

**OPERATIONS AND MAINTENANCE MANUAL FOR
COACHELLA VALLEY WATER DISTRICT
COVERED ACTIVITIES AND FACILITIES
WITHIN CONSERVATION AREAS**



Prepared by:
Coachella Valley Water District
Environmental Services Department
P.O. Box 1058
Coachella, CA 92236
(760) 398-2651

July 2015

Table of Contents

Acronyms and Definitions.....	v
1.0 Introduction	1
1.1 Organization and Use of the Operations and Maintenance Manual.....	1
1.1.1 Organization of the Manual.....	2
1.1.2 Use of the Manual	2
1.2 Sources of Information.....	5
2.0 Routine Covered Activities, Potential Impacts, and Activity-Related Protection Measures.....	5
2.1 Operations and Maintenance Activity Planning.....	6
2.1.1 Conservation Area Review and Avoidance and Minimization Measures.....	7
2.2 Avoidance and Minimization Measures for Covered Activities	9
2.3 Levee Repair, Bank Protection, and Erosion Control Activities.....	11
2.4 Vegetation Management.....	11
2.4.1 Control of Terrestrial Weeds.....	12
2.4.2 Control of Aquatic Weeds.....	14
2.5 Pest Control Activities.....	16
2.6 Temporary De-Watering and Removal of Sediment from Water Supply Reservoirs, Detention Basins and Canals.....	19
2.7 Flood Control and Drainage Channel Maintenance	20
2.7.1 Agricultural Drain Cleaning	20
2.7.2 Flood Control and Drainage Channel Maintenance	21
2.8 Special-Status Species	22
2.8.1 Special Status Species in the Coachella Valley MSHCP	22
2.8.2 Conservation Areas in the Coachella Valley.....	23
2.9 Species Accounts and Avoidance Measures	23
3.0 Plants	24
3.1 Mecca Aster.....	24
3.2 Coachella Valley Milkvetch.....	26
3.3 Triple-Ribbed Milkvetch.....	28
3.4 Orocopia Sage	29
3.5 Little San Bernardino Mountains Linanthus	31
4.0 Insects	32
4.1 Coachella Valley Giant Sand-Treader Cricket.....	33
4.2 Coachella Valley Jerusalem Cricket.....	34
5.0 Fish.....	36
5.1 Desert Pupfish	36
6.0 Reptiles	38
6.1 Desert Tortoise	38
6.2 Coachella Valley Fringe-Toed Lizard.....	41

6.3	Flat-Tailed Horned Lizard.....	44
7.0	Birds.....	46
7.1	Burrowing Owl.....	47
7.2	Yuma Ridgway’s Rail	50
7.3	California Black Rail.....	51
7.4	Southwestern Willow Flycatcher	53
7.5	Crissal Thrasher.....	55
7.6	Le Conte’s Thrasher	57
7.7	Least Bell’s Vireo.....	59
7.8	Gray Vireo.....	61
7.9	Yellow Warbler	62
7.10	Yellow-Breasted Char	64
7.11	Summer Tanager	66
8.0	Mammals.....	68
8.1	Southern Yellow Bat	69
8.2	Coachella Valley Round-Tailed Ground Squirrel	70
8.3	Palm Springs Pocket Mouse.....	73
8.4	Peninsular Bighorn Sheep	76

TABLES

Table 1	Vegetation, Algae, and Invasive Species Control at CVWD Facilities and Infrastructure	79
Table 2	Coachella Valley MSHCP Covered Species	80
Table 3	CVWD Covered Activities and Required Avoidance/Minimization Measures	83
Table 4	Coachella Valley Stormwater Channel and Delta Conservation Area	99
Table 5	Desert Tortoise and Linkage Conservation Area.....	100
Table 6	East Indio Hills Conservation Area	102
Table 7	Indio Hills/Joshua Tree National Park Conservation Area.....	104
Table 8	Joshua Tree National Park Conservation Area	106
Table 9	Mecca Hills/Orocopia Mountains Conservation Area.....	108
Table 10	Mission Creek/Morongu Wash Conservation Area.....	110
Table 11	Santa Rosa and San Jacinto Mountains Conservation Area	112
Table 12	Thousand Palms Conservation Area.....	115
Table 13	Whitewater Floodplain Conservation Area	119
Table 14	Willow Hole Conservation Area.....	121
Table 15	Dos Palmas Conservation Area	123

FIGURES

Figure 1	Coachella Valley Water District Covered Activities Locations	85
Figure 2	Coachella Valley MSHCP Conservation Area Showing CVWD Lands	86

Figure 3	CVWD Lands within the Desert Tortoise Linkage Conservation Area	87
Figure 4	CVWD Lands within the East Indio Hills Conservation Area	88
Figure 5	CVWD Lands within the Indio Hills/Joshua Tree National Park Conservation Area	89
Figure 6	CVWD Lands within the Joshua Tree National Park Conservation Area	90
Figure 7	CVWD Lands within the Mecca Hills/Orocopia Mountains Conservation Area	91
Figure 8	CVWD Lands within the Mission Creek/Morongo Wash Conservation Area.....	92
Figure 9	CVWD Lands within the Santa Rosa/San Jacinto Mountains Conservation Area	93
Figure 10	CVWD Lands within the Thousand Palms Conservation Area.....	94
Figure 11	CVWD Lands within the Whitewater Floodplain Conservation Area	95
Figure 12	CVWD Lands within the Willow Hole Conservation Area.....	96
Figure 13	CVWD Lands within the Dos Palmas Conservation Area	97
Figure 14	Coachella Valley MSHCP Valley-wide Conservation Area Map	98

REFERENCES

References.....	126
-----------------	-----

APPENDIX

Coachella Canal Water Supply Quagga Mussel Monitoring and Control Program — March 2015.....	A1
CVWD Sample Collection and Decontamination Procedures.....	A6
Table A1 Chlorine Residual Down Stream of Dosing Station	A12
Table A2 Location of Monitoring Blocks within the Coachella Canal	A12
Figure A1 Chlorination Dosing Station at Drop One	A13
Figure A2 Maximum Daily Coachella Canal Water Temperature	A13
Figure A3 Quagga Monitoring Locations Along the Coachella Canal.....	A14
Figure A4 Typical Monitoring Block Location in Coachella Canal.....	A15
Figure A5 Veliger Sampling Points	A16
Figure A6 CVWD <i>Dreissen</i> Veliger Monitoring Summary	A17
Figure A7 Additional Monitoring Points within Lake Cahuilla	A17
Figure A8 Buildup of Organic Growth on Monitoring Block	A18
Figure A9 Coachella Canal Quagga Mussel Monitoring Block Inspection Record	A19
Appendix References	A20

**CVWD OPERATIONS AND MAINTENANCE MANUAL ACRONYMS
AND DEFINIITONS**

List of Acronyms Used in This Manual

ACEC	Area of Critical Environmental Concern
ALERT	Flash Flood Alert Station in Santa Rosa Mtns
AOC	Area of Concern
BLM	Bureau of Land Management
BMP	Best Management Practice
CA	California
CSC	California Species of Special Concern
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Pesticide Regulations
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society
CVAG	Coachella Valley Association of Governments
CVCC	Coachella Valley Conservation Committee
CVWD	Coachella Valley Water District
E	Federally Endangered
ESA	Endangered Species Act
ESD	Environmental Services Department
FWS	U.S. Fish and Wildlife Service
CVMSHCP	Coachella Valley Multiple Species Habitat Conservation Plan
NCCP	Natural Communities Conservation Plan
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
SE	State Endangered
SSC	Federal Species of Special Concern
ST	State Threatened
T	Federally Threatened
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
µg/L	Microgram per Liter
mg/L	Milligram per Liter

1.0 INTRODUCTION

In October 2008, wildlife agencies issued permits for the Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (CVMSHCP) which calls for the conservation and protection of threatened and endangered wildlife species and natural habitat communities within the Coachella Valley. The CVMSHCP was developed by the Coachella Valley Association of Governments (CVAG). CVAG fills the role of the Coachella Valley Conservation Commission (CVCC), which is a California joint powers authority created to implement the CVMSHCP. The CVMSHCP planning area encompasses approximately 1,206,000 acres. The planning area extends from the Cabazon area of the San Geronio Pass in the northwest to lands surrounding the northern reaches of the Salton Sea to the southeast excluding Indian Reservation Lands not covered by the CVMSHCP. The Coachella Valley Water District (CVWD) is a local permittee within the CVMSHCP. In addition to CVWD, member agencies of the CVMSHCP include: US Bureau of Land Management (BLM), US Forest Service (FWS), National Park Service, California Department of Fish and Wildlife (CDFW), California Department of Parks and Recreation, California Department of Transportation, Coachella Valley Mountains Conservancy, Riverside County Flood Control and Water Conservation District, Riverside County Regional Parks and Open Space District, Riverside County Waste Management District, Imperial Irrigation District, County of Riverside, and the following nine cities: Cathedral City, Coachella, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage.

CVWD and the remaining permittees are obligated to implement avoidance and minimization measures to ensure the protection of threatened and endangered species and their habitat on CVMSHCP conservation lands within the Coachella Valley. Conservation measures in the CVMSHCP include a requirement for CVWD to develop an Operations and Maintenance plan (O&M Manual) for its facilities (e.g., levees, flood control channels, groundwater recharge, roads, pump stations, reservoirs, and agricultural drains) in Conservation Areas that will minimize impacts to Covered Species and natural communities. This manual is a working document that will be updated when additional information becomes available that justifies modified avoidance and protection measures or changes in the presence and distribution of threatened and endangered species or their protected status. CVWD will acquire the necessary permits/authorizations as required for species surveys and use approved protocols where available.

1.1 ORGANIZATION AND USE OF THE OPERATIONS AND MAINTENANCE MANUAL

This O&M Manual serves as guidance for CVWD staff when planning or implementing covered operations and maintenance activities in Conservation Areas. The O&M Manual provides appropriate avoidance and protection measures that can be used by field personnel when conducting these activities. Appropriate sections of the document shall be reviewed by CVWD staff prior to initiating covered operation and maintenance activities as required under the CVMSHCP. In order to simplify the use of this operation and maintenance manual, a quick reference guide describing actions to be taken for covered activities occurring on CVWD lands within MSHCP Conservation Areas is provided in **Section 1.1.2** on page 2. This quick reference

guide will serve as a means to prepare for covered activities within each Conservation Area containing CVWD lands or infrastructure.

1.1.1 ORGANIZATION OF THE O&M MANUAL

Section 1.0 of the O&M Manual provides the objective and basis for developing the manual and how CVWD staff can use the manual to implement avoidance and minimization measures required by the CVMSHCP.

Section 2.0 of the O&M Manual describes the types of covered activities that are considered to be routine on CVWD lands within the CVMSHCP Conservation Areas (**Figures 2 – 13**). It also provides examples and information on the types of potential impacts to threatened and endangered species that may be caused by the various routine operations and maintenance activities, the standard activity-related avoidance and minimization measures to protect sensitive species and/or habitat, and supplemental information regarding the environmental regulations and pesticide use that may apply to certain operations and maintenance situations. **Figure 14** provides all Conservation Areas within the Coachella Valley MSHCP as well as those that contain CVWD lands.

Section 2.9 of the O&M Manual contains descriptions of the special-status species within the CVMSHCP, their habitat requirements, and Plan-wide occurrence/distribution information. **Tables 4 - 15** provide a list of species that may be encountered in each Conservation Area, and the associated avoidance and minimization measures used to protect these species when performing Covered Activities.

1.1.2 USE OF THE MANUAL

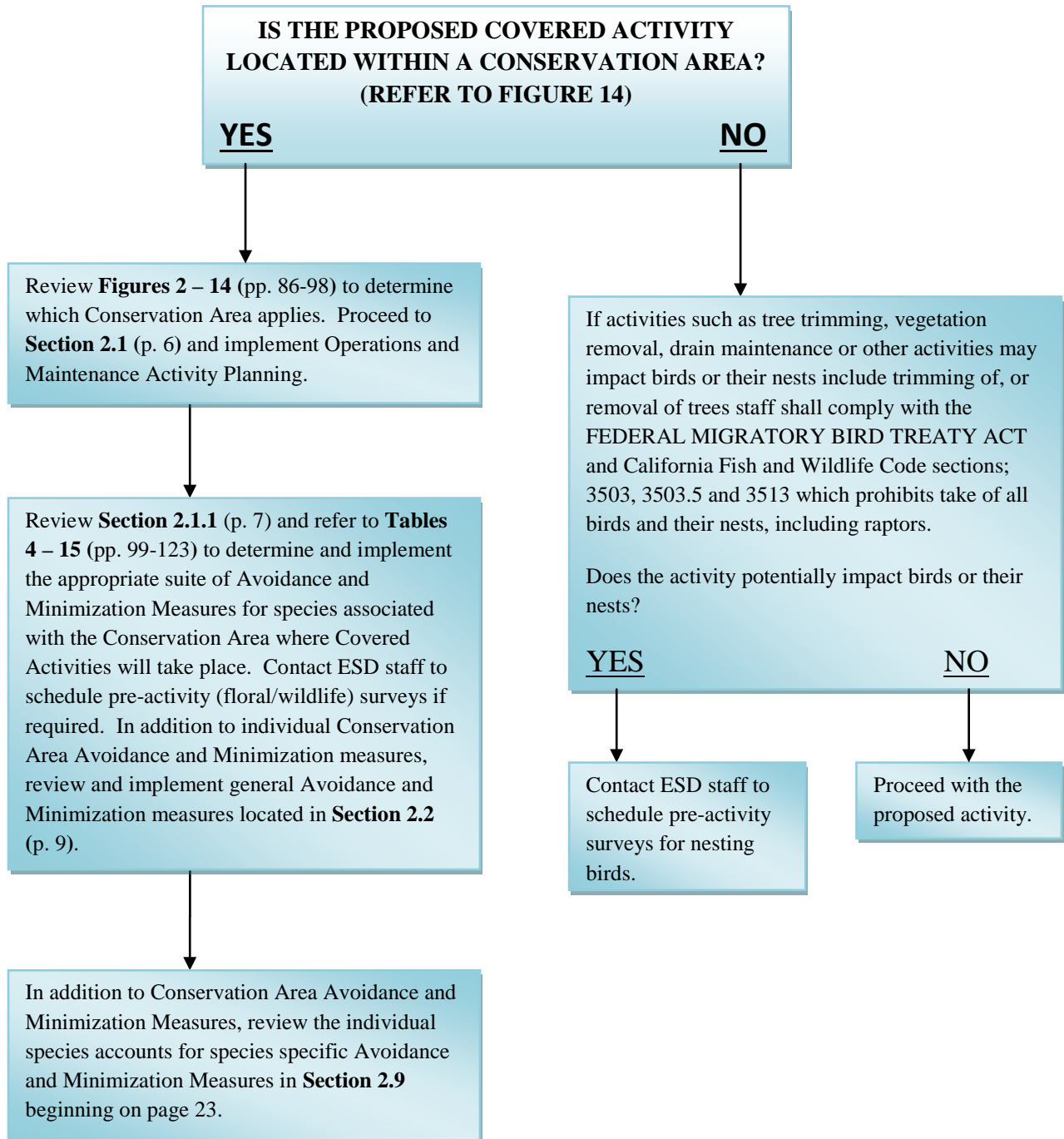
When planning operations and maintenance activities, supervisory personnel and their staff will use avoidance and minimization measures outlined in **Section 2.0** for the respective work activity (e.g., levee and channel maintenance, erosion control, weed control, pest control etc.). The supervisor should review the Valley Wide CVMSHCP Conservation Area Map (**Figure 14**) to determine if the planned activities are within a Conservation Area where threatened or endangered species may be present. If the planned activity is within a designated Conservation Area, refer to the Conservation Area maps (**Figures 2-13**) to identify the individual Conservation Area and associated habitat. Refer to **Tables 4 -15** for individual Conservation Area Avoidance and Minimization Measures. The supervisor must incorporate the activity-related and the species-specific or habitat-specific avoidance and minimization measures as part of the planned activities. The supervisor shall inform the field crews of the need to implement and follow such measures. Supervisors and staff should review the Coachella Canal Water Supply Quagga Mussel Monitoring and Control Program located in the appendix, and familiarize themselves with the program in the event that covered activities or other anticipated work takes place in areas where invasive quagga mussel sampling or monitoring occur. This should help minimize conflicts with sampling and monitoring staff and interference with the program.

If the planned activity is within a Conservation Area and the avoidance and minimization measures are problematic to implement, then the supervisor should contact CVWD's Environmental Services Department (ESD) staff for guidance. Some projects which are not considered to be Covered Activities may be required to undergo a Joint Project Review (JPR) with CVCC and the appropriate wildlife agencies. The JPR provides CVCC and the wildlife agencies an opportunity to review project elements, recommend avoidance and minimization measures and to oversee compliance with the requirements of the MSHCP and the Implementation Agreement (IA). A JPR is required by CVCC for all projects under the Local Permittees' jurisdiction in a Conservation Area that would result in disturbance to habitat, natural communities, biological corridors, or essential ecological processes.

Consistent with the CVMSHCP, this manual uses a “**habitat-based**” approach for addressing protection of federally-listed and other special-status species as these species are typically associated with distinct habitat types. Many of the species described within this manual are associated with distinct habitat types. Other species such as birds and bats can be found widely spread throughout the valley and potentially found in many different habitat types. In many instances, the manual uses the term “potential habitat.” The term “potential habitat” is used to describe vegetation types, community associations, and/or specific habitat components that have the characteristics to support particular special-status species. In some instances, potential habitat for a species can also be limited by the species' range or distribution in the Coachella Valley. Assessing the presence or absence of many special-status species, and, therefore, determining if operations and maintenance activities would affect individuals of protected species can be difficult and time consuming. Many of the species in the Coachella Valley may only be identifiable for a short time period during the year (plant species for example), and for some species, they may not be detectable every year (Coachella Valley Giant Sand-Treader Cricket). Multiple years of surveys are often required to confirm presence or absence of any particular species. Thus, a habitat-based approach provides maximum flexibility for conducting routine operations and maintenance activities with minimum delay while still providing the required protection of threatened, endangered, and other special-status species. The following quick reference diagram will assist supervisors and staff in reviewing each Conservation Area which contains CVWD lands or infrastructure.



CVWD QUICK REFERENCE GUIDE TO OPERATIONS AND MAINTENANCE REQUIREMENTS WITHIN CVM SHCP CONSERVATION AREAS



1.2 SOURCES OF INFORMATION

The information and recommendations presented in this manual are based on discussions and consultation with the FWS, CDFW, CVCC, and CVMSHCP permittee representatives. Additionally, information has been adapted from the following sources:

- U.S. EPA Interim Measures for Use of Pesticides in Riverside County (USEPA 2000)
- Coachella Valley Multiple Species Habitat Conservation Plan
- Coachella Valley Natural Community Conservation Plan

The information in this manual will be updated as needed. Revisions to incorporate new information and/or include improved methods to protect listed species will be implemented as information becomes available.

2.0 ROUTINE COVERED ACTIVITIES, POTENTIAL IMPACTS, AND ACTIVITY-RELATED PROTECTION MEASURES

Operation and maintenance of existing CVWD facilities is needed to protect the integrity of existing infrastructure such as roads, reservoirs, wells, water control structures (pipes, conduits, culverts, etc.), pump stations, reservoirs, levees, canals, flood control channels, and distribution systems. These operational requirements are classified under the CVMSHCP as Covered Activities and are required so that existing facilities may operate efficiently and safely. Examples of CVWD's Covered Activities and facilities listed in the CVMSHCP include the following:

CVWD Flood Control Facilities

- The removal of sand, silt, sediment, debris, rubbish, woody, and herbaceous vegetation in existing flood control facilities, culverts and storm drains in order to maintain design capacity of the facility and or compliance with local fire regulations
- Control of weeds and vegetation by non-chemical means, and control of debris on all access roads and District rights-of- way
- The repair or replacement of *constructed flood control facilities*, such as channels, basins, drop structures, and levees as necessary to maintain the structural integrity and hydraulic capacity of the facility.
- For ALERT stations, an annual inspection visit
- For ALERT stations, emergency maintenance to replace batteries or make repairs on transmitters, solar panels, tipping buckets, etc. Emergency access may occur at any time of year via the Dunn Road, notwithstanding bighorn sheep avoidance measures.

CVWD Water Storage and Transmission Facilities

- Maintain reservoirs by removing interior and exterior coating; caulking joints as needed; repainting exterior roof, shell, and appurtenances; and recoating interior with an approved epoxy system.
- Maintain boosters by providing routine oil changes and obtaining samples; remove, repair, replace, or add booster pump as needed
- Maintain landscaping around reservoirs (where applicable) by maintaining irrigation pumps, performing routine repairs on irrigation system, trimming trees and shrubs as needed, and clearing brush from site
- Maintain altitude valves by checking water level with valve operation, check function of valves, and rebuild or replace as needed.
- Maintain pipelines by inspecting, repairing, or replacing as needed.
- Maintain sediment basin by inspecting, removing sediment as needed, and making any necessary repairs removal of sediment, vegetation, and debris from culverts, drains, canals, flood control channels, and reservoirs; replacement of utilities; backfilling of gullies and holes caused by soil erosion; trimming of over-grown or over-hanging vegetation and/or use of herbicides on trails, canal maintenance roads, or embankments to prevent excess growth of weeds and for fire control.

Brief descriptions of these Covered Activities, examples of the types of associated impacts, and ways to avoid and minimize such impacts are provided in **Sections 2.2** through **2.7.2**. These descriptions are intended to be categorical representatives, rather than exhaustive, detailed discussions of all possible activities and related impacts.

2.1 OPERATIONS AND MAINTENANCE ACTIVITY PLANNING

It is the responsibility of anyone participating in routine operations and maintenance activities to adhere to avoidance and minimization measures when working in Conservation Areas. Prior to initiating any covered activity, verify whether the area to be worked in is located within a Conservation Area by reviewing the Valley Wide CVMSHCP Conservation Area Map (**Figure 14**) which shows all Conservation Areas within the boundaries of the Plan. Managers and first-line supervisors should review operations and maintenance activities to ensure avoidance and minimization measures are used and when possible to schedule Covered Activities to avoid and minimize disturbance to species at a critical time; an example would be the timing of grading activities in areas known to harbor Burrowing Owls and their burrows during the breeding season. Contact CVWD's ESD staff to discuss potential species issues and impact assessment surveys following emergency repairs to any infrastructure or flood control conveyance facility.

2.1.1 CONSERVATION AREA REVIEW AND AVOIDANCE AND MINIMIZATION MEASURES

This section describes procedures for determining the necessary avoidance and minimization measures for Conservation Areas, evaluating site conditions, specific special-status species, and implementing avoidance and minimization measures during Covered Activities. In addition to the 11 Conservation Areas containing CVWD lands or infrastructure (**Figures 2 – 14**), there are ten (10) additional Conservation Areas within the CVMSHCP boundaries listed on the Valley Wide CVMSHCP Conservation Area Map. These lands shall be evaluated for wildlife and plant species in the event that Covered Activities are proposed in these areas. The applicable avoidance and minimization measures that apply to each species must be implemented if Covered Activities will take place within these Conservation Areas. The following procedures and criteria have been developed on a site-specific basis to evaluate the potential for occurrence of, and impacts to, species protected under the CVMSHCP. In addition to identifying the lands associated with the Conservation Areas, **Figures 2 - 14** provides the applicable APN parcel numbers to facilitate identification of CVWD owned lands.

Review of the individual Conservation Area species list provided in **Tables 4 – 15** will provide a list of the wildlife and plant species associated with each of the Conservation Areas and the avoidance and minimization measures required for each species. **Section 2.9** provides species account, seasonal occurrence and species specific avoidance and minimization measures for each species identified in the applicable Conservation Area. Review of the individual Conservation Area avoidance and minimization measures should be done well in advance of proposed Covered Activities in order to schedule any required surveys or implement seasonal avoidance and minimization measures. Refer to **Tables 4 – 15** and review the applicable Conservation Area avoidance and minimization measures for seasonal or Covered Activity restrictions. No impacts are anticipated as part of the following Covered Activities:

- Annual inspections for ALERT stations, or
- Emergency maintenance to replace batteries or make repairs on transmitters, solar panels, tipping buckets for ALERT stations, and
- Emergency access at any time of year via the Dunn Road, notwithstanding bighorn sheep avoidance measures.

If a special-status species or sensitive habitat are in question, contact ESD staff for more in-depth site evaluation. If needed, these activities should be performed well in advance of the Covered Activity initiation (30 days is recommended) to avoid delays due to conflicts with sensitive habitat, species and/or their breeding season. It should be noted that detection of many of the special-status species is time and/or season sensitive.

Field Supervisors

CVWD field supervisors will contact ESD staff to arrange avoidance and minimization training for field crews when performing Covered Activities within a conservation area. The field supervisors will be responsible for documenting onsite field observations of listed species and any impacts resulting from Covered Activities operations (or for delegating this responsibility to staff), requesting surveys if needed, and ensuring CVWD staff and contractors comply with the CVMSHCP. Field supervisors will assist ESD staff through annual forecasting of O&M work.

The crew supervisor or first-line managers shall undertake the following steps when planning of any of the routine operations and maintenance activities:

1. The project site will be evaluated to determine if the lands lie within a Conservation Area, in addition, if the site is located within a Conservation Area refer to the appropriate Conservation Area species list for each Conservation Area and determine what species are associated with the Conservation Area and what avoidance/minimization measures are required (**Tables 4 – 15**). For additional information on the listed species, including species specific avoidance and minimization measures and associated habitats that occur within the CVWD service area, see **Section 2.9**.
2. If the proposed activity is not located within a Conservation Area the activity may proceed as planned but must adhere to federal and state species regulations such as the Migratory Bird Treaty Act California Fish and Wildlife code section 1600, 3503, 3503.5, 3513, and any other mandatory regulations such as the Clean Water Act, NPDES or Air Quality regulations.
3. If special-status species may be present, the supervisor shall review the applicable avoidance and minimization measures for the Covered Activity (see **Section 2.2** through **2.7.2**) and the required avoidance and minimization measures for individual Conservation Areas (**Tables 4 – 15**). To protect special-status species and their habitat, activity avoidance and minimization measures will be implemented with the appropriate species-specific avoidance and minimization measures. If the activity or species specific avoidance and protection measures cannot be implemented, the supervisor should contact CVWD's ESD staff to conduct a more detailed site assessment and develop site-specific project recommendations. CVWD's ESD staff should be contacted in advance of Covered Activities (30 days is recommended; longer periods may be necessary if specific surveys are needed) to avoid delays due to conflicts with sensitive species and nesting birds.

If Covered Activities may result in impacts to Yuma Ridgway's Rail, California Black Rail, or Peninsular Bighorn Sheep seek guidance from CVWD's ESD staff prior to initiating any activity.

Although routine operation and maintenance activities undertaken by the CVWD are considered a Covered Activity under the CVMSHCP, some activities may require additional permitting which will be determined as required by consultation with appropriate agencies. Although generally not subject to evaluation and discretionary permitting, Covered Activities can affect threatened and endangered species and their habitats without proper planning.

For the purposes of this manual, Covered Activities include: maintenance related to the repair, rehabilitation, or replacement of any previously serviceable structure (flap gates, discharge pipes, siphons, weirs, drop structures, outfalls, intakes, or other water control devices) or facility, and removal of silt, debris, and vegetation from constructed channels, debris basins, and retention/detention basins provided that such work does not alter the maintenance baseline conditions of the feature (e.g., depth, width, length, location, configuration or design capacity). Minor changes to facilities are also considered routine where such changes result from changes in materials, construction techniques, or safety and building codes.

In addition to the avoidance and minimization measures included in this manual, construction or maintenance work on facilities not designated as Covered Activities may require a Joint Project Review, special mitigation conditions and/or an amendment to the CVMSHCP and shall be evaluated on a case by case basis by CVWD's ESD staff. Additionally, nothing in this manual obviates the need to obtain appropriate permits or authorizations for activities regulated by other agencies such as the USACE (Section 404 of the federal Clean water Act and Section 10 of the Rivers and Harbors Act), CDFW (Section 1600-1616, Lake and Streambed Alteration Program), or Regional Water Quality Control Board (Section 401 of the federal Clean Water Act, Porter-Cologne State Water Quality Act).

2.2 AVOIDANCE AND MINIMIZATION MEASURES FOR COVERED ACTIVITIES

In this context, Covered Activities primarily consist of routine repairs to, and maintenance of, existing facilities. These types of activities are routine in nature, and can involve a relatively small area or larger areas involving water conveyance infrastructure. Examples of minor routine activities include; grading, trenching, cleaning and removing debris from agricultural drains and inlet structures, temporary stock piling of removed sediment from drains adjacent to the drain where space permits, or trimming of over-grown and/or over-hanging vegetation, and vegetation clearing in agricultural drains. The replacement or reconstruction of existing structures and facilities can also be included within this category if the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity. The primary measure of a routine activity is that it involves negligible or no expansion of use beyond that pre-existing condition.

Impacts to sensitive species and their habitat can potentially occur as a result of minor routine activities. For example; grading activities in areas known to support Burrowing Owls may negatively impact the species through disturbance or direct impact to their burrows. Consequently, the owls could abandon young in the nest. Similarly, grading can alter the topography of an area such that drainage patterns and overall hydrology are affected. This could potentially result in the flooding of a Burrowing Owl burrow through ponding water or altered drainage patterns onsite. Disturbance of the soil can also crush or bury plants and animals. Even slight disturbances can destroy burrow openings, collapse below-ground tunnels, and prohibit the escape of animals. Animals that can be affected by maintenance activities include those, like the burrowing owl, that use burrows created by other species, and those that create their own burrows, like the Coachella Valley Round-Tailed Ground Squirrel and the Desert Tortoise. Although routine repairs and maintenance typically occur in areas that are previously disturbed

and therefore, less likely to be occupied by threatened and endangered species, impacts may still occur and attempts to avoid such impacts must be made. Refer to **Section 2.9** for details on the special-status species within the Plan Area, their suitable habitat, locations of occurrence, and species-specific avoidance and minimization measures.

The following avoidance and minimization measures have been established to protect threatened and endangered species and their habitats. When Covered Activities are to occur in a Conservation Area, the following activity-related avoidance and minimization measures are to be implemented in conjunction with the appropriate species-specific avoidance and minimization measures applicable to species found in each Conservation Area as provided in **Tables 4 – 15**.

