2-1	Occurs along most drainages; best represented in Coon Cyn. and Wildman's Canyon	an estimated 340 plants occur in Acquisition parcel; additional plants are uncommon in northern drainages of mitigation bank	moderate to high in limited habitat areas	Considered to be an aggressive shrub that will expand effectively given the proper conditions. Most commonly found in coastal drainages south of San Marcos to the Mexican border.
Southwestern Spiny Rush (<i>Juncus acutus</i> ssp. <i>leopoldii</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Occurs along most drainages; best represented in Coon Cyn. and Wildman's Canyon	an estimated 250 plants occur; all are within Acquisition Parcel	moderate to low density for this species	May be locally common in drainages or around springs and marshes throughout the coastal plain and into the foothills.
San Diego Goldenstar (<i>Muhlia clevelandii</i>)	Federal: none State: none CNPS R-E-D 2-2-2	Observed within perennial grassland of the Mitigation Bank	abundant within the grassland	high density population	Primarily a plant of the southern San Diego County coastal plains where it has been severely impacted by continuing urban development.
Munz's Sage (<i>Salvia munzii</i>)	Federal: none State: none CNPS R-E-D 2-2-1	Observed within suitable sage scrub habitat occurring on slopes	very common in suitable habitat	moderate	This primarily Baja California shrub occurs in a few sizeable populations north of the Mexican border in the Otay Lakes region.

VEGETATION / SPECIES	LISTING	DISTRIBUTION	ABUNDANCE	DENSITY	COMMENTS
Ashy Spike-moss (<i>Selaginella cinerascens</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Commonly seen throughout the site in areas where the subsoil has remained undisturbed	very common in suitable habitat	moderate density for this species	Regionally common despite limited U.S. range. Adequately protected in large numbers on public lands on the coastal plain.
San Diego County Vigulera (<i>Viguiera laciniata</i>)	Federal: none State: none CNPS R-E-D 1-2-1	Widespread as a dominant element of much of the sage scrub on site	very common dominant species on the site	high	Regionally common in southern portions of San Diego County. Spreading rapidly along freeway slopes where planted in hydroseeded mixes. Ranges well inland along the Mexican border.
Amphibians					
Western Spadefoot (<i>Spea hammondi</i>)	Federal: none State: SSC	Localized distribution, typically associated with the five stock ponds	abundant in ponds during the winter/spring	present	This species has been seriously impacted by the destruction of sage scrub and vernal pool habitats throughout its range.
Reptiles					
San Diego Horned Lizard (<i>Phrynosoma coronatum blainvilliei</i>)	Federal: none State: SSC, FP	Widely distributed	regularly observed on site	present	Generally widespread within sage scrub and sparse grasslands. Also found in other habitats at higher elevations, typically in areas distant from urban encroachment.
Orangethroat Whiptail (<i>Cnemidophorus hyperythrus beldingi</i>)	Federal: none State: SSC	Found within suitable sage scrub habitat	low numbers of this lizard have been detected	low density for this species	Generally widespread, occurring within sage scrub, chaparral, woodlands, and along the edges of riparian habitats.
Coastal Whiptail (<i>Cnemidophorus tigris multiscutatus</i>)	Federal: none State: none	Widely distributed	common	present	Widespread in coastal and inland valley areas.
Coastal Rosy Boa (<i>Lichanura trivirgata roseofusca</i>)	Federal: none State: PR	Found within sage scrub habitat	unknown	present	Appears to be widespread in the coastal region within suitable, generally undisturbed, habitat.
Two-striped Garter Snake (<i>Thamnophis hammondi</i>)	Federal: none State: SA	Localized near stock ponds and seasonal drainages	unknown	present	Widespread within the region, but primary habitat is typically open riparian woodlands, freshwater marsh, and other freshwater and brackish wetland habitats.
N. Red Diamond Rattlesnake (<i>Crotalus ruber ruber</i>)	Federal: none State: SSC	Regularly encountered on site	common	present	Rocky areas within sage scrub and chaparral are the typical habitat occupied by this species.
BIRDS					
Turkey Vulture (<i>Cathartes aura</i>)	Federal: none State: none	Forages throughout the site	Common winter visitor	moderate	Breeding sites are now limited to remote cliffs and extensive rock outcrop.
Osprey (<i>Pandion haliaetus</i>)	Federal: none State: SSC	Forages over adjacent Sweetwater Reservoir	Rarely observed on-site in association with Sweetwater Reservoir	low	In San Diego County, regularly occurs at major reservoirs and in south San Diego Bay. No recent nesting records in San Diego County (> 80 years).
White-tailed Kite (<i>Elanus leucurus</i>)	Federal: none State: SA, Protected	Found near grassland and sage scrub communities	Commonly seen throughout the site and on adjacent Sweetwater Authority and Otay Water District lands	moderate to high	Species of the open grasslands during the winter season. Breeding occurs within oak, riparian, or exotic woodlands adjacent to favored foraging areas. San Miguel Ranch in combination with the Sweetwater Reservoir and River corridor form ideal habitat for this species

VEGETATION / SPECIES	LISTING	DISTRIBUTION	ABUNDANCE	DENSITY	COMMENTS
Northern Harrier (<i>Circus cyaneus</i>)	Federal: none State: SSC	Forages over relatively open and low-growing vegetation communities	Commonly observed in low numbers. Local breeding expected.	moderate	Widespread in North America, but a very localized breeder. Recent estimates suggest there may be fewer than 30 nesting pair in coastal southern California.
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	Federal: none State: SSC	Seen over most of the site	Uncommonly observed as a winter visitor	low	Fairly common winter visitor in southern California.
Cooper's Hawk (<i>Accipiter cooperii</i>)	Federal: none State: SSC	Frequents densely vegetated woodlands	Commonly observed in low to moderate numbers	low	Breeds in undisturbed oak and riparian woodlands, and less frequently in eucalyptus woodlands; comparatively widespread in the non-breeding months.
Red-shouldered Hawk (<i>Buteo lineatus</i>)	Federal: none State: none	Frequents densely vegetated woodlands	Uncommonly observed; likely forages on-site but is more typically associated with nearby riparian woodlands.	low	This species is a fairly common resident of oak, riparian, and eucalyptus woodlands.
Golden Eagle (<i>Aquila chrysaetos</i>)	Federal: BGEA State: FP, SSC	Forages over the more open areas of the site	Regularly observed foraging on-site. Breeds at nearby San Miguel Mountain.	low but typical of good habitat for this species	Uncommon resident in southern California. Has severely declined in San Diego County due to urban encroachment and the loss of foraging habitat and encroachment at nest sites.
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Federal: FE State: SE, FP	Possible over most habitats on-site	Rarely observed.	low	Currently, three pair appear to be breeding residents in or around San Diego Bay, and a fourth pair is found at Mission Bay. Others individuals occur during migration.
Prairie Falcon (<i>Falco mexicanus</i>)	Federal: none State: SSC	Forages over the more open areas of the site	Rarely observed.	low	This is a rare breeding resident in San Diego County, with perhaps as many as 30 breeding pairs remaining, including those occurring in desert areas.
Greater Roadrunner (<i>Geococcyx californianus</i>)	Federal: none State: none	Detected throughout the site on a regular basis	Common resident on-site.	moderate to high	This is a common species in undeveloped and rural lands of southern California as well as western U.S. Roadrunners are locally declining due to habitat loss.
Western Burrowing Owl (<i>Speotyto cunicularia hypugaea</i>)	Federal: none State: SSC	Found near grassland and sage scrub edges. May nest in grasslands around the Sweetwater Reservoir	Uncommonly observed in open scrub or grassland. No resident colonies have been located on-site.	low	Declined greatly during the urbanization of coastal southern California. The few remaining colonies support low numbers of individuals.
California Horned Lark (<i>Eremophila alpestris actia</i>)	Federal: none State: SSC	Regularly observed within grasslands near ranch house	Abundant winter visitor and likely breeds on-site.	moderate	This is a common winter visitor and a regular breeding resident in the region.
San Diego Cactus Wren (<i>Campylorhynchus brunneicapillus sandiegensis</i>)	Federal: none State: SSC	Found within sage scrub habitat with suitable cactus patches	5 resident pairs plus adjacent pairs which overlap in site use; all in Acquisition Parcel	moderate to very high in localized areas	Within the area, the few remaining concentrations of this species include Sweetwater/San Miguel region, Otay Ranch, San Pasqual Valley, and San Elijo Lagoon.

VEGETATION / SPECIES	LISTING	DISTRIBUTION	ABUNDANCE	DENSITY	COMMENTS
Blue-gray Gnatcatcher (<i>Poliopitila caerulea</i>)	Federal: none State: none	Regular visitor to chaparral and sage scrub on the site	Primarily a winter visitor; low numbers may breed in more dense scrubland and chaparral at higher elevations of Mother Miguel.	unknown	This species has greatly declined as a breeding species but still breeds in chaparral in the foothill zone.
Coastal California Gnatcatcher (<i>Poliopitila californica californica</i>)	Federal: FT State: SSC	Widely distributed on-site at moderate and lower elevations	85 pairs (includes all observed adult males) Ranges from 69 to 92 pairs with 85 pairs being detected in most comprehensive survey; approximately 38 pairs occur in the Acquisition Parcel; 22 pairs on adjacent Sweetwater and Olay WD lands with overlapping use on site; 19 pairs occur in the Mitigation Bank; and 6 in North Mitigation Area	0.046 pair/acre (all habitats); 0.054 pair/acre (sage scrub only)	Currently occurs primarily in San Diego, Riverside, and Orange counties south to Baja California. The San Miguel Ranch supports critical populations of this species.
Swainson's Thrush (<i>Catharus ustularius</i>)	Federal: none State: none	Widely distributed during migration	Common spring migrant but does not breed on-site.	mod. to low	Common spring and fall migrant, this is a rare and localized breeder in the region.
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	Federal: none State: SSC	Localized	Uncommon-to-common resident. Probable breeder on-site	moderate	This is generally still a common species of open grassland, agricultural fields, and open scrubland habitats.
Warbling Vireo (<i>Vireo gilvus</i>)	Federal: none State: none	n/a	Observed -- presumed migrant.	unknown	Believed to be declining due to habitat loss and brood parasitism by the brown-headed cowbird.
Yellow-breasted Chat (<i>Icteria virens</i>)	Federal: none State: SSC	Very localized and probably highly variable between years.	Very low numbers may breed in dense riparian habitat (sage scrub, etc.); abundant off-site in nearby riparian woodlands.	low and not regular	Formerly widespread breeder in riparian habitats throughout California. Declining due to habitat loss and brood parasitism by brown-headed cowbirds.
Blue Grosbeak (<i>Guiraca caerulea</i>)	Federal: none State: none	Localized.	Uncommon and presumed breeder on-site. Abundant in nearby riparian woodlands.	low	Has declined as a breeding species in southern California due to habitat loss and possibly to brood parasitism by brown-headed cowbirds.

VEGETATION / SPECIES	LISTING	DISTRIBUTION	ABUNDANCE	DENSITY	COMMENTS
S.C. Rufous-crowned Sparrow (<i>Aimophila ruficeps canescens</i>)	Federal: none State: SSC	Widely distributed.	Relatively abundant in sage scrub and chaparral habitats.	very high	Losses of this species are attributed with the regional destruction of sage scrub and chaparral vegetation; however, this species is still common in suitable habitat.
Bell's Sage Sparrow (<i>Amphispiza belli belli</i>)	Federal: none State: SSC	Widely distributed in lower-statured sage scrub	Common in sage scrub and chamise chaparral	moderate	This species is fairly widespread throughout the coastal slope in sage scrub and chamise chaparral vegetation; however, it is typically only found in very large blocks of suitable habitat.
Black-chinned Sparrow (<i>Spizella atrogularis</i>)	Federal: none State: none	Widely distributed in sage scrub and chaparral.	Seasonal inhabitant; common breeding species on-site.	moderate	In the coastal lowland, uncommon to localized, but breeds in generally large and relatively undisturbed tracts of sage scrub and chaparral.
Grasshopper Sparrow (<i>Ammodramus savaianum</i>)	Federal: none State: SSC	Localized in mixed grassland and sage scrub.	Fairly common, localized breeder on-site.	moderately dense in grassland areas	Found primarily in grasslands and in open scrublands mixed with grassland. Local population declines are believed to be due to habitat loss from urban and agricultural development.
Tricolored Blackbird (<i>Agelaius tricolor</i>)	Federal: none State: SSC	Primarily forages in grassland and pastures.	Forages on-site; known to breed at nearby, off-site freshwater marsh habitat.	low	This species can be common but is very localized in its nesting distribution. During the non-breeding season it is widespread among grasslands, agricultural fields, and marsh habitats.
MAMMALS					
San Diego Black-tailed Jackrabbit (<i>Lepus californicus benettii</i>)	Federal: none State: SSC	Widely distributed; greatest numbers observed in open sage scrub.	Common-to-abundant	moderate to high	Generally found in large blocks of suitable open scrubland and grassland habitat.
NW. San Diego Pocket Mouse (<i>Chaetodipus fallax fallax</i>)	Federal: none State: SSC	Widely distributed in sage scrub and other habitats.	Abundant.	unknown, trapped regularly	Widespread within suitable habitat (scrublands, woodlands) predominantly in coastal south San Diego County.
San Diego Desert Woodrat (<i>Neotoma lepida intermedia</i>)	Federal: none State: SSC	Widely distributed in sage scrub and other habitats.	Common to abundant.	moderate to high	Well distributed in scrubland and woodland habitats within the coastal region.
Dobson (<i>Felis rufus</i>)	Federal: none State: none	Presumed to be widely distributed.	Present.	unknown	Common within large open blocks of native habitat.
Mountain Lion (<i>Felis concolor</i>)	Federal: none State: SSC	Sign is limited, but use of site has been positively confirmed twice since 1989 and mountain lions have been irregularly seen in the immediate vicinity at least 4 times since 1992.	Identification of sign indicates some site use. Numbers of individuals are unknown but likely low.	unknown	In southern California, found in large tracts of wildlands.
Mule Deer (<i>Odocoileus hemionus</i>)	Federal: none State: none	Widely distributed.	Present in moderate numbers.	moderate	Common in large blocks of native habitat.

- FE = Federal Endangered
- FT = Federal Threatened
- PE = Proposed Endangered
- PT = Proposed Threatened
- BOEA = Bald and Golden Eagle Act

- CE = California Endangered
- CT = California Threatened
- CR = California Rare
- SA = Special Animal
- SSC = Species of Special Concern
- FP = Fully Protected

- CNPS R-E-D = California Native Plant Society; Rarity - Endangerment - Distribution

EXHIBIT C

J-12587

REMAINDER OF EMERALD PROPERTIES
SAN MIGUEL RANCH NORTHERN PARCEL
MINUS THE SOUTH PARCEL MITIGATION SITE

Being a portion of Sections 11, 14, 15, and 22, Township 17 South, Range 1 West San Bernardino Meridian all in the County of San Diego, State of California, said portions more particularly described as follows:

Beginning at the Northwest corner of said Section 14; thence along the Northerly line thereof South $88^{\circ}42'01''$ East 2966.44 feet to the Southwest corner of the Southeast Quarter of said Section 11; thence along the Westerly line of said Southeast Quarter of Section 11 North $03^{\circ}36'23''$ West 2597.73 feet to the East-West centerline of said Section 11; thence along said East-West centerline South $89^{\circ}30'53''$ West 835.89 feet to the Southeasterly corner of land described under Parcel "A" in deed to the California Water & Telephone Company, recorded August 4, 1954 as File/Page No. 101777 in Book 5321, Page 522 Official Records; thence along the Easterly line of said land North $14^{\circ}31'28''$ East 702.47 feet and North $11^{\circ}28'16''$ West 1229.65 feet to a point on the Southeasterly line of Jamacha Rancho; thence North $35^{\circ}02'13''$ East along said Southeasterly line 229.68 feet to the most Northerly corner of the land described in deed to L.A. Thompson recorded November 14, 1946 as File/Page No. 121337 in Book 2281, Page 228, Official Records, also being a point on the Southerly line of Record of Survey Map No. 8521 on file in the Office of the San Diego County Recorder; thence along said Southerly line South $53^{\circ}57'08''$ East 4160.85 feet to a point on the East line of said Section 11; thence along the East line thereof South $02^{\circ}13'47''$ East 2231.92 feet to the Southeast corner of said Section 11; thence North $89^{\circ}32'37''$ West along the South line thereof 1257.66 feet more or less to the Northwest corner of the Easterly Quarter of said Section 14; thence along the Westerly line of said Easterly Quarter South $01^{\circ}17'36''$ West 5105.72 feet more or less to the South line of said Section 14; thence along said South line North $87^{\circ}02'47''$ West 1363.65 feet to the South Quarter corner of said Section 14; thence continuing along said Southerly line South $89^{\circ}44'48''$ West 2602.91 feet to the Northeast corner of said Section 22; thence along the North line thereof South $89^{\circ}30'11''$ West 500.00 feet; thence leaving said line South $00^{\circ}00'00''$ West 1309.25 feet; thence North $89^{\circ}24'22''$ East 484.37 feet; thence South $00^{\circ}41'05''$ West 1308.67 feet; thence South $89^{\circ}18'33''$ West 1875.74 feet; thence South $00^{\circ}00'00''$ West 1424.12 feet to the Northerly line of that land shown as an exception to Parcel 2 of that land described in a deed recorded July 19, 1994 as Document No. 1994-0447444 of Official Records of San Diego County; thence along said Northerly line the following courses: North $86^{\circ}56'21''$ West 815.94 feet; thence North $43^{\circ}03'53''$ West 115.32 feet to the Easterly line of the Southeast Quarter of the Northeast Quarter of the Southwest Quarter of said Section 22; thence along said Easterly line North $00^{\circ}49'46''$ East 626.00 feet to the Northeast corner of said Southeast Quarter of the Northeast Quarter of the Southwest Quarter; thence along the Northerly line of said Southeast Quarter of the Northeast Quarter of the Southwest Quarter South $89^{\circ}15'26''$ West 675.01 feet to the Northwest corner of said Southeast Quarter of

REMAINDER OF EMERALD PROPERTIES
SAN MIGUEL RANCH NORTHERN PARCEL
MINUS THE SOUTH PARCEL MITIGATION SITE
(Continued)

the Northeast Quarter of the Southwest Quarter; thence South 89°15'26" West 674.72 feet; thence North 00°20'03" East 660.99 feet to the Southwest corner of the East Half of the Northwest Quarter of said Section 22; thence along the Westerly line of said East Half North 00°27'24" East 1315.45 feet; thence North 00°28'09" East 657.80 feet to the CNNW 1/64th corner of said Section 22; thence North 36°43'58" East 5251.51 feet; thence North 02°18'03" East 1640.00 feet to a point on the North line of said Section 15; thence South 87°41'57" East along said North line 771.86 feet to the Point of Beginning.

Containing 1186 acres more or less.

Note: The bearings, distances and area were derived or calculated from A.L.T.A. survey by P&D Technologies dated August 29, 1988 and not a field survey by Rick Engineering Company. The bearings on said survey are based on grid north defined by NAD 27 computations.



Robert G. Schoettmer L.S. 4324

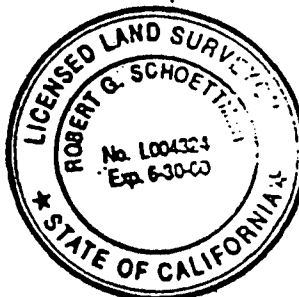


EXHIBIT D

J-12587

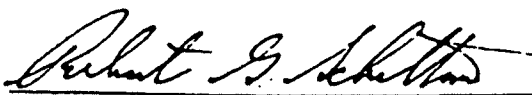
500 ACRE PARCEL

Being a portion of Sections 10, 15, 21 and 22, Township 17 South, Ranch 1 West, San Bernardino Meridian together with a portion of Jamacha Rancho all in the County of San Diego, State of California, said portions more particularly described in total as follows:

Beginning at the Southwest corner of said Section 15; thence along the Westerly line of said Section 15 North $03^{\circ}56'34''$ West 1439.50 feet to the intersection of said Westerly line with the Easterly prolongation of the East and West centerline of Block 62 of San Miguel City as same is shown on Map thereof No. 335, filed in the Office of the County Recorder of San Diego County, August 4, 1887; thence South $89^{\circ}41'28''$ East 293.60 feet along the Easterly prolongation of said centerline to a point distant thereon 1458.56 feet Easterly from the Westerly line of the alley in said Block 62, said point also being monumented by a 2" iron pipe marked R.E. 7768 as shown on Record of Survey Map No. 3446 on file in the Office of said County Recorder; thence North $22^{\circ}12'51''$ East 1383.77 feet to a 2" iron pipe marked R.E. 7768 as shown on said Record of Survey Map No. 3446; thence North $02^{\circ}40'06''$ East 2605.40 feet to a 2" iron pipe marked R.E. 7768 as shown on said Record of Survey Map No. 3446; thence North $39^{\circ}38'12''$ East 1029.53 feet to a 2" iron pipe marked R.E. 7768 as shown on said Record of Survey Map No. 3446; thence South $89^{\circ}55'15''$ East 2055.20 feet to a 2" iron pipe marked R.E. 7768 as shown on said Record of Survey Map No. 3446; thence South $00^{\circ}44'46''$ West 865.14 feet to a point on the Northerly line of said Section 15; thence along said Northerly line South $87^{\circ}41'57''$ East 1034.30 feet; thence leaving said Northerly line South $02^{\circ}18'03''$ West 1640.00 feet; thence South $36^{\circ}43'58''$ West 5251.51 feet to the CNNW 1/64th corner of said Section 22; thence South $89^{\circ}27'37''$ West 684.01 feet to the NWNW 1/64th corner of said Section 22; thence South $00^{\circ}16'38''$ West 658.36 feet to the CWNW 1/64th corner of said Section 22; thence South $89^{\circ}24'42''$ West 681.90 feet to the Southeasterly corner of the Northeast Quarter of the Northeast Quarter of said Section 21; thence along the Southerly line of said Northeast Quarter of the Northeast Quarter of Section 21 North $89^{\circ}50'17''$ West 1322.73 feet to the Southwesterly corner of said Northeast Quarter of the Northeast Quarter of Section 21; thence North $00^{\circ}06'57''$ East 1317.27 feet to the Northwesterly corner of said Northeast Quarter of the Northeast Quarter of Section 21; thence along the Northerly line of said Section 21 South $89^{\circ}51'17''$ East 1322.55 feet to the Point of Beginning.

Containing 500 acres more or less.

Note: The bearings, distance and area were derived or calculated from A.L.T.A. survey by P&D Technologies dated August 29, 1988 and not a field survey by Rick Engineering Company. The bearings on said survey are based on grid north defined by NAD 27 computations.


Robert G. Schoettmer L.S. 4324

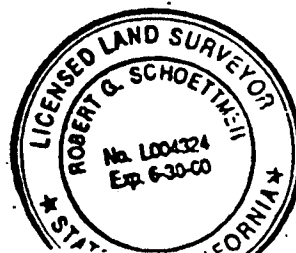


EXHIBIT E

J-12587

SAN MIGUEL RANCH SOUTH PARCEL
MITIGATION SITE

Being a portion of Sections 22 and 23, Township 17 South, Range 1 West, San Bernardino Meridian all in the County of San Diego, State of California, said portions more particularly described as follows:

Beginning at the Northwest corner of said Section 23; thence along the North line of said Section North $89^{\circ}44'48''$ East 1301.37 feet to the Northwesterly corner of Record of Survey No. 8514 on file in the Office of the Recorder of said County and State; thence along the boundary of said Record of Survey South $00^{\circ}43'23''$ West 2644.25 feet, North $89^{\circ}04'03''$ West 649.93 feet, South $02^{\circ}00'05''$ West 659.32 feet, North $89^{\circ}00'58''$ West 653.64 feet, South $02^{\circ}25'42''$ West 886.10 feet to the Northerly line of that land shown as an exception to Parcel 2 of that land described in a deed recorded July 19, 1994 as Document No. 1994-0447444 of Official Records of San Diego County; thence along said Northerly line North $86^{\circ}56'21''$ West 1813.50 feet; thence leaving said Northerly line North $00^{\circ}00'00''$ East 1424.12 feet to a point; thence North $89^{\circ}18'33''$ East 1875.74 feet to a point; thence North $00^{\circ}41'05''$ East 1308.67 feet to a point; thence South $89^{\circ}24'22''$ West 484.37 feet to a point; thence North $00^{\circ}00'00''$ East 1309.25 feet to a point on the North line of said Section 22; thence along said line North $89^{\circ}30'11''$ East 500.00 feet to the Point of Beginning.

Containing 166 acres more or less.

Note: The bearings, distances and area were derived or calculated from A.L.T.A. survey by P&D Technologies dated August 29, 1988 and not a field survey by Rick Engineering Company. The bearings on said survey are based on grid north defined by NAD 27 computations.