Avoidance and Minimization Measures

Maintenance activities will be designed and implemented using the following avoidance and minimization measures to protect threatened species and their habitat:

- All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
- Use appropriate buffer zones when performing tree trimming and tree removal activities near active migratory bird nests or ground nesting birds such as Burrowing owl.
- No materials in concentrations deleterious to fish and wildlife including, but not limited to asphalt spoils, chemicals, pesticides/algaecides, and material that contain creosote may be placed in any receiving water.
- When working in sensitive areas (e.g., Conservation Areas, marsh and riparian habitats, Coachella Valley Storm Water Channel, Aeolian Sand Areas), the number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries outside of normal access roads shall be clearly delineated through fencing or flagging. These areas shall be outside of riparian, wetlands, and other sensitive areas.
- Food, trash, and other solid wastes shall be disposed of in raven proof/wildlife proof, covered refuse containers and regularly removed from the various structures and facilities on a daily basis to avoid offsite dispersal of waste and to avoid attracting wildlife onto the project site. Following covered activity work, all trash and debris shall be removed from the work area.
- The potential for wildfires will be reduced by parking vehicles away from vegetation and by the use of shields, protective mats, and other fire preventive methods when welding, grinding, or conducting other activities that are likely to create a fire hazard.

- Any contractor or employee who during routine operations and maintenance activities inadvertently impacts a listed species or a sensitive habitat shall immediately report the incident to their supervisor. The supervisor will then notify CVWD ESD staff. The report from the supervisor will be made within 24 hours of the incident and will include pertinent information including the date, time, location, species or description of organism, habitat, and possible cause of the impact (if known).
- The potential for increased soil erosion and sediment loading to receiving water will be minimized by limiting road improvements to those necessary for project construction, operation and maintenance.

Section 2.9 provides species-specific avoidance and minimization measures for use when performing Covered Activities on CVWD lands within or outside of Conservation Areas. Continue strict adherence to Federal Migratory Bird Treaty Act, California regulations including Section 1600-1616 for Streambed Alteration, Section 3503 and 3503.5 for protection of migratory birds, Clean Water Act and Air Quality regulations when working in the field.

2.3 LEVEE REPAIR, BANK PROTECTION, AND EROSION CONTROL ACTIVITIES

Activities in this category include repair of existing levees and/or replacement of existing bank protection materials to stabilize minor head-cuts or slip outs, blading of rills and gullies, repairing roads, stabilizing head-cuts or slumps, and replacement of existing bank protection materials with clean quarry rock, broken concrete free of rebar, and gabions, and replacement of concrete slope paving and channel lining, pipe and weir revetments, articulated concrete mats, and similar materials.

Standard protection measures have been established to prevent unnecessary and potentially serious impacts to sensitive species and their habitats. The avoidance and minimization measures required for erosion control activities are the same as those mentioned above in **Section 2.2**. They are to be implemented in conjunction with the appropriate species-specific avoidance and minimization measures presented in **Section 2.9**.

2.4 VEGETATION MANAGEMENT

Vegetation management activities include the use of herbicides, mowing, and other methods of reducing the amount of cover of terrestrial weeds or other vegetation that may interfere with the operation of facilities or to limit the spread of undesirable plants and nonnative species. It also includes various methods of controlling aquatic weeds, including algae. The following discussion of weed control is separated into the two main categories of plants, terrestrial versus aquatic, and focuses primarily on mechanical and chemical control of both types of vegetation. See **Section 2.6** for a discussion of mechanical means of weed control (e.g., mowing, disking) for O&M purposes.

2.4.1 CONTROL OF TERRESTRIAL WEEDS

Terrestrial vegetation control is important for the removal of exotic, or noxious, undesirable plants as well as native plants that may interfere with the operation of facilities. Typical methods of control include mowing or hand removal with power tools (e.g. chain saw, string trimmer or brush cutter), blading, excavating, disking, and herbicides. The elimination of weeds on channel banks has been a common practice because it facilitates the early detection of leaks and structural damage and in maintaining channel capacity. Weed control occurs along maintenance roads, road shoulders, and unpaved roads, mostly as a means of reducing fire hazard, reducing the spread of noxious weeds into right of way, and maintaining the integrity of the roads (plant growth can potentially crack and destroy pavement, canal lining, and compacted road shoulders). **Table 1** provides a summary of the herbicides typically used by CVWD. The information contained in this table serves as a guideline for the general herbicide use by CVWD throughout their service contract area. Applications of any herbicide will be made in accordance with the manufacturer's label information.

Although chemical control of terrestrial weeds is widespread, potential problems associated with the use of herbicides may occur. Following the product label directions and precautions will minimize the risk to listed species on CVWD lands within Conservation Areas.

In addition to the avoidance and minimization measures listed in **Section 2.2**, the following activity-related measures are to be implemented when conducting weed control activities in listed species habitat areas. These measures are to be implemented in conjunction with the appropriate species-specific avoidance and minimization measures presented in **Section 2.9**.

Avoidance and Minimization Measures

- Comply with the requirements specified on the pesticide product labeling; use of pesticides shall also comply with the guidelines and use restrictions for herbicides provided in the U.S. Environmental Protection Agency's "Interim Measures for Use of Pesticides in Riverside County."
- For spray-able or dust formulations, when air is calm or moving away from sensitive species and habitat, applications may commence on the side nearest the habitat and proceed away from the sensitive species/habitat. When air currents are moving toward sensitive species/habitat, do not make applications within 200 yards by air or 40 yards by ground upwind of the habitat.
- Ensure herbicide use near U.S. Waters is performed in accordance with state general permit provisions to protect sensitive habitats and areas where threatened and endangered species are observed. Consider alternate methods when feasible.

- Mix herbicides in areas not prone to runoff such as concrete mixing/loading pads, disked soil in flat terrain, or graveled mixing pads. Do not mix herbicides and/or fill application equipment tanks within the channel and/or in locations that may be subjected to high storm flows. Avoid mixing herbicides and/or filling application equipment tanks within 150 feet of receiving waters whenever possible. Use an appropriate method to contain spills and the rinsate. Properly empty and triple rinse pesticide containers at the end of each use.
- Prevent herbicide/pesticide runoff into U.S. Waters including rivers, creeks, lakes, streams, wetlands and marshes by providing a buffer zone of vegetation on which no pesticides are applied where feasible.

The application rate will vary depending upon the mode of action of the compound, the target species, the existence of Pest Management Zones, and the potential occurrence of sensitive species. Avoid impacts from the drift of spray-able or dust formulations away from the target locations. Appropriate spray devices and application methods, such as spray pressures, nozzle opening size, and additives such as spray retardants, will be used to prevent drift. Under no circumstances should any herbicide application occur when wind speed exceeds 10 miles per hour. When the air is moving toward the habitats, do not make applications within 200 yards by air or 40 yards by ground upwind from the sensitive habitat. These buffer zones may be reduced if there is an adequate physical barrier (e.g., hedgerow, wind break, or riparian corridor) that substantially reduces the probability of drift. Additionally, applications will not be made during rain so that organisms that respond to rainfall, such as amphibians and plant species, would not be subject to direct spray. It is possible that some residue in the soil could affect amphibians, reptiles, and plant species that are in contact with ground that has been treated. Accordingly, the least toxic herbicides will be used that will provide adequate control.

Mechanical control methods such as mowing are used as an alternative to the application of herbicides, whenever appropriate. The practicality of mechanical methods as a method of weed control will be determined on a site-by-site basis. The accepted approach to weed control in any one area will likely be a combination of techniques, using the best method for the conditions in a particular area.

For the routine trimming of over-grown and over-hanging vegetation that may pose a human safety threat along pathways or service roads leading to CVWD facilities contact CVWD ESD staff to survey for nesting birds. If no active nests are present, then trim trees and shrubs.

Avoidance and Minimization Measures for Mechanical Vegetation Clearance

- Contact ESD staff and arrange for pre-activity bird nesting survey if activity will occur from March 1 to September 1 for migratory birds, January 1 to July 31 for raptors (hawks, owls, eagles), and February 1 to August 31 for Burrowing owls.
- Mowing vegetation growing within the WWRSC/CVSC will be performed using a rubber tired vehicle.
- Conduct all equipment refueling and maintenance outside the channel, preferably in a staging area appropriate to the type of activities that will occur.

2.4.2 CONTROL OF AQUATIC WEEDS

Vegetation growing in channels, canals, and reservoirs can decrease volume of flow or storage capacity and make it difficult to calculate water availability and flow for deliveries. In lined canals, vegetation growing from panel seams can cause damage to the integrity of the lining. Large blooms of algae can clog drains and at times substantially reduce water quality when large-scale die-offs occur. Prevention of aquatic weed buildup is an important consideration of a weed control and management program, and early detection and eradication is a prime objective. Prevention and removal of sediment deposits within canals reduces suitable rooting substrate and deters the establishment of aquatic plants.

Current practices for the removal of aquatic weeds and grass within water conveyance canals and channels include the use of Triploid Grass Carp which has proven to be the safest for the environment, most effective and least costly. Herbicide, under the trade name Aquaneat, is also used to control nuisance vegetation and other weed growth in some facilities with Covered Activities. **Table 1** provides a summary of herbicide use by CVWD. The information contained in this table serves as a guideline for the general herbicide use throughout CVWD's service area.

Avoidance and minimization measures noted above for the chemical control of terrestrial weeds apply to the control of aquatic weeds, excluding the precautions related to surface water. Additionally, the following activity-related general measures are to be implemented where appropriate. These measures are to be implemented in conjunction with the pertinent species-specific avoidance and minimization measures presented in the individual Conservation Area species lists found in **Tables 4 – 15**.

Aquaneat is the recommended product for aquatic weed control within the restored habitats and/or native habitat and on CVWD lands within Conservation Areas that include wildlife management areas.

Habitat Restoration and Maintenance — when applied as directed, exotic and other undesirable vegetation may be controlled in habitat management areas. Applications may be made to allow recovery of native plant species, to open up water to attract waterfowl, and for similar broad-spectrum vegetation control requirements in habitat management areas. Spot treatments may be made to selectively remove unwanted plants for habitat enhancement. For spot treatments, care should be exercised to keep spray off of desirable plants.

The use of any herbicide or pesticide **shall comply with the requirements specified on the product labeling** and follow the guidelines and use restrictions provided in the U.S. Environmental Protection Agency's "Interim Measures for Use of Pesticides in Riverside County". Pesticide applications in U.S. Waters shall comply with the State Water Resources Control Board general NPDES permit for applying aquatic pesticides to control weeds. When chemical methods are used, the herbicides least toxic to aquatic animal life will be applied in order to obtain the required results. Herbicides are rated on the label according to the level of danger from toxicity, and toxicity rating should be reviewed with respect to target criterion and concentrations. For any application of herbicides applications must be made in compliance with the label requirements from the manufacturers. The actual choice of the chemical used for a

particular application should be made based on use restrictions and discussions with the California Department of Pesticide Regulations (CDPR). The CDPR pest management program is established to help water purveyors achieve the most effective and safe pest control program for their sites for a review of current regulations and discussion go to the CDPR website at <http://www.cdpr.ca.gov/>. Combination approaches of manual, mechanical, and chemical methods can be implemented in areas where various logistical and biological constraints must be considered. New formulations of aquatic herbicides will likely be developed to control aquatic weeds and will become available in the near future. The application of any new chemical product for aquatic weed control should be coordinated with CVWD ESD staff to minimize the risk to listed aquatic species that might be living in the habitat or area to be treated. Use the following avoidance and minimization measures and species-specific avoidance and minimization measures beginning in **Section 2.9** of this manual:

Avoidance and Minimization Measures

- Any herbicide use shall comply with the requirements specified on the product labeling. Use of pesticides shall also comply with the guidelines and use restrictions for herbicides provided in the California Department of Pesticide Regulations (CDPR).
- For spray-able or dust formulations, when air is calm or moving away from sensitive species/habitat, applications may commence on the side nearest the habitat and proceed away from the sensitive species/habitat. When air currents are moving toward sensitive species/habitat, do not make applications within 200 yards by air or 40 yards by ground upwind of the habitat.
- Ensure herbicide use in U.S. Waters is performed in accordance with state general permit provisions to protect sensitive habitats and areas where threatened and endangered species are observed. Consider alternate methods when feasible.
- Mass application of herbicide is discouraged in U.S. Waters and spot spraying or more localized applications are recommended. Where appropriate, selective herbicides should be used to eliminate only broad-leaved plants and encourage native vegetation.
- Mix herbicides in areas not prone to runoff such as concrete mixing/loading pads, disked soil in flat terrain, or graveled mixing pads. Use an appropriate method to contain spills and the rinsate. Properly empty and triple rinse application sprayers or containers at the end of each use.
- Prevent pesticide runoff into U.S. Waters including rivers, creeks, lakes, streams, wetlands and marshes by providing a buffer zone of vegetation on which no pesticides are applied where feasible.
- Herbicides shall not be applied to U.S Waters without first obtaining the applicable NPDES permit for this application. CVWD ESD staff shall be consulted to discuss the need for this type of permit.

Herbicide Safety BMPs

- Read and follow label safety directions, maintain appropriate Material Safety Data Sheets, and become certified prior to applying restricted use pesticides.
- Wear the appropriate protective equipment specified on the pesticide label to minimize unnecessary exposure to pesticide. Be sure to clean protective gear after each day's use.
- Provide emergency hand and eye wash facilities for personnel working in chemical storage, mixing, and treatment areas. Develop a safety plan that includes information about poison centers and emergency response phone numbers in highly visible places near areas where chemical handling occurs.
- Know what to do in case of accidental pesticide poisoning. Have an emergency response kit available when handling pesticides. Check the product label for instructions and call the nearest poison center in the event a pesticide is swallowed or when pesticide exposure has occurred. Product labels often include a telephone number where expert information is also available. Take the pesticide label to the attending physician if you need treatment.
- Follow all Worker Protection Standard (WPS) requirements and postings as specified by the CVWD Safety Department.

2.5 PEST CONTROL ACTIVITIES

Pest control activities include limited use of pesticides, and rodent control for Roof rats (*Rattus rattus*), Norway rats (*Rattus norvegicus*), and House mouse (*Mus musculus*) at CVWD facilities. Contract consultants are enlisted, as needed, to trap rodents such as California ground squirrels (*Otospermophilus beecheyi*) that may compromise the integrity of canal banks, agricultural drains, or other infrastructure to protect these facilities from damage. Prior to implementing any trapping, the target species will be identified to avoid/minimize impacts to species listed under the MSHCP. Rodenticides and insecticides are no longer used in the field as part of CVWD's nuisance pest control protocol but are utilized at CVWD office and water reclamation facilities as needed. Although rodenticides are no longer used during the course of field maintenance activities, rodent control is implemented at CVWD offices and water reclamation facilities in the form of bait stations. Use of these stations within CVWD facilities is not anticipated to impact listed plant or animal species due to the lack of suitable onsite habitat and level of disturbance associated with developed facilities. **Table 1** provides a summary of the pest control activities by CVWD. The information contained in this table serves as a guideline for the general control methods used by CVWD. If, in the future, chemical or bait methods are used to control rodents at additional facilities, the intended treatment areas will be evaluated for the potential occurrence of special-status species that are associated with burrow complexes, such as Desert Tortoise, Coachella Valley round tailed ground squirrel, and Burrowing owls. See **Section 2.9** for special-status species occurrences and distribution in the Coachella Valley.

Although most chemicals known for high rates of secondary poisoning have been banned in recent years, secondary poisoning can still occur if a predator feeds upon the carcass of an animal that has been poisoned by a rodenticide especially second generation anti-coagulants. Young animals are especially sensitive to secondary poisoning. Rodenticides can accumulate in the tissues of higher carnivores and scavengers. Sensitive species that are considered at risk from secondary poisoning include burrowing owl, other birds of prey and desert tortoise. Alternative (i.e., non-chemical) approaches should be considered for rodent control in areas potentially supporting threatened and endangered wildlife. Trapping may be very effective for control of rodents in CVWD facilities.

If feasible, use standard rodent traps as an alternative to chemical control for rodents in and around CVWD facilities. Traps will not be placed in open desert or outside of CVWD facilities to avoid impacting non-target species. Stake all traps during placement. Trapped rodents will be removed from traps and placed in the trash. The following avoidance and minimization measures apply to the use of insecticides and rodenticides and trapping. These measures are to be implemented where appropriate and in conjunction with the appropriate species-specific avoidance and minimization measures beginning in **Section 2.9**.

Avoidance and Minimization Measures for Trapping and Pesticide Use

- Comply with the requirements specified on the pesticide and bait station product labeling when using insecticides and rodenticides; use of such pesticides shall also comply with the guidelines and use restrictions for pesticides provided in the California Department of Pesticide Regulations (CDPR, Appendix B).
- Maintain application equipment in good working condition and calibrate equipment frequently to ensure that pesticides are applied at recommended rates. Replace all worn components of pesticide application equipment, especially nozzles, prior to application.
- Ensure that the pesticide applicator knows the exact field location to be treated. Post warning signs around fields that have been treated, in accordance with local, state, and federal laws. Follow the established re-entry interval as stated on the pesticide label.
- Employ application techniques that increase efficiency and allow the lowest effective labeled application rate. Use band and spot applications of pesticides where appropriate to reduce environmental hazards and treatment costs.
- Avoid unnecessary and poorly timed application of pesticides. Optimize pesticide rate, timing, and placement to avoid the need for re-treatment.
- Avoid overspray and chemical drift, especially when surface water is in close proximity to treatment area. Avoid applications if wind speed favors drift beyond the intended application area. Increasing nozzle size and/or lowering boom pressure will increase droplet size and help reduce drift. Always recalibrate following equipment adjustments or modifications.

- Time pesticide application in relation to soil moisture, anticipated weather conditions, and irrigation schedules to achieve the greatest efficiency and reduce the potential for off-site transport. Avoid pesticide application when soil moisture status or scheduled irrigation increases the possibility of runoff or deep percolation. After application, manage irrigation to reduce the possibility of erosion, runoff and/or leaching, which may transport pesticide from the target site.
- Establish buffer zones so pesticide is not applied within 50 feet of wells and surface water.
- Apply pesticides in a manner that will minimize off-target effects.
- Ensure that backflow prevention devices are installed and operating properly on irrigation systems used for applying pesticide or herbicide.
- When disposing of dead rodents do not touch them with bare hands, use gloves or a plastic bag to pick up the rat or to remove the rat from the trap.
- Do not place bait stations or rodent traps in open desert outside of CVWD facilities or field locations supporting CVWD infrastructure.

Pesticide Safety BMPs

- Read and follow label safety directions, maintain appropriate Material Safety Data Sheets (MSDS), and become certified prior to applying restricted use pesticides.
- Wear the appropriate protective equipment specified on the pesticide label to minimize unnecessary exposure to pesticide. Be sure to clean protective gear after each day's use.
- Provide emergency hand and eye wash facilities for personnel working in chemical storage, mixing, and treatment areas. Develop a safety plan that includes information about poison centers and emergency treatment centers. Post emergency response phone numbers in highly visible places near areas where chemical handling occurs.
- Know what to do in case of accidental pesticide poisoning. Have an emergency response kit available when handling pesticides. Check the product label for instructions and call the nearest poison center in the event a pesticide is swallowed or when pesticide exposure has occurred. Product labels often include a telephone number where expert information is also available. Take the pesticide label to the attending physician if you need treatment.
- Follow all Worker Protection Standard (WPS) requirements and postings as specified by the CVWD Safety Department.

2.6 TEMPORARY DE-WATERING AND REMOVAL OF SEDIMENT FROM WATER SUPPLY RESERVOIRS, DETENTION/RETENTION BASINS, AND CANALS

Accumulated sediment, silt, and aquatic vegetation needs to be periodically cleaned from water supply reservoirs, detention/retention basins, pipelines, and other water control structures in order to retain capacity, permit proper functioning, and maintain water quality. These sorts of activities are typically conducted on an as needed basis which is determined by irrigation staff (i.e., after or prior to the irrigation season). In some cases, it is also necessary to temporarily de-water facilities in order to conduct the maintenance activities outside of the normal periods when such facilities may normally be dry or drained as part of normal operations.

The following activity-related avoidance and minimization measures have been developed to protect listed species and their habitats. These measures are to be implemented in conjunction with the appropriate species-specific avoidance and minimization measures presented in **Section 2.9**.

Avoidance and Minimization Measures

If a work site is to be temporarily de-watered or filled, the de-watering and other required maintenance should be conducted as follows:

- Contact CVWD ESD staff to determine if any pre-activity surveys are required for Covered Activities within Conservation Areas.
- Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during the covered activity. Upon completion of Covered Activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.
- Discharges of deleterious amounts of sediment shall be controlled to reduce the risk to listed species found in aquatic habitats.
- Be aware that sensitive species and other animals may hide under piles of trash, construction materials, or parked vehicles. Check for wildlife before moving these items.
- Conduct all equipment refueling and maintenance outside the stream channel, preferably in a staging area appropriate to the type of activities that will occur.
- The spread of or introduction of invasive, exotic plants, animals, invertebrates and mollusks should also be avoided to the maximum extent possible. CVWD accomplishes this by washing down and drying drain clearing equipment after use in the field.

2.7 FLOOD CONTROL AND DRAINAGE CHANNEL MAINTENANCE

CVWD also performs flood control channel maintenance. Maintenance of flood control channels is critical for the channel to convey flood waters as designed and is considered to be a Covered Activity under the CVMSHCP. This involves numerous activities for maintaining the channel's integrity, controlling vegetation, removing debris, and maintaining access roads. The following discussion is intended to address the nature, impacts, and impact avoidance measures for each type of activity.

The following measures have been developed to protect listed species and their habitats while conducting channel maintenance operations. These measures are to be implemented in conjunction with the avoidance and minimization measures described in **Section 2.2** and the appropriate species-specific avoidance and minimization measures presented in **Section 2.9** and **Tables 4 – 15**. Other associated specific activity measures described in **Sections 2.2** through **2.7.2** should be implemented if required.

2.7.1 AGRICULTURAL DRAIN CLEANING

Drain maintenance is required to remove sediment and emergent vegetation that has accumulated in the agricultural drains so that the capacity of each drain is maintained. Some agricultural drains occur within the Delta Conservation Area and therefore require avoidance and minimization measures to protect listed species, such as the Desert pupfish, Yuma Ridgway's Rail and California black rail, and migratory birds which may nest in the area.

Avoidance and Minimization Measures

The following avoidance and minimization measures are intended to protect species associated with the potential habitat found in the agricultural drains that occur along the Salton Sea and within the CVSC Delta Conservation Area. Further development of avoidance and minimization measures may be incorporated into this manual as new information regarding species occurrence and distribution within the Plan area is learned. The following avoidance and minimization measures may be used individually or in concert with each other depending upon the potential impacts the activity may involve:

- If covered drain activities will occur within a Conservation Area refer to the appropriate Conservation Area Species list for applicable avoidance and minimization measures; contact CVWD ESD staff and determine if any pre-activity surveys are required.
- If coffer dams and pumps are used to isolate and dry the work area, prevent the pumped water from reentering the stream channel unless/until deleterious amounts of sediment has settled out.
- Conduct all equipment refueling and maintenance outside the stream channel, preferably in a staging area appropriate to the type of activities that will occur.
- Deposit dredged material where water from this material is less likely to drain directly into the agricultural drain to minimize erosion and transport of the dredged material.

- In areas of Yuma Ridgway's Rail/California Black Rail habitat: Perform pre-activity nesting surveys between March 1 – September 1 to determine presence of nesting rails or other marsh/riparian bird species on the worksite. If nesting rails or other nesting bird species are present flag and create a buffer zone of at least 200 feet to avoid and minimize impacts to nesting birds or their offspring.
- Discharges of deleterious amounts of sediment shall be controlled to reduce the risk to listed species found in aquatic habitats.
- Be aware that sensitive species and other animals may hide under piles of trash, construction materials, or parked vehicles. Check for wildlife before moving these items.

2.7.2 FLOOD CONTROL CHANNEL MAINTENANCE

Current O&M activities for flood control channels include emergency repairs following major flooding events, mowing, and vegetation removal by hand, maintenance of access roads, and replacement of signage. CVWD is currently working with state and federal agencies to obtain Clean Water Act permits to perform expanded O&M activities to allow the Whitewater River and Coachella Valley Stormwater Channel (WWSC/CVSC) system and associated tributaries to operate under optimum conditions per design. The following avoidance and minimization measures will be used for these Covered Activities:

Avoidance and Minimization Measures

- Contact CVWD ESD staff to determine if any pre-activity surveys are required for Covered Activities within Conservation Areas.
- Have ESD staff perform a pre-activity survey of the site for the presence of nesting migratory/marsh birds having the potential to occur in this habitat and implement appropriate buffer zones for nesting birds.
- Implement BMPs and beneficial control measures identified in the drain maintenance study to minimize direct impacts to Desert pupfish.
- If coffer dams and pumps are used to isolate and dry the work area, prevent the pumped water from reentering the stream channel unless/until deleterious amounts of sediment have settled out.
- Conduct all equipment refueling and maintenance outside the flood control channel, preferably in a staging area appropriate to the type of activities that will occur. This will include washing of equipment and vehicles which occurs at the CVWD equipment storage yard following maintenance activities.
- Deposit dredged material where water from this material is less likely to drain directly into the flood control channel to minimize erosion and transport of the dredged material.

- Minimize the impacts associated with the Covered Activity site access roads, including (1) locating the roads so as to minimize the pruning or removal of vegetation, (2) using erosion control BMPs to stabilize the roads prior to the rainy season, and (3) closing the roads off following completion of the Covered Activity to prevent use by off-road vehicles.

2.8 SPECIAL-STATUS SPECIES

The Federal Endangered Species Act (ESA) prohibits the "taking" of threatened and endangered plant and animal species unless authorized by the FWS under Section 7 or Section 10(a) of the ESA and sections 3503, 3503.5, and 3513 of the California Fish and Game Code (FGC) prohibit the take of all birds and their nests, including raptors. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Protection can also extend to the habitat of listed species meaning that modifications to or destruction of a listed species' habitat can also be considered "Take" under certain circumstances.

The covered operations and maintenance activities that are considered routine and necessary within the CVWD service area constitute actions that could potentially impact listed plants and animals. The following section provides guidance to protect state and federally-listed plants and wildlife within the CVWD service area. Review of the appropriate portions of this section prior to initiating routine activities will help to avoid violation of the "Take" provisions of the ESA while still providing for the continuance of routine operations and maintenance procedures.

It is important for all operations and maintenance personnel, including contractors, to be informed of the sensitive nature of listed species and the legal consequences of intentionally modifying or destroying them or the habitats in which they occur.

2.8.1 SPECIAL-STATUS SPECIES IN COACHELLA VALLEY MSHCP

Twenty seven species of plants and animals are listed as threatened or endangered under the federal Endangered Species Act (ESA) and include nine species which are jointly listed by the state of California. These listed species all occur in CVMSHCP boundary and CVWD's service area with the exception of the Desert Slender Salamander. An additional four species are listed as rare, threatened or endangered by the State. These plant and animal species along with their status are shown in **Table 2**.

Many of these sensitive species are associated aquatic or wetland habitats (perennial and/or seasonal) for much of the year or for critical life functions such as breeding and rearing/growth of young. However, many of these species also use uplands for other essential life functions such as refuge, aestivation, migration or dispersal and escape from floods. Thus, both wetlands and uplands within the range of special-status species are of concern for facilities operation and management activities.

2.8.2 CONSERVATION AREAS IN THE COACHELLA VALLEY

Twenty-one Conservation Areas have been identified within the Coachella Valley. Conservation Areas are habitat-based and represent the primary regions containing habitats that may support one or more of the listed species shown in **Table 2**. The Conservation Areas have been developed as general guidelines for locations that may support the 27 species covered under the CVMSHCP. Special-status species may also occur outside of the general mapped Conservation Area's and other factors such as habitat should be considered prior to commencement of Covered Activities. CVWD ESD staff shall survey sites within Conservation Area's prior to the start of Covered Activities likely to impact special-status species.

The Conservation Area map is intended to be used as a guide to indicate the locations of Conservation Area's and the associated CVWD owned lands within each Conservation Area. In addition to the Conservation Area Map the individual Conservation Area species lists are designed to provide an overview of avoidance and minimization measures applicable to species associated with each Conservation Area. The individual Conservation Area species list is designed to be used as an avoidance and minimization guide for CVWD staff and is not intended to identify all site-specific locations of threatened or endangered species habitats in the Coachella Valley. However, for two of the species – Yuma Ridgway's Rail, and California Black Rail- occurrence outside of their respective Conservation Areas is unlikely based upon the best available science. For these species, the applicable protection measures only apply to designated habitat areas.

The Conservation Area species lists and associated avoidance and minimization measures specific to each Conservation Area are provided in **Tables 4-15**. The following section provides natural history as well as additional reference for avoidance and minimization measures for each species covered under the CVMSHCP.

2.9 SPECIES ACCOUNTS AND AVOIDANCE MEASURES

The following sections provide information on the threatened and endangered species in the Coachella Valley that are most likely to be encountered during normal operations and maintenance activities. Specific avoidance measures for each species or group of species/habitat association are also described to prevent or minimize the potential for take of sensitive species. As per the terms and conditions of the CVMSHCP, these avoidance and minimization shall be implemented to the maximum extent possible. These procedures will be followed by CVWD staff in charge of maintenance activities to avoid unauthorized incidental take of threatened and endangered species. If the required avoidance and minimization measures outlined below cannot be followed, the project must be reviewed to determine if threatened or endangered species may be impacted.

The following steps should be followed prior to the start of a Covered Activity:

1. The relevant information in **Section 2.0** should be carefully reviewed regarding the type(s) of routine activity(s) to be initiated and the associated avoidance and minimization measures needed to protect sensitive species and habitats.

2. Once Step 1 has been completed, the Conservation Area map should be reviewed and the on-site and near-site conditions evaluated to determine if special-status species potentially occur.

If the results of these initial evaluation steps (i.e., Steps 1 and 2) indicate that special-status species may occur at or near a designated work site, the appropriate species accounts should be reviewed. These species accounts are intended to provide detailed information regarding species descriptions, their habitat requirements, general activity period, and the required avoidance measures to be implemented to prevent or minimize impacts to sensitive species.

It is important to note that the required species-specific avoidance and minimization measures presented in **Section 2.9** of the manual are intended to be implemented in conjunction with the activity-related avoidance and minimization measures outlined in **Section 2.0**.

3.0 PLANTS

The species accounts and avoidance and minimization measures presented below are designed for supervisors and field crews, and can be used for a variety of purposes such as planning and contractor awareness training, as well as use in the field by operations and maintenance staff.