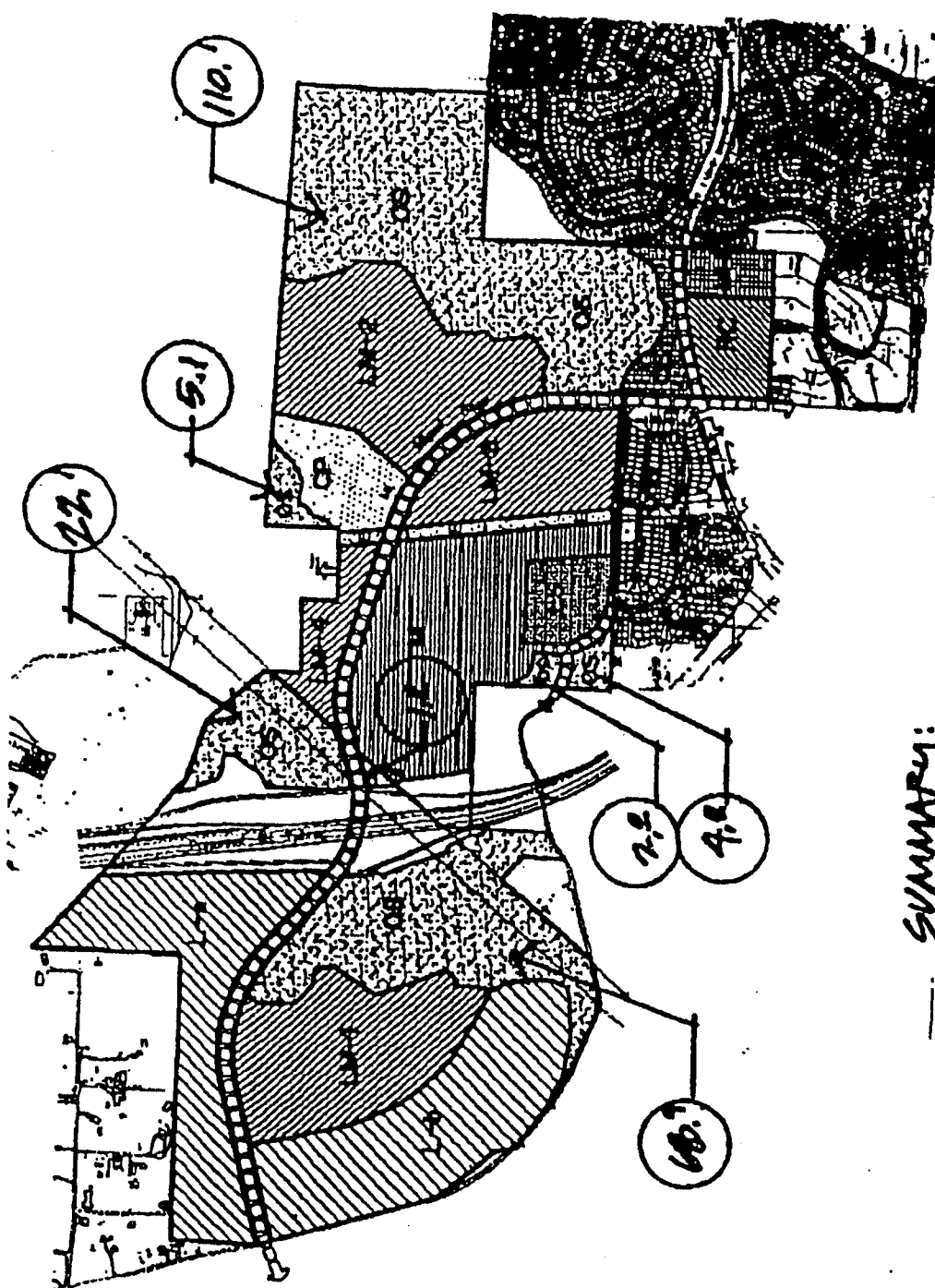

Robert G. Schoettmer L.S. 4324



jb/12587.003

EXHIBIT F

Legend	
Symbol	Land Use
1	Urban
2	Residential
3	Commercial
4	Industrial
5	Open Space
6	Water
7	Other
8	Unimproved
9	Other
10	Other
11	Other
12	Other
13	Other
14	Other
15	Other
16	Other
17	Other
18	Other
19	Other
20	Other
21	Other
22	Other
23	Other
24	Other
25	Other
26	Other
27	Other
28	Other
29	Other
30	Other
31	Other
32	Other
33	Other
34	Other
35	Other
36	Other
37	Other
38	Other
39	Other
40	Other
41	Other
42	Other
43	Other
44	Other
45	Other
46	Other
47	Other
48	Other
49	Other
50	Other



General De
San Miguel Ranch
 Emerald Properties Corporation
 Figure 8
 6-30-97

SUMMARY:

27.1
 5.1
 110.1
 2.0
 4.0
 1.0
 60.1
 213.2 ac. ±

146 acres within the 213 identified comprise the South Mitigation Parcel. An additional 21 acres of Otay Tarplant Preserve would be established within the 213 acres in accordance with the Project EIR.

EXHIBIT G

EXHIBIT G

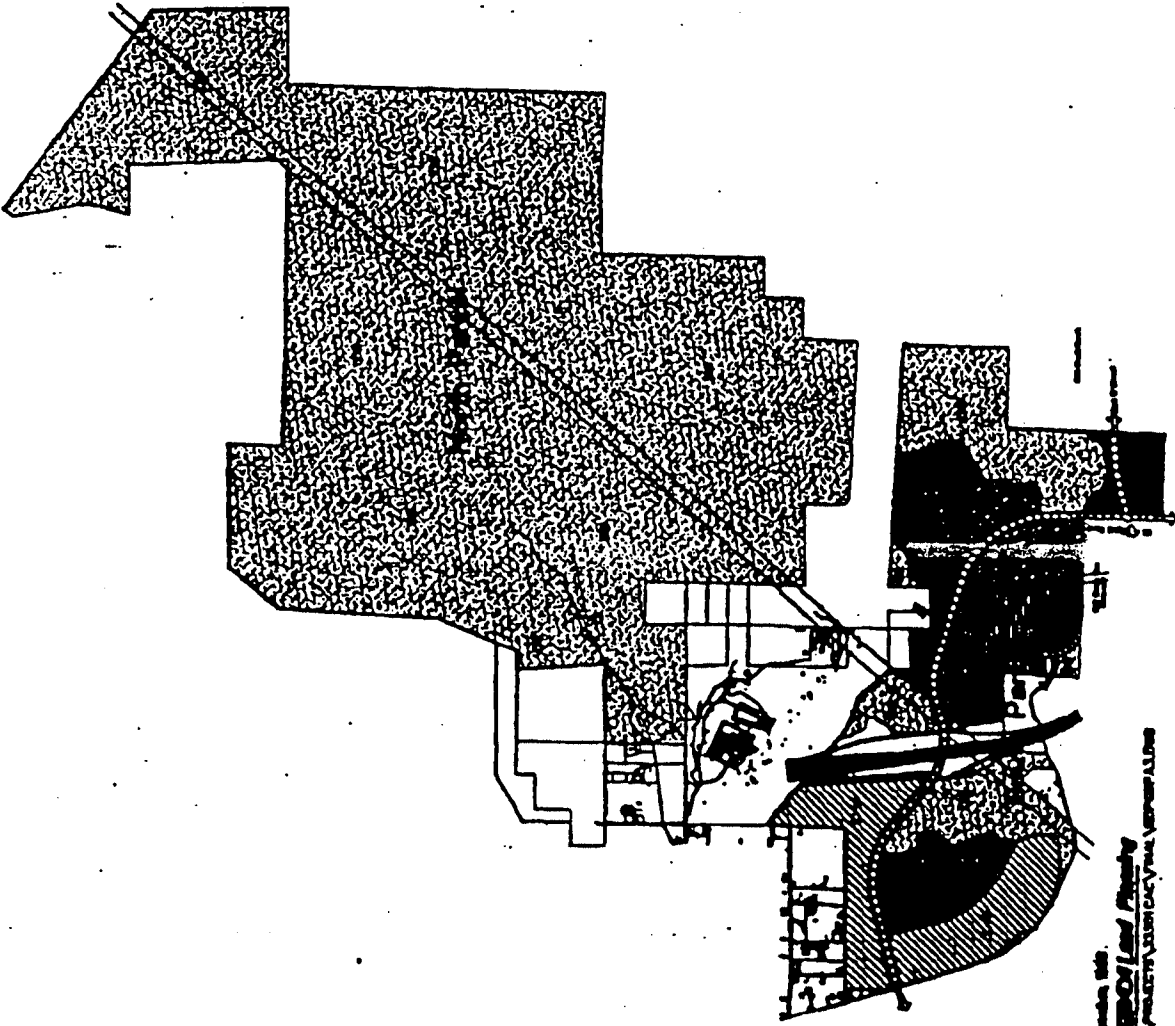
MITIGATION SERVICE AREA FOR NORTH SAN MIGUEL CONSERVATION BANK

The San Miguel Conservation Bank (Bank) lands may be used for habitat conservation multispecies/multihabitat mitigation in accordance with the terms of the San Miguel Conservation Bank Implementation Conservation Bank Agreement for impacts occurring within cis-montane areas of San Diego County lying below the 3,500 foot elevation contour.

For impacts occurring within the "zone of coastal influence," acceptability of the Bank for mitigation uses shall be subject to a case-by-case approval by the USFWS and CDFG. The approval or denial of the Bank use will be based on the objectives of ensuring that maritime habitats, marine-influenced sensitive species, and coastal core and linkage areas are adequately conserved through regionalization of mitigation land exchanges. The "zone of coastal influence" is defined as:

- All lands occurring within three (3) miles of any marine water body including the Pacific Ocean and all salt water lagoons, bays and estuaries which are at least intermittently open to tidal influence.
- All lands within ten miles of marine waters occurring below the rim of the main stem or first-order tributary valleys of the Santa Margarita River, San Luis Rey River, Buena Vista Creek, Loma Alta Creek, Encinitas Creek, Agua Hedionda Creek, San Marcos Creek, Escondido Creek, San Dieguito River, Los Penasquitos Creek, Sweetwater River, the Otay River, and Tijuana River which also support any derivative of a native maritime vegetation community (eg. maritime succulent scrub, maritime chaparral, maritime bluff scrub).

EXHIBIT H



December 1988
 Emerald Properties Corporation
 10000 Via Arroyo, San Diego, CA 92121

Legend			
Symbol	Land Use	Green Acres	Units
Residential Uses			
U	U - 9 RU/Acre	162.3	84
U1	U1 - 6 RU/Acre	164.8	86
U2	U2 - 3 RU/Acre	87.8	47
U3	U3 - 1.5 RU/Acre	7.8	4
	Residential Total	492.7	221
Commercial Uses			
CC	CC - Retail Commercial	13.8	
Industrial Uses			
CI	CI - Community Industrial Site	7.8	
IS	IS - Heavy Industrial Site	1.7	
	Industrial Total	9.5	
Open Space Uses			
OP	OP - Open Space Park	10.0	
E	E - Utility Easements/Right-of-Way	1.1	
OS	OS - Natural Open Space	2004.8	
	Open Space Total	2015.9	
Conditional Planned Uses			
CP	CP - Office Building	11.8	
CCP	CCP - Office Building	2.1	
	Conditional Planned Total	13.9	
	Total Acreage	2690.2	
	Total Units		221


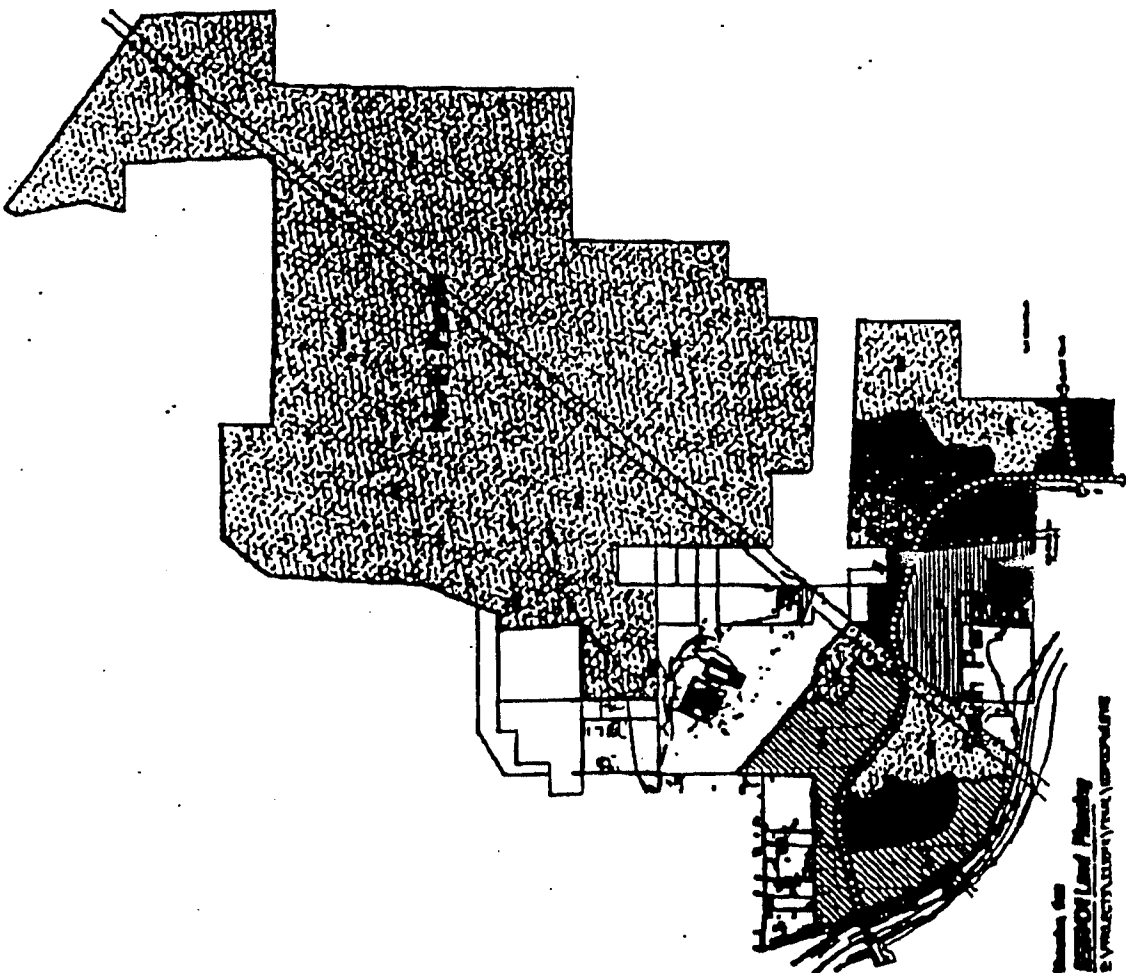


Overall Project
Amended Horseshoe Bend
General Development Plan
San Miguel Ranch
 Emerald Properties Corporation
 Figure 1

EXHIBIT I



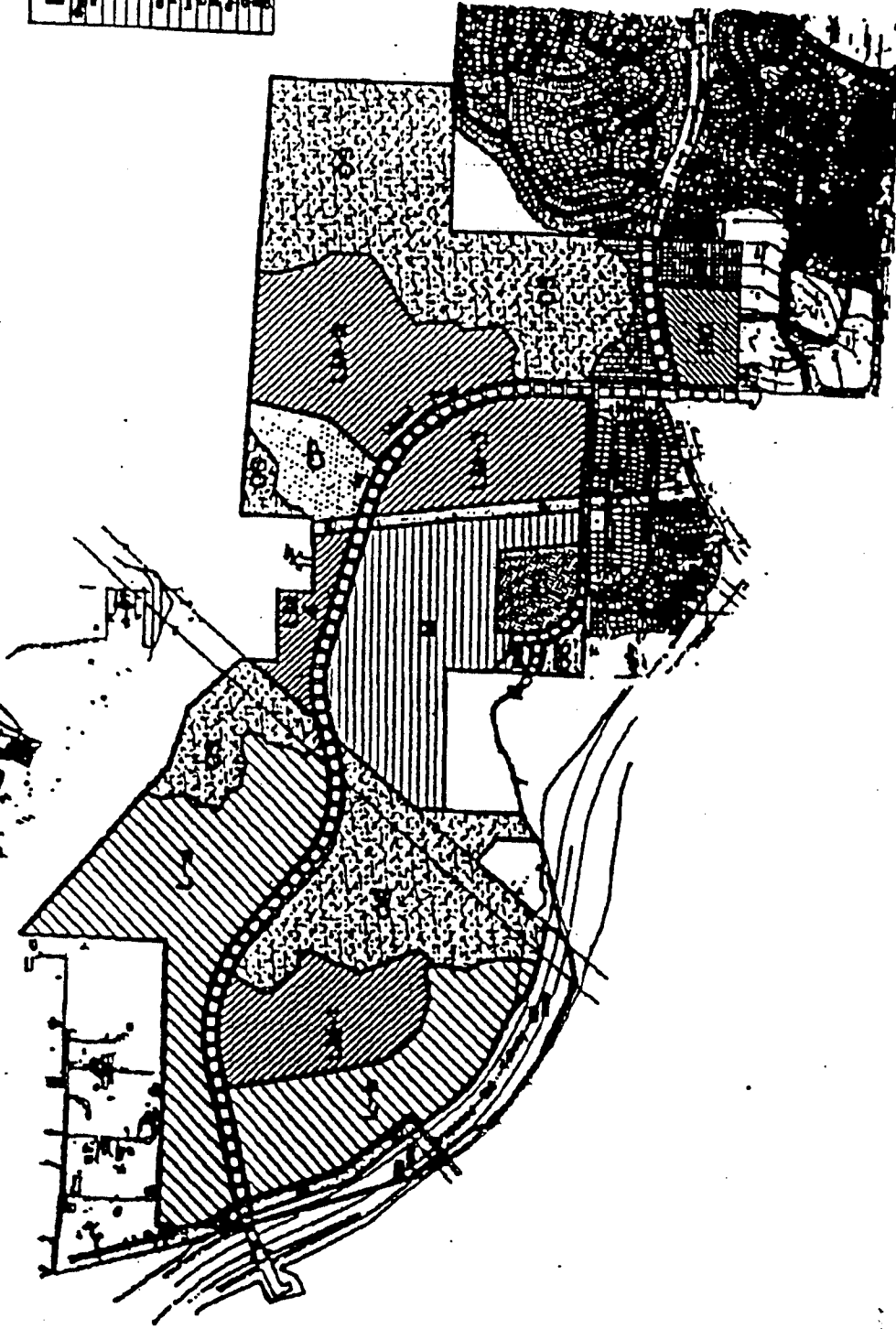
Emerald Properties Corporation
 21000 E. 1st Avenue, Suite 100
 Aurora, Colorado 80012

Legend			
Symbol	Land Use	Acres	Units
Proposed Uses			
U	U - 8 BU/Acre	85.1	857
L	L - 8 BU/Acre	85.1	857
G	G - 8 BU/Acre	85.1	857
B	B - 8 BU/Acre	85.1	857
M	M - 8 BU/Acre	85.1	857
Conditional Uses			
CC	CC - 8 BU/Acre	85.1	857
Neighborhood Uses			
CS	CS - Community Service Site	7.8	
MS	MS - Medium Density Residential	8.7	
HS	HS - High Density Residential	8.3	
Open Space Uses			
OP	OP - Open Space Park	8.0	
IP	IP - Intensive Recreation/Performance	8.7	
MP	MP - Medium Density Open Space	2,070.0	
HP	HP - High Density Open Space	1,081.7	
Conditional Mixed Uses			
MSR	MSR - Medium Density Residential/Service	8.7	
MSR	MSR - Medium Density Residential/Service	8.7	
MSR	MSR - Medium Density Residential/Service	8.7	
Total Acres		2,990.2	
Total Units			4,032


Overall Project
Amended Proctor Valley
General Development Plan
San Miguel Ranch
 Emerald Properties Corporation
 Figure 1

Legend

Symbol	Description
[Stippled pattern]	Open Space
[Diagonal lines /]	Residential
[Diagonal lines \]	Commercial
[Cross-hatch]	Industrial
[Dotted pattern]	Public Use
[Solid black]	Water
[Thick black line]	Major Road
[Thin black line]	Minor Road
[Dashed line]	Proposed Road
[Thin black line]	Property Boundary
[Thin black line]	Utility Line
[Thin black line]	Other



South Parcel
 Amended
 Proctor Valley
 General Development Plan
San Miguel Ranch
 Emerald Properties Corporation

Figure B
 1-1

Scale: as
 prepared by
 C:\PROJECTS\JUN17\1704\17040001.Dwg

EXHIBIT J

Exhibit J. Mitigation Credit Reservation For Sensitive Species Value Transfer From Acquisition Parcel to Mitigation Bank *

Species	Abundance (approx.)	Density**	Comments
Otay Tarplant (<i>Hemizonia conjugens</i>)	12,260 on 25.5 acres	481 plants/acre	Numbers may vary year to year based on rainfall totals. The northern portion of San Miguel Ranch differs from the southern in that the clay lenses are smaller and less contiguous. Occurs in Diablo clay soils and unmapped clay inclusions in nearby San Miguel-Exchequer soils.
San Diego Marsh Elder (<i>Iva hayesiana</i>)	340 on 5 acres	68 plants/acre	High density patches account for approx. 2/3 of plants.
Palmer's Grapplinghook (<i>Harpagonella palmieri</i>)	1,000 on 2.2 acres	455 plants/acre	Numbers may vary year to year based on rainfall totals.
San Diego Barrel Cactus (<i>Ferocactus viridescens</i>)	1,620 on 1.8 acres; and 6,235 on 39 acres	900 plants/acre and 160 plants/acre	Concentrated in areas of exposed rocky terrain. One small area supports 1,620 plants on 1.8 acres. If more than 1,620 plants are needed, the remaining plants are less densely distributed over 39 acres at approximately 160 plants/acre.
Southwestern Spiny Rush (<i>Juncus acutus</i>)	250 on 3-5 acres	50 plants/acre	Typically restricted to drainages.
California Adolphia (<i>Adolphia californica</i>)	350 on 0.7 acre	500 plants/acre	Population restricted to southern boundary on clay soils. Occurs in Diablo clay soils and unmapped clay inclusions in nearby San Miguel-Exchequer soils.
San Diego Cactus Wren (<i>Campylorhynchus brunneicapillus sandiegensis</i>)	5 pairs	one pair per 3.21 acres or 0.312 pairs per acre	Rea and Weaver, experts on this species, estimate an average territory to be approx. 3.21 acres with a range of 1.97 to 4.94 acres.
TOTAL TRANSFERABLE CREDITS	95.25 acres		

* Credit exchanges are to be done through mitigation bank reductions based on resource density of populations on the Acquisition Parcel.

** The density of resources is presumed to be non-separable from the acreage on which resources occur, thus where a mitigation need is defined by acreage, individual resource count, or both, the greatest requirement will govern the credit reduction (eg. a requirement for mitigation of 1 acre of Otay Tarplant with 100 plants, would result in credit reduction of 1 acre and the associated 455 plants).

Exhibit B

Assignment and Assumption Agreement

[see attached]

ASSIGNMENT AND ASSUMPTION AGREEMENT

THIS ASSIGNMENT AND ASSUMPTION AGREEMENT (“**Agreement**”) is dated as of March 24, 2003, by and between EMERALD PROPERTIES CORP., a New York corporation (the “**Assignor**”), and SAN DIEGO COUNTY WATER AUTHORITY, a county water authority duly organized pursuant to the County Water Authority Act (the “**Assignee**”).

RECITALS

A. Assignor has entered into that certain San Miguel Conservation Bank Agreement (“**Conservation Bank Agreement**”) dated August 27, 1997, by and among Assignor, the California Department of Fish and Game (“**CDFG**”), and the United States Fish and Wildlife Service (“**USFWS**”) (CDFG and USFWS are referred to collectively hereafter as the “**Wildlife Agencies**”). All capitalized terms used herein and not otherwise defined shall have the meanings set forth in the Conservation Bank Agreement.

B. Pursuant to the Conservation Bank Agreement, Assignor and the Wildlife Agencies established a conservation bank with respect to approximately 1186 acres in the County of San Diego, California (the “**Bank Property**”) in order to provide for conservation in perpetuity of the Bank Property, the use of such land as mitigation for impacts to certain endangered, threatened, and sensitive species (“**Sensitive Species**”) and related habitat (“**Sensitive Species Habitat**”), and the sale of conservation bank credits (“**Conservation Credits**”) by Assignor to third party purchasers in need of such mitigation.

C. CDFG, which has certain concurrence rights with respect to the assignment of the Conservation Bank Agreement, has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of certain species under the California Endangered Species Act, California Fish and Game Code § 2050 *et seq.*, and other State laws. CDFG is also the manager and trustee of fish and wildlife resources and their habitat pursuant to California Fish and Game Code § 1802.

D. USFWS, which also has certain concurrence rights with respect to the assignment of the Conservation Bank Agreement, has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species under the Endangered Species Act, 16 U.S.C. § 1531 *et seq.*, and the Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-666c, and the Fish and Wildlife Act of 1956, 16 U.S.C. § 742(f) *et seq.*, and other Federal laws.

E. Assignee and Assignor have entered into that certain Agreement to Assign Conservation Bank Agreement (“**Agreement to Assign**”) dated as of _____, 2003, pursuant to which Assignor agreed to assign, and Assignee agreed to assume all of Assignor’s right, title, and interest under the Conservation Bank Agreement, including all of its remaining interest in the Conservation Bank, in accordance with the terms and conditions set forth in the Agreement to Assign.

NOW, THEREFORE, in consideration of the foregoing recitals and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

1. Assignor hereby assigns, sets over and transfers to Assignee, all of Assignor's legal and beneficial right, title, interest, and estate arising under or by virtue of the Conservation Bank Agreement, and any other right, title, interest, and estate now owned or hereafter acquired by Assignor with respect to the San Miguel Conservation Bank, including, without limitation, all rights to any remaining Conservation Credits (the foregoing are collectively referred to hereinafter as the **"Assigned Interests"**).