3.1



Mecca Aster

Xylorhiza cognate

Status Federal: No official status

State: No official status

CNPS: List 1B

Species Account:

Mecca aster may be associated with two intergraded geologic formations found in these hills; the Palm Springs formation and the Canebrake formation (Stewart 1991). These formations are similar in age and are both fluvial deposits; the Palm Springs formation is composed of sandstones and clays while the Canebrake formation includes granitic conglomerates of larger materials. Stewart noted a strong correlation between the known occurrences of this species and the Palm Springs and Canebrake geologic formations. The original model for this species incorporated the mapped distribution of the Palm Springs formation. This formation includes a significant area in the Indio Hills west of the Thousand Palms Preserve where this species has never been observed. Conversely, the Palm Springs formation is not mapped in an area in the East Indio Hills, between Macomber Palms and Biskra Palms, where many known occurrences of Mecca aster have been recorded. So in October 2002, the model was revised to more accurately reflect the known distribution of the Mecca aster.

This species is located within the following Conservation Areas:

- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- For Covered Activities within Mecca Aster habitat in the Thousand Palms, Indio Hills, East Indio Hills, Desert Tortoise and Linkage, and Mecca Hills/Orocopia Mountains Conservation Areas, surveys by ESD staff will occur prior to ground disturbance activities during the growing and flowering period from February 1 - May 15.
- Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Mecca Aster where it may occur in appropriate habitat along roads or wash bottoms.
- CVWD will continue to control and manage access to Mecca aster habitat on district owned lands within the CVMSHCP area. In addition, CVWD does not allow OHV use on its lands and prohibits public access.
- Avoid the use of herbicides outside of CVWD facilities in areas that are known to support Mecca Aster.

What to Do If Found

- Immediately stop all work in the vicinity of the plant and create a 25-foot buffer zone which will allow for avoidance of the plant and reduce potential impacts from Covered Activities. Notify ESD staff that a Mecca Aster was observed and what actions were taken to avoid impacts.

3.2



Coachella Valley Milkvetch

Astragalus lentiginosus var. coachellae

Status Federal: Endangered

State: No official status

CNPS: List 1B

Species Account:

The Coachella Valley Milkvetch (CVM) occurs in dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides where they occur adjacent to existing sand dunes. Within the sand dunes and sand fields, this Milkvetch tends to occur in the coarser sands at the margins of dunes, not in the most active blow sand areas. As this species is strongly affiliated with sandy substrates, it may occur in localized pockets where sand has been deposited by wind or by active washes. It may also occur in sandy substrates in creosote bush scrub, not directly associated with sand dune habitats. In the Plan Area, populations are known from the Snow Creek area (in the sandy areas on either side of Snow Creek Road east toward Windy Point and scattered along Tipton Road, north of Highway 111), on the Whitewater Floodplain Preserve, the Willow Hole-Edom Hill Preserve/ACEC, and the Thousand Palms Preserve. Other concentrations of the species occur along Gene Autry Trail near the airport in Palm Springs, on and around Flat Top Mountain, along Varner Road at the base of Edom Hill, on remnants of the Big Dune south of Interstate 10, and in scattered locations in the southern parts of Desert Hot Springs (including at the wastewater treatment plant). In the area of the Big Dune, Habitat viability has been much reduced by roads, fragmentation, and disturbance (C. Barrows 1987, CNDDDB/CDFW 1997). Though suitable habitat appears to be present in the Indio and La Quinta areas, this species has not been recorded there. Within the Plan Area, the easternmost occurrence for CVM is on the Thousand Palms Preserve.

This species is located within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Edom Hill Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- For Covered Activities within modeled CVM habitat in the Whitewater Canyon, Whitewater Floodplain, Cabazon, Stubbe and Cottonwood, Upper Mission Creek/Big Morongo Canyon, Edom Hill, Indio Hills/Joshua Tree National Park Linkage, Indio Hills Palms, East Indio Hills, and Santa Rosa and San Jacinto Mountains Conservation Areas, pre-activity surveys by the ESD staff will be required for ground disturbance activities during the growing and flowering period from February 1 - May 15.
- Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of CVM where it may occur in appropriate habitat along roads or wash bottoms.
- If CVM is found to be within the footprint of any covered activity contact ESD staff to determine if salvage of plant and/or seeds is feasible.
- CVWD will continue to control and manage access to CVM habitat on district owned lands within the CVMSHCP area. In addition, CVWD does not allow OHV use on its lands and prohibits public access.
- Avoid the use of herbicides outside of CVWD facilities in areas that are known to support CVM.

What to Do If Found

Immediately stop all work in the vicinity of the plant and create a 25-foot buffer zone which will allow for avoidance of the plant and reduce potential impacts from Covered Activities. Notify ESD staff that a Coachella Valley Milk-vetch was observed and what actions were taken to avoid impacts.

3.3



Triple-Ribbed Milk-vetch

Astragalus tricarinatus

Status Federal: Endangered

State: No official status

CNPS: List 1B

Species Account:

The Triple-Ribbed Milk-vetch is an endemic species found in a narrow range primarily from the northwestern portion of the Coachella Valley, from the vicinity of Whitewater Canyon, the type locality, in Mission Creek Canyon across Highway 62 to Dry Morongo Wash and Big Morongo Canyon. Another location where the species has been collected is Agua Alta Canyon, a branch of Martinez Canyon in the Santa Rosa Mountains in the southern portion of the Plan Area; this record is for one individual collected by Jon Stewart and identified by Andy Sanders of the U.C. Riverside herbarium. Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. In particular, known occurrences on a map maintained by CVCC shall not be disturbed.

This species is found within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- For Covered Activities within Triple-Ribbed Milk-vetch habitat in the Whitewater Canyon, Whitewater Floodplain, Upper Mission Creek/Big Morongo Canyon, and Santa Rosa and San Jacinto Mountains Conservation Areas, surveys by ESD staff will occur for ground disturbance activities during the growing and flowering period from February 1 - May 15.
- Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Triple-ribbed Milk-vetch where it may occur in appropriate habitat along roads or wash bottoms.
- If Triple-Ribbed Milk-vetch is found to be within the footprint of any covered activity contact ESD staff to determine if salvage of plant and/or seeds is feasible.
- Avoid the use of herbicides outside of CVWD facilities in areas that are known to support Triple-Ribbed Milk-vetch.

What to Do If Found

- Immediately stop all work in the vicinity of the plant and create a 25-foot buffer zone which will allow for avoidance of the plant and reduce potential impacts from Covered Activities. Notify ESD staff that a Triple Ribbed Milk-vetch was observed and what actions were taken to avoid impacts.

3.4



Orocopia Sage

Salvia greatae

Status Federal: No official status

State: Special Plant, California Species of Special Concern

CNPS: List 1B

Species Account:

The preferred habitat of Orocopia sage is in gravelly or rocky soils on broad bajadas or fans, often adjacent to desert washes or on the rocky slopes of canyons. It may occur on alluvial terraces and sandy or rocky benches elevated above the flood plain of a wash, as in the Salt Creek Wash along the Bradshaw Trail. The species does not appear to occur within the immediate wash zone. This species has also been recorded up to 2,800 feet in the Orocopia Mountains. Though Orocopia sage is patchy in its distribution, it is typically one of the dominant members of the vegetation where it occurs. Plants may be 3 to 4 feet tall and usually form dense, rounded clumps, sometimes as large as 4 or 5 feet in diameter. Multiple branching from near ground level results in a very bushy appearance. This species is associated with desert dry wash woodland and Sonoran creosote bush scrub.

This species occurs within the following Conservation Areas:

- Mecca Hills/Orocopia Mountains.
- Desert Tortoise and Linkage.

Species Specific Avoidance and Minimization Measures are described below:

- For Covered Activities within Orocopia Sage habitat in the Mecca Hills/Orocopia Mountains, and Desert Tortoise Linkage Conservation Areas, surveys by ESD staff will occur ground disturbance activities during the growing and flowering period from February 1 - May 15.
- Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Orocopia sage where it may occur in appropriate habitat.
- If Orocopia sage is found to be within the footprint of any covered activity contact the ESD to determine if salvage of plant and/or seeds is feasible.
- Avoid the use of herbicides outside of CVWD facilities in areas that are known to support Orocopia Sage.

What to Do If Found

- Immediately stop all work in the vicinity of the plant and create a 25-foot buffer zone which will allow for avoidance of the plant and reduce potential impacts from Covered Activities. Notify ESD staff that an Orocopia Sage was observed and what actions were taken to avoid impacts.

3.5



Little San Bernardino Mountains Linanthus

Linanthus maculatus (also *Gilia maculata*)

Status Federal: Species of Concern

State: Species of Special Concern

CNPS: List 1B

Species Account:

The preferred habitat of Little San Bernardino Mountains Linanthus is in loose soft sandy soils on low benches along washes, generally where the substrate shows some evidence of water flow. It seems to occur in areas where few or no competing species are found, with little shrub or tree cover in the immediate vicinity. The sand is loose and well-aerated, soft and unconsolidated (Sanders 1999). The occurrences within the Plan Area are on the margins of washes on shallow sandy benches, not on areas where a hard surface layer occurs, and not on loose blow sand away from washes. It is associated with creosote bush scrub, but avoids growing in the shadow of other plants. The elevation range of the species is from 500 to 4,000 feet. Little is known of the life history of this species. Its pollinators, germination requirements, seed longevity, and population parameters have not been described. The flower form and color are indicative of insect pollination but no information on pollination ecology is available. The plants are very small, generally reaching a height of only 0.8 to 1.2 inches. They have a slender, little-branched tap root that may extend over 3 inches into the sand, probably allowing the plants to tap subsurface supplies of moisture and thus avoid atmospheric drying. They are nevertheless very ephemeral.

Associated Covered Species. Within the Plan Area, other species of concern who's Core Habitat overlaps with that of the Little San Bernardino Mountains Linanthus include Triple-Ribbed Milk-vetch, Palm Springs Pocket Mouse, Desert Tortoise, and Burrowing Owl.

This species is found within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Morongo Wash Special Provisions Area within the Upper Mission Creek/Big Morongo Canyon Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- For Covered Activities within Linanthus habitat in the Whitewater Canyon Conservation Area, Upper Mission Creek/Big Morongo Canyon Conservation Area, and Morongo Wash Special Provisions Area within the Upper Mission Creek/Big Morongo Canyon Conservation Area perform surveys by ESD staff will be required for ground disturbance activities during the growing and flowering period from February 1 - May 15.
- Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Little San Bernardino Mountains Linanthus where it may occur in appropriate habitat.
- If Little San Bernardino Mountains Linanthus is found to be within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible.
- Avoid the use of herbicides outside of CVWD facilities in areas that are known to support Linanthus.

What to Do If Found

- Immediately stop all work in the vicinity of the plant and create a 25-foot buffer zone which will allow for avoidance of the plant and reduce potential impacts from Covered Activities. Notify ESD staff that a Little San Bernardino Mountain Linanthus was observed and what actions were taken to avoid impacts.

4.0 INSECTS

This section contains species accounts, including habitat parameters and significant threats, for each of the two insect species currently covered under the CVMSHCP/NCCP. Neither of the target insect species has any state or federal status, however they are protected under the CVMSHCP and therefore require appropriate avoidance and minimization efforts to deter impacts to these species. These insects, the Coachella Valley Giant Sand-Treader cricket and the Coachella Valley Jerusalem cricket, are endemic to the Coachella Valley and the Plan Area. Some of the features of the biology of insect species warrant special note with regard to these conservation strategies. General measures common to both of these insects are listed below, and measures specific to either species are considered in the individual species description.

4.1



Coachella Valley Giant Sand-Treader Cricket

Macrobaenetes valgum

Status Federal: Species of Concern (No official status)

State: No official status

Species Account:

As previously noted, the Coachella Valley Giant Sand-Treader cricket depends on the active dunes and ephemeral sand fields at the west end of the Coachella Valley. They can be found in appropriate habitat west of Palm Drive at least to Snow Creek Road, adjacent to the Whitewater River and San Gorgonio River washes. Suitable habitat also occurs within the Whitewater Floodplain Preserve. Despite the low numbers reported below from pit-trap samples at the Thousand Palms Preserve, burrows of these crickets are commonly observed in the more active portions of the Aeolian sands in the southern dunes (C. Barrows 1998). The distinctive, cone-shaped excavation tailings of this species' diurnal burrows can be easily identified and used to confirm this species' occurrence at a given location (C. Barrows 1998). They were not as common at Willow Hole, and were not observed at a La Quinta site and at the east end of the Indio Hills. The east end of the Indio Hills also includes suitable active blow sand habitat, and, although comprehensive surveys have not been conducted, this species has not been observed there. Perennial shrubs, including creosote bush, burrobush, honey mesquite, Mormon tea, desert willow, and sandpaper bush, dominate the preferred habitat of this species in windblown environments. The Coachella Valley Giant Sand-Treader cricket has its primary period of activity during the spring. They are nocturnal, coming to the surface to forage on detritus blown over the dunes, or to look for mates. During the day they conceal themselves in self-dug burrows from five to 20 meters deep in the sand. These burrows are often associated with the roots of perennial shrubs or are found under boards, rocks, and other hiding places. The adult and juvenile instars disappear during the warm months of the year, suggesting that individuals spend the summer in the egg stage. Activity of small juvenile instars begins in the late fall through early winter. By mid to late spring the adults have disappeared.

Associated Covered Species. Within the Plan Area, other species of concern whose habitat overlaps with that of the Coachella Valley Giant Sand-Treader cricket include Coachella Valley Milkvetch, Coachella Valley fringe-toed lizard, flat-tailed horned lizard, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, Coachella Valley Jerusalem cricket, and burrowing owl.

This species is found within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Thousand Palms Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Perform pre-activity surveys for this species in areas of unpaved soil during the winter and spring emergence and breeding periods.
- Maintenance activities will be designed and implemented using Best Management Practices (BMPs) in a way that minimize new disturbances, to prevent erosion, off-site degradation, and reduce direct impacts to Giant Sand-Treader crickets.
- All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
- No pesticide use shall occur outside of CVWD facilities in habitat occupied by this species.

What to Do If Found

- Allow the cricket to leave the area and notify ESD staff that a Coachella Valley Giant Sand-Treader cricket was observed and what actions were taken to avoid impacts.

4.2



Coachella Valley Jerusalem Cricket

Stenopelmatus cahuilaensis

Status Federal: No official status

Status State: No official status

Species Account:

The Coachella Valley Jerusalem cricket is known from the Snow Creek area from Fingal's Finger east to Windy Point, and from remnants of sand dune habitat around the Palm Springs Airport. The easternmost known occurrence is a record from the Thousand Palms' area in the vicinity of Bob Hope Drive and Interstate 10. In spring 2003 surveys by the University of California found this cricket west from Fingal's Finger to nearly the Plan boundary. They occur in sandy to somewhat gravelly sandy soils and have been called an obligate sand species (G. Ballmer, pers. comm.). They do not necessarily require active blow sand habitat but have been found in loose windblown drift sands, dunes, and sand in vacant lots if native vegetation exists. According to Hawks (1995), these Jerusalem crickets require high humidity; most observations have followed winter and spring storms while the soil substrate remains moist. They are most often located beneath surface debris during the cooler and wetter months of the year. During the summer months, they spend daylight hours in deep burrows in the ground; they may rarely be encountered at the surface during the night (Hawks 1995). Because these Jerusalem crickets have been observed more widely at the western edge of the Coachella Valley and because of their affiliation with cool, moist conditions, it has been suggested that they may be limited in distribution by temperature and moisture regimes (Tinkham 1968, Hawks 1995). They have not been found in the vicinity of the Whitewater Floodplain Preserve and Hawks (1995) suggests that suitable habitat does not exist in this area. The easternmost occurrence is in the vicinity of Thousand Palms, near Bob Hope Drive and Interstate 10. This location may no longer be extant, as the area is increasingly developed. Greg Ballmer suggests this record is probably an outlier. The lack of observations of this species east of Windy Point suggests that they may not occur in significant numbers in the central Coachella Valley.

Associated Covered Species. Within the Plan Area, other species of concern whose habitat overlaps with that of the Coachella Valley Jerusalem cricket include Coachella Valley Milk-vetch, Coachella Valley Fringe-Toed lizard, Flat-Tailed horned lizard, Palm Springs pocket mouse, Coachella Valley round-tailed ground squirrel, Coachella Valley Giant Sand-Treader cricket, and burrowing owl.

This species occurs within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Perform pre-activity surveys for this species in areas of unpaved soil during the winter and spring emergence and breeding periods.
- Avoid stockpiling construction materials, lumber, or other sources of artificial cover (AC) at CVWD facilities if feasible, within the known range of this species.
- Maintenance activities will be designed and implemented using Best Management Practices (BMPs) in a way that minimize new disturbances, to prevent erosion, off-site degradation, and reduce direct impacts to Jerusalem cricket.

- All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat, vegetation or burrows.
- No pesticide use shall occur outside of CVWD facilities in habitat occupied by this species.

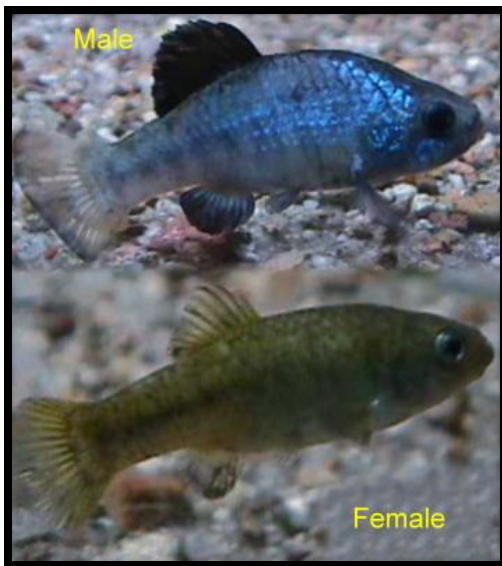
What to Do If Found

- Allow the cricket to leave the area and notify ESD staff that a Coachella Valley Jerusalem cricket was observed and what actions were taken to avoid impacts.

5.0 FISH

This section contains a species account and conservation approach, including habitat parameters and significant threats, for the one fish species proposed for coverage under this Plan, the desert pupfish. Conservation measures specific to the desert pupfish are also included here.

5.1



Desert Pupfish

Cyprinodon macularius

Status Federal: Endangered

State: Endangered

Species Account:

Historically, desert pupfish occurred in the lower Colorado River in Arizona and California, from about Needles downstream to the Gulf of California and into its delta in Sonora and Baja. In California, pupfish inhabited springs, seeps, and slow-moving streams in the Salton Sink basin, and backwaters and sloughs along the Colorado River (Black 1980). The Salton Sea, its tributary streams, irrigation drains, and shoreline pools, supported large pupfish populations until sharp declines began in the mid- to late-1960s. Currently, in the Plan Area, pupfish are found in upper and lower Salt Creek, the mouth of Salt Creek (Sutton 1999), many of the irrigation drains emptying into the Salton Sea (Imperial and Riverside County), some shoreline pools, and several refugia; Dos Palmas; Oasis Springs Ecological Reserve; The Living Desert; and Salton Sea State Recreation Area. The Plan Area contains a substantial portion of remaining pupfish habitat, including one of only two natural tributary streams, as well as shoreline pools and irrigation drains. A stable population exists in Salt Creek in both the upper and lower portions of the creek. Adequate water quantity and quality must be maintained in desert streams, springs, irrigation drains, and shoreline pools. Surface and groundwater from upper Salt Creek Canyon and other canyons in the Orocopia and Chocolate Mountains may contribute to the groundwater system. Groundwater pumping, channel erosion, water diversion, contaminants, and other threats must be reduced.

Associated Covered Species. Other species of concern whose range overlaps that of the Desert pupfish within the Plan Area include California black rail, Yuma Ridgway's Rail, as well as other riparian species occurring in similar habitat, including the Yellow-Breasted Chat, Summer Tanager, Least Bell's vireo, and Yellow Warbler.

This species occurs within the following Conservation Areas:

- Coachella Valley Stormwater Channel and Delta Conservation Area including; Dos Palmas

Species Specific Avoidance and Minimization Measures are described below:

- In accordance with the Coachella Valley MSHCP, CVWD is developing a drain maintenance study which will evaluate potential impacts associated with drain maintenance activities.
- Maintenance activities will be designed and implemented using BMPs in a way that minimize new disturbances, to prevent erosion, off-site degradation, and reduce direct impacts to Desert pupfish.
- All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
- Ensure herbicide near U.S. Waters is performed in accordance with state general permit provisions to protect sensitive habitats and areas where threatened and endangered species are observed. Consider alternate methods when feasible.

What to Do If Found

- If the pupfish are moving out of the area, allow them to leave the immediate area before resuming work. Notify ESD staff if pupfish are observed and what actions were taken to avoid impacts.

6.0 REPTILES

This section contains species accounts, including Species Conservation Goals and Objectives, significant threats, and life history information, for each of the three species of reptile proposed for coverage under this Plan. These species include the desert tortoise, listed as threatened by the federal and state governments, the Coachella Valley fringe-toed lizard, listed as a state Endangered and a federal Threatened Species, and the flat-tailed horned lizard, a species proposed for federal listing. General measures common to all of these reptiles are listed below, and measures specific to a given species are included under mandatory avoidance and minimization measures.

6.1



Desert Tortoise

Xerobates agassizii (or *Gopherus agassizii*)

Status Federal: Threatened

State: Threatened

Species Account:

The Desert Tortoise (DT) is widely distributed through an exceptionally broad array of habitats that span 1,100 kilometers from northern Sinaloa State, Mexico where it occupies deciduous forest, across the Sonoran (including the Colorado Desert Subdivision in California) and Mojave Deserts, to the edge of the Colorado Plateau in arid southwestern Utah (Ernst et al. 1994, Germano 1994). Populations north and west of the Colorado River were listed as federal threatened in April 1990. The species is listed by California as a Threatened Species, and it is the official state reptile. In California, the desert tortoise is naturally absent from most areas west of the Salton Sea. Thus the Imperial Valley and portions of the southern Coachella Valley may not support native populations of desert tortoises. DT, however, are found naturally along the northern, eastern, and western rim of the Coachella Valley in the foothills of the Little San Bernardino Mountains, the Painted and Whitewater Hills (in the latter they are common), and the San Jacinto and northern Santa Rosa Mountains.

The Plan Area represents a small, but perhaps biologically significant portion of the DT's overall range. DT in the foothills of the southeastern San Bernardino Mountains (especially in the Whitewater Hills) represents the western-most reproductively active population of desert tortoises in the Colorado Desert ecosystem (Lovich et al. 1999). The western-most records of live tortoises in the San Gorgonio Pass are from T2S, R3E, Sec. 31 near the north end of Verbenia Avenue (J. Lovich, pers. comm.). This may explain the relatively high density of desert tortoises in the Whitewater Hills, as the area is situated in a transition zone between plant communities from the San Bernardino Mountains, the Mojave and Colorado Deserts, and coastal assemblages. The clustered nature of DT burrows in the western Coachella Valley environs is consistent with the observations of others throughout the range of the tortoise; DT frequently exhibit a contiguous distribution, with clusters of individuals in some areas and large intervening areas of what appears to be suitable habitat without desert tortoises.

Associated Covered Species. Other Covered Species with ranges overlapping the modeled habitat for the DT include Peninsular bighorn sheep, Palm Springs pocket mouse, Burrowing owl, Triple-Ribbed Milk-vetch, Little San Bernardino Mountains Linanthus, and Gray vireo.

This species occurs within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for DT using accepted USFWS survey protocol which provides 100% coverage of the survey site including a 500' buffer zone.
- In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season on CVWD lands that occur within this species habitat if feasible.
- Establish a 100-foot buffer around each suspected DT burrow identified in the pre-activity survey.
- Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed.
- Before moving, burying, or capping, inspect for DT in any pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the covered activity site.
- Inspect excavations for tortoises before filling. If a DT is found, have the biological monitor relocate it to a safe place offsite.
- Prior to the initiation of Covered Activities, all personnel will be instructed on the protection of the DT. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities.
- All movement of vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads.
- All Covered Activity sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas.
- Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of DT falling into them.
- Covered Activity sites and access roads shall be surveyed by ESD staff no more than 15 days prior to the initiation of Covered Activities. Surveys shall provide 100 percent coverage of the work area.
- During periods of high DT activity (approximately March through October) ESD staff shall be present to monitor Covered Activities in areas not previously cleared or stabilized.
- Personnel on the right-of-way, within DT habitat, will be required to check under their vehicles prior to moving them.
- All DT burrows located will be flagged or marked.

- All DT burrows, and other species' burrows that may be used by DT, will be examined to determine the occupancy of the burrow if possible.
- USFWS and CDFW will be notified, within 72 hours, of any DT death or injury caused by Covered Activities. Notification will include the date, time, circumstances, and location.
- Dead tortoises will be marked and left on-site for CDFW/USFWS staff.
- Injured tortoises will be transported to a qualified veterinarian and the CDFW/USFWS will determine their disposition.

What to Do If Found

- Immediately stop all work near the tortoise's location and notify the biological monitor, if present. If the tortoise is moving stop work and allow it to leave the site. If the tortoise is not moving, have an authorized biological monitor relocate the tortoise to an appropriate location off site.
- If no authorized biological monitor is present onsite, call CVWD's ESD staff to notify them that a DT was observed and what actions (if any) were taken to avoid impacts.
- Desert tortoises shall not be handled by unauthorized personnel.

6.2



Coachella Valley Fringe-Toed Lizard

Uma inornata

Status Federal: Threatened

State: Endangered

Species Account:

The Coachella Valley fringe-toed lizard (CVFTL) is restricted to the Coachella Valley and was found historically from near Cabazon at the northwestern extreme to near Thermal at the southeastern extreme. It is associated with a substrate of Aeolian (wind-blown) sand to which it has developed morphological and behavioral adaptations (Heifetz 1941, Stebbins 1944, Norris 1958), and it occurs wherever there are large patches of the appropriate substrate (England and Nelson 1976, La Pre and Cornett 1981, Turner et al. 1981, England 1983, C. Barrows 1997). As Development of the Coachella Valley progressed, fringe-toed lizard habitat declined from roughly 171,000 acres, historically (The Nature Conservancy 1985) to 63,360 acres in 1980 (Federal Register 1980) to 27,206 acres estimated by the model in 2000.

The CVFTL is omnivorous, and diet changes as a function of food availability. During normal to wet years, it eats primarily flowers and plant dwelling arthropods. During dry periods, the diet shifts to primarily leaves and ants (Durtsche 1987, 1995). The dietary content differs also between breeding and non-breeding seasons for males, but does not differ significantly for females. During late summer, the diets of the two sexes are indistinguishable (Durtsche 1992). CVFTL differ sexually in their spatial use of the habitat. Males have a significantly larger home range size than do females. The average sizes are 1,070m² (11,518 ft²) for males and 437m² (4,704 ft²) for females (Horchar 1992). A home range is the area within which an animal conducts its normal daily and seasonal activity. A territory, on the other hand, is a portion of a home range that is defended. Muth and Fisher (pers. comm.) saw no evidence of territoriality in 16 years, contrary to Carpenter's (1963) observations of captive lizards. CVFTL are active from March to mid-November (and sometimes into December when the weather is accommodating), although adults are primarily active from April to October with a peak in May-June (Mayhew 1965, Muth and Fisher, pers. comm.). Springtime activity is triggered when subsurface temperatures exceed the minimum voluntary temperature at -5 cm (-2 inches) where the lizards hibernate, and end when these temperatures drop below minimum voluntary in the fall (Cowles 1941, Brattstrom 1965, Muth and Fisher 1991). Daily activity is also associated with temperature: Mayhew (1964) found them active when their body temperatures ranged from 25.8-44.0° C (78-111° F); the mean is 38.0° C (100° F).

Associated Covered Species. Other target species whose habitat overlaps with that of the CVFTL include the Flat-Tailed Horned lizard, Coachella Valley Milk-vetch, Palm Springs Pocket mouse, Coachella Valley Round-Tailed ground squirrel, Coachella Valley Giant Sand-Treader cricket, Coachella Valley Jerusalem cricket, and the Burrowing owl.

This species occurs within the following Conservation Areas:

- Where the AAC traverses the Algodones Dunes (Imperial Sand Dunes).
- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for CVFTL.
- Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed.
- Coordinate with the ESD staff to examine Covered Activities areas for lizards when surface temperatures exceed 30°C (86°F).
- Inspect trenches, holes, or other excavations before filling. If a CVFTL is found have the biological monitor relocate the lizard.
- Exercise caution while driving on the project site and be on the lookout for CVFTL when onsite temperature exceeds 30°C (86°F).
- Before moving, burying, or capping, inspect for CVFTL in any construction pipes, culverts, or similar structures that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the work site.
- Prior to the initiation of Covered Activities, all personnel will be instructed on the protection of the CVFTL. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities.
- All movement of vehicles outside of the right-of-way will be restricted to pre-designated access roads.
- All covered activity sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas.
- Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of CVFTL falling into them.
- During periods of high CVFTL activity (May through September) ESD staff shall be present to monitor Covered Activities in areas not previously cleared or stabilized.
- Personnel on the right-of-way, within CVFTL habitat, will be required to check under their vehicles prior to moving them.

What to Do If Found

- Immediately stop all work near the CVFTL location and allow the lizard to leave the area.
- If the CVFTL is not moving, authorized CVWD staff will relocate the lizard offsite to the nearest available habitat.
- Lizards may not be handled by unauthorized or unpermitted personnel.
- If no biological monitor is present onsite, call ESD staff to notify them that a CVFTL was observed and what actions were taken to avoid impacts.

6.3



Flat-Tailed Horned Lizard

Phrynosoma mcallii

Status Federal: No official status

State: California Species of Special Concern

Species Account:

The Flat-tailed horned lizard (FTHL) has a wide, flattened body with a short tail and dagger-like spines on its head. It can be distinguished from other horned lizards by a dark stripe running down the back and the presence of two slender, elongated horns. FTHL are pale colored to closely match the soils on which they live. Typically, the FTHL is often associated with sand flats and sand dunes, although it is rare on more active dunes. It also occurs far from blow sand on concreted silt and gravel substrates (Beauchamp et al. 1998, Cameron Barrows, pers. comm., Muth and Fisher 1992). The most common perennial plants associated with habitat for this lizard are creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) (Turner et al. 1980, Muth and Fisher 1992). Within the Plan Area, the FTHL occurs at low elevations in the valley. This lizard is found in two protected areas created by the CVMSHCP: the Thousand Palms Preserve and the Whitewater Floodplain Preserve. Another population is known from an unprotected area at the east end of the Indio Hills on the north side of the Coachella Canal.