2. Assignee hereby accepts the assignment of the Assigned Interests and, from and after the date hereof, assumes and agrees to be bound by all of the terms, covenants and conditions to be performed by the **"Bank Property Owner"** as defined in and in accordance with the Conservation Bank Agreement, including, without limitation, the unfunded obligations set forth in Sections 4 and 5 of the Conservation Bank Agreement (as and when conservation credits are used or sold to third parties) and further assumes all costs, expenses (including reasonable attorneys' fees and expenses), claims, losses, commitments, liabilities and obligations of any kind or nature, accrued or contingent, arising on or after the Closing Date and relating to the ownership, use, possession, enjoyment or operation of any of the Assigned Interests (**"Assumed Liabilities"**).

3. Assignee shall indemnify, defend and hold harmless Assignor and its respective attorneys, directors, officers, employees, agents, shareholders, participants, partners, successors, assigns, consultants and affiliates (**"Indemnified Parties"**) from and against any losses, causes of action, liabilities, claims, demands, obligations, damages, costs and expenses, including accountants' and attorneys' fees, to which the Indemnified Parties may become subject on account of, arising out of or relating to the Assumed Liabilities.

4. Nothing contained in this Agreement shall be construed to modify the terms and conditions of the Agreement to Assign.

5. This Agreement may be executed in counterparts.

[Signature page is next page]

IN WITNESS WHEREOF, this Agreement has been executed as of the date first set forth above.

ASSIGNOR: **EMERALD PROPERTIES CORP.,**
 a New York corporation

By: _____
Name: James D. Egan
Title: President

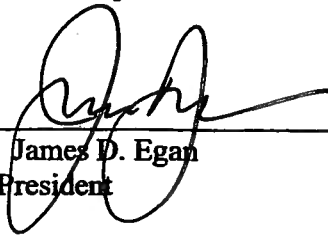
ASSIGNEE: **SAN DIEGO COUNTY WATER AUTHORITY**
 a county water authority

By: _____
Name: Paul Lanspery
Title: Deputy General Manager

[Signature page for consent is next page]

IN WITNESS WHEREOF, this Agreement has been executed as of the date first set forth above.

ASSIGNOR: EMERALD PROPERTIES CORP.,
a New York corporation

By: 
Name: James D. Egan
Title: President

ASSIGNEE: SAN DIEGO COUNTY WATER AUTHORITY
a county water authority

By: _____
Name: _____
Title: _____

[Signature page for consent is next page]

Consent

The California Department of Fish and Game and the United States Fish and Wildlife Service hereby consent to the foregoing assignment and assumption as of this 21 day of March, 2003.

CALIFORNIA DEPARTMENT OF FISH AND GAME

By: William E. Tippett
Name: WILLIAM E. TIPPETT
Title: Deputy Regional Manager

UNITED STATES FISH AND WILDLIFE SERVICE

By: Jim A. Bartel
Name: Jim A. Bartel
Title: Field Supervisor

RECEIVED MAR 26 2003


Consent

The California Department of Fish and Game and the United States Fish and Wildlife Service hereby consent to the foregoing assignment and assumption as of this ____ day of ____, 2003.

CALIFORNIA DEPARTMENT OF FISH AND GAME

By: _____
Name: _____
Title: _____

UNITED STATES FISH AND WILDLIFE SERVICE

By: 
Name: Jim A. Bartel
Title: Field Supervisor

**San Miguel Conservation Bank
 Conservation Credit Sales Schedule
 1,186 Multispecies Credits**

Date Sold	Purchaser	Conservation Credits Sold	Type of Credit	Name of Development	Endowment Paid	Credits Remaining
7/28/1998	The Eastlake Company LLC	1.00	CSS	Eastlake Communities	\$100,000.00	1,186.00
9/30/1998	Pacific Bay Homes	2.00	CSS	Rolling Hills Ranch	\$0.00	1,185.00
2/11/2000	Captain's Hill, Ltd	5.75	CSS	Captain's Hill	\$0.00	1,183.00
3/31/2000	Brian and Lisa Wier and Edward Barrett	0.34	CSS	Wier Tentative Parcel Map	\$0.00	1,177.25
6/16/2000	Beazer Homes Holdings Corp.	10.56	CSS	Sunset Heights	\$0.00	1,176.91
7/12/2000	Pacific Bay Homes	30.00	CSS	Rolling Hills Ranch	\$0.00	1,166.35
7/12/2000	Pacific Bay Homes	7.70	Otay Tar Plant	Rolling Hills Ranch	\$0.00	1,136.35
5/4/2001	Williams Communications, Inc.	8.00	CSS	Riverside to San Diego Fiber Optic Installation	\$0.00	1,128.65
6/29/2001	Otay Mesa Generating Company, LLC	4.10	CSS	Otay Mesa Power Plant	\$0.00	1,120.65
6/29/2001	Otay Mesa Generating Company, LLC	31.80	Tier III	Otay Mesa Power Plant	\$0.00	1,116.55
6/29/2001	San Diego County Water Authority	200.00	CSS	Emergency Storage Project	\$80,625.00	1,084.75
8/8/2001	Williams Communication, Inc.	1.50	CSS		\$750.00	884.75
8/14/2001	Cingular Wireless	0.50	CSS		\$250.00	883.25
1/3/2002	Eastlake Company, LLC	1.50	CSS	Eastlake III Project	\$750.00	882.75
1/23/2002	San Diego County Water Authority	7.00	CSS	Emergency Storage Project	\$3,500.00	881.25
4/1/2002	CalPeak Power Border, LLC	0.50	Tier III	CalPeak Power Project	\$250.00	874.25
4/1/2002	CalPeak Power Enterprise, LLC	0.30	CSS	CalPeak Power Project	\$150.00	873.75
4/1/2002	CalPeak Power Enterprise, LLC	0.20	Tier III	CalPeak Power Project	\$100.00	873.45
4/18/2002	Metropolitan Transit Development Board	9.60	CSS	Mission Valley Project	\$4,800.00	873.25
5/28/2002	Rodney and Joey Schaefer	5.10	CSS	Schaefer Tentative Tract Map TPM 20489	\$2,550.00	863.65
7/18/2002	William Jungman	3.90	CSS	Jungman Project	\$1,950.00	858.55
7/31/2002	Darmor Development Inc.	2.50	CSS	Parkview Project	\$1,250.00	854.65
7/31/2002	Darmor Development Inc.	0.60	Tier III	Parkview Project	\$300.00	852.15
8/13/2002	Joan & George Hood	0.50	CSS	Heatherwood Hollow Project	\$250.00	851.55
8/13/2002	Joan & George Hood	1.00	Tier III	Heatherwood Hollow Project	\$500.00	851.05
9/25/2002	CRV Escondido 68 LP	26.00	CSS	Jesmond Project	\$13,000.00	850.05
11/7/2002	Santa Fe Irrigation District	3.20	CSS	Raw Water Pipeline Project	\$1,600.00	824.05
TOTAL		365.15			\$212,575.00	

2/28/03

Exhibit C

Summary of Conservation Credits Sold to Date

[see attached]

SAN MIGUEL CONSERVATION BANK

BANK NAME:

San Miguel Conservation Bank
Bank Created on: 08/27/97

CREDIT OWNER:

Larry Purcell
San Diego County Water Authority
4677 Overland Avenue
San Diego, CA 92123
Phone: (858) 522-6752

MANAGER:

FWS Refuge
(619) 669-7295

EXHIBIT B

3/24/2003 Assignment and Assumption Agreement signed between Emerald Properties and San Diego County Water Authority.

Habitat Type CAGN, CSS, chamise, mix chaparral, grassland, riparian scrub, freshwater marsh, seasonal ponds, Otay tarplant (*Hemizonia conjugens*).

Service Area Western San Diego County. Available to mitigate cis-montane impacts below 3,500 ft.

Restrictions No coastal areas or coastal obligate species

Obligations: Owner will deposit \$100,000 into endowment + \$500 per each North parcel credit sold after first 140 credits have been sold;
[original owner has no obligation for the South Parcel]

BANKING ACTIVITY: 1,186 acres on Bank Property

		Mitigation Bank											Credit Transfer from 500-acre Acquisition Parcel*												
Date	Buyer	Project Impacted	San Diego barrel cactus	Otay tarplant	Coastal California gnatcatcher	Tier I Perennial Grassland		Tier I Dry marsh/ Riparian scrub		Tier I Seasonal stock pond		Tier II Coastal sage scrub		Tier III Southern mixed/chamise chaparral		Expected Available Credits	Available Credits (As-Built)	California adolphia	Higher Density San Diego barrel cactus	Lower Density San Diego barrel cactus	Palmer's grapplehook	Otay tarplant	San Diego marsh elder	Southwestern spiny rush	San Diego cactus wren
		Beginning Credits (Density**)	376	20,000/7.7 ac	55 pairs at 1 pr/21.74 acres (all habitats) or 56 pairs at 1pr/18.52 acres CSS	16.00		3.00		1.00		1,034.00		132.00		1,186.00	1,186.00	350/0.7 ac (500/acre)	1,620/1.8 ac (900/acre)	6,235/30.0 ac (160/acre)	1,000/2.2 ac (455/acre)	12,260/25.5 ac (481/acre)	340/5.0 ac (68/acre)	250/3-5 ac (50/acre)	5 prs (1 pr/3.21 acres)
						Expected Impacts	Actual Impacts	Expected Impacts	Actual Impacts	Expected Impacts	Actual Impacts	Expected Impacts	Actual Impacts	Expected Impacts	Actual Impacts										
8/27/1997	Administered by Emerald Properties																								
7/28/1998	The Eastlake Company	Eastlake Communities									1.00	1.00				1,185.00	1,185.00								
9/30/1998	Pacific Bay Properties	Rolling Hills Ranch									2.00	2.00				1,183.00	1,183.00								
2/11/2000	Captain's Hill, Ltd	Captain's Hill									5.75	5.75				1,177.25	1,177.25								
3/31/2000	Brian & Lisa Wier and Edward Barrett	Wier TPM									0.34	0.34				1,176.91	1,176.91								
6/16/2000	Beazer Homes Holdings Corp.	Sunset Heights									10.56	10.56				1,166.35	1,166.35								
7/12/2000	Pacific Bay Properties	Rolling Hills Ranch									30	30				1,136.35	1,136.35								
7/13/2000	Pacific Bay Properties	Rolling Hills Ranch		20,000		7.70	7.70									1,128.65	1,128.65								
5/4/2001	Williams Communications	Riverside/SD Fiber Optic									8.00	8.00				1,120.65	1,120.65								
6/29/2001	Otay Mesa Generating Company	Otay Mesa Generating Project												31.80	31.80	1,088.85	1,088.85								
6/30/2001	Otay Mesa Generating Company	Otay Mesa Generating Project									4.10	4.10				1,084.75	1,084.75								
6/29/2001	San Diego County Water Authority	Emergency Storage Project									200.00	200.00				884.75	884.75								
8/8/2001	Williams Communications										1.50	1.50				883.25	883.25								
8/14/2001	Cingular Wireless										0.50	0.50				882.75	882.75								
1/3/2002	Eastlake Company, LLC	Eastlake III									1.50	1.50				881.25	881.25								
1/23/2002	San Diego County Water Authority	Emergency Storage Project									7.00	7.00				874.25	874.25								
4/1/2002	CalPeak Power Border, LLC	CalPeak Power Project												0.50	0.50	873.75	873.75								
4/1/2002	CalPeak Power Enterprise, LLC	CalPeak Power Project									0.30	0.30				873.45	873.45								
4/1/2002	CalPeak Power Enterprise, LLC	CalPeak Power Project												0.20	0.20	873.25	873.25								
4/18/2002	Metropolitan Transit Development Board	Mission Valley Project									9.60	9.60				863.65	863.65								
5/28/2002	Rodney and Joey Schaefer	Schaefer TPM 20489									5.10	5.10				858.55	858.55								
7/18/2002	William Jungman	Jungman Project									3.90	3.90				854.65	854.65								
7/31/2002	Darmor Development Inc	Parkview Project									2.50	2.50				852.15	852.15								
7/31/2002	Darmor Development Inc	Parkview Project												0.60	0.60	851.55	851.55								
8/13/2002	Joan & George Hood	Heatherwood Hollow Project									0.50	0.50				851.05	851.05								
8/14/2002	Joan & George Hood	Heatherwood Hollow Project												1.00	1.00	850.05	850.05								
9/25/2002	CRV Escondido 68 LP	Jesmond Project									26.00	26.00				824.05	824.05								
11/7/2002	Santa Fe Irrigation District	Raw Water Pipeline Project									3.20	3.20				820.85	820.85								
3/24/2003	Administered by San Diego County Water Authority for its projects																								
11/15/2009	N0401-Carryover Storage & San Vicente Dam Raise Proj (CSP)										220.72					600.13									
11/15/2009	Reserved N0401- CSP Reserved (per CSP Amended BO)										18.96					581.17									
11/15/2009	Reserved C0601 Mission Trails FRS-II & Vent Demolition (Tier I)					0.05										581.12									
		TOTAL CREDITS DEBITED :	0	20,000	0	7.75	7.70	0.00	0.00	0.00	0.00	563.03	323.35	34.10	34.10	604.88	365.15	0	0	0	0	0	0	0	0
		CREDITS AVAILABLE:	376	0	38	8.25	8.30	3.00	3.00	1.00	1.00	470.97	710.65	97.90	97.90	581.12	820.85	350	1620	6235	1000	12260	340	250	5

*Credit exchanges are to be done through mitigation bank reductions based on resource density of populations on the Acquisition Parcel.

Density **The density of resources is presumed to be non-separable from the acreage on which resources occur; thus, where a mitigation need is defined by acreage, individual resource count, or both, the greatest requirement will govern the credit reduction (e.g.,

- Otay tarplant (*Hemizonia conjugens*) 481 plants/grassland acre
- San Diego marsh elder (*Iva hayesiana*) 68 plants/wetland acre
- Palmer's grapplehook (*Harpagonella palmeri*) 455 plants/appropriate habitat acre
- San Diego barrel cactus (*Ferocactus viridescens*) 160 plants/appropriate habitat acre
- Southwestern spiny rush (*Juncus acutus*) 50 plants/wetland acre
- California adolphia (*Adolphia californica*) 500 plants/CSS acre

- 1 pair/3.21 appropriate habitat acres
- San Diego cactus wren (*Campylorhynchus brunneicapil*) 0.312 pairs/appropriate habitat acre
- 0.046 pair/acre (all habitats)
- Coastal California gnatcatcher (*Polioptila californica cali*) 0.054 pair/acre (CSS only)

Reserved in a project title means a project has been approved (CEQA complete), but no Notice To Proceed issued.

as of 12/31/06

Appendix K

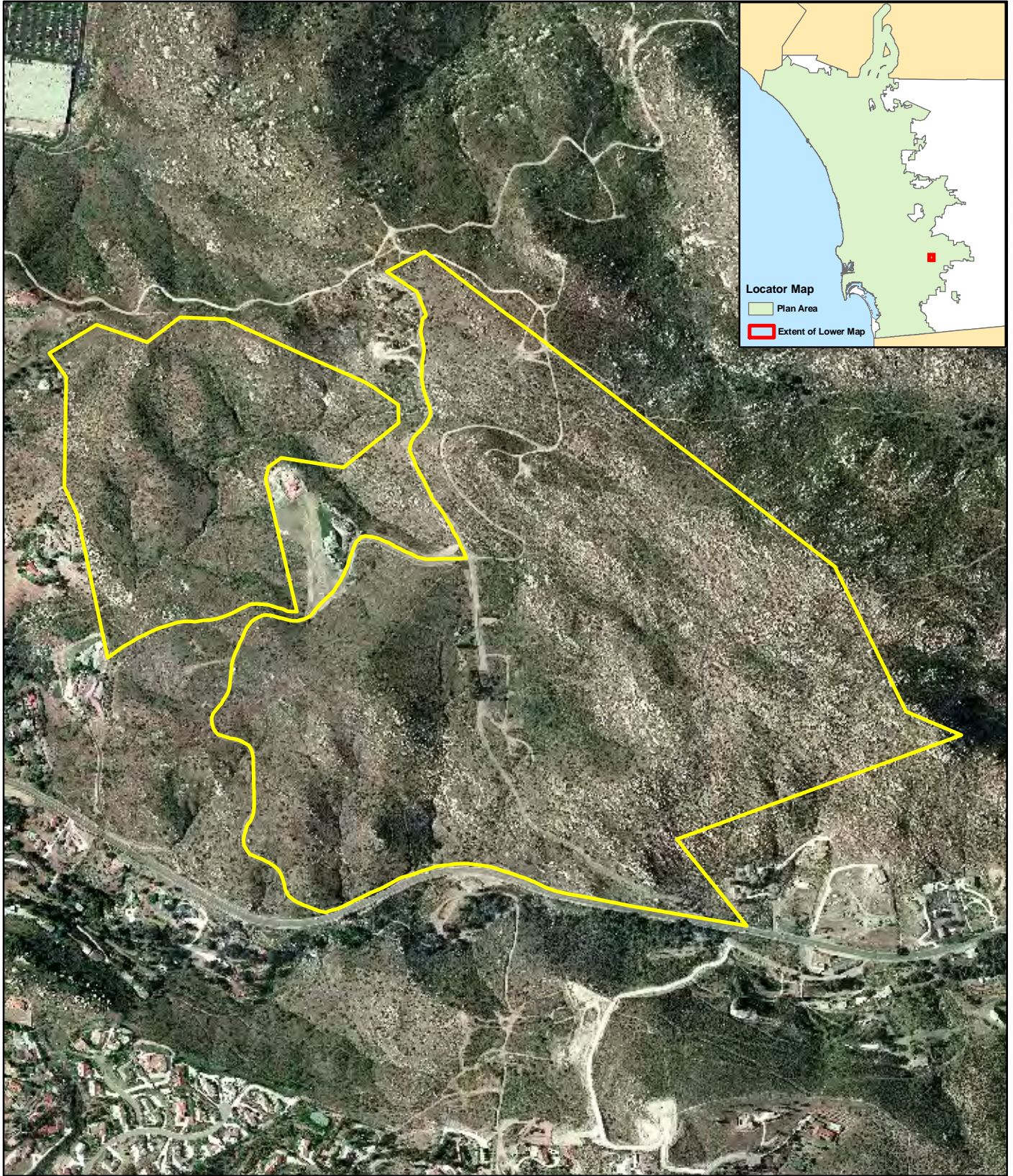
Preserve Area and MMA Locations

The purpose of this Appendix is to show the locations of the Water Authority's Preserve Area (the area of combined HMAs) and MMAs. Each figure includes an inset that shows the location of the Preserve Area within the Plan Area. Figures K-1 through K-6 show the general location of each HMA, and Figures K-7 through K-10 show the location and boundaries of each MMA.

The figures in this Appendix include:

- K-1: Crestridge HMA
- K-2: San Miguel HMA
- K-3: Rancho Cañada HMA
- K-4: Tijuana River Valley HMA
- K-5: San Luis Rey HMA
- K-6: Manchester HMA
- K-7: Myers MMA
- K-8: Montaña Mirador MMA
- K-9: Escondido Creek Uplands MMA
- K-10: Elfin Forest MMA

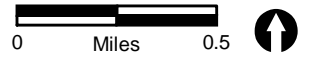
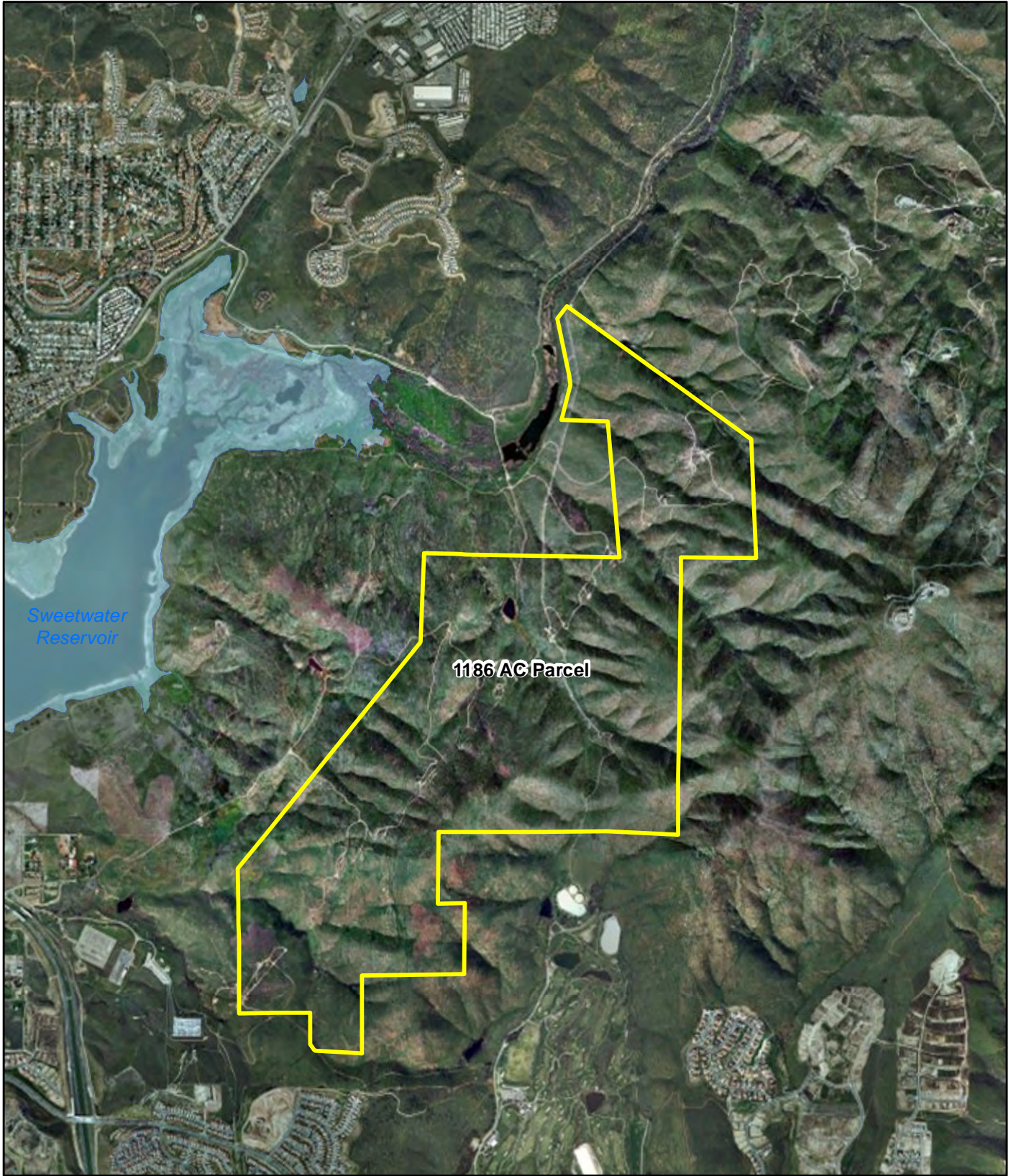
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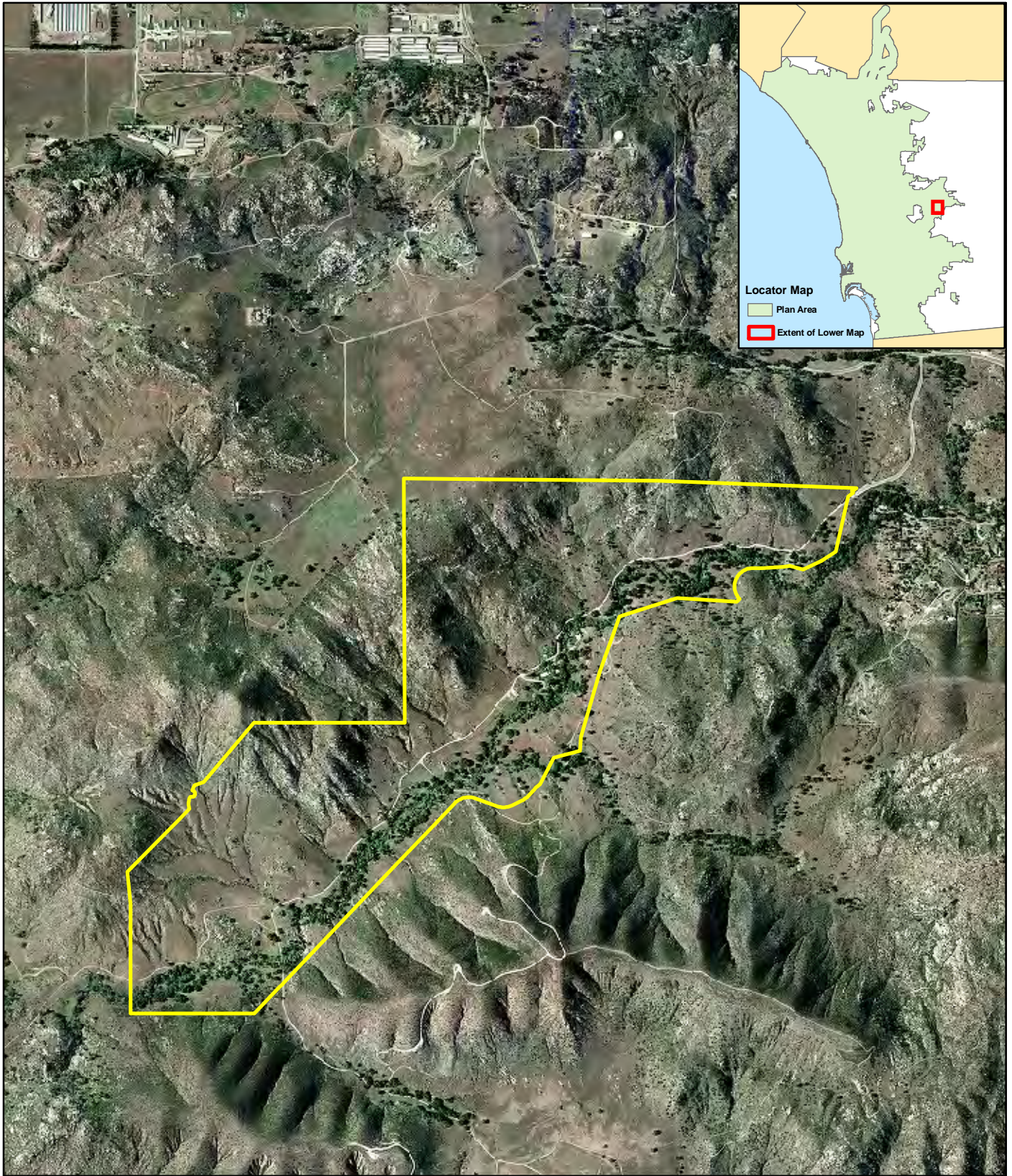
 Crestridge HMA Boundaries


Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.