Within the Plan Area, the FTHL occurs at low elevations in the valley. Nearly all sightings in California and Arizona were below 800 feet (250 m) elevation (Mayhew and Carlson 1986, Turner et al. 1980, M. Fisher, pers. comm.). A potential habitat corridor was identified between the east end of the Indio Hills and the Thousand Palms Preserve. In a survey conducted to evaluate the suitability of this corridor in 1999 it was concluded that the corridor is not presently suitable for FTHL (Hays, LaPointe, and Wright 1999). The FTHL is relatively active for a desert lizard. More than half (54%) of the day is spent in some kind of activity, including feeding, digging burrows, and running (Muth and Fisher 1992). They dig burrows to escape hot midday temperatures, and for winter hibernation. When approached by a potential predator, a FTHL usually stops running and flattens its body against the ground. It relies on cryptic coloration to avoid predation and will usually remain immobile until after the threat has passed. They hibernate from mid-November to mid-February in shallow burrows, although at least some juveniles are active on warm days during the winter (Cameron Barrows, pers. comm.).

Reproductive activity begins in the spring and the first clutch of eggs hatches in late July. A second cohort may hatch in September.

This species occurs within the following Conservation Areas:

- Thousand Palms Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- East Indio Hills Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Within the Plan Area, other species of concern whose habitat overlaps with that of the flat-tailed horned lizard include the Coachella Valley Milk-vetch, Palm Springs pocket mouse, Coachella Valley Fringe-Toed lizard, Coachella Valley Round-Tailed Ground squirrel, Coachella Valley Giant Sand-Treader cricket, Coachella Valley Jerusalem cricket, and burrowing owl.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for FTHL.
- Environmental staff/biological monitor will possess authorization for relocation and handling of FTHL.
- Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed.
- Coordinate with the ESD staff to examine covered activity work areas for lizards when surface temperatures exceed 30°C.
- Inspect trenches, holes, or other excavations before filling. If a FTHL is found, have the biological monitor relocate the lizard.
- Inspect excavations for FTHL before filling. If FTHL is found, have the biological monitor relocate it to a safe place offsite.
- Before moving, burying, or capping, inspect for FTHL in any pipes, culverts, or similar structures that are stored on the site for one (1) or more nights. Alternatively, cap structures before storing on the covered activity work site.
- Prior to the initiation of Covered Activities, all personnel will be instructed on the protection of the FTHL. The training will address: life history, listing status, applicable state and federal laws.

- All movement of vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads.
- All covered activity work sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas.
- Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of FTHL falling into them.
- Personnel on the right-of-way, within FTHL habitat, will be required to check under their vehicles prior to moving them.

What to Do If Found

- Immediately stop all work near the FTHL location and allow the lizard to leave the area. Notify ESD staff, if present.
- If the FTHL is not moving, authorized ESD staff or biological monitor will relocate the lizard offsite to the nearest available habitat.
- If no biological monitor is present onsite, call ESD staff to notify them that a FTHL was observed and what actions were taken to avoid impacts.

7.0 BIRDS

This section contains species accounts, including Species Conservation Goals and Objectives, significant threats, and life history information, for each of the bird species covered under the Plan. Many of these species are listed as threatened or endangered by the federal and state governments. General measures common to all of these species are listed below, and measures specific to a given species are included under mandatory avoidance and minimization measures.

7.1



Burrowing Owl



Burrowing Owl Burrow

Burrowing Owl

Athene cunicularia

Status Federal: Species of Concern (No official status)

State: Species of Special Concern

Species Account:

The burrowing owl (BUOW) is a small, ground-dwelling owl with a round head and long, stilt like legs. BUOW typically inhabit open areas, such as grasslands, pastures, coastal dunes, desert scrub, and the edges of agricultural fields. The BUOW has a broad distribution that includes open country throughout the Midwest and western United States, Texas and southern Florida, parts of central Canada, and into Mexico and the drier regions of Central and South America. In Southern California, it is known from lowlands over much of the region, particularly in agricultural areas. Within the Plan Area, BUOW are scattered in low numbers on open terrain throughout the lowlands. They occur in open desert areas, in fallow fields, along irrigation dikes and levees, wherever burrows (generally dug by ground squirrels) are available away from intense human activity. They can occur adjacent to residential Development, as evidenced by regular observations of these owls in sandy substrates along Washington Avenue in Bermuda

Dunes (prior to development of empty lots) (Cameron Barrows, pers. comm.), and around the Palm Springs Airport (J. Cornett, pers. comm.). Burrowing owls are notably common in Imperial County, along roads and levees in the agricultural areas. They may occur along roads and levees in agricultural areas at the eastern end of the Coachella Valley, within the Plan Area. However, efforts to locate reliable records for burrowing owls in these agricultural areas met with limited success. BUOW typically occupy burrows dug by others, primarily ground squirrels. Lutz and Plumpton (1999) have found that broods from previous years were significantly larger for females that reused a site than for those that selected a new nest site. If left undisturbed, owls from southern localities will reuse the same burrow while northern migrating populations typically do not utilize the same burrow each year (Lutz and Plumpton 1999). A clutch of seven to nine eggs is laid between March and July (Dechant et al. 1999, revised 2002, p. 3). Both parents take part in incubation for about 28 days. The young emerge from the nest and spend daylight hours at the burrow entrance with one or both adults. Their distress call is a low rattle, said to be a mimic of a rattlesnake. The burrows selected by these owls are typically abandoned rodent burrows; however, they also commonly use old pipes, culverts or other debris that simulates a hole in the ground. Though their occurrence, distribution, and habitat preferences in the Coachella Valley are not well documented BUOW are well studied elsewhere. BUOW follow a crepuscular habit, being most active during the early morning and evening hours. They are often observed perched on fence posts or utility wires. They typically live 8 years or more. Their diet is predominantly large insects and small rodents, but they will also take small birds, reptiles, amphibians, fish, scorpions, and other available prey. Impacts to BUOW can include temporary and permanent levels of disturbance. Temporary impacts to BUOW may include disturbance from storm water channel maintenance activities and emergency repairs. Permanent impacts may include loss of burrows during emergency repairs following storm events

This species occurs within the following Conservation Areas:

- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Within the Plan Area, other species of concern whose habitat overlaps with that of the BUOW include the Flat-Tailed horned lizard, the Coachella Valley Milk-vetch, Palm Springs Pocket mouse, Coachella Valley Fringe-toed lizard, Coachella Valley Round-Tailed Ground squirrel, Coachella Valley Giant Sand-Treader cricket, Coachella Valley Jerusalem cricket, and Desert Tortoise.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for BUOW prior to initiating any O&M activities.
- Caution in use of pesticides in the vicinity of burrowing owl burrows is also important. Other measures that may enhance potential habitat in agricultural areas should be evaluated. Proactive habitat enhancement in agricultural areas could benefit burrowing owls if they are using berms along agricultural drains.
- Immediately prior to initiating drain, or channel cleaning operations where burrowing owl may be present, have ESD staff visually inspect banks for burrows and mark active burrows with lathe and colored tape and determine adequate buffer zones..
- Establish a 250-foot buffer zone during the breeding season (February 1 – August 31); 160 feet outside of the breeding season. This buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species.
- Avoid collapsing or filling active burrows during drain and canal cleaning.
- Exercise care when removing sediment from the drain or canal and depositing spoils on the bank so as to avoid impacting any marked burrows.
- Leave active burrows in levees, dikes, and drain and canal banks where possible.
- Prior to replacing facilities or constructing new facilities, coordinate with CVWD ESD staff to determine if burrows occupied by burrowing owls would be filled or collapsed.
- Avoid collapsing or filling active burrows during drain and canal cleaning. CVWD does not anticipate removing burrows, however if a BUOW burrow is made inaccessible, CVWD will mitigate with creation of two artificial burrows in the project vicinity.
- ESD staff will provide annual training on general species ecology and avoidance and minimization measures as part of the O&M Manual training program.

What to Do If Found

- If an occupied burrow or dead owl is found during Covered Activities, stop all work and notify the ESD staff.
- Avoid work near the burrow until the ESD staff approves work resumption.

ESD staff will mark occupied burrows with a 4' stake that has a colored tape streamer to provide good visibility. Ground disturbance activities will be restricted to a 160-foot buffer area of an active burrow outside of breeding season and 250 feet of an active burrow during the breeding season (February 1- August 31).

7.2



Yuma Ridgway's Rail

Rallus obsoletus yumanensis

Status Federal: Endangered

State: Threatened

SPECIES ACCOUNT:

Yuma Ridgway's Rails are found in marsh habitats of cattails (*Typha domingensis*) and bullwhip/California bulrush (*Scirpus californicus*). In habitats found along and adjacent to the lower Colorado River, these rails selected some combination of cattails and bulrush for breeding. There was a post-breeding shift at some sites concurrent with a rise in water level, to higher elevation willows, arrowweed and salt cedar dominated habitats. Common reed (*Phragmites communis*) was also used as habitat, but usually occurred in areas too dry for breeding and foraging. Water depth appears to be an important habitat characteristic, with average preferred depths varying from 6.5 cm to 20 cm, depending on the study site. In deeper water, a residual mat of decaying vegetation was important to allow the rails to have access and use throughout their home range. The rails also preferred habitat edges and generally less dense habitat to facilitate mobility and access. Home ranges for male birds were found to average 7.7 +/- 5.9 ha, and for females 9.9 +/- 9.6 ha. The Yuma Ridgway's Rail occurs at the Salton Sea State Recreation Area at the mouth of Salt Creek. Yuma Ridgway's Rails occur within the Dos Palmas marshland complex in unknown numbers. The Dos Palmas area may have particular importance in that it may be one of the few occupied sites throughout this bird's entire range that is relatively free of chemical contaminants. Both Dos Palmas and the Whitewater River delta/Salton Sea could, if managed appropriately, provide additional habitat to what already exists there. The population size of Yuma Ridgway's Rails within this area is not known, nor is the trend in its population numbers, but it is likely that this population will require immigration from occupied habitat to the south to maintain long term viability.

This species occurs within the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Associated Covered Species. California Black rails are often found in association with Yuma Ridgway's Rail habitat. Conservation measures for one species will benefit the other. Desert puffin and riparian birds may be found in associated wetland habitat.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, contact ESD staff to arrange pre-activity surveys.
- In areas where Yuma Ridgway's Rails occur, operations and maintenance activities shall establish a minimum 200-foot buffer zone between work activities, if the maintenance activity must be performed due to capacity or vegetation issues within drains. This buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the colony.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biologist is present onsite, call ESD staff and seek direction.

7.3



California Black Rail
Laterallus jamaicensis
Status Federal: No official status
State: Threatened

Species Account:

California Black Rails are birds of dense coastal and inland marsh habitat. Based on radio telemetry data gathered on the lower Colorado River, California Black Rails selected habitat dominated by California bulrush (*Scirpus californicus*) and three square bulrush (*S. americanus*). They either avoided cattails (*Typha domingensis*) or utilized cattail habitat in proportion to its availability. However, nests were often constructed of cattail leaf blades, even though cattails were rarely the dominant vegetation type surrounding the nest. Preferred habitat sites had a shallow water depth of <2.5 cm, with 25% of the substrate covered in water. They preferred areas closer to the shoreline than would have been expected in random distribution.

Depending on sex and time of year, home range size in appropriate habitat along the lower Colorado River varied from 0.43 to 0.55 hectares, which are three to four times smaller than those described for the Eastern Black Rail and may result from more stable water levels than found in tidal habitats. The rails were found to be entirely diurnal in their activity and resident year-round. California Black Rails are omnivorous, eating both invertebrates and bulrush seeds. Predators include house cats, short-eared owls, northern harriers, great blue herons, great egrets, and exotic bullfrogs.

This species occurs within the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Associated Covered Species. California Black Rails are often found in association with Yuma Ridgway's Rail habitat. Conservation measures for one species will benefit the other species; however, additional information is needed on how these two species partition the habitat. Other associated species may include riparian birds and Desert pupfish.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for California Black Rail.
- In areas where Black Rails occur, operations and maintenance activities shall establish a minimum 200-foot buffer zone between work activities and the active nests if the maintenance activity must be performed due to capacity or vegetation issues within drains. This buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biologist is present onsite, call ESD staff and seek direction.

7.4



Southwestern Willow Flycatcher

Empidonax traillii extimus

Status Federal: Endangered

State: Endangered

Species Account:

The southwestern willow flycatcher (SWWF) is restricted to dense riparian woodlands and forests along the river and stream systems of Southern California, primarily in Kern, San Diego, San Bernardino, and Riverside Counties. Their breeding range also includes southern Nevada, Arizona, New Mexico, Utah, western Texas, and possibly southwestern Colorado. They are reported as breeding birds in Mexico, in extreme northern Baja California and Sonora. They winter in Mexico, Central America, and northern South America. This flycatcher can be found at sites where a dense growth of willows (*Salix* sp.), *Baccharis*, arrowweed (*Pluchea* sp.), or other plants occurs in thickets. These thickets are often associated with a scattered over story of cottonwood (*Populus fremontii*) and other riparian trees. This species has also been found nesting in Southern California in relatively narrow bands of riparian habitat and can utilize extremely small remnant riparian areas (one medium size willow tree) during migration (T. Newkirk-Gonzales, pers. comm.). In surveys by biologists from the University of California, Riverside, Center for Conservation Biology (Center for Conservation Biology, University of California, Riverside 2004) willow flycatchers were detected at Cottonwood Springs in Joshua Tree National Park, Dos Palmas Preserve, Mission Creek, Thousand Palms Oasis, and Whitewater Canyon. It is not known whether these individuals were *Empidonax traillii extimus*, the subspecies that breeds in southern California (Unitt 1987; Sedgwick 2000), or whether they were a different subspecies that occurs as migrants in southern California but breed farther north (e.g., *E. t. brewsteri*). The breeding status of the southwestern willow flycatcher within the Plan Area is not well known. Suitable breeding habitat is present in a number of locations where riparian habitat exists, in Chino, Andreas, Murray, Palm, Millard, and Whitewater Canyons, and possibly in Stubbe and Cottonwood Canyons. Suitable breeding habitat may also occur at Oasis de los Osos, along the Whitewater River near the Salton Sea, at the Thousand Palms Preserve,

and at Dos Palmas Preserve/ACEC. The birds begin to arrive in Southern California to breed late in the spring, generally from mid-March through the summer months, until August.

Associated Covered Species. Other riparian species occurring in similar habitat, including the Yellow-Breasted chat, Summer Tanager, Least Bell's vireo, and Yellow Warbler, will benefit from conservation and Adaptive Management actions for southwestern willow flycatcher. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or succession stages for optimal breeding habitat, which may require different management strategies.

This species occurs within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Morongo Wash Special Provisions Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for SWWF.
- If an active nest is located, a 200-foot buffer zone will be established around each nest site; however, there may be a reduction of this buffer zone depending on site-specific conditions or the existing ambient level of activity following consultation with CDFW. No covered activity work will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biologist is present onsite, call ESD staff and seek direction.

7.5



Crissal Thrasher

Toxostoma crissali

Status Federal: No official status

State: Species of Special Concern

Species Account:

The Crissal Thrasher is a ground-dwelling relative of the mockingbird that occurs in the Plan Area. The distribution of habitat for the Crissal Thrasher is quite patchy, particularly in the vicinity of the Salton Sea where areas occupied by mesquite hummocks and desert saltbush scrub are highly fragmented. They occupy arid habitats and are year-round residents in the CVMSHCP area, though they may make seasonal elevation migrations (up to 40 km) (Sheppard 1996). Crissal Thrashers are associated with desert washes, riparian brush and mesquite thickets at lower elevations and dense scrub in arroyos at higher elevations (Cody 1999). In the Coachella Valley (low elevation) the species occurs in areas dominated by mesquite hummocks and thickets with acacias, arrow weed, and in desert saltbush scrub (Hanna 1933). The species commonly nests in mesquite (Gilman 1902, Hanna 1933). The mean territory size for Crissal Thrasher in the Granite Mountains was estimated to be 4.92 ha, although the defended area is thought to be larger (Cody 1999). Like the Le Conte's thrasher, Crissal Thrashers are secretive, feeding under the cover of dense vegetation making them difficult to locate with the exception of singing males that often perch on taller vegetation. Crissal Thrashers have dark brown bodies with a dark chestnut crissum (the feathers also known as the under-tail coverts) and lack the contrast between the tail and body seen in Le Conte's thrashers. The nest of Crissal Thrasher is an open cup rather large twiggy nest built low to the ground and well hidden in dense mesquite or other thick desert vegetation. Crissal Thrasher clutch size is typically two to three eggs with an incubation time of 14 days and fledging after 11 to 13 days (Erhlich et al. 1988). The Crissal Thrasher seldom flies in the open, but moves furtively among streamside mesquite thickets, willows, and other tangles. This bird resembles the California Thrasher in its habit of gathering food by hacking the ground with its heavy curved bill, but their ranges do not overlap. Except

during the hottest months and briefly after molting, it delivers its loud melodious song year-round. The peak for mating and vocalizations for Crissal Thrashers appears to be between February and April (Center for Conservation Biology, University of California, Riverside 2004). The breeding season is protracted, extending at least from February to July, and in the winter rainfall part of the range, to the northwest, a second brood may be produced in the fall (Cody 1999).

This species occurs within the following Conservation Areas:

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area

Associated Covered Species. Crissal Thrashers are found in habitat that also may be used by riparian bird species during migration, including the Least Bell's vireo, Summer Tanager, Yellow Warbler, Yellow-Breasted Chat, and Southwestern Willow Flycatcher. Conservation measures for one species will benefit the other; however, additional information is needed on how these two species partition the habitat. In mesquite hummock areas, Coachella Valley round-tailed ground squirrels would occur with Crissal Thrashers. Other species including the Coachella Valley Fringe-Toed lizard, Flat-Tailed horned lizard, and Palm Springs Pocket mouse may occur within the same habitat as the Crissal Thrasher.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Crissal thrasher.
- Within the Conservation Areas that harbor this species, Essential habitat will be avoided to the maximum extent practical.
- If an active nest is located, a 200 foot buffer zone will be established around each nest site; however, this buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

7.6



Le Conte's Thrasher

Toxostoma lecontei

Status Federal: No official status

State: Species of Special Concern

Species Account:

Le Conte's thrasher is a relatively small bird, up to approximately 9 inches in length, and has a long, curved bill. This thrasher is grayish brown with a long, dark tail. It has dark legs, dark eyes, and a pale throat. Le Conte's thrasher occurs in open desert washes and desert scrub habitats on sandy and often alkaline soils. They occur in Desert Scrub, Desert Succulent Shrub, Desert Wash, and Alkali Desert Scrub habitats. Desert shrubs and cacti are frequently used for cover. This species often inhabits areas with sandy soils and where the topography is flat and open, including dunes and gently rolling hills. Surface water rarely exists anywhere within several miles of most of its territories, except temporarily following infrequent rains. For nesting, Le Conte's thrasher prefers thick, dense, and thorny shrubs or Cholla cactus. Cholla cactus and saltbush were used in 85% of 289 nest sites throughout the distribution of the species. The remaining 15% were in a large variety of desert shrubs, small trees, and yucca. Within the Plan Area, there are historical records in the CNDDDB and a few recent records. Nests are known to persist for several years and are often easier to find than the birds.

Modeled habitat within the following CVMSHCP Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Morongo Wash Special Provisions Area
- Willow Hole Conservation Area

- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area
- Dos Palmas Conservation Area

Associated Covered Species: Le Conte's thrashers are found in habitat that also may be used by riparian bird species during migration, primarily desert dry wash woodland, including the Least Bell's vireo, Summer Tanager, Yellow Warbler, Yellow-Breasted chat, and Southwestern Willow Flycatcher. They also may be associated with Crissal Thrasher, Desert Tortoise, Palm Springs Pocket mouse, Coachella Valley Round-Tailed Ground squirrel, Flat-Tailed horned lizard, and Coachella Valley Milk-vetch among other species.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Le Conte's thrasher.
- All grading or brushing taking place within riparian habitats of the Le Conte's thrasher during Covered Activities will occur following a pre-activity survey by ESD.
- If an active nest is located, a 200 foot buffer zone will be established around each nest site; however, this buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.



Least Bell's Vireo

Vireo bellii pusillus

Status Federal: Endangered

State: Endangered

Species Account:

The Least Bell's vireo (LBV) inhabits riparian woodland habitats along the riverine systems of Southern California, primarily in San Diego, Santa Barbara, and Riverside Counties. They also breed in northern Baja California and are seen in migration in southern Baja California. This vireo species occurs at sites with two primary features: (1) a dense shrub cover within 1 to 2 meters (3 to 6 feet) off the ground, where nests are typically placed, and (2) a dense, stratified canopy for foraging (Goldwasser 1981, USFWS 1998). Typical riparian habitats are those which may include cottonwoods (*Populus fremontii*), oak woodlands, and a dense understory of species such as willow (*Salix* spp.), Mulefat (*Baccharis salicifolia*), and California wild rose (*Rosa californica*); in desert areas, arrow-weed (*Pluchea sericea*) and wild grape (*Vitis girdiana*) may be dominant species in these riparian woodlands. The LBV is known to occur as a breeding bird in Chino Canyon and in Andreas Canyon. Other suitable breeding habitat may occur in Millard Canyon, Whitewater Canyon, Mission Creek, Palm Canyon, Murray Canyon, at Oasis de los Osos, at the Willow Hole-Edom Hill Preserve/ACEC, along the Whitewater River near the Salton Sea, and at Dos Palmas. LBVs also migrate through the Plan Area en route to other breeding areas. In migration, they may use desert fan palm oasis woodland, mesquite hummocks, mesquite bosque, arrowweed scrub, desert dry wash woodland, southern sycamore-alder riparian woodland, Sonoran cottonwood-willow riparian forest, and southern arroyo willow riparian forest. The LBV typically arrives in Southern California to breed from mid-March to early April and remain until late September. During the breeding season, male vireos establish and defend territories; they maintain a stubborn attachment to these sites throughout the breeding season. Nests are constructed in dense thickets of willow or Mulefat, one to two meters from the ground. These vireos may also make their nests in other riparian tree and shrub species.

This species occurs within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Other riparian species that occur in similar habitat, including the Yellow-Breasted Chat, Southwestern Willow Flycatcher, Summer Tanager, and Yellow Warbler, will benefit from conservation and Adaptive Management actions for least Bell's vireo. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding habitat, which may require different management strategies. Birds begin returning to southern California breeding sites in mid- to late-March; Grinnell and Miller (1944) reported later arrival (early April) for historic northern California populations. Males arrive in advance of females by several days, and observations of banded birds suggest that returning adult breeders may arrive earlier than first-year birds by several weeks (Kus, unpublished. data).

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Least Bell's vireo.
- If an active nest is located, a 200-foot buffer zone will be established around each nest site; however, this buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

7.8



Gray Vireo

Vireo vicinior

Status Federal: No official Status

State: Species of Special Concern

Species Account:

The Gray Vireo is a small passerine about the size of a house sparrow that inhabits arid, shrub-covered slopes in Pinyon-Juniper, and chemise-redshank chaparral habitats on foothills and mesas. Suitable habitat typically occurs from 2,000 to 6,500 feet (600-2,000 m) (Zeiner et al. 1990). In its preferred habitat it is found in areas with sparse to moderate cover and scattered small trees. Although junipers are the dominant trees in gray vireo habitat, oaks may also be common. The summer range of the gray vireo is from New Mexico, southern Nevada, southern Utah, southern Colorado, western Texas, Arizona, and southeastern California. This species winters primarily south of the Mexican border and in southwestern Arizona. In California, breeding gray vireos are known from the northeastern slopes of the San Bernardino Mountains in the vicinity of Rose Mine and Round Valley, in the San Jacinto and Santa Rosa Mountains from Mountain Center to Pinyon Flat and Sugarloaf Mountain, and on the southern slopes of the Laguna Mountains near Campo and Kitchen Creek. Descriptions by Grinnell and Swarth (1913) indicate that the gray vireo was a common summer resident on the slopes of the Santa Rosa and San Jacinto Mountains. While it is not known how many birds may still exist in the area, sightings are rare. Regular surveys for this species have not been conducted in the Plan Area. The gray vireo usually arrives from its wintering areas in Mexico from the end of March to early May. It generally departs by the end of August. The nest of the gray vireo is an open cup of plant fibers, bits of leaves, spider silk, and bark strips, often hung from twigs or a forked branch in a shrub or small tree, usually two to eight feet above ground (Zeiner et al. 1990). Eggs are laid from mid-May to mid-June. Gray vireos feed by gleaning insects and invertebrates from bushes and small trees. In New Mexico, territories encompass 100 acres or more (Schwarz 1991).

This species occurs within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Joshua Tree National Park Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Another Covered Species that occurs in similar habitat is the Peninsular Bighorn sheep, which occurs in Pinyon-Juniper dominated woodlands up to about 4,000 feet. Desert tortoise may also occur in the same habitat at elevations to approximately 3,800 feet.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Gray vireo.
- If an active nest is located, a 200 foot buffer zone will be established around each nest site; however, there may be a reduction of this buffer zone depending on site-specific conditions or the existing ambient level of activity. The Applicant will contact Wildlife Agencies to determine the appropriate buffer zone. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

7.9



Yellow Warbler

Dendroica petechia brewsteri

Status Federal: No official status

State: Species of Special Concern

Species Account:

The yellow warbler occurs in riparian areas throughout Alaska, Canada, the United States, and parts of Mexico. A tropical subspecies occurs in Central and South America. The yellow warbler prefers wetlands and mature riparian woodlands dominated by cottonwoods, alders, and willows. It also uses well-watered, second growth woodlands and gardens. The species breeds throughout the United States and Canada. It was once a locally abundant summer resident in riparian areas throughout California. Currently, populations are reduced and locally extirpated (e.g., Sacramento Valley and San Joaquin Valley). This species was once a common resident in San Francisco; however, there are no recent breeding records for that area. The yellow warbler has declined significantly as a breeding bird in the coastal lowlands of Southern California and is believed to be extirpated from the Colorado River. Destruction of riparian habitats and cowbird parasitism are the major causes of the decline. The yellow warbler is known or believed to occur as a breeding bird at Whitewater Canyon, Mission Creek, Chino Canyon, Andreas Canyon, in the Whitewater River near the Salton Sea, and at Cottonwood Spring in Joshua Tree National Park. Many yellow warblers also migrate through the Plan Area en route to other breeding areas. No conservation measures are proposed in urban areas; however, it is anticipated that suitable landscape trees and shrubs will continue to thrive in urban areas. Yellow warblers typically arrive from their wintering areas from late March to May and typically begin nest building activities in April and continue nesting through early summer (June) in appropriate habitat. They tend to nest in locations of intermediate height and shrub density. The nest is built in an upright fork or crotch of a large tree, or sometimes a sapling or bush, generally 6 to 8 feet above the ground. The nest is a well-formed cup of interwoven plant fibers and down, fine grasses, lichens, mosses, spider silk, hairs, etc. Usually four to five eggs are laid in spring or early summer. Incubation is 11 days, and the young leave the nest at 9 to 12 days old. The yellow warbler feeds on caterpillars, cankerworms, moth larvae, bark beetles, borers, weevils, small moths, aphids, grasshoppers, and spiders, and occasionally feeds on a few species of berries.

This species occurs within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area

- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Other riparian species that occur in similar habitat, including the Least Bell’s vireo, Southwestern Willow Flycatcher, Summer Tanager, and Yellow-Breasted Chat, will benefit from conservation and Adaptive Management actions for the Yellow Warbler. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow warbler.
- If an active nest is located, a 200 foot buffer zone will be established around each nest site; however, this buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

7.10



Yellow-Breasted Chat

Icteria virens

Status Federal: No official status

State: Species of Special Concern

Species Account:

The yellow-breasted chat is found throughout most of the United States, southern Canada, parts of Mexico, and south to Panama in the appropriate habitat. It is more often heard than seen, preferring to stay under cover in dense riparian thickets. The yellow-breasted chat nests in dense riparian thickets and brushy tangles in the lower portions of foothill canyons and in the lowlands. Its nest is a cup of dried leaves, coarse straw, and bark, lined with grasses, fine plant stems and leaves, built low in a bush, vine, or briar; there are typically three to five eggs laid from early May to mid-July. It is primarily an insect eater but also eats wild berries and wild grapes. This species is known to breed or is likely to breed in Whitewater Canyon, Mission Creek, Chino Canyon, and the Whitewater River between Mecca and the Salton Sea. It is possible that it breeds elsewhere in the Plan Area as well. In migration, the yellow-breasted chat may use desert fan palm oasis woodland, mesquite hummocks, mesquite bosque, arrowweed scrub, desert dry wash woodland, desert sink scrub, desert saltbush scrub, southern sycamore alder riparian woodland, Sonoran cottonwood-willow riparian forest, coastal and valley freshwater marsh, and cismontane alkali marsh in the Plan Area. It has been observed at Dos Palmas, the Thousand Palms Preserve, and Willow Hole. It has also been observed in Andreas Canyon on the Agua Caliente Indian Reservation. Individuals observed in these locations may have been in migration to other breeding areas outside the Plan Area. The yellow-breasted chat is in a general state of decline. The primary threat is loss of habitat, mainly due to flood control activities; the chat is also subject to cowbird parasitism. Human activities, including golf courses and agriculture, attract cowbirds, thereby increasing the threat to the species.

This species occurs within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Other riparian species that occur in similar habitat, including the Least Bell's vireo, Yellow-Breasted Chat, Summer Tanager, and Yellow Warbler, will benefit from conservation and Adaptive Management actions for the yellow-breasted chat. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow-Breasted chat.
- If an active nest is located, a 200-foot buffer zone will be established around each nest site; however, this buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

7.11



Summer Tanager

Piranga rubra cooperi

Status Federal: No official status

State: Species of Special Concern

Species Account:

The North American breeding population of summer tanagers has remained generally stable since the mid-1970s, although some populations in the eastern United States and along the Colorado River have declined. It was formerly considered common in the lower Colorado River valley by Grinnell (1914), but only 216 individuals were estimated to be present by 1976 (Rosenberg et al. 1991). Habitat destruction is the likely cause of the decrease. Little is known of the breeding biology of the species. Summer tanagers nest in mature riparian groves dominated by cottonwoods and willows. Early arrivals from wintering grounds may appear in late March, but the main migration is April through early May. Nesting is primarily May through June. The nest is built on a horizontal limb of large trees including cottonwoods, usually 10 to 35 feet above the ground, and often over an opening such as a creek bed. The nest is a loosely built, shallow cup of weed stems, leaves, bark, and grasses, lined with fine grasses. From three to five, but usually four eggs are laid. Incubation is approximately 12 days. Tanagers eat insects, including bees and wasps, and small wild fruits. This species is known or suspected to nest in the Plan Area in Mission Creek, the Whitewater Canyon, and Palm Canyon, and also migrates through the area on its way to more coastal and northern habitats. There are also records from the Whitewater River delta and the Thousand Palms Preserve, but whether it nests in these areas or only uses them in migration is not known.