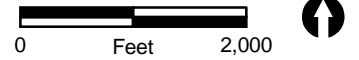


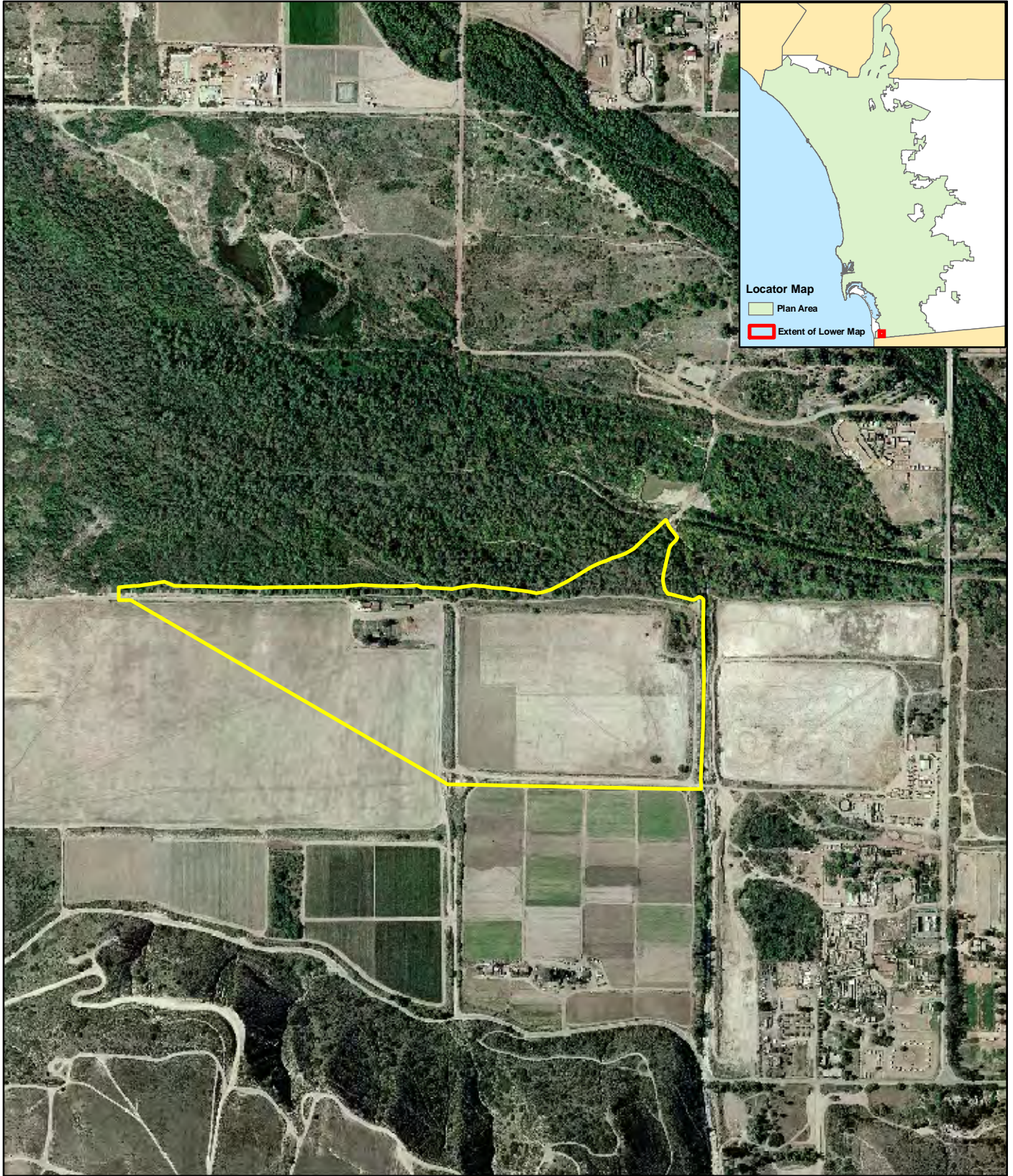
 San Miguel HMA Boundary




 Rancho Cañada HMA Boundary

Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.

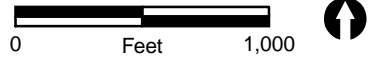


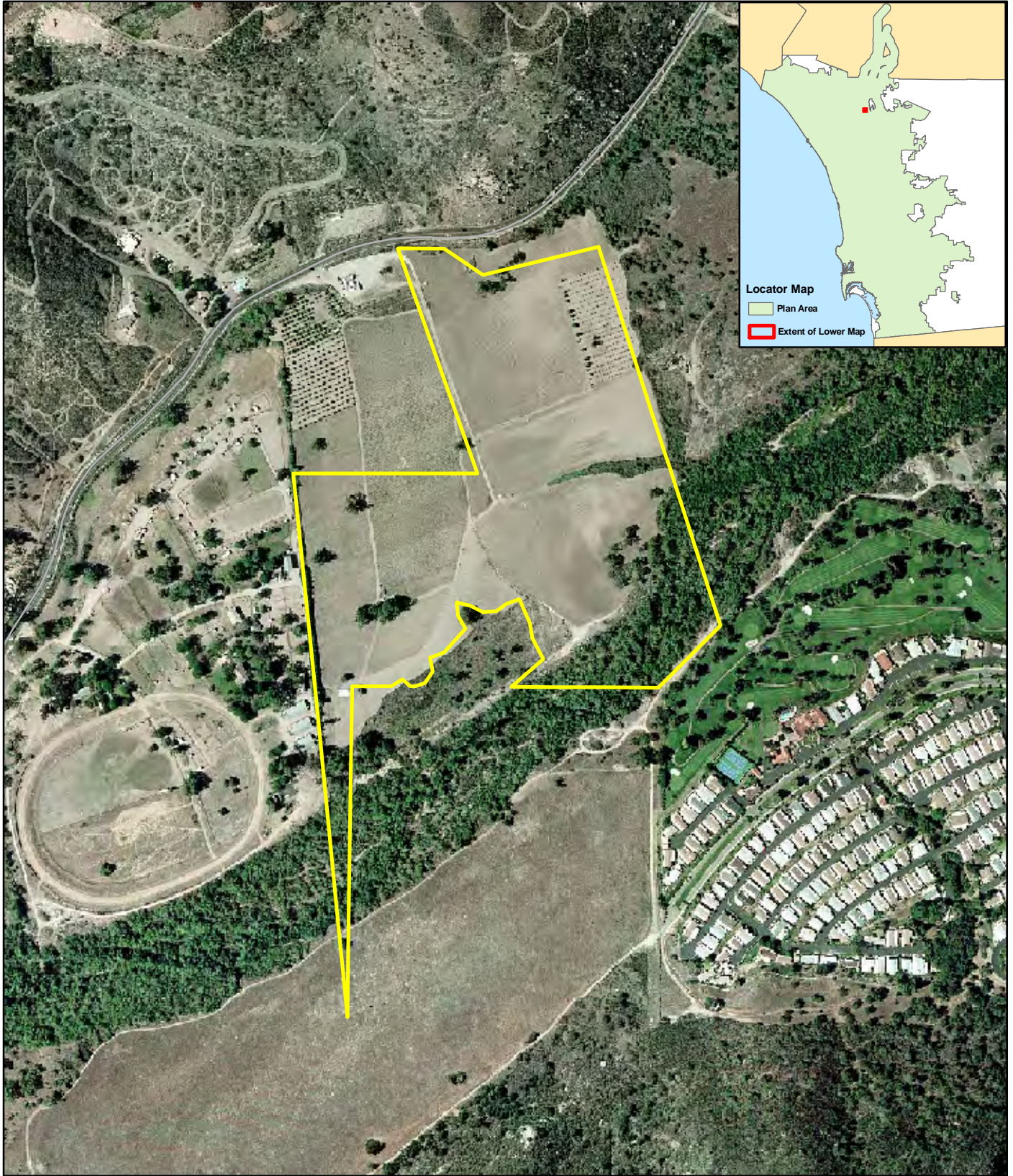


Locator Map
 Plan Area
 Extent of Lower Map

 Tijuana River Valley HMA Boundary

Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.



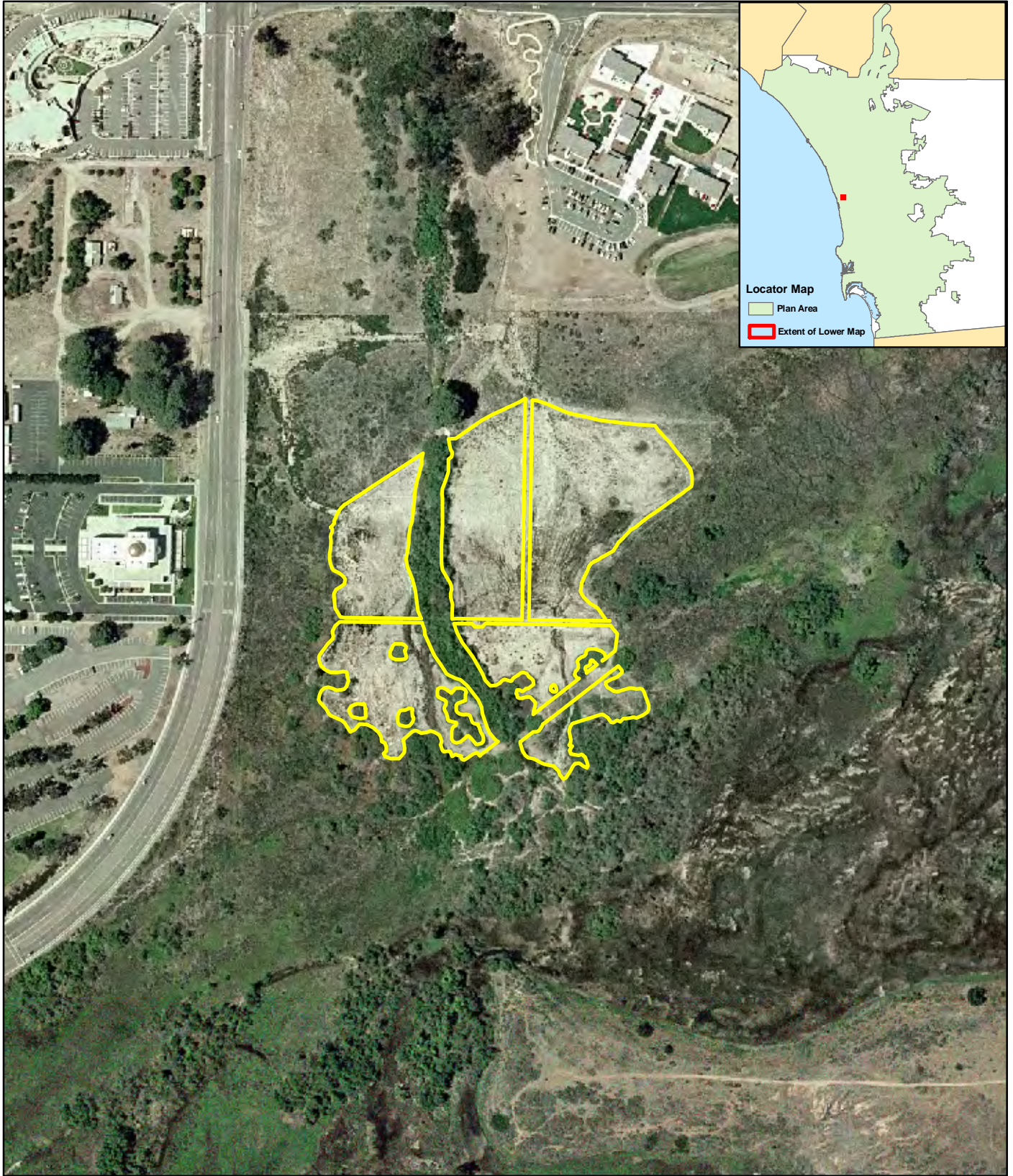



Locator Map
 Plan Area
 Extent of Lower Map

 San Luis Rey HMA Boundaries

Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.

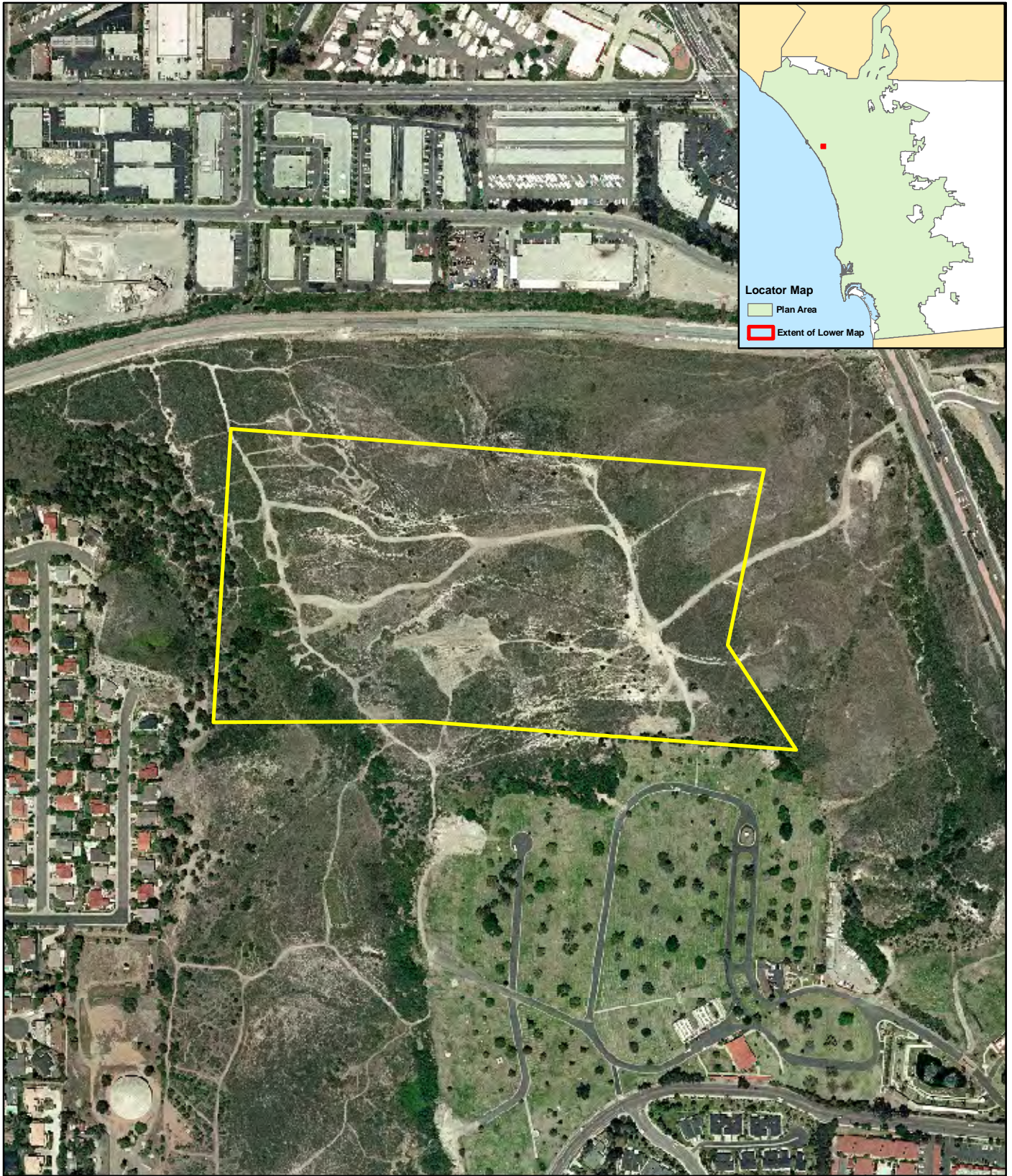




 Manchester HMA Boundaries

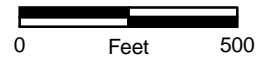
Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.





 Myers MMA Boundary

Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.

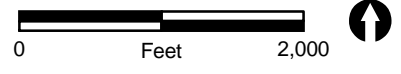


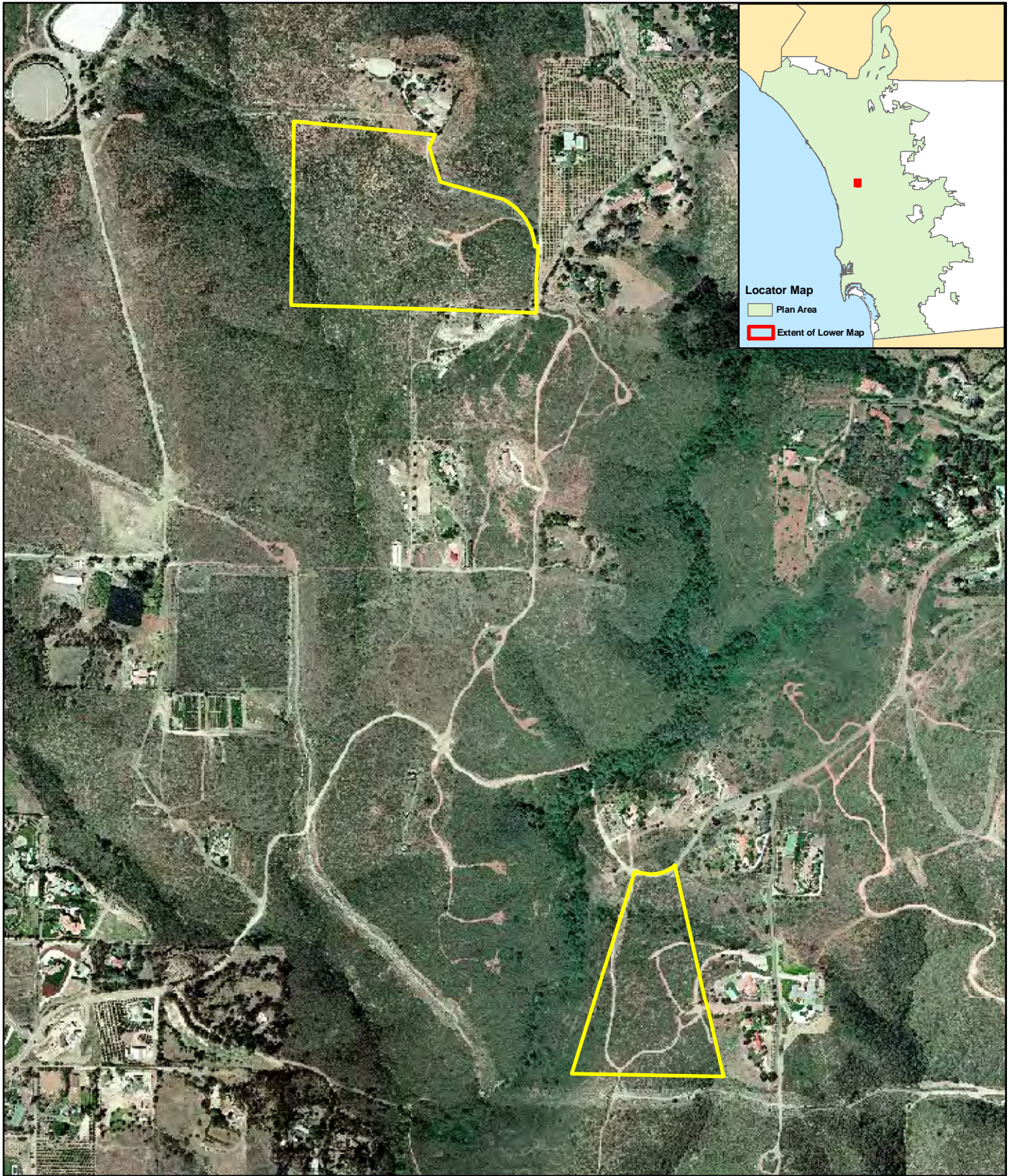


Locator Map
 Plan Area
 Extent of Lower Map

 Montaña Mirador MMA Boundaries

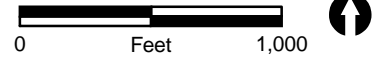
Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.

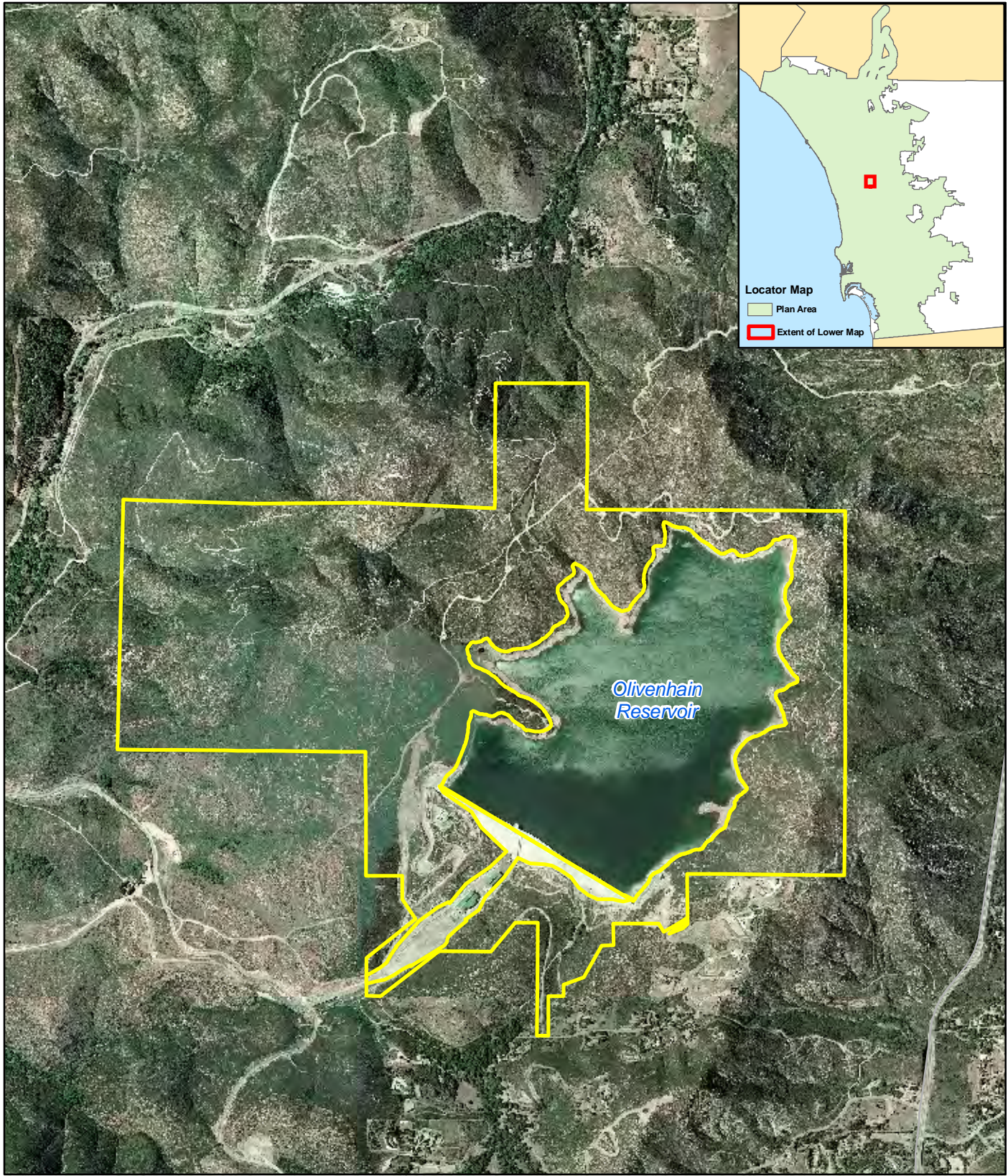




 Escondido Creek Uplands MMA Boundaries

Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.





 Elfin Forest MMA Boundaries

Aerial imagery was acquired in Spring 2007 and may not represent current vegetation conditions.