This species occurs within the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Snow Creek/Windy Point Conservation Area
- Whitewater Canyon Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Coachella Valley Stormwater Channel & Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Other riparian species that occur in similar habitat, including Least Bell's vireo, Yellow-Breasted Chat, Southwestern Willow Flycatcher, and Yellow Warbler, will benefit from conservation and Adaptive Management actions for summer tanager. Riparian bird species will be considered as a guild in the Plan with regard to their general presence in riparian areas. However, each of these riparian bird species may require slightly different structural features or successional stages for optimal breeding habitat, which may require different management strategies.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Summer Tanager.
- If an active nest is located, a 200 foot buffer zone will be established around each nest site; however, this buffer zone may be reduced if ESD staff in consultation with CDFW determines that a narrower buffer zone will adequately protect the species. No Covered Activities will take place within this buffer until the nest is no longer active, unless there are physical or safety constraints.

What to Do If Found

- Immediately stop all work within a 200 foot radius of an active nest during breeding season (March 1 – September 1) and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

8.0 MAMMALS

This section contains species accounts, including Species conservation goals and objectives, significant threats, and life history information, for each of the mammal species covered under this Plan. These species include the Southern Yellow bat, Peninsular Bighorn Sheep, Palm Springs round-tailed ground squirrel, and Palm Springs Pocket Mouse. General measures common to all of these mammals are listed below, and measures specific to a given species are included under mandatory avoidance and minimization measures.

8.1



Southern Yellow Bat

Lasiurus ega

Status Federal: No official status

State: Species of Special Concern

Species Account:

The Southern Yellow Bat roosts in trees, primarily palm trees. It appears to prefer the dead fronds of palm trees as a refugium and daytime roost. It feeds on flying insects such as beetles and true bugs, and forages over water and among trees. This species is thought to be non-colonial, although aggregations of up to 15 have been found in the same roost site. Yellow bats probably do not hibernate; activity has been observed year-round in both the southern and northern portions of the range. This species probably forms small maternity groups in trees and palms. Pregnancy occurs from April to June, with lactation occurring in June and July. Females carry from one to four embryos. In Texas, bat pups have been found on fronds that have been trimmed from trees (Mirowsky 1997). There is very little information available on the life history of this species.

This species occurs within the following Conservation Areas:

- Whitewater Canyon Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area
- Indio Hills Palms Conservation Area
- Joshua Tree National Park Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Associated Covered Species. Because riparian birds may also use palm oases in migration, protection of the oases for the Southern Yellow Bat may benefit Least Bell's vireo, Southwestern Willow Flycatcher, Yellow-Breasted Chat, Summer Tanager, and Yellow Warbler.

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow Bat if palm trees will be trimmed or removed.
- Avoid removal or trimming of palm trees with a well-developed “petticoat” of fronds from March 1 – July 31 to avoid impacts to pregnant bats and/or lactating pups.

What to Do If Found

- Immediately stop all work on a palm tree if a Southern Yellow Bat is observed and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

8.2



Coachella Valley Round-Tailed Ground Squirrel

Spermophilus tereticaudus chlorus

Status Federal: Candidate

State: Species of Special Concern

Species Account:

The Coachella Valley round-tailed ground squirrel is typically associated with sand fields and dune formations (Bradley and Deacon 1971), although it does not require active blow sand areas. This small ground squirrel seems to prefer areas where hummocks of sand accumulate at the base of large shrubs that provide burrow sites and adequate cover (Grinnell and Dixon 1918, Cameron Barrows, pers. comm.). Various authors have referred to the use of mesquite habitat by round-tailed ground squirrels (Allen and Price 1895, Elliot 1904, Grinnell and Dixon 1918, Vorhies 1945, Drabek 1973, Dunford 1975). In surveys for this Plan, Dodero (1995) reported observing this squirrel at Willow Hole in the central portion of the dune as well as at the southern periphery, at the edge of mesquite clumps. The Coachella Valley round-tailed ground squirrel occurs in small colonies widely scattered in suitable sandy habitats (Ryan 1968). According to Jaeger (1961), 10 to 15 animals per square mile (0.01 to 0.02/acre) is probably an average number. Based on input from various observers, including members of the Planning Team, areas where the Coachella Valley round-tailed ground squirrel occurs in relatively high density have been identified. This squirrel occurs in good populations in the vicinity of Snow Creek, from Fingal's Finger to Windy Point; it has also been observed further west near Cabazon. It occurs around the Whitewater River channel north and west of Palm Springs, including the Whitewater Floodplain Preserve. It has been observed along the Mission Creek wash and likely occurs in suitable habitat in the southern parts of Desert Hot Springs. The burrows of the Coachella Valley round-tailed ground squirrel are typically located at the base of a large creosote bush or other shrub, often on a small mound or hummock. The entry is several inches across leading to tunnels that are not usually deep or over five or six feet in length (Jaeger 1961). Young are born in March or April in litters of four to 12. In winter, they remain in their underground burrows for much of the time. They feed on seeds and green leaves of desert plants, including the stems of Mormon tea (*Ephedra* sp.), leaves and beans of mesquite, cactus fruit, ocotillo blossoms (Hoffmeister 1986), and agricultural crops, but may occasionally take small lizards (including flat-tailed horned lizards) and insects; they have also been observed to feed on carrion.

Associated Covered Species. Within the Plan Area, other species of concern whose habitat overlaps with that of the Palm Springs Round-Tailed Ground squirrel include Flat-Tailed Horned lizard, Palm Springs Pocket mouse, Coachella Valley Fringe-Toed lizard, Coachella Valley Milk-vetch, Coachella Valley Giant Sand-Treader cricket, Coachella Valley Jerusalem cricket, and Burrowing owl.

This species occurs within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Additional habitat located in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Edom Hill Conservation Area
- Thousand Palms Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed Covered Activity will take place within a Conservation Area known to harbor this species, have ESD staff perform pre-activity surveys (using track detection, sighting counts and vocalization) for Coachella Valley round tailed ground Squirrel.
- If a Round-Tailed ground squirrel burrow is observed during grading or brushing activities within a Conservation Area contact ESD staff.
- Work related materials and wastes shall be removed from the Project site upon completion of the Project.

What to Do If Found

- Immediately stop all work if a Round-tailed ground squirrel is observed onsite and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

8.3



Palm Springs Pocket Mouse

Perognathus longimembris bangsi

Status Federal: No official status

State: Species of Special Concern

Species Account:

The Palm Springs pocket mouse is one of seven subspecies of *Perognathus longimembris*, the “little pocket mouse” that occurs in Southern California. The species is the smallest of the Heteromyidae family that also includes kangaroo rats, kangaroo mice, and spiny pocket mice. The Palm Springs pocket mouse was originally described by Mearns (1898) with the type locality in Palm Springs. This subspecies occurs in the lower Sonoran life zone from the San Geronio Pass area east to the Little San Bernardino Mountains and south along the eastern edge of the Peninsular Range to Borrego Valley and the east side of San Felipe Narrows (Hall 1981). There is no evidence that this subspecies’ range is different than what has been described in the past (Dodd 1996), although its habitat has been greatly reduced by urbanization and agriculture in the Coachella Valley. The Palm Springs pocket mouse is known to hybridize with the Los Angeles pocket mouse (*P.l. brevinasus*) along its western boundary. Although the extent is not known, hybridization also occurs with other subspecies, including the Jacumba pocket mouse (*P. l. internationalis*) to the south and the little pocket mouse (*P. l. longimembris*) to the north. Generally, their habitat is described as having level to gently sloping topography, sparse to moderate vegetative cover, and loosely packed or sandy soils. The species was found broadly distributed in the Plan Area on slopes ranging from 0% to approximately 15% (Dodd 1996). The Plan Area contains the major portion of the range of this species, including the western, northern, and eastern limits of the species’ range. Dodd (1996, 1997) conducted extensive trapping for this species within the Coachella Valley and surrounding region, and found much higher PSPM densities in the northern and western Coachella Valley. The species also occurs on three existing preserves: the Thousand Palms Preserve, the Whitewater Floodplain Preserve, and the Willow Hole-Edom Hill Preserve/ACEC. It occurs at the highest reported densities for the Plan Area in the Snow Creek area. Surveys completed for this Plan (Dodd 1999) confirmed that the species also occurs at Dos Palmas Preserve/ACEC and in the Cottonwood Canyon area of Joshua Tree National Park. This species generally breeds from January to August, with a peak of activity from March to May (Dodd 1996). Several studies suggest that reproduction in heteromyids may be dependent on availability of annual vegetation. Studies of other subspecies of the little pocket

mouse indicate that they hibernate in winter and are active above ground in spring, summer, and fall (Bartholomew and Cade 1957).

Associated Covered Species. This species is generally associated with sandy soils. The Palm Springs Pocket mouse is a near-endemic to the Plan Area; the type locality for the species is from Palm Springs (Mearns 1898). It does, however, occur in the vicinity of Borrego Springs and on the east side of the San Felipe Narrows (Hall 1981), which are not within the Plan Area. Other target species whose habitat overlaps with that of the Palm Springs Pocket mouse include the Flat-Tailed Horned lizard, Coachella Valley Round-Tailed Ground squirrel, Coachella Valley Giant Sand-Treader cricket, Coachella Valley Milk-vetch, Coachella Valley Jerusalem cricket, Coachella Valley Fringe-Toed lizard, and the Burrowing owl.

This species occurs within the following Conservation Areas:

- Snow Creek/Windy Point Conservation Area
- Whitewater Floodplain Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Morongo Wash Special Provisions Area
- Willow Hole Conservation Area
- Thousand Palms Conservation Area

Additional habitat located in the following Conservation Areas:

- Cabazon Conservation Area
- Stubbe and Cottonwood Canyons Conservation Area
- Whitewater Canyon Conservation Area
- Highway 111/I-10 Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Mission Creek/Morongo Wash Conservation Area
- Edom Hill Conservation Area
- Indio Hills/Joshua Tree National Park Linkage Conservation Area
- Indio Hills Palms Conservation Area
- East Indio Hills Conservation Area
- Joshua Tree National Park Conservation Area
- Desert Tortoise and Linkage Conservation Area
- Mecca Hills/Orocopia Mountains Conservation Area
- Dos Palmas Conservation Area

- Coachella Valley Stormwater Channel and Delta Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Species Specific Avoidance and Minimization Measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, implement pre-activity surveys to determine presence.
- PSPM surveys will include visual surveys, and examination of BUOW scat for PSPM remains.
- Prior to covered activity work, CVWD's ESD staff should assist work crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible).
- During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable.
- Work related materials and wastes shall be removed from the Covered Activity site upon completion of the O&M work.

What to Do If Found

- Immediately stop all work if a suspected PSPM is observed in the project site and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

8.4



Peninsular Bighorn Sheep

Ovis canadensis nelsoni

Status Federal: Endangered

State: Threatened

Species Account:

The Peninsular bighorn sheep is restricted to the east-facing, lower elevation slopes (below 1,400 meters) of the Peninsular Ranges in the Sonoran desert life zone. Range-wide estimates of abundance for the U.S. population, from the San Jacinto Mountains to the Mexican border, began in the 1970s. The highest population estimate was 1,171 in 1974 (Weaver 1975). Surveys in the 1970s, 1980s, and 1990s indicate that significant declines have occurred in multiple ewe groups. The synergistic effects from habitat loss, disease, human disturbance, and predation are believed to have caused the decline. The 1998 range-wide population was estimated to be 334 animals (excluding lambs). Approximately half of these were in the Plan area in four subpopulations, or ewe groups. The San Jacinto (Recovery Region 1) and Northern Santa Rosa (Recovery Region 2) ewe groups have the smallest populations, excluding lambs. These two groups are especially vulnerable. In contrast to most mountain sheep, Peninsular Ranges bighorn sheep tend to favor the lower elevation habitat which makes them particularly vulnerable to habitat loss and human disturbance (Ostermann 2001).

The Essential habitat for bighorn sheep in the northern portion of the Peninsular Ranges which is within the Plan Area borders the rapidly urbanizing Coachella Valley area. Urban encroachment into alluvial fans, bajadas, and canyons within Peninsular bighorn sheep habitat in the San Jacinto and northern Santa Rosa Mountains began in the 1950s and continues today (Ostermann 2001). DeForge and Scott (1982) described the situation of bighorn sheep using urban areas during the hot summer months in the mid-1950s. Urbanization was considered the leading cause of mortality for Peninsular bighorn sheep from 1991 to 1996 (Bighorn Institute 1999). Bighorn sheep in the Peninsular Ranges were listed as threatened by the State of California in 1971 and endangered by the U.S. Fish and Wildlife Service in 1998 (USFWS 1998).

Associated Covered Species. Other species of concern which occur in the same general area as Bighorn Sheep include Gray Vireo, Desert Tortoise, and some riparian bird species.

This species occurs within the following Conservation Areas:

- Cabazon Conservation Area
- Snow Creek/Windy Point Conservation Area
- Santa Rosa and San Jacinto Mountains Conservation Area

Species Specific Avoidance and minimization measures are described below:

- Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys to determine if the site contains water sources.
- Primary risks to Peninsular bighorn sheep during O&M and Covered Activities include disturbance to, or exclusion from, water sources.
- In San Jacinto and Santa Rosa Mountains, avoid activities that could impact Bighorn sheep during the lambing season from approximately January 31 through June 29 in our region.

What to Do If Found

- Immediately stop all work if a Peninsular bighorn sheep is observed onsite and notify the ESD staff if present.
- If no biological monitor is present onsite, call ESD staff and seek direction.

TABLES AND FIGURES

Table 1	Vegetation, Algae, and Invasive Species Control at CVWD Facilities and Infrastructure
Table 2	Coachella Valley MSHCP Covered Species
Table 3	CVWD Covered Activities and Required Avoidance and Minimization Measures
Figure 1	Coachella Valley Water District Covered Activities Locations
Figures 2 – 13	CVWD Lands/Infrastructure located within CVMSHCP Conservation Areas
Figure 14	Coachella Valley MSHCP Valley Wide Conservation Area Map
Tables 4 -15	Coachella Valley MSHCP Conservation Areas and Avoidance and Minimization Measures

Table 1. Vegetation, Algae, Pest and Invasive Species Control at CVWD Facilities and Infrastructure

CVWD Activity	Control Method	Industry Name	Notes
Vegetation Control on service roads and facilities	Herbicide	Aqua Neat	Preferred for use in sensitive habitats
Aquatic Vegetation control in channels and canals	Triploid Grass Carp	Grass Carp	Integrated algae/grass control
	Herbicide	Aqua Neat	Used in agricultural drain channels
Quagga Mussel Control	Sodium Hypochlorite	Chlorine	Coachella Canal treatment for invasive (Quagga) mussels
Insect and Rodent Control	Bait Station Insecticide	Fast Track Temprid SC Nibor D	Used at CVWD office facilities and water reclamation plants

Table 2. Coachella Valley Multiple Species Habitat Conservation Plan Covered Species

Species	Conservation Status	Habitat Associations
	California	Coachella Valley
Plants		
<i>Xylorhiza cognate</i> Mecca Aster	US: CA: CNPS: List 1B	Mecca aster may be associated with two intergraded geologic formations found in local hills; the Palm Springs formation and the Canebrake formation (Stewart 1991).
<i>Astragalus lentiginosus</i> var. <i>cochellae</i> Coachella Valley Milkvetch	US: FE CA: CNPS: List 1B	The Coachella Valley Milkvetch occurs in dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides.
<i>Astragalus tricarinatus</i> Triple-Ribbed Milkvetch	US: FE CA: CNPS: List 1B	The triple-ribbed Milkvetch is found in a narrow range primarily from the northwestern portion of the Coachella Valley, from the vicinity of Whitewater Canyon, the type locality, across Highway 62 to Dry Morongo Wash and Big Morongo Canyon.
<i>Salvia greatae</i> Orocopia Sage	US: CA: CSC CNPS: List 1B	The preferred habitat of Orocopia sage is in gravelly or rocky soils on broad bajadas or fans, often adjacent to desert washes or on the rocky slopes of canyons.
<i>Linanthus maculatus</i> (also <i>Gilia maculata</i>) Little San Bernardino Mountains Linanthus	US: SSC CA: CSC CNPS: List 1B	The occurrences within the Plan Area are on the margins of washes on shallow sandy benches.
Insects		
<i>Macrobaenetes valgum</i> Coachella Valley Giant Sand -Treader Cricket	US: CSC CA:	Coachella Valley Giant Sand -Treader cricket depends on the active dunes and ephemeral sand fields at the west end of the Coachella Valley.
<i>Stenopelmatus cahuilaensis</i> Coachella Valley Jerusalem Cricket	US: CA:	The Coachella Valley Jerusalem cricket is known from the Snow Creek area east to Windy Point, and from remnants of sand dune Habitat around the Palm Springs Airport.
Fish		
<i>Cyprinodon macularius</i> Desert pupfish	US: FE CA: SE	Desert backwater areas, springs, streams, and pools. In California, found in the Salton Sea and some of its tributaries (San Felipe Creek, San Sebastian Marsh, and Salt Creek) in Riverside and Imperial Counties.
Reptiles		
<i>Gopherus (Xerobates) agassizii</i> Desert Tortoise	US: FT CA: ST	Historically found throughout the Mojave and Sonoran Deserts into Arizona, Nevada, and Utah. Occurs throughout the Mojave Desert in scattered populations. Found in creosote bush scrub, saltbush scrub, thorn scrub (in Mexico), and Joshua tree woodland.
<i>Phrynosoma mcallii</i> Flat-Tailed Horned lizard	US: – CA: CSC	Fine sand in desert washes and flats with vegetative cover generally below 180 meters' (600 feet) elevation in Riverside, San Diego, and Imperial Counties.
<i>Uma inornata</i> Coachella Valley Fringe-Toed lizard	US: FT CA: SE	Fine, loose, windblown sand (dunes), interspersed with hardpan and widely spaced desert shrubs; known only from the Coachella Valley.

Table 2 (continued). Coachella Valley Multiple Species Habitat Conservation Plan Covered Species

Birds	Conservation Status California	Habitat Associations Coachella Valley
<i>Athene cunicularia</i> burrowing owl	US: – CA: CSC	Lives in dry, open areas along agricultural fields and berms along the CVSC.
<i>Dendroica petechia brewsteri</i> Yellow Warbler	US: – CA: CSC	The yellow warbler prefers wetlands and mature riparian woodlands dominated by cottonwoods, alders, and willows. It also uses well-watered, second growth woodlands and gardens.
<i>Toxostoma crissale</i> Crissal thrasher	US: – CA: CSC	The distribution of habitat for the Crissal Thrasher is quite patchy, particularly in the vicinity of the Salton Sea where areas occupied by mesquite hummocks and desert saltbush scrub are highly fragmented.
<i>Toxostoma lecontei</i> Le Conte's thrasher	US: – CA: CSC	Le Conte's thrasher occurs in open desert washes and desert scrub habitats on sandy and often alkaline soils. They occur in Desert Scrub, Desert Succulent Shrub, Desert Wash, and Alkali Desert Scrub habitats.
<i>Icteria virens</i> Yellow-Breasted Chat	US: – CA: CSC	The yellow-breasted chat nests in dense riparian thickets and brushy tangles in the lower portions of foothill canyons and in the lowlands.
<i>Empidonax traillii extimus</i> Southwestern Willow Flycatcher	US: E – CA: E	The southwestern willow flycatcher is restricted to dense riparian woodlands and forests along the river and stream systems of Southern California, primarily in Kern, San Diego, San Bernardino, and Riverside Counties.
<i>Rallus obsoletus yumanensis</i> Yuma Ridgway's Rail	US:E – CA:T	Yuma Ridgway's Rails are found in marsh habitats of cattails (<i>Typha domingensis</i>) and California bulrush (<i>Scirpus californicus</i>).
<i>Laterallus jamaicensis</i> California Black Rail	US: – CA:T	California black rails are birds of dense coastal and inland marsh habitat. California black rails are usually associated with habitat dominated by California bulrush (<i>Scirpus californicus</i>) and three square bulrush (<i>S. americanus</i>).
<i>Vireo bellii pusillus</i> Least Bell's Vireo	US: E – CA: E	The Least Bell's vireo inhabits riparian woodland habitats along the riverine systems of Southern California, primarily in San Diego, Santa Barbara, and Riverside Counties.
<i>Vireo vicinior</i> Gray Vireo	US: – CA: CSC	Suitable habitat typically occurs from 2,000 to 6,500 feet (600-2,000 m). Preferred habitat is found in areas with sparse to moderate cover and scattered small trees. Although junipers are the dominant trees in gray vireo habitat, oaks are common.
<i>Dendroica petechia brewsteri</i> Yellow Warbler	US: – CA: CSC	The yellow warbler prefers wetlands and mature riparian woodlands dominated by cottonwoods, alders, and willows. It also uses well-watered, second growth woodlands and gardens.
<i>Piranga rubra cooperi</i> Summer Tanager	US: – CA: CSC	Summer tanagers nest in mature riparian groves dominated by cottonwoods and willows. Early arrivals from wintering grounds may appear in late March, but the main migration is April through early May.

Table 2 (continued). Coachella Valley Multiple Species Habitat Conservation Plan Covered Species

Mammals	Conservation Status California	Habitat Associations Coachella Valley
<i>Lasiurus xanthinus</i> Western Yellow Bat	US: – CA: CSC	The southern yellow bat roosts in trees, primarily palm trees. It appears to prefer the dead fronds of palm trees as a refugium and daytime roost.
<i>Xerospermophilus tereticaudus chlorus</i> Palm Springs Round-Tailed Ground squirrel	US: – CA: CSC	The Coachella Valley round-tailed ground squirrel is typically associated with sand fields and dune formations (Bradley and Deacon 1971), although it does not require active blow sand areas.
<i>Perognathus longimembris bangsi</i> Palm Springs Pocket mouse	US: – CA: CSC	Generally, their habitat is described as having level to gently sloping topography, sparse to moderate vegetative cover, and loosely packed or sandy soils.
<i>Ovis canadensis nelson</i> Peninsular Bighorn	US: E – CA: T	The Peninsular bighorn sheep is restricted to the east-facing, lower elevation slopes (below 1,400 meters) of the Peninsular Ranges in the Sonoran desert life zone. Fully protected in California.
<p>USFWS = USFWS CSC = State Species of Special Concern T = State Threatened CA = California SSC = Federal Species of Special Concern E = State Endangered E = Federally Endangered T =Threatened California Native Plant Society = CNPS 1B Rare, Threatened or Endangered plants in the state of California</p>		

Table 3. CVWD Covered Activities and Required Avoidance and Minimization Measures

Facility	Conservation Area Where Located	Avoidance/Minimization Measures Required
a) ALERT stations, all except Upper Bear Creek	Santa Rosa & San Jacinto Mts.; Whitewater Canyon Whitewater Floodplain; Thousand Palms; CVSC and Delta; Desert Tortoise and Linkage Area.	None
b) CVSC, including increased flows from the WMP	CVSC and Delta	Provision of replacement habitat; burrowing owl
c) East Valley drains, including increased flows from the WMP	CVSC and Delta	Desert pupfish, Yuma Ridgway's Rail, California black rail
d) Oasis area drains, including increased flows from the WMP	CVSC and Delta	Desert pupfish, Yuma Ridgway's Rail, California black rail
e) Coachella Canal; canal siphons & overshoots; East Side dike & evacuation channels	Dos Palmas, Mecca Hills/Orocopia Mountains; East Indio Hills	None
f) WRP-7 recharge facility (construction and O&M)	East Indio Hills	Tamarisk removal; Mesquite restoration
g) ALERT Station, Upper Bear Creek	Santa Rosa & San Jacinto Mts.	Bighorn sheep
h) Deep Canyon training dikes & channel	Santa Rosa & San Jacinto Mts.	None
i) Dead Indian Canyon debris basin	Santa Rosa & San Jacinto Mts.	Bighorn sheep
j) East La Quinta detention basins, channels & dikes	Santa Rosa & San Jacinto Mts.	Bighorn sheep
k) Magnesia Canyon detention basin	Santa Rosa & San Jacinto Mts.	Bighorn sheep
l) Stormwater drain inlets	Santa Rosa & San Jacinto Mts.	Bighorn sheep
m) Dike No. 4 recharge facility [Levy facility] (construction and O&M)	Santa Rosa & San Jacinto Mts.	Bighorn sheep
n) Martinez Recharge Facility, (construction and O&M)	Santa Rosa & San Jacinto Mts.	Minor Amendment with criteria; Bighorn sheep
o) Reservoirs & associated booster stations & transmission mains (existing)	Santa Rosa & San Jacinto Mts.	Bighorn sheep
p) Reservoirs & associated booster stations & transmission mains (construction and O&M)	Santa Rosa & San Jacinto Mts.	Minor Amendment with criteria; Bighorn sheep
q) Reservoirs & associated booster stations & transmission mains (existing)	Thousand Palms	Fluvial sand transport
r) Reservoirs & associated booster stations & transmission mains (construction and O&M)	Thousand Palms	Fluvial sand transport

Table 3 (continued). CVWD Covered Activities and Required Avoidance and Minimization Measures

Facility	Conservation Area Where Located	Avoidance/Minimization Measures Required
s) Transmission water mains	Thousand Palms; West Deception Canyon	None
t) Whitewater River flood control levees (construction and O&M)	Thousand Palms	Subject to terms & conditions of FESA Section 7 consultation
u) CRA turnout & recharge channel (O&M)	Whitewater Canyon; Whitewater Floodplain	None
v) Spreading area for CRA water (O&M)	Whitewater Floodplain	Blow Sand removal & placement in deposition area
w) Cathedral City transmission mains	Santa Rosa & Santa Jacinto Mts	Bighorn sheep

Figure 1. Coachella Valley Water District Covered Activities Locations

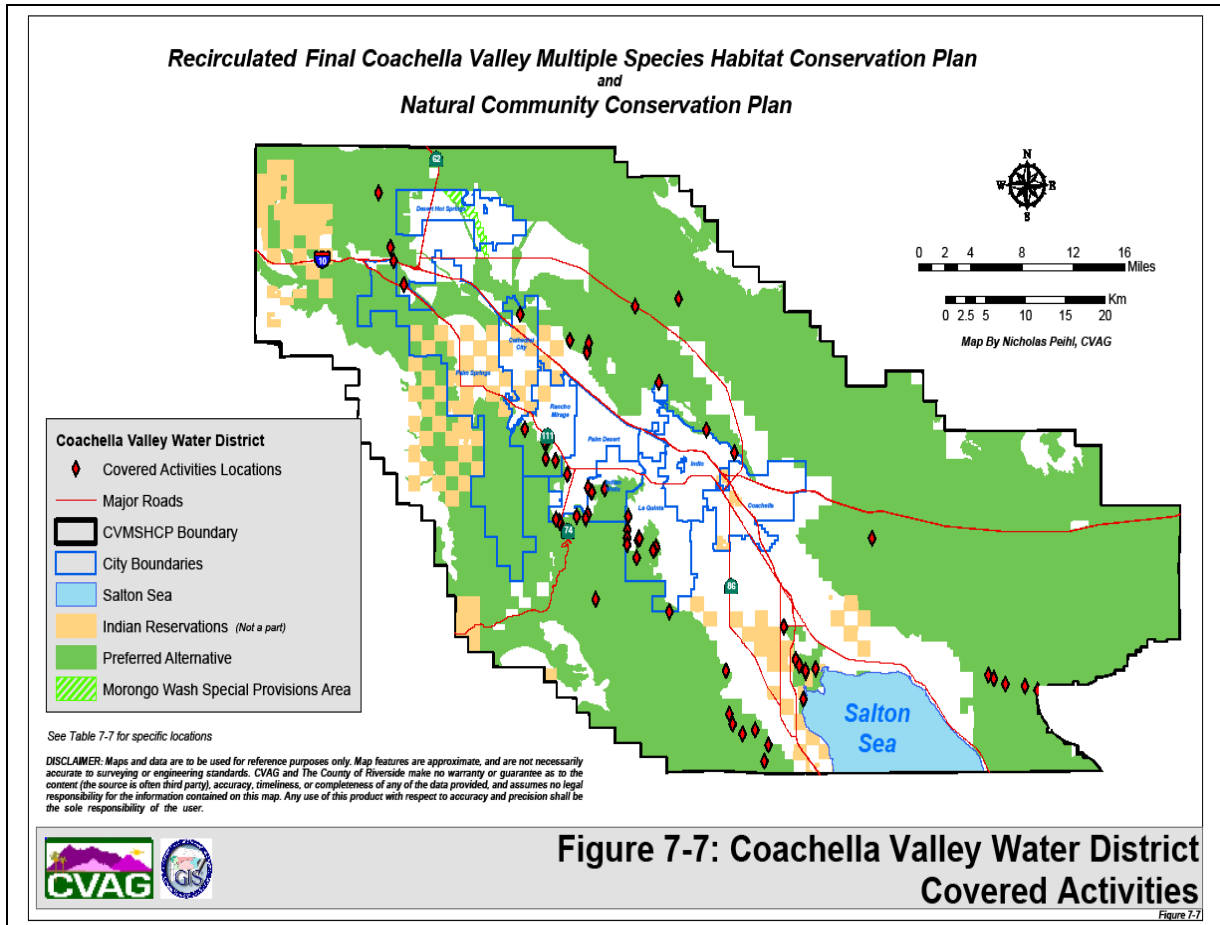


Figure 2. CVWD Lands within the Coachella Valley Stormwater and Delta Conservation Area

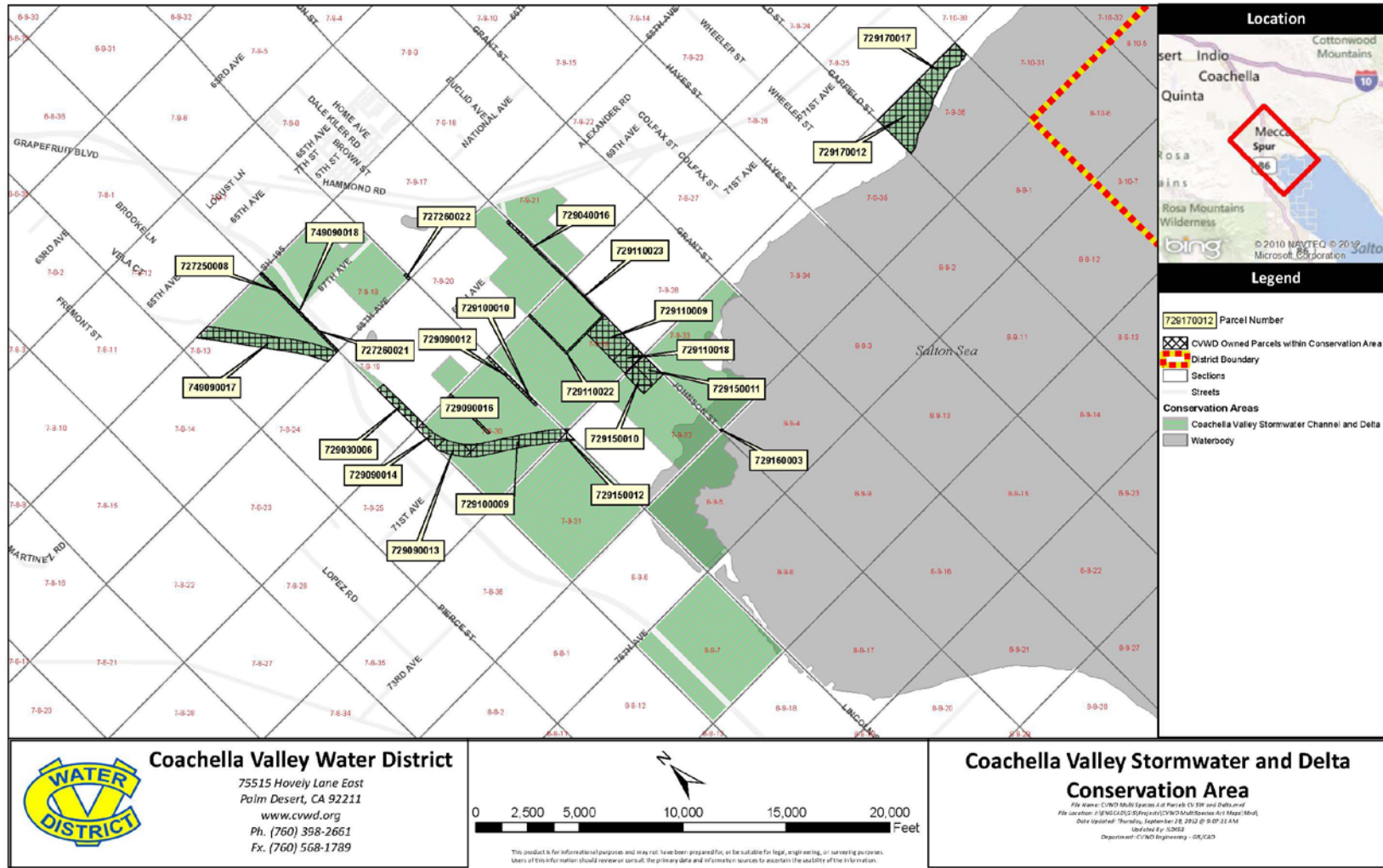


Figure 3. CVWD Lands within the Desert Tortoise Linkage Conservation Area

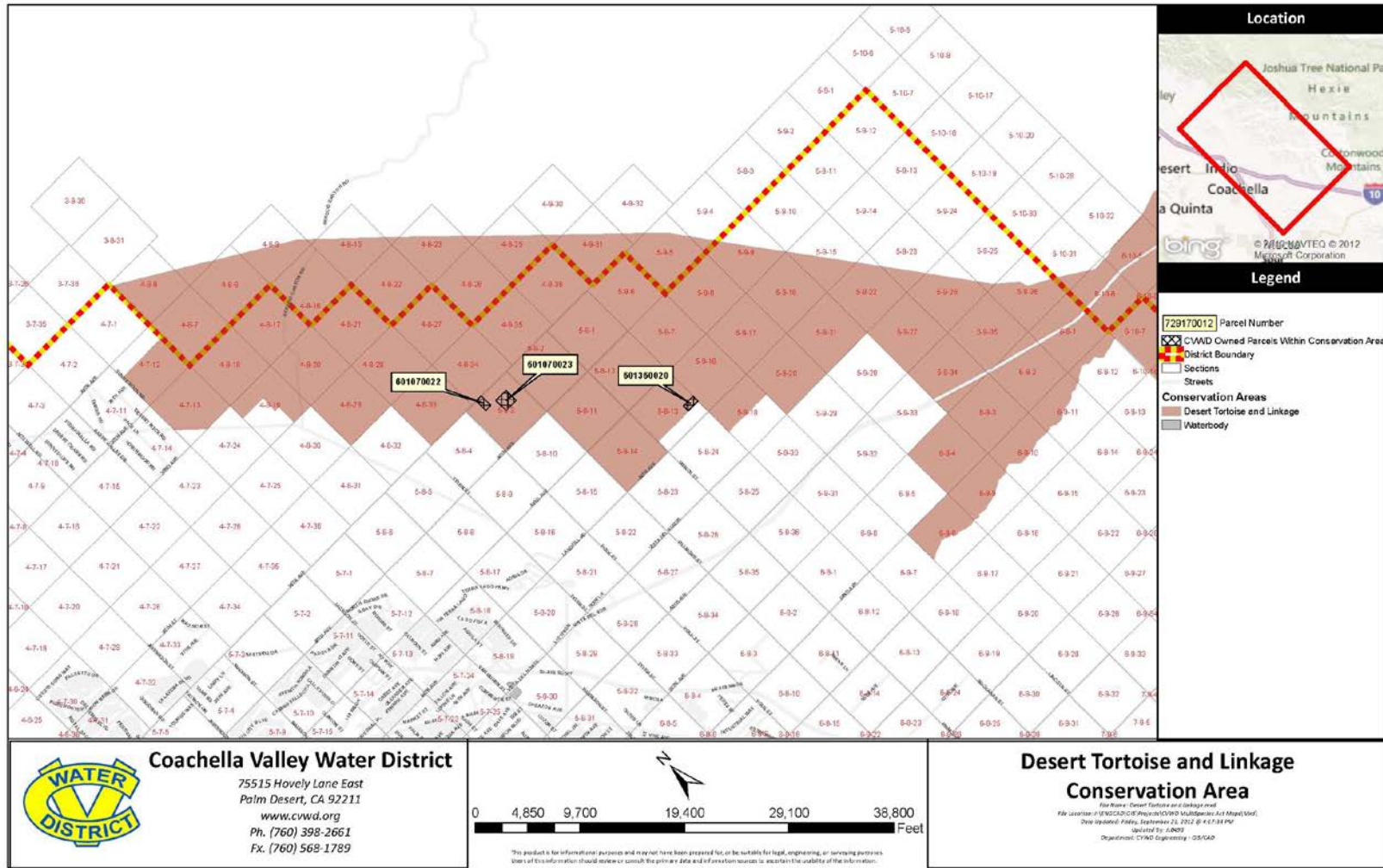


Figure 4. CVWD Lands within the East Indio Hills Conservation Area

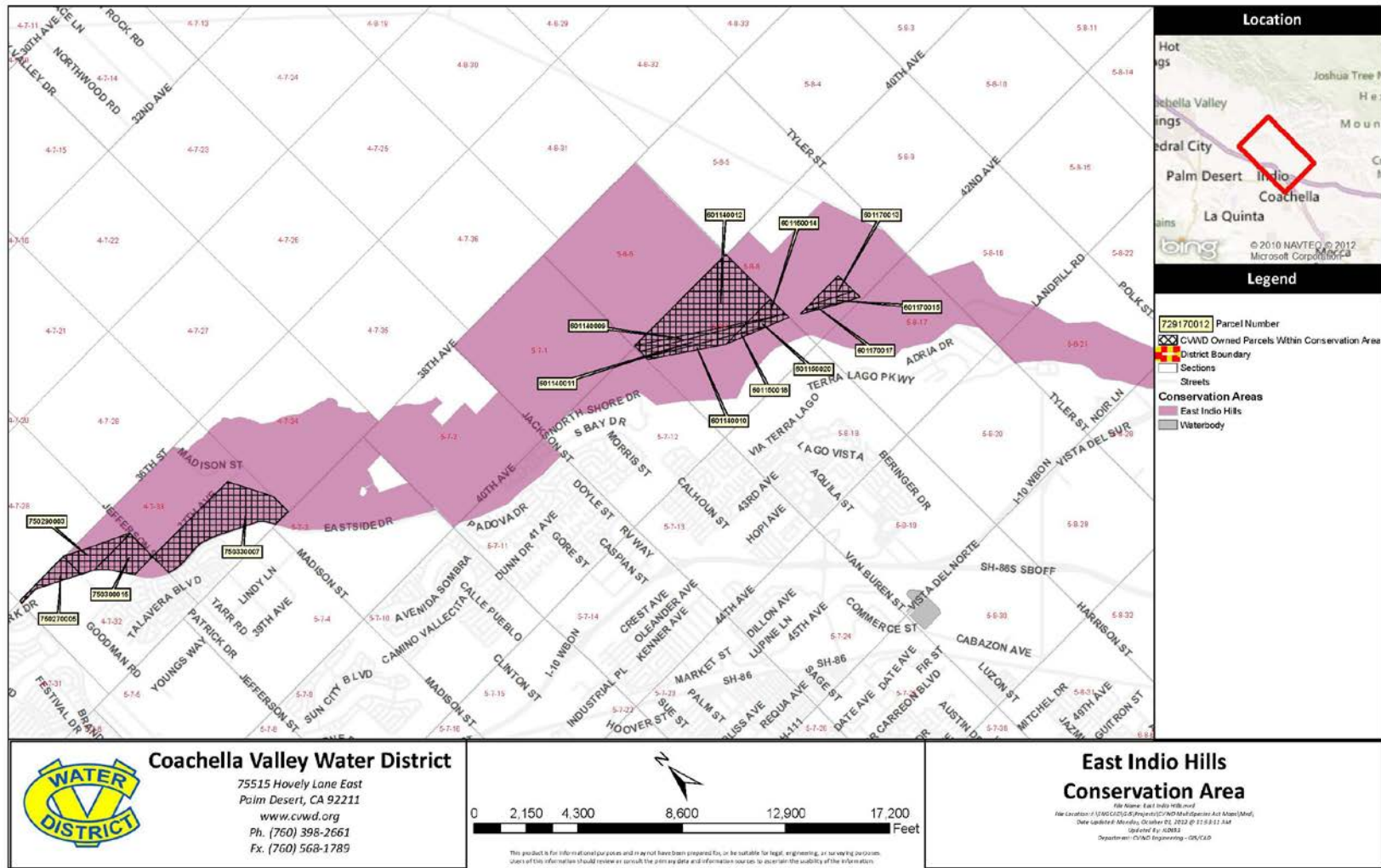


Figure 5. CVWD Lands within the Indio Hills/Joshua Tree National Park Conservation Area

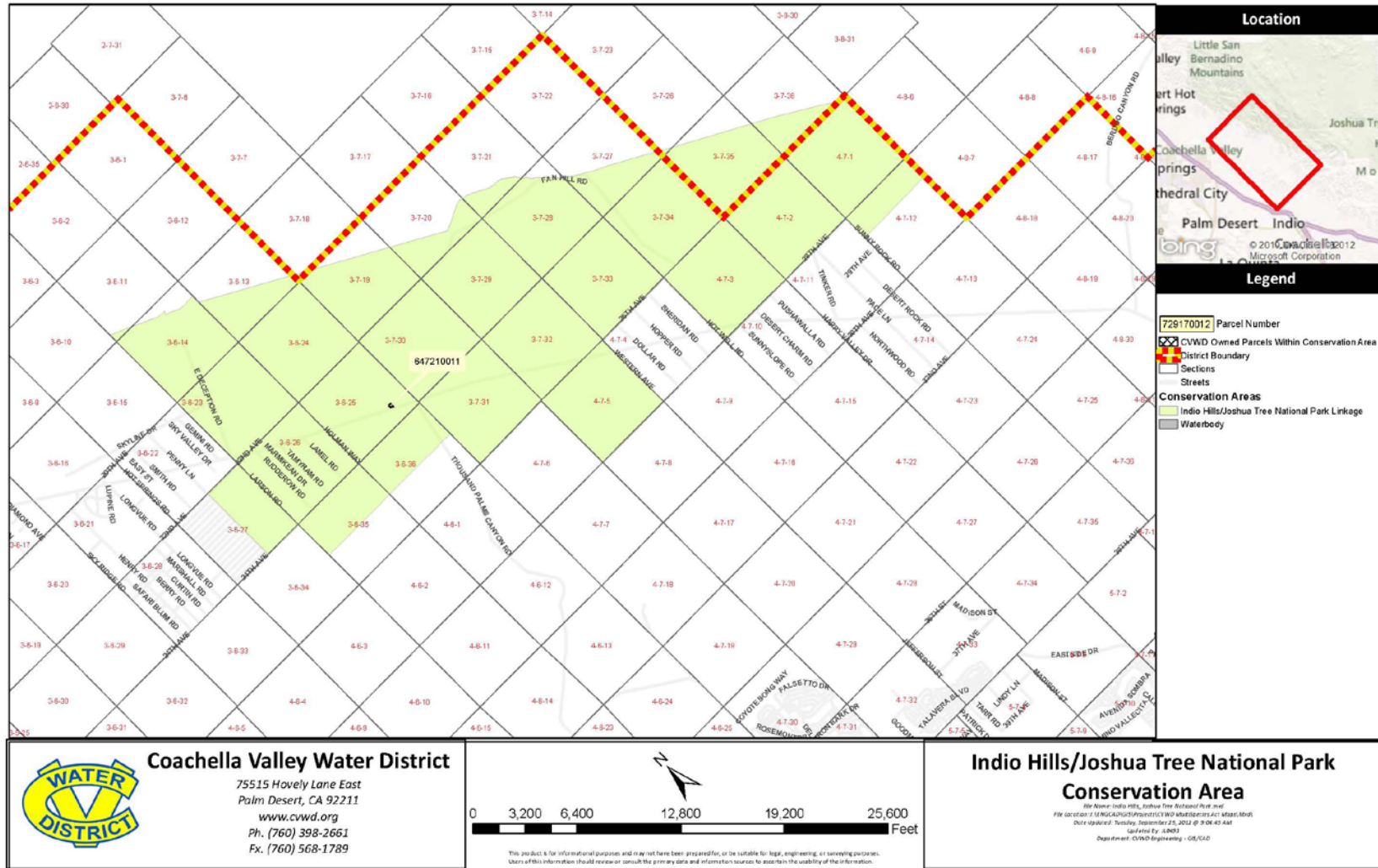


Figure 6. CVWD Lands within the Joshua Tree National Park Conservation Area

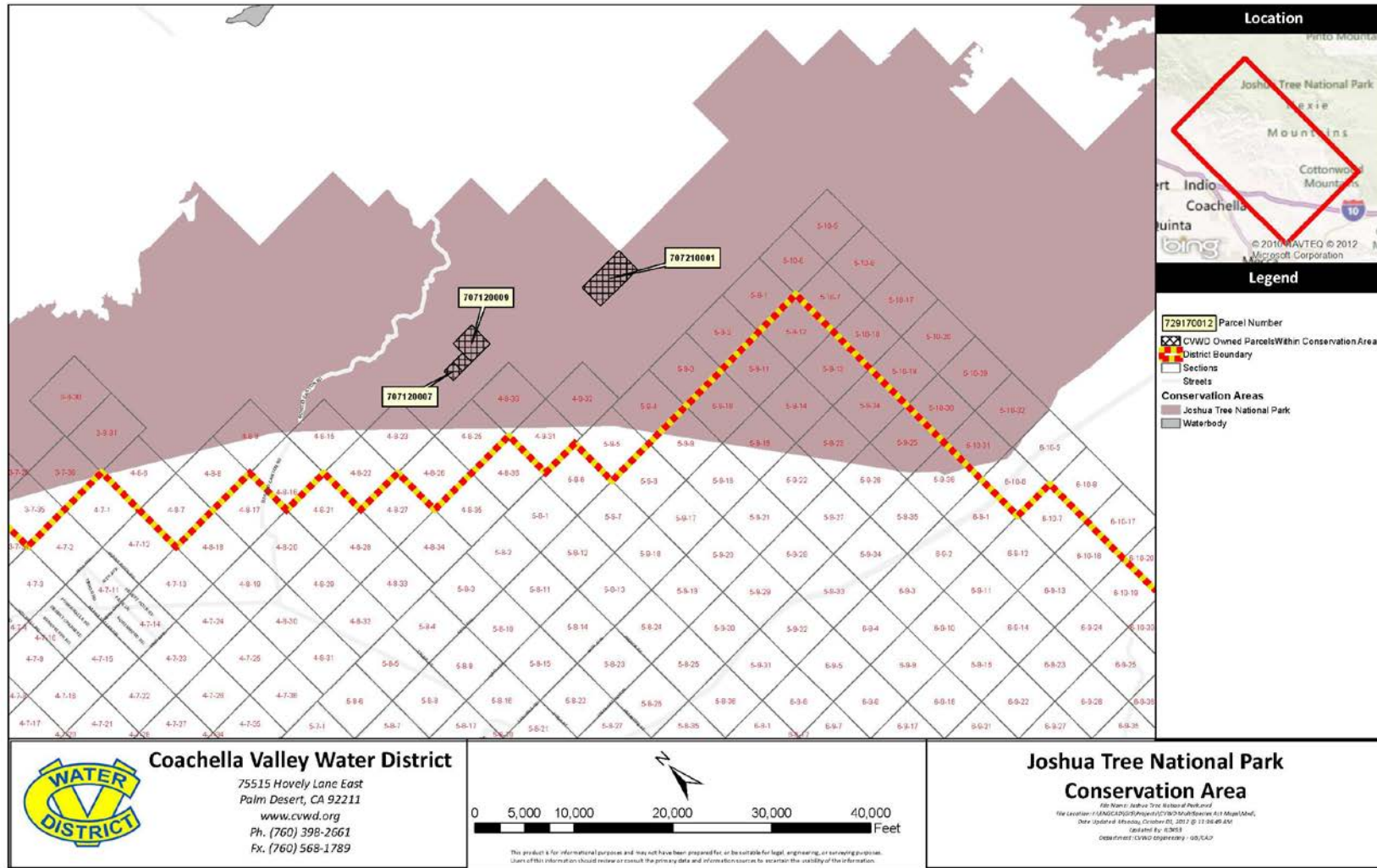


Figure 7. CVWD Lands within the Mecca Hills/Orocopia Mountains Conservation Area

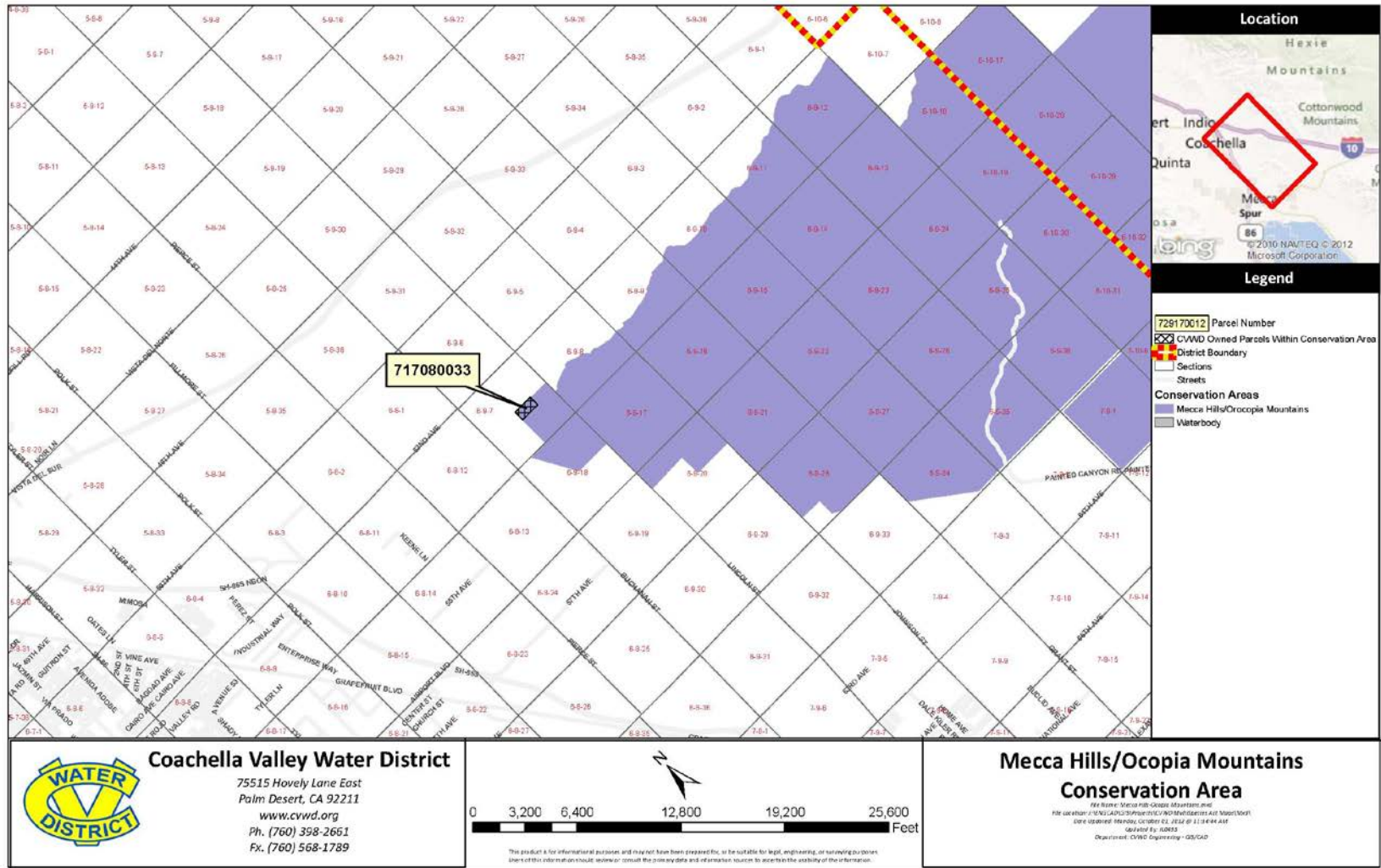


Figure 8. CVWD Lands within the Mission Creek/Morongo Wash Conservation Area

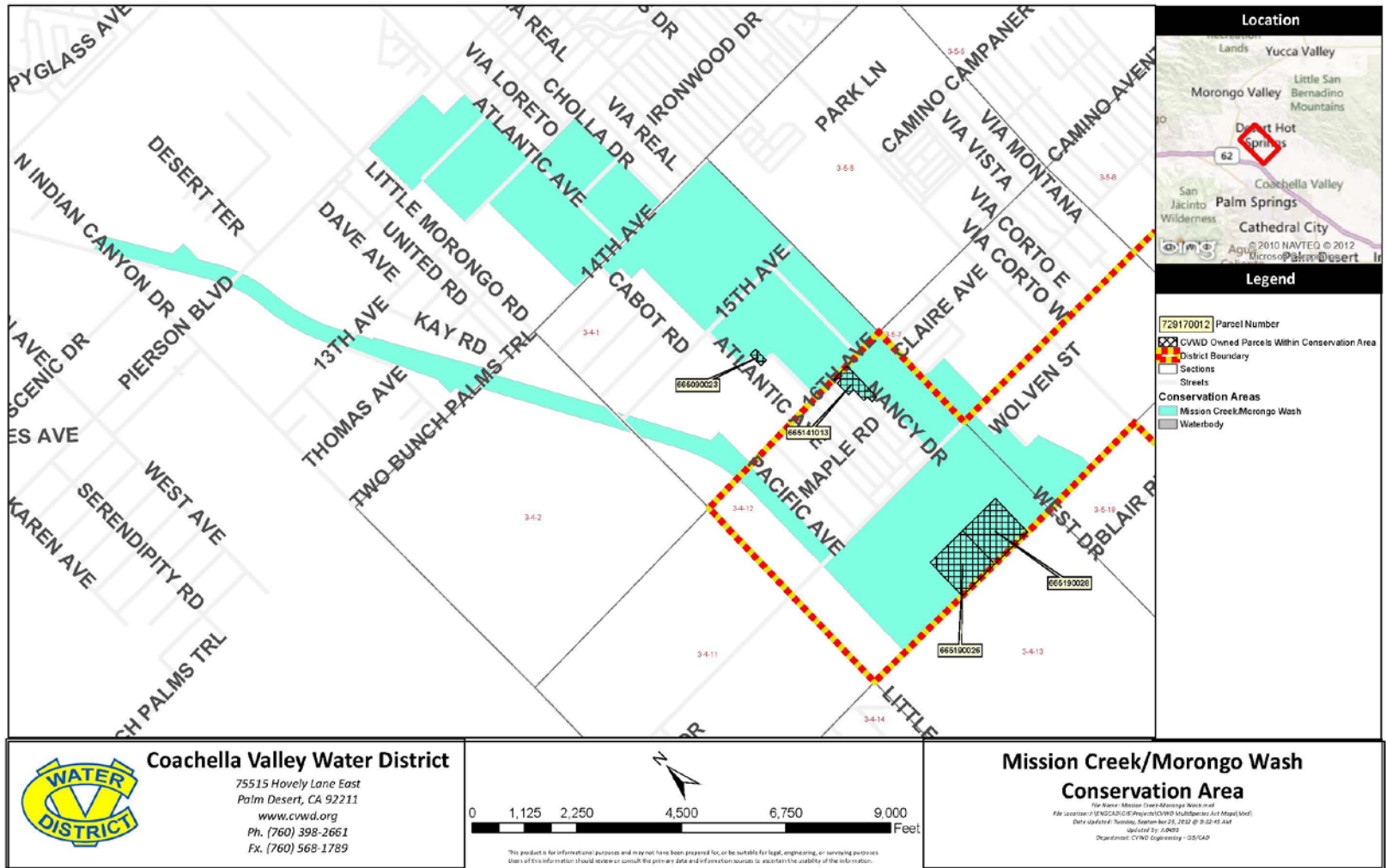


Figure 9. CVWD Lands within the Santa Rosa/San Jacinto Mountains Conservation Area

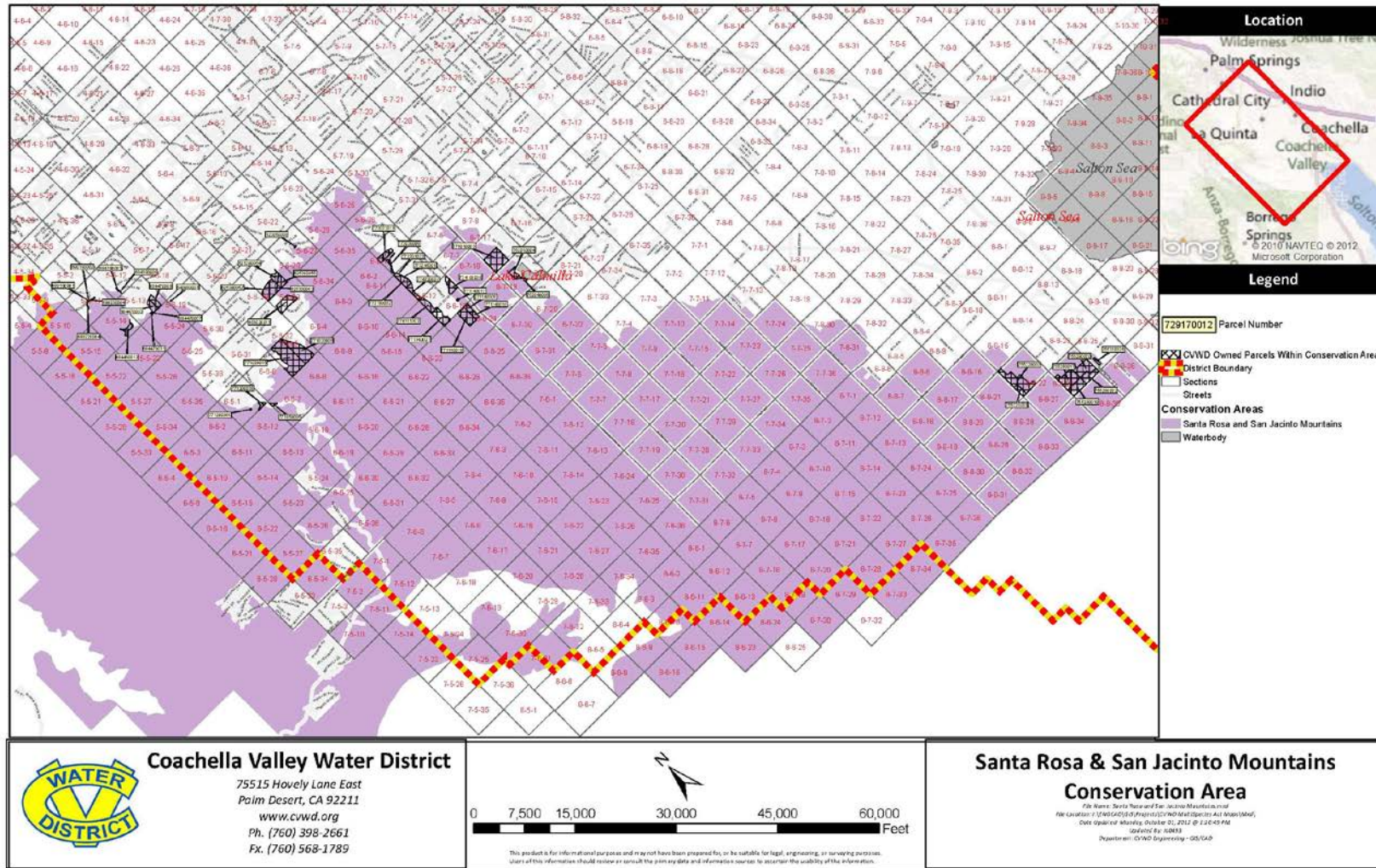


Figure 10. CVWD Lands within the Thousand Palms Conservation Area

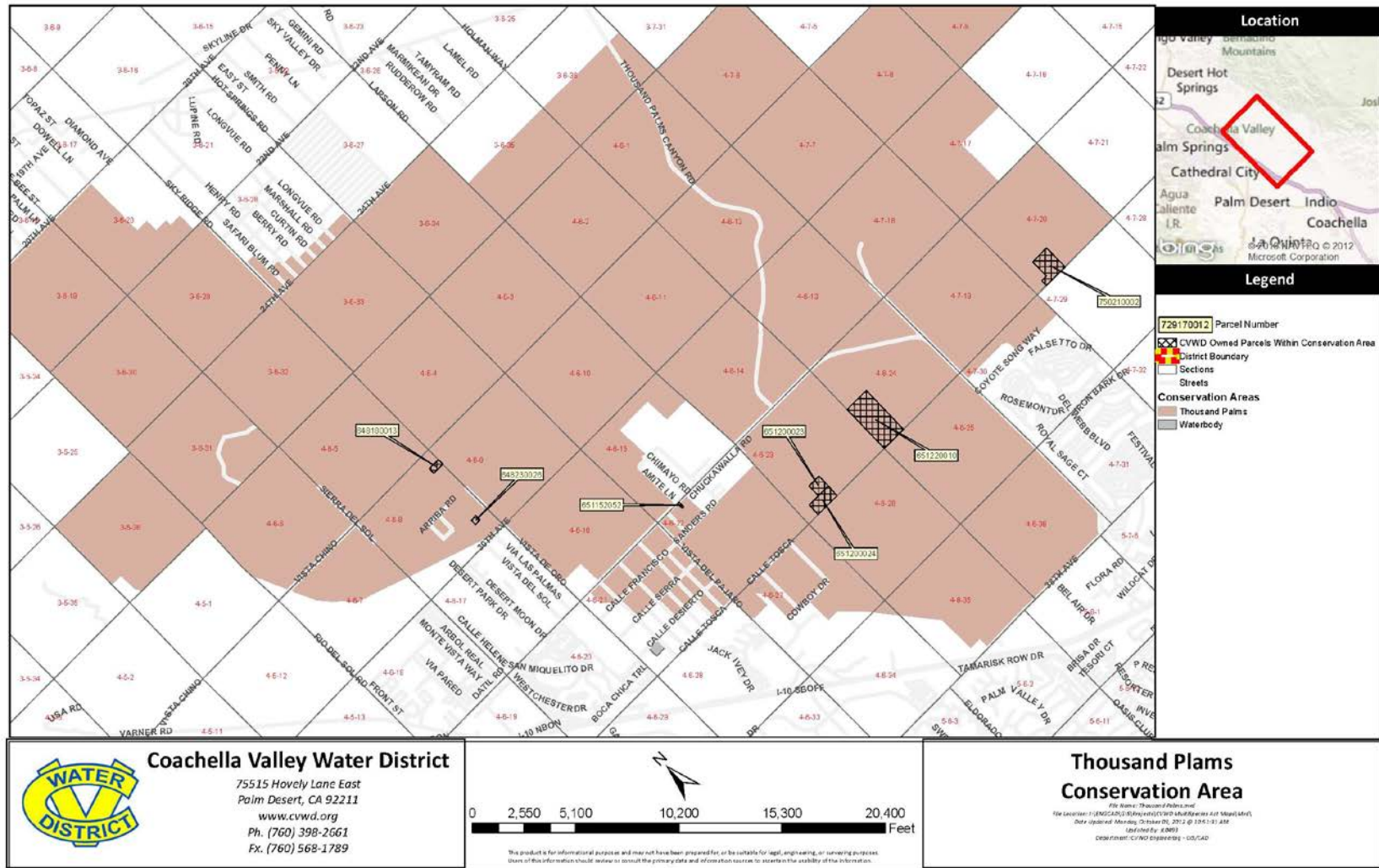


Figure 11. CVWD Lands within the Whitewater Floodplain Conservation Area

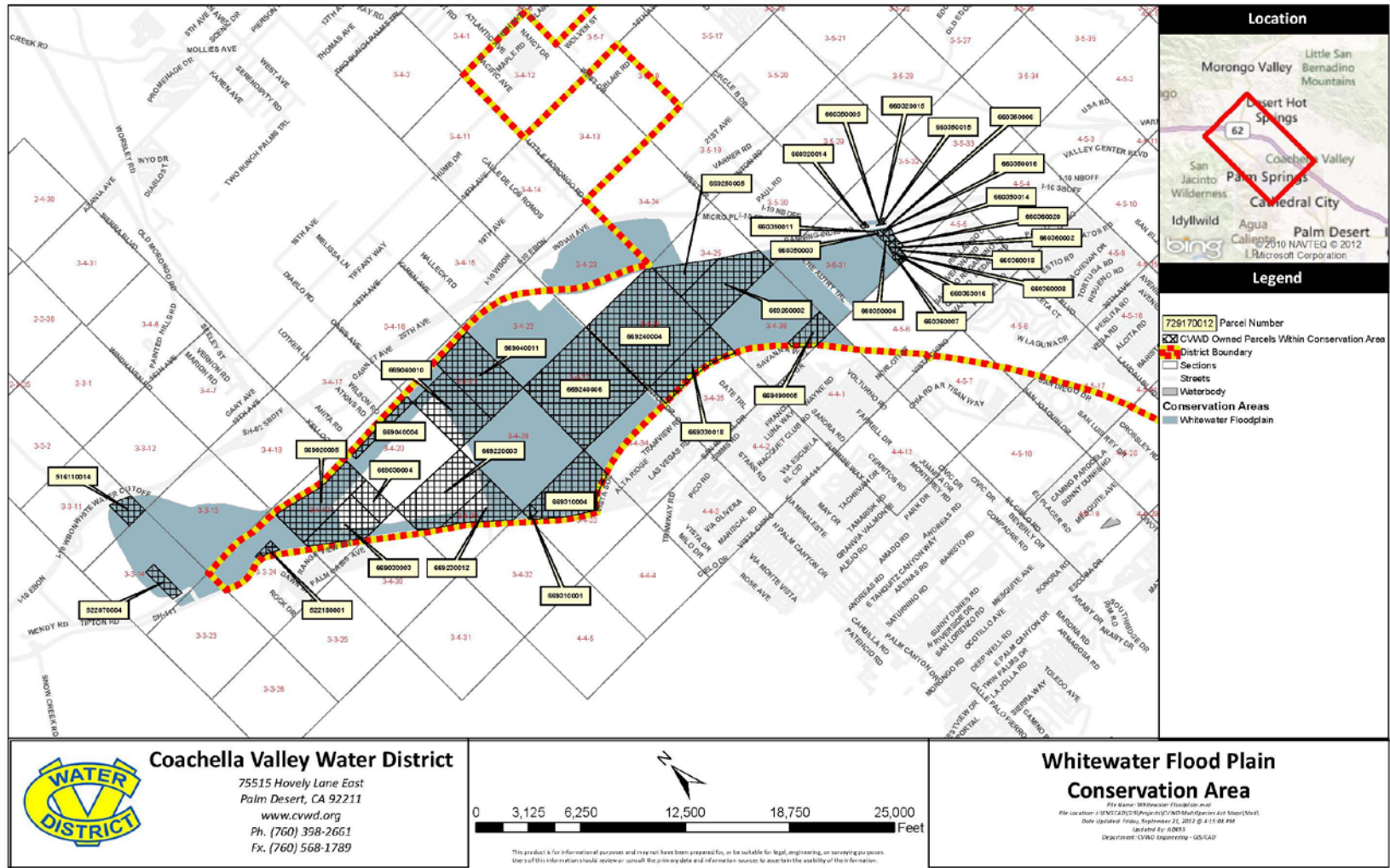


Figure 12. CVWD Lands within the Willow Hole Conservation Area

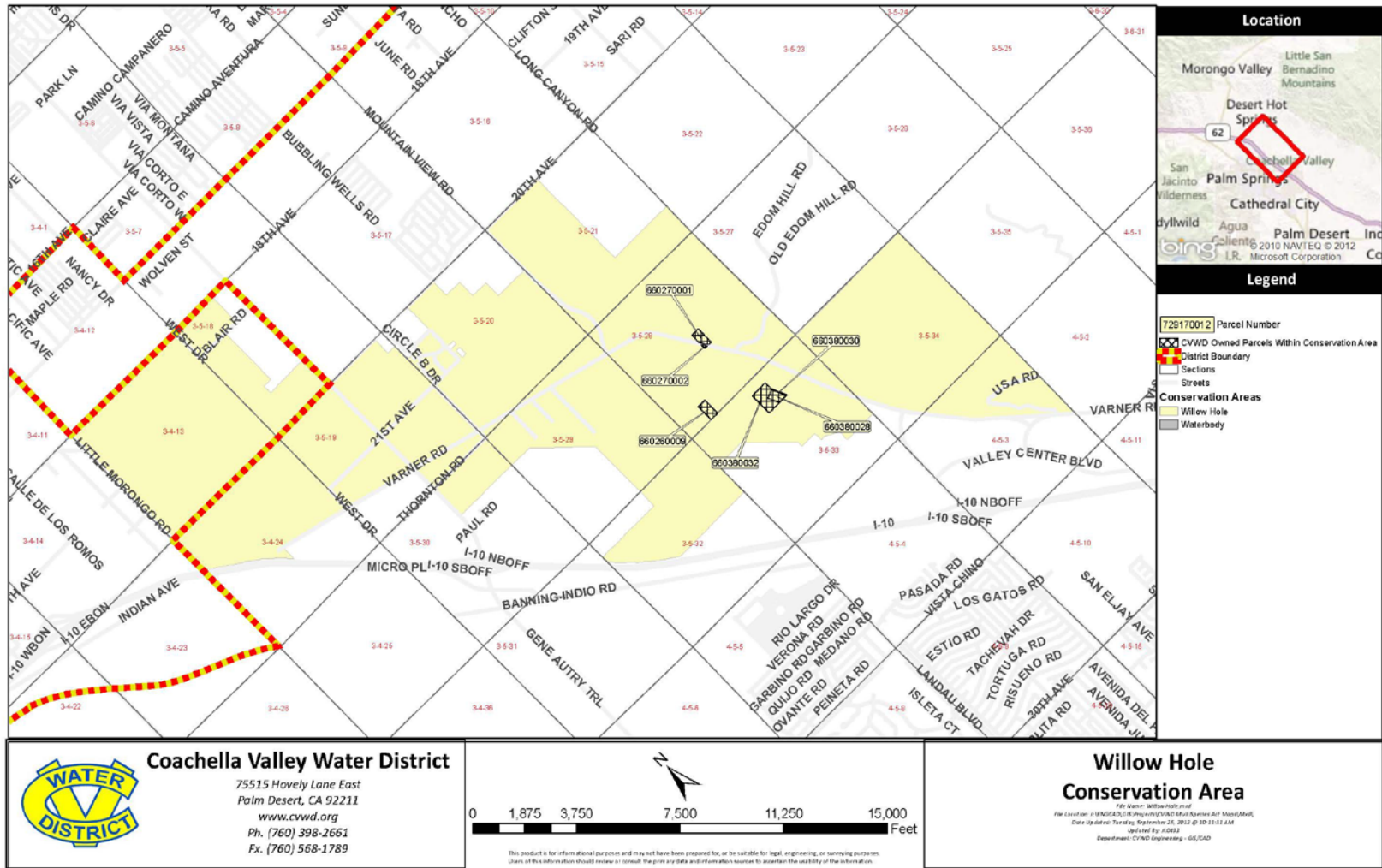


Figure 13. CVWD Lands within the Dos Palmas Conservation Area

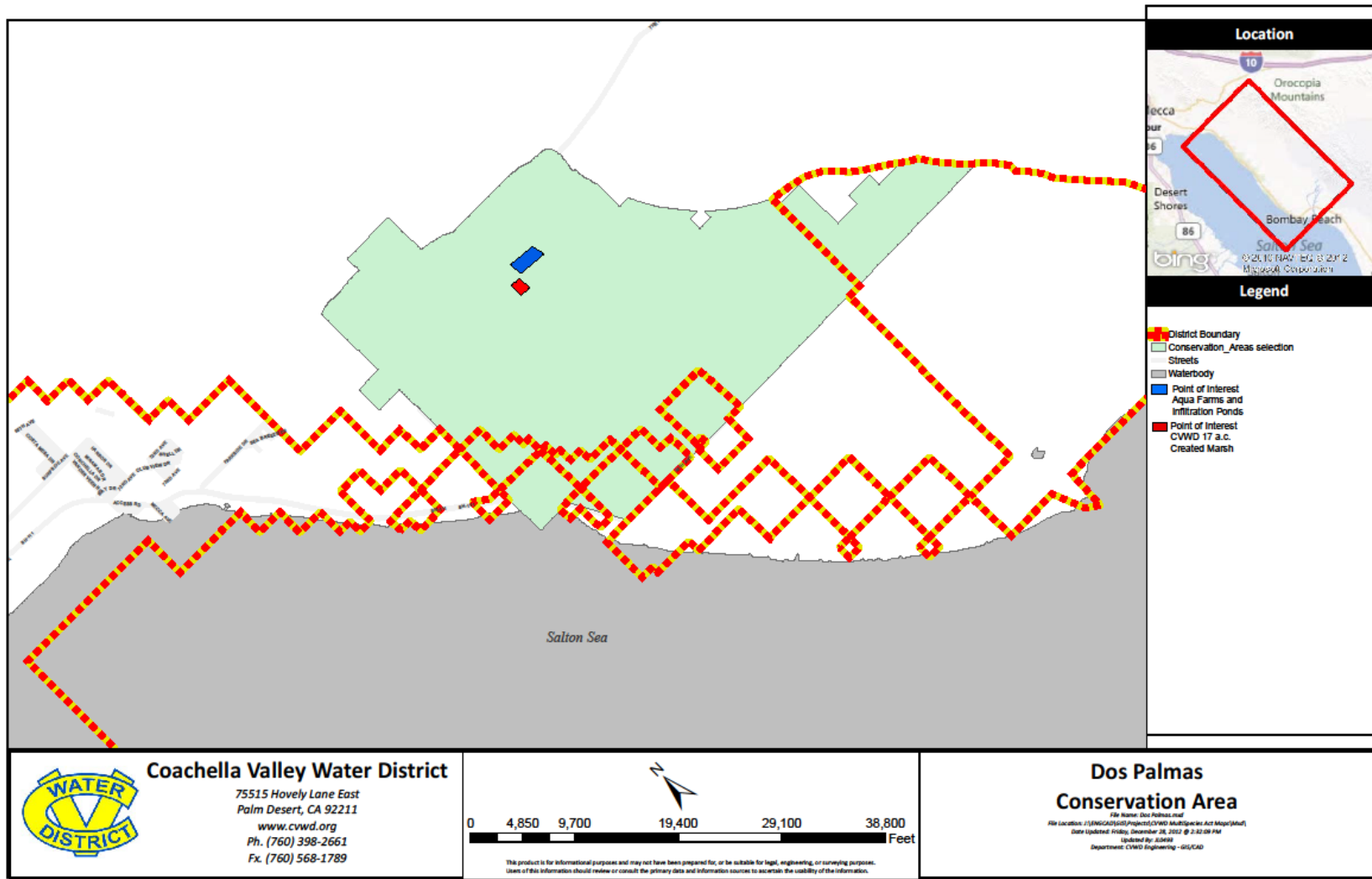


Figure 14. Coachella Valley MSHCP Valley-Wide Conservation Area Map

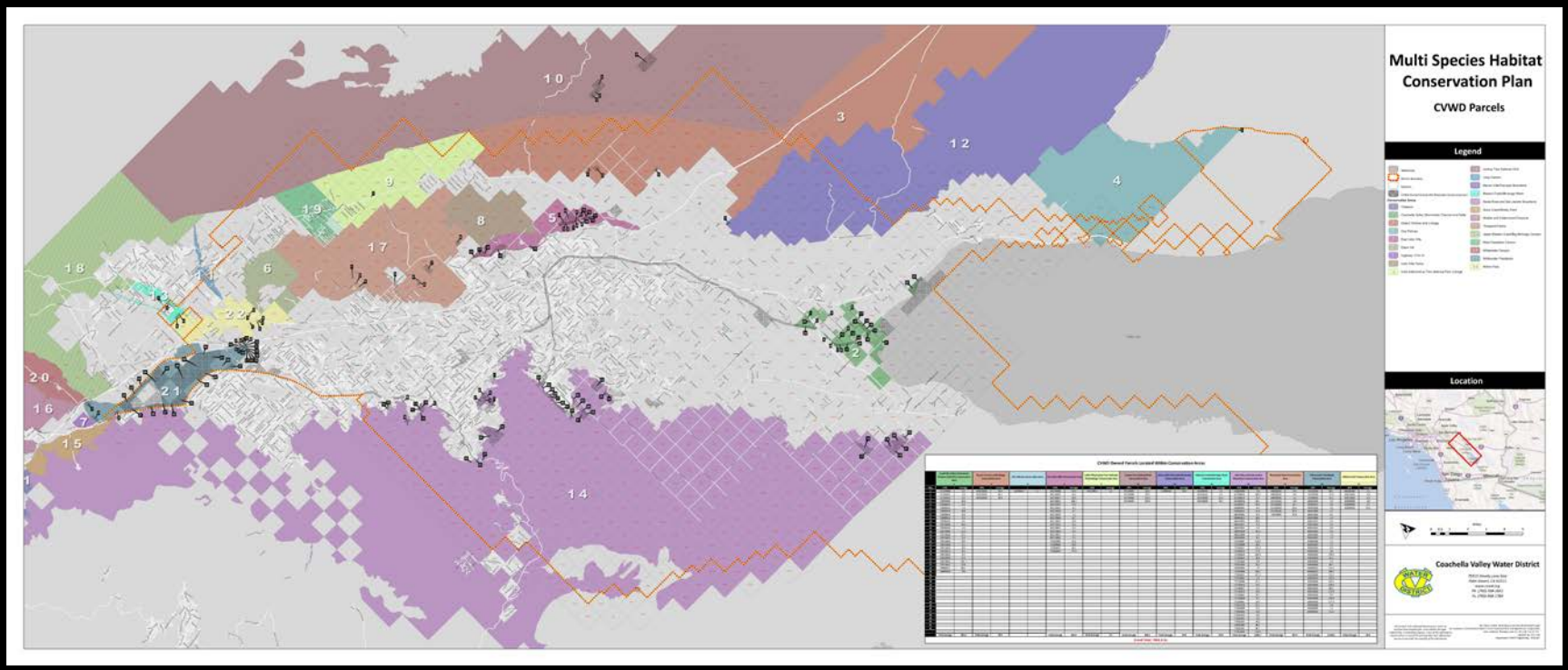


Table 4. Coachella Valley Stormwater Channel and Delta Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Desert Pupfish	<ul style="list-style-type: none"> • CVWD is developing a drain maintenance study the results of which will be used to evaluate current drain maintenance practices and potential impacts of changing drain maintenance approach. • Maintenance activities will be designed and implemented using Avoidance and Minimization measures in a way that minimizes new disturbances, to prevent erosion, off-site degradation, and reduce direct impacts to Desert pupfish. • All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat, including agricultural drains, Coachella Valley Stormwater Channel, and proposed 25 acre created habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
Crissal Thrasher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Southwestern Willow Flycatcher Burrowing Owl California Black Rail Yuma Ridgway's Rail	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.
Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, ESD staff should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. Remove any materials or waste from the site upon completion of the Covered Activity.

Table 5. Desert Tortoise and Linkage Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
<p>Mecca Aster Orocopia Sage</p>	<ul style="list-style-type: none"> • For Covered Activities within Mecca Aster/Orocopia Sage habitat in the Desert Tortoise Linkage Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Mecca Aster/Orocopia Sage where it may occur in appropriate habitat along roads or wash bottoms. • If Mecca Aster/Orocopia Sage is found to be within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • Avoid the use of herbicides in areas that are known to support Mecca Aster and Orocopia Sage.
<p>Desert Tortoise</p>	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If a proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for DT. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. •

Table 5 (continued). Desert Tortoise and Linkage Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • During periods of high tortoise activity, approximately March through October) a biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel on the right-of-way, within Desert Tortoise habitat, will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows and other species' burrows will be examined to determine the occupancy by tortoises.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.
Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable.

Table 6. East Indio Hills Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
<p>Mecca Aster Orocopia Sage</p>	<ul style="list-style-type: none"> • For Covered Activities within Mecca Aster/Orocopia Sage habitat in the Desert Tortoise Linkage Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Mecca Aster/Orocopia Sage where it may occur in appropriate habitat along roads or wash bottoms. • If Mecca Aster/Orocopia Sage is found to be within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • Avoid the use of herbicides in areas that are known to support Mecca Aster and Orocopia Sage.
<p>Desert Tortoise</p>	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for DT. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. • During periods of high tortoise activity, approximately March through October) a biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized.

Table 6 (continued). East Indio Hills Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • Personnel on the right-of-way, within Desert Tortoise habitat, will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows and other species' burrows will be examined to determine the occupancy by tortoises.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.
Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.

Table 7. Indio Hills/Joshua Tree National Park Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Coachella Valley Milk- vetch	<ul style="list-style-type: none"> • For Covered Activities within Coachella Valley Milkvetch (CVM) habitat in the Indio Hills/Joshua Tree National Park Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of CVM where it may occur in appropriate habitat along roads or wash bottoms. • If CVM is found to be within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • Avoid the use of herbicides in areas that are known to support CVM.
Desert Tortoise	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for DT. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. • During periods of high tortoise activity, approximately March through October) a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized.

Table 7 (continued). Indio Hills/Joshua Tree National Park Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows, and other species' burrows that may be used by Desert Tortoises, will be examined to determine occupancy.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.
Palm Springs Pocket Mouse Palm Springs Round-tailed Ground Squirrel	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • If proposed covered activity will take place within a Conservation Area known to harbor RTGS, implement pre-activity surveys to determine presence. RTGS surveys will include visual surveys, track detection and listening for calls. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.
Southern Yellow Bat	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed. • Avoid removal or trimming of Palm trees with a well-developed "petticoat" of fronds from March 1 – July 31 to avoid impacts to pregnant bats and/or lactating pups.

Table 8. Joshua Tree National Park Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Desert Tortoise	<ul style="list-style-type: none"> • Perform pre-activity surveys for Desert Tortoise. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. • During periods of high tortoise activity, approximately March through October) a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows, and other species' burrows that may be used by Desert Tortoises, will be examined to determine occupancy.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Gray Vireo Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.

Table 8 (continued). Joshua Tree National Park Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Southern Yellow Bat	<ul style="list-style-type: none">• Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed.• Avoid removal or trimming of Palm trees with a well-developed “petticoat” of fronds from March 1 – July 31 to avoid impacts to pregnant bats and/or lactating pups.

Table 9. Mecca Hills/Orocopia Mountains Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
<p>Mecca Aster Orocopia Sage</p>	<ul style="list-style-type: none"> • For Covered Activities within Mecca Aster/Orocopia Sage habitat in the Desert Tortoise Linkage Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Mecca Aster/Orocopia Sage where it may occur in appropriate habitat along roads or wash bottoms. • If Mecca Aster/Orocopia Sage is found to be within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • CVWD will continue to control and manage access to Mecca Aster/Orocopia Sage habitat on district owned lands within the CVMSHCP area. In addition, CVWD does not allow OHV use on its lands and prohibits public access. • Avoid the use of herbicides in areas that are known to support Mecca Aster and Orocopia Sage.
<p>Desert Tortoise</p>	<ul style="list-style-type: none"> • Perform pre-activity surveys for Desert Tortoise. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. • During periods of high tortoise activity, approximately March through October) a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them.

Table 9 (continued). Mecca Hills/Orocopia Mountains Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows, and other species' burrows that may be used by Desert Tortoises, will be examined for tortoise
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff. .
Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.
Southern Yellow Bat	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed. • Avoid removal or trimming of Palm trees with a well-developed "petticoat" of fronds from March 1 – July 31 to avoid impacts to pregnant bats and/or lactating pups.

Table 10. Mission Creek/Morongu Wash Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Coachella Valley Milk-vetch Triple-Ribbed Milk-vetch Little San Bernardino Mountains Linanthus	<ul style="list-style-type: none"> • For Covered Activities within modeled Coachella Valley Milk-vetch, Little San Bernardino Mountains Linanthus and Triple Ribbed Milk-vetch habitat in the Mission Creek/Morongu Wash Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of CVM where it may occur in appropriate habitat along roads or wash bottoms. • If these plant species are found within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • CVWD will continue to control and manage access to these species habitat on district owned lands within the CVMSHCP area. In addition, CVWD does not allow OHV use on its lands and prohibits public access. • Avoid the use of herbicides in areas that are known to support these species.
Desert Tortoise	<ul style="list-style-type: none"> • Perform pre-activity surveys for Desert Tortoise. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area.

Table 10 (continued). Mission Creek/Morongu Wash Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • During periods of high tortoise activity, approximately March through October) a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows, and other species' burrows that may be used by Desert Tortoises, will be examined to determine occupancy.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff..
Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting <ul style="list-style-type: none"> ○ conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.

Table 11. Santa Rosa and San Jacinto Mountains Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Coachella Valley Milk-vetch	<ul style="list-style-type: none"> • For Covered Activities within modeled Coachella Valley Milk-vetch habitat in the Mission Creek/Morongro Wash Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of CVM where it may occur in appropriate habitat along roads or wash bottoms. • If CVM is found within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • CVWD will continue to control and manage access to CVM habitat on district owned lands within the CVMSHCP area. Avoid the use of herbicides outside of CVWD facilities in areas that are known to support CVM.
Desert Tortoise	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Desert Tortoise. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area.

Table 11 (continued). Santa Rosa and San Jacinto Mountains Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • During periods of high tortoise activity, approximately March through October) a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked. • All Desert Tortoise burrows and other species' burrows will be examined to determine the occupancy by tortoises.
Flat-Tailed Horned Lizard	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor these species, perform pre-activity surveys for FTHL. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Prior to the initiation of construction activities, all construction personnel will be instructed on the protection of the CVFTL/FTHL. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities. Inspect trenches, holes, or other excavations before filling. If a CVFTL/FTHL is found, have the biological monitor relocate the lizard. • CVWD staff driving to and from facilities where these species may be present will not exceed 25 mph when onsite temperatures exceed 30°C (86°F). • Before moving, burying, or capping, inspect for CVFTL/FTHL in any construction pipe, culverts, or similar structures that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of CVFTL/FTHL from falling into them. • During periods of high CVFTL/FTHL activity (May through September) a biologist shall be present to monitor construction activities in areas not previously cleared or stabilized. • Personnel on the right-of-way, within CVFTL/FTHL habitat, will check under their vehicles prior to moving them.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Gray Vireo Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff..

Table 11 (continued). Santa Rosa and San Jacinto Mountains Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Southern Yellow Bat	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed. • Avoid removal or trimming of Palm trees with a well-developed “petticoat” of fronds from March 1 – July 31 to avoid impacts to pregnant bats and/or lactating pups.
Peninsular Bighorn Sheep	<ul style="list-style-type: none"> • If Covered Activities will take place within a Conservation Area known to harbor this species, perform pre-activity surveys to determine if the site contains water sources. • In San Jacinto and Santa Rosa Mtns, avoid activities that could impact Bighorn sheep during the lambing season from approximately January 31 through June 29 in our region.

Table 12. Thousand Palms Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Coachella Valley Milk-Vetch Mecca Aster	<ul style="list-style-type: none"> • For Covered Activities within modeled Coachella Valley Milk Vetch and Mecca Aster habitat in the Thousand Palms Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of CVM where it may occur in appropriate habitat along roads or wash bottoms. • If listed plant species are found within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • CVWD will continue to control and manage access to CVM habitat on district owned lands within the CVMSHCP area. In addition, CVWD does not allow OHV use on its lands and prohibits public access. • Avoid the use of herbicides in areas that are known to support these species.
Coachella Valley Giant Sand-Treader Cricket	<ul style="list-style-type: none"> • Control and manage activities that degrade Coachella Valley Giant Sand-Treader cricket habitat. In particular, control and manage those activities that result in sand compaction or may crush burrows, which may include OHV travel except on designated routes of travel. • Restrict human access to occupied habitat during the emergence period in the winter months and during the breeding season in the spring. • Control and manage activities that degrade potential Coachella Valley Giant Sand-Treader cricket habitat on CVWD lands: In particular, these activities include alteration of the natural vegetation, fragmentation, and construction equipment impacts. • Restrict human access to occupied habitat during the emergence and breeding season from January through March on CVWD lands if feasible and required. • Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined that there are impacts to giant sand-treader cricket habitat. • Avoid stockpiling construction materials, lumber, or other sources of artificial cover (AC) at CVWD facilities if feasible, within the known range of this species. • Maintenance activities will be designed and implemented using Best Management Practices (BMPs) in a way that minimize new disturbances, to prevent erosion, off-site degradation, and reduce direct impacts to Jerusalem cricket. • All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. • No pesticide use shall occur in habitat occupied by this species. • Perform pre-activity surveys for this species in areas of unpaved soil during the winter and spring emergence and breeding periods

Table 12 (continued). Thousand Palms Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Desert Tortoise	<ul style="list-style-type: none"> • Review Conservation Area map which illustrates lands owned by CVWD within Conservation Areas. If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for DT. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. • During periods of high tortoise activity, approximately March through October, a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked.
Flat-Tailed Horned Lizard Coachella Valley Fringe-Toed Lizard	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor these species, perform pre-activity surveys for FTHL. Surveys will include looking for tracks, scat, visual observation of lizards between April and October (inclusive of both months) between 7:30-11:00 a.m. when the temperature 1 centimeter above the open (unshaded) sand surface is greater than 95 degrees Fahrenheit and less than 110 degrees Fahrenheit (35 to 43 degrees Celsius). • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Coordinate with the ESD staff to examine construction areas for lizards when surface temperatures exceed 30°C (86°F). • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed.

Table 12 (continued). Thousand Palms Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • Prior to the initiation of construction activities, all construction personnel will be instructed on the protection of the CVFTL/FTHL. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities. Inspect trenches, holes, or other excavations before filling. If a CVFTL/FTHL is found, have the biological monitor relocate the lizard. • CVWD staff driving to and from facilities where these species may be present will not exceed 25 mph when onsite temperatures exceed 30°C (86°F). • Before moving, burying, or capping, inspect for CVFTL/FTHL in any construction pipes, culverts, or similar structures that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of CVFTL/FTHL from falling into them. • During periods of high CVFTL/FTHL activity (May through September) a biologist shall be present to monitor covered activities in areas not previously cleared or stabilized. • Personnel on the right-of-way, within CVFTL/FTHL habitat, will check under their vehicles prior to moving them.
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Gray Vireo Yellow Breasted Chat Summer Tanager Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff..
Southern Yellow Bat	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed. • Avoid removal or trimming of Palm trees with a well-developed "petticoat" of fronds from March 1 – July 31 to avoid impacts to pregnant bats and/or lactating pups.
Coachella Valley Round Tailed Ground Squirrel Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • If proposed covered activity will take place within a Conservation Area known to harbor RTGS, implement pre-activity surveys to determine presence. RTGS surveys will include visual surveys, track detection and listening for calls.

Table 12 (continued). Thousand Palms Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • Prior to Covered Activities, CVWD’s ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • If proposed covered activity will take place within a Conservation Area known to harbor RTGS, implement pre-activity surveys to determine presence. RTGS surveys will include visual surveys, track detection and listening for calls. • Prior to Covered Activities, CVWD’s ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.

Table 13. Whitewater Floodplain Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Coachella Valley Milk-vetch Mecca Aster	<ul style="list-style-type: none"> • For Covered Activities within modeled Coachella Valley Milk-vetch and Mecca Aster habitat in the Thousand Palms Conservation Area, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent Feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of CVM where it may occur in appropriate habitat along roads or wash bottoms. • If listed plant species are found within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • CVWD will continue to control and manage access to CVM habitat on district owned lands within the CVMSHCP area. In addition, CVWD does not allow OHV use on its lands and prohibits public access. • Avoid the use of herbicides in areas that are known to support CVM.
Coachella Valley Giant Sand-Treader Cricket	<ul style="list-style-type: none"> • Control and manage activities that degrade Coachella Valley Giant Sand-Treader cricket habitat. In particular, control and manage those activities that result in sand compaction or may crush burrows, which may include OHV travel except on designated routes of travel. • Restrict human access to occupied habitat during the emergence period in the winter months and during the breeding season in the spring. • Control and manage activities that degrade potential Coachella Valley Giant Sand-Treader cricket habitat on CVWD lands: In particular, these activities include alteration of the natural vegetation, fragmentation, and construction equipment impacts. • Restrict human access to occupied habitat during the emergence and breeding season from January through March on CVWD lands if feasible and required. • Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined that there are impacts to Giant Sand-Treader cricket habitat. • Avoid stockpiling construction materials, lumber, or other sources of artificial cover (AC) at CVWD facilities if feasible, within the known range of this species. • Maintenance activities will be designed and implemented using Best Management Practices (BMPs) in a way that minimize new disturbances, to prevent erosion, off-site degradation, and reduce direct impacts to Jerusalem cricket. • All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. • No pesticide use shall occur in habitat occupied by this species. • Perform pre-activity surveys for this species in areas of unpaved soil during the winter and spring emergence and breeding periods.
Flat-Tailed Horned Lizard Coachella Valley Fringe-Toed Lizard	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor these species, perform pre-activity surveys for FTHL and CVFTL. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed.

Table 13 (continued). Whitewater Floodplain Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • Coordinate with the ESD staff to examine construction areas for lizards when surface temperatures exceed 30°C (86°F). • Prior to the initiation of construction activities, all construction personnel will be instructed on the protection of the CVFTL/FTHL. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities. Inspect trenches, holes, or other excavations before filling. If a CVFTL/FTHL is found, have the biological monitor relocate the lizard. • CVWD staff driving to and from facilities where these species may be present will not exceed 25 mph when onsite temperature exceeds 30°C (86°F). • Before moving, burying, or capping, inspect for CVFTL/FTHL in any construction pipes, culverts, or similar structures that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of CVFTL/FTHL from falling into them. • During periods of high CVFTL/FTHL activity (May through September) a biologist shall be present to monitor construction activities in areas not previously cleared or stabilized. • Personnel on the right-of-way, within CVFTL/FTHL habitat, will check under their vehicles prior to moving them.
Le Contes Thrasher Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active Le Conte’s Thrasher nest is located, ESD will tag the tree containing the nest. All tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.
Coachella Valley Round-Tailed Ground Squirrel Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • If proposed covered activity will take place within a Conservation Area known to harbor RTGS, implement pre-activity surveys to determine presence. RTGS surveys will include visual surveys, track detection and listening for calls. • Prior to Covered Activities, CVWD’s ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.

Table 14. Willow Hole Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Flat-Tailed Horned Lizard Coachella Valley Fringe-Toed Lizard	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor these species, perform pre-activity surveys for CVFTL/FTHL. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Coordinate with the ESD staff to examine construction areas for lizards when surface temperatures exceed 30°C (86°F). • Prior to the initiation of construction activities, all construction personnel will be instructed on the protection of the CVFTL/FTHL. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities. Inspect trenches, holes, or other excavations before filling. If a CVFTL/FTHL is found, have the biological monitor relocate the lizard. • CVWD staff driving to and from facilities where these species may be present will not exceed 25 mph when onsite temperatures exceed 30°C (86°F). • Before moving, burying, or capping, inspect for CVFTL/FTHL in any construction pipes, culverts, or similar structures that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of CVFTL/FTHL from falling into them. • During periods of high CVFTL/FTHL activity (May through September) a biologist shall be present to monitor construction activities in areas not previously cleared or stabilized. • Personnel on the right-of-way, within CVFTL/FTHL habitat, will check under their vehicles prior to moving them.
Burrowing Owl Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.

Table 14 (continued). Willow Hole Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Coachella Valley Round Tailed Ground Squirrel Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • If proposed covered activity will take place within a Conservation Area known to harbor RTGS, implement pre-activity surveys to determine presence. RTGS surveys will include visual surveys, track detection and listening for calls. • Prior to Covered Activities, CVWD’s ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.
Southern Yellow Bat	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed. • Avoid removal or trimming of Palm trees with a well-developed “petticoat” of fronds from March 1–July 31 to avoid impacts to pregnant bats and/or lactating pups.

Table 15. Dos Palmas Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Orocopia Sage	<ul style="list-style-type: none"> • For Covered Activities within Orocopia Sage habitat, surveys by ESD staff will be required for activities during the growing and flowering period from February 1 - May 15. • Any occurrences of the species will be flagged and public infrastructure projects shall avoid impacts to the plants to the maximum extent feasible. • Limit off road vehicle travel when performing Covered Activities to avoid unnecessary take of Orocopia Sage where it may occur in appropriate habitat along roads or wash bottoms. • If Orocopia Sage is found to be within the footprint of any covered activity contact ESD to determine if salvage of plant and/or seeds is feasible. • Avoid the use of herbicides in areas that are known to support Orocopia Sage.
Desert Pupfish	<ul style="list-style-type: none"> • CVWD is developing a drain maintenance study the results of which will be used to evaluate current drain maintenance practices and potential impacts of the current drain maintenance approach. • All fueling and maintenance of vehicles and other equipment as well as location of staging areas shall be located as far as practicable from any potential habitat, including agricultural drains, Coachella Valley Storm water Channel, and proposed 25 acre created habitat. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
Flat-Tailed Horned Lizard	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor these species, perform pre-activity surveys for CVFTL/FTHL. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Coordinate with the ESD staff to examine construction areas for lizards when surface temperatures exceed 30°C (86°F). • Prior to the initiation of construction activities, all construction personnel will be instructed on the protection of the CVFTL/FTHL. The training will address: life history, listing status, applicable state and federal laws, field procedures, and prohibited activities. Inspect trenches, holes, or other excavations before filling. If a CVFTL/FTHL is found, have the biological monitor relocate the lizard. • CVWD staff driving to and from facilities where these species may be present will not exceed 25 mph when onsite temperatures exceed 30°C (86°F). • Before moving, burying, or capping, inspect for CVFTL/FTHL in any construction pipes, culverts, or similar structures that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas. • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or fencing will be installed to prevent the possibility of CVFTL/FTHL from falling into them.

Table 15 (continued). Dos Palmas Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
	<ul style="list-style-type: none"> • During periods of high CVFTL/FTHL activity (May through September) a biologist shall be present to monitor construction activities in areas not previously cleared or stabilized. • Personnel on the right-of-way, within CVFTL/FTHL habitat, will check under their vehicles prior to moving them.
Desert Tortoise	<ul style="list-style-type: none"> • Perform pre-activity surveys for Desert Tortoise. • Surveys for this species will follow accepted USFWS protocol which provides 100% coverage of survey site. The survey approach will also use appropriate seasonal surveys, and buffer zones. • In the western Coachella Valley, the nesting season extends from April through at least July. Schedule Covered Activities involving grading and trenching outside of the breeding season if feasible. • Establish a 100-foot buffer around each suspected desert tortoise burrow identified in the pre-activity survey. • Erect exclusion fencing around trenches, pits, pipe materials and other potential hazards and provide escape ramps if feasible until excavation activities are completed. • Before moving, burying, or capping, inspect for tortoises in any construction pipes, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the site for 1 or more nights. Alternatively, cap structures before storing on the construction site. • Inspect excavations for tortoises before filling. If a tortoise is found, have the biological monitor relocate it to a safe place offsite. • Prior to the initiation of Covered Activities, all construction personnel will be instructed on the protection of the Desert Tortoise. • All movement of construction vehicles outside of the right-of-way will be restricted to pre-designated access, contractor acquired access, or public roads. • All construction sites and access roads shall be clearly marked or flagged at the outer limits prior to the onset of any surface disturbing activity. All personnel shall be informed that their activities must be confined within the marked or flagged areas • Any excavated holes (i.e., foundations) left open overnight will be covered, and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into them. • Construction sites and access roads shall be surveyed by qualified tortoise biologists no more than 15 days prior to the initiation of construction. Surveys shall provide 100 percent coverage of the construction area. • During periods of high tortoise activity, approximately March through October) a tortoise biologist shall be present to monitor Covered Activities in areas not previously cleared or stabilized. • Personnel within Desert Tortoise habitat will be required to check under their vehicles prior to moving them. • All Desert Tortoise burrows located will be flagged or marked.

Table 15 (continued). Dos Palmas Conservation Area

SPECIES	AVOIDANCE AND MINIMIZATION MEASURE
Southwestern Willow Flycatcher Le Contes Thrasher Least Bell's Vireo Yellow Warbler Yellow Breasted Chat Summer Tanager Le Contes Thrasher Crissal Thrasher Burrowing Owl	<ul style="list-style-type: none"> • Contact ESD staff to perform pre-activity surveys within riparian habitats of the bird species associated with this Conservation Area prior to implementing Covered Activities to assure that no active nest or owl burrow is present. • If an active nest is located, ESD will tag the tree containing the nest and establish a 200-foot buffer zone around the tree; all tagged trees will be left in place until the nest is determined to be inactive. • If an active BUOW burrow is located immediately stop all work within a 160 foot radius of burrow outside of the breeding season and a 250-foot radius of the burrow during the breeding season and notify the ESD staff.
Coachella Valley Round Tailed Ground Squirrel Palm Springs Pocket Mouse	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor PSPM, implement pre-activity surveys to determine presence. PSPM surveys will include visual surveys and an examination of BUOW scat for PSPM remains. • If proposed covered activity will take place within a Conservation Area known to harbor RTGS, implement pre-activity surveys to determine presence. RTGS surveys will include visual surveys, track detection and listening for calls. • Prior to Covered Activities, CVWD's ESD staff should assist construction crews in planning access routes to avoid impacts to occupied habitat as much as feasible (i.e., placement of preferred routes on project plans and incorporation of methods to avoid as much suitable habitat/soil disturbance as possible). • During Covered Activities, the biological monitor should ensure that connected, naturally vegetated areas with sandy soils and typical native vegetation remain intact to the extent feasible and practicable. • All temporary facilities and impacts shall be removed and restored to the preexisting conditions and contours to the extent practicable. • Covered Activities related materials and wastes shall be removed from the site upon completion of the Project.
Southern Yellow Bat	<ul style="list-style-type: none"> • If proposed covered activity will take place within a Conservation Area known to harbor this species, perform pre-activity surveys for Yellow bat if palm trees will be trimmed or removed. • Avoid removal or trimming of Palm trees with a well-developed "petticoat" of fronds from March 1–July 31 to avoid impacts to pregnant bats and/or lactating pups.

REFERENCES

- Allen, J. A. and W. W. Price. "On a Collection of Mammals from Arizona and Mexico," New York: American Museum of Natural History Bulletin. 1895(7):123-258.
- Ames Research Center Burrowing Owl Habitat Management Plan.
- Arizona Burrowing Owl Working Group. Burrowing Owl Mitigation Standards and Guidelines. Arizona Game and Fish Department, Phoenix, AZ. Azgfd.gov. 2007.
- Arizona Game and Fish Department. Arizona Revised Statutes, 17-235, Migratory birds, and 17-236, Taking birds; possession of raptors. Retrieved from: <http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp?Title=17>.
- Barrows, C.W. "Habitat Relationships of the Coachella Valley Fringe-toed Lizard (*Uma inornata*)," The Southwestern Naturalist. 1997 42(2):218–23.
- Barrows, C.W. Species Description for the Coachella Giant Sand-treader Cricket in the Coachella Valley Multiple Species Habitat Conservation Plan. Unpublished report. 1998.
- Barrows, K. Element Conservation Plan: *Astragalus lentiginosus* var. *coachellae*. Unpublished report to The Nature Conservancy, San Francisco, California. May 15, 1987.
- Bartholomew, G. A. and T. J. Cade. "Temperature Regulation, Hibernation, and Aestivation in the Little Pocket Mouse, *Perognathus longimembris*," Journal of Mammalogy. 1957:38:60–72.
- Black, G. F. Status of the Desert Pupfish, *Cyprinodon macularius* (Baird and Girard) in California. Inland Fisheries, Region 5 CDFW Inland Fisheries Endangered Species Program. 1980.
- Bradley, W. G. and J. E. Deacon. "Ecology of Small Mammals at Saratoga Springs, Death Valley National Monument, California," Journal of the Arizona Academy of Science. 1971(6):206–15.
- Brattstrom, B. H. "Body Temperatures of Reptiles," American Midland Naturalist. 1965 73(2):376–422.
- California Department of Fish and Game, Natural Heritage Division. California Natural Diversity Data Base (CNNDB). Sacramento, California. 1997.
- Carpenter, C. C. "Patterns of Behavior in Three Forms of the Fringe-toed Lizard (*Uma: iguanidae*)," Copeia. 1963(2):406–12.
- Cody, Martin L. Crissal Thrasher (*Toxostoma crissale*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/419doi:10.2173/bna.419>. 1999.

Conway, C. J. and L. A. Ellis. Demography of Burrowing Owls Nesting in Urban and Agricultural Lands in Southern Arizona. Arizona Game and Fish Department, Heritage Grant Technical Report U03006, Phoenix, AZ. 2004.

Cowles, R. B. "Observations on the Winter Activities of Desert Reptiles," *Ecology*. 1941 22(2):125–40.

Dodd, S. C. Report of the Palm Springs Pocket Mouse (*Perognathus longimembris bangsi*) surveys. Unpublished report prepared for the Coachella Valley Association of Governments by S. C. Dodd Biological Consulting. February 13, 1996.

Dodd, S. C. Report of the 1999 Palm Springs Pocket Mouse (*Perognathus longimembris bangsi*) Surveys. Unpublished report prepared for the Coachella Valley Mountains Conservancy by S.C. Dodd Biological Consulting. November 19, 1999.

Dodero, M. (Regional Environmental Consultants [RECON]) Biological Information Report, Coachella Valley Round-tailed Ground Squirrel (*Spermophilus tereticaudus*). Unpublished report prepared for the Coachella Valley Multiple Species Habitat Conservation Plan. August 11, 1995.

Drabek, C. M. "Home Range and Daily Activity of the Round-tailed Ground Squirrel, *Spermophilus tereticaudus neglectus*," *American Midland Naturalist*. 1973 89(2):287–93.

Duncan, D., H. Johnson and T. H. Nicholls (Eds.). *Biology and Conservation of Owls of the Northern Hemisphere: Second International Symposium*, Winnipeg, Manitoba, Canada. USDA For. Serv. Gen. Tech. Rep. NC-190. February 5-9, 1997.

Dunford, C. J. Density Limitation and the Social System of Round-tailed Ground Squirrels. Ph.D. Dissertation, University of Arizona. 1975.

Durtsche, R. D. Foraging and Food of the Fringe-toed Lizard, *Uma inornata*, an Endangered Species from the Coachella Valley, California. Master's Thesis, California State University, Fullerton. 1987.

Durtsche, R. D. "Foraging Ecology of the Fringe-toed Lizard, *Uma inornata*, During Periods of High and Low Food Abundance," *Copeia*. 1995(4):915–26.

Ehrlich, P. R., D. S. Dobkin and D. Wheye. *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*. New York, Simon and Schuster, Inc. 1988.

Elliot, D. G. "Catalogue of Mammals Collected by E. Heller in Southern California," *Field Columbian Museum Publications, Zoological Series*. 1904(3):271–321.

England, A. S. and S. G. Nelson. Status of the Coachella Valley Fringe-toed Lizard (*Uma inornata*). Inland Fisheries Administrative Report # 77-1. The Resources Agency, California Department of Fish and Game. 1976.

England, A. S. "The Coachella Valley, An Endangered Ecosystem: Progress Report on Conservation and Management Efforts," Cal-Nevada Wildlife Trans. 1983:148-156.

Ernst, C. H., J. E. Lovich and R. W. Barbour. Turtles of the United States and Canada. Washington, D.C., Smithsonian Institution Press. 1994.

Hendrickson, D. A. and A. Varela-Romero. "Conservation Status of Desert Pupfish, *Cyprinodon macularius*, in Mexico and Arizona," Copeia. 1989(2):478-483.

Germano, D. J. "Growth and Age at Maturity of North American Tortoises in Relation to Regional Climates," Canadian Journal of Zoology. 1994(72):918-31.

Goldwasser, S. Habitat Requirements of the Least Bell's Vireo. Final report to California Department of Fish and Game. 1981 Job # IV-381.

Grinnell, J. "An Account of the Mammals and Birds of the Lower Colorado Valley, with Especial Reference to the Distributional Problems Presented," Univ. Calif. Publ. Zool. 1914(12):226-304.

Grinnell, J. and J. Dixon. "Natural History of the Ground Squirrels of California," Bulletin of California State Commission on Horticulture. 1918(7):597-708.

Grinnell, J. and A. H. Miller. "The Distribution of the Birds of California," Pacific Coastal Avifauna. 1944(27):1-608.

Grinnell, J. and H. S. Swarth. 1913. "An Account of the Birds and Mammals of the San Jacinto Area of Southern California," University of California Publications in Zoology. 1913 10(10):197-406.

Grinnell, J. "An Account of the Mammals and Birds of the Lower Colorado Valley, with Especial Reference to the Distributional Problems Presented," University of California Publications in Zoology. 1914(12):226-304.

Hall, E. R. The Mammals of North America, Two Volumes (Second Edition). New York: John Wiley and Sons. 1981:537-539.

Hawks, D. Survey for Sensitive Insects of Concern to the Coachella Valley Multiple Species Habitat Conservation Plan. Unpublished report to the Coachella Valley Association of Governments prepared by Hawks Biological Consulting. November 30, 1995.

Hays, J. L., J. A. LaPointe and G. R. Wright. A Report on the Habitat Corridor Between Two Populations of Flat-tailed Horned Lizards (*Phrynosoma mcallii*) in Riverside County, California. Unpublished report to the Bureau of Land Management, Palm Springs, California. 1999.

Heifetz, W. "A Review of the Lizards of the Genus *Uma*," *Copeia*. 1941:99–111.

Horchar, V. M. Home Range Dynamics of the Coachella Valley Fringe-toed Lizard. Master's Thesis, California State University, Fullerton. 1992.

Jaeger, E. C. Desert Wildlife. Stanford, California: Stanford University Press. 1961.

Jennings, M. R. and M. P. Hayes. Amphibian and Reptile Species of Special Concern in California. 1994.

LaPre, L. F. and J. Cornett. Public Lands Survey for the Coachella Valley Fringe-toed Lizard. Unpublished report to the Bureau of Land Management. 1981.

Lovich, J. E., P. Medica, H. Avery, K. Meyer, G. Bowser and A. Brown. "Studies of Reproductive Output of the Desert Tortoise at Joshua Tree National Park, the Mojave National Preserve, and Comparative Sites," *Park Science*. 1999 19(1):22-4.

Lutz, R. S. and Plumpton, D. L. "Philopatry and Nest Site Reuse by Burrowing Owls: Implications for Productivity," *Journal of Raptor Research*. 1999 33(2):149–153.

Marsh, P. C. and D. W. Sada. Desert Pupfish Recovery Plan. United States Fish and Wildlife Service, Albuquerque, New Mexico. 1993.

Mayhew, W. W. "Taxonomic Status of California Populations of the Lizard Genus *Uma*," *Herpetologica*. 1964(20):170-83.

Mayhew, W. W. "Hibernation in the Horned Lizard, *Phrynosoma mcallii*," *Comparative Biochemical Physiology* 1965(16):103-19.

Mayhew, W. W. and B.A. Carlson. Final Status of the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) in California. Report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, contract #85/86 C1335. 1985.

Mearns, E. A. "Descriptions of Three New Forms of Pocket Mice from the Mexican Border of the United States, Article XV," *Bulletin of the American Museum of Natural History*. 1898 10(15):299-300.

Millsap, B. A. and C. Bear. "Density and Reproduction of Burrowing Owls along an Urban Development Gradient," *Journal of Wildlife Management*. 2000(64):33-41.

Mirowsky, K. "Bats in Palms: Precarious Habitat," *Bats*. 1997 15(2):3-6.

- Muth, A. and M. Fisher. Population Biology of the Coachella Valley Fringe-toed Lizard. Report to California Department of Fish and Game, contract #86/87 C2056 and #87/88 C2056, Am. 1. 1991.
- Muth, A. and M. Fisher. Development of Baseline Data and Procedures for Monitoring Populations of the Flat-tailed Horned Lizard, *Phrynosoma mcallii*. Final unpublished report to California Department of Fish and Game, Sacramento, California, contract #FG9268. December 1992.
- Norris, K. S. "The Evolution and Systematics of the Iguanid Genus *Uma* and Its Relation to the Evolution of Other North American Desert Reptiles," Bulletin of the American Museum of Natural History. 1958 114(3):247-326.
- Ostermann, S.D., J. R. DeForge and W. D. Edge. "Captive Breeding and Reintroduction Evaluation Criteria: A Case Study of Peninsular Bighorn Sheep," Conservation Biology. 2001 15(3):749-60.
- Rosenberg, K. V., R. D. Ohmart, W. C. Hunter and B. W. Anderson. Birds of the Lower Colorado River Valley. Tucson: University of Arizona Press. 1991
- Ryan, R. M. Mammals of Deep Canyon, Colorado Desert, California. Palm Springs, California: The Desert Museum. 1968.
- Sanders, A. C. Triple-ribbed Milkvetch, *Astragalus tricarinatus*. Unpublished species account for the draft West Mojave Desert Habitat Conservation Plan. 1999.
- Schreiber, D. C. and W. L. Minckley. "Feeding Interrelations of Native Fishes in a Sonoran Desert Stream," Great Basin Naturalist. 1981(41):409-426.
- Schwarz, H. R. Gray Vireo Observations in the Sandia Mountains of Central New Mexico. Unpublished report on file at the U.S. Forest Service, San Jacinto Ranger District, Idyllwild, California. 1991.
- Sedgwick, J. A. 2001. "Geographic Variation in the Song of Willow Flycatchers: Differentiation Between *Empidonax traillii adastus* and *E. t. extimus*," Auk. 2001 118(2):366-79.
- Sheffield, S. R. "Current Status, Distribution and Conservation of the Burrowing Owl (*Speotyto cunicularia*) in Midwestern and Western North America," in J. R. Soltz Our Disappearing Desert Fishes, Nature Conservancy News. 1979:399-407.
- Stebbins, R. C. "Some Aspects of the Iguanid Genus *Uma*," Ecological Monographs. 1994 (14):311-78.
- Stewart, J. M. Letter to Mark Skinner, California Native Plant Society, regarding the status of the Mecca aster (*Xylorhiza cognata*), from Jon M. Stewart, Curator of Gardens at The Living Desert, Palm Desert, California. September 6, 1991.

Sutton, R. The Desert Pupfish of the Salton Sea: A Synthesis Prepared for Salton Sea Authority Bureau of Reclamation. 1999.

Tinkham, E. R. "Studies in Nearctic Desert Sand Dune Orthoptera. Part XI: A New Arenicolous Species of *Stenopelmatus* from Coachella Valley with Key and Biological Notes," Great Basin Naturalist. 1968 28(3):124-31.

Tucson Unified School District. Science Curriculum CORE Standards. Tucson, Arizona. 2001.

Turner, F. B., J. C. Rorabaugh, D. C. Weaver. A Survey of the Occurrence and Abundance of the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) in California. Report #YA-512-CT8-58, USDI, Bureau of Land Management. 1980.

Turner, F. B., D. C. Weaver and J. C. Rorabaugh. The Abundance of the Fringe-toed Lizard (*Uma inornata*) at Ten Sites in the Coachella Valley, California. Report to U.S. Army Corps of Engineers, Los Angeles District. 1981.

Unitt, P. "*Empidonax traillii extimus*: An Endangered Subspecies," Western Birds. 1987(18):137-62.

U.S. Fish and Wildlife Service. Draft Recovery Plan for the Least Bell's Vireo (*Vireo bellii pusillus*). U.S. Fish and Wildlife Service, Portland, Oregon. 1998.

U.S. Fish and Wildlife Service. Draft Recovery Plan for Bighorn Sheep in the Peninsular Range (*Ovis canadensis*). U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. 1999.

Vorhies, C. T. "Water Requirements of Desert Animals in the Southwest," Arizona Agricultural Experimental Station Technical Bulletin. 1945(107):486-525.

Walters, L. L. and E. F. Legner. Impact of the Desert Pupfish, *Cyprinodon macularius*, and *Gambusia affinis affinis* on Fauna in Pond Ecosystems. U.S. Fish and Wildlife Service, Migratory Bird Treaty Act, Migratory Bird Permit Office. Retrieved from <http://www.fws.gov/permits/mbpermits/birdbasics.html>. Hilgardia 1979(48):1-18.

Weaver, D. (California Department of Fish and Game, Retired). Personal Communications.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer and M. White (eds.). California Wildlife Volume II: Birds. California Statewide Habitat Relationships System. Sacramento, California: State of California, Resources Agency, Department of Fish and Game. 1990.

APPENDIX

COACHELLA CANAL WATER SUPPLY QUAGGA MUSSEL MONITORING AND CONTROL PROGRAM



Prepared by:
Coachella Valley Water District
Environmental Services Department
P.O. Box 1058
Coachella, CA 92236
(760) 398-2651

March 2015

Introduction

The Coachella Valley Water District (CVWD) initiated a Quagga mussel (*Dreissena bugensis*) monitoring and control program in 2007 for the Coachella Canal water supply following reports that this invasive species had colonized locations within the Colorado River upstream of the All American Canal diversion that supplies water to the Coachella Canal. Quagga mussels were found in January 2007 in Lake Mead and since then quagga or zebra mussels have been found in Arizona, California, Colorado, Texas and Utah. Metropolitan Water District (MWD) has observed Quagga mussels throughout their 240 mile Colorado River Aqueduct conveyance system. Quagga mussel are established in 15 of the lakes served by this water supply and have been collected from 10 reservoirs in the southern California area (USGS 2012, <http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=95>). The Coachella Canal (Canal) conveys Colorado River water north to the Coachella Valley via a 123 mile open water canal from the All American Canal in El Centro. The Canal is fenced for the majority of its length as it travels north and access is controlled through the use of locked service road gates. No recreation is permitted in or along the Canal. There are subsurface irrigation laterals along the Canal that deliver water to farms and ranches. Several emergency waste-way channels are located along the Canal. These drain to the Salton Sea and Coachella Valley Storm Water Channel and are used in emergency situations such as earthquake damage to the Canal. Lake Cahuilla is a terminal storage reservoir. There are no tributaries downstream of Lake Cahuilla. All water exiting Lake Cahuilla is conveyed via pipeline to farms, ranches and the Thomas E Levy Groundwater Replenishment Facility. Recreational fishing from the shoreline occurs at Lake Cahuilla. Riverside County Parks Department also hosts an annual fishing derby at Lake Cahuilla with rainbow trout supplied by the California Department of Fish and Wildlife (CDFW). No rental boats or concessions for rental boats exist at Lake Cahuilla, and no boats are allowed on the lake. In addition, no swimming, diving or other direct body contact is allowed in the lake. Lake Cahuilla and portions of the surrounding lands are owned by the Bureau of Reclamation (BOR) and are operated and maintained by CVWD. Riverside County Parks Department has a lease for Lake Cahuilla and the camp ground area with CVWD, and leases remaining portions of the surrounding land from the BOR. Riverside County Parks Department is responsible for any outreach and education related to quagga mussels or other aquatic invasive species at Lake Cahuilla. The arrival of Quagga and zebra mussels (often referred to as Dreissenids) to western waters brings the potential to extend with devastating impacts into a geographical area already challenged with water-related problems. This monitoring and control program has been implemented to prevent the colonization of CVWD's Coachella Canal and the irrigation and groundwater replenishment facilities supplied from the Canal.

Existing Quagga Mussel Control Measures

CVWD has implemented a multi-barrier approach with the goal of preventing Quagga mussel colonization of CVWD's Colorado River water conveyance infrastructure. This multi-barrier approach was established following the reports of the initial Dreissenid invasion at Lake Mead in 2007. The Lake Cahuilla and Canal water sample analysis performed by the CDFW has shown low numbers of veligers (larval mussels) present during cooler times of the year; however, the analysis is unable to determine whether these veligers are viable. Monthly inspection of monitoring blocks and monthly water samples along the length of the Canal and in Lake Cahuilla

have not shown colonization by mussels since quagga mussels were discovered at Lake Mead in 2007. CVWD has not observed any colonization within its infrastructure or water conveyance system but has observed low veliger density sporadically in samples since monitoring began in August of 2007. One initial response to early reports of Quagga mussels found in Colorado River consisted of installing chlorination facilities at the Drop 1 structure where Colorado River water delivered from the All-American Canal enters the Canal. The chlorination station runs continuously 24 hours a day 7 days a week. There are three 10,000 gallon chlorine tanks onsite that provide additional storage in order to avoid interruptions to the dosing regimen. A remote generator is maintained onsite to provide power to the dosing pumps in the event of a power supply interruption. In addition to implementing disinfection at Drop 1, control measures include a boating ban at Lake Cahuilla and hydraulic jumps within the Canal. This multi-barrier approach is further augmented by naturally occurring high temperatures during the summer months which is expected to reduce the Quagga mussels' ability to spawn successfully (from Mills et al., 1996, citing Antonov and Skorbatov, 1990). These natural and artificial control measures are summarized below:

1. Chlorination:

In July, 2008, CVWD installed a chlorine dosing station at Mile Post 0.2 adjacent to the Canal turn out. **Figure A1** shows the dosing station used to add chlorine to Colorado River water entering the Canal to kill or inactivate the juvenile stage (veliger) of the Quagga mussel prior to colonization. It has been shown that chlorine affects the ability of veligers and adult mussels to attach to substrate suitable for colonization (Simms, La Bounty, Johnson, Roeffer, Southern Nevada Water Authority, 2007). Sodium hypochlorite is added to achieve a target free chlorine residual of 1.5 milligrams per liter (mg/L) at the Drop 1 structure. Residual chlorine levels diminish to less than detection (0.08 mg/L) approximately 1.5 miles downstream of Drop 1. **Table A1** summarizes the chlorine residual levels downstream of the chlorine dosing station.

2. Hydraulic Jumps:

Turbulent eddies are created by lowering check gates down along the Canal at several points depending upon how water is conveyed and delivered to customers. When lowered, the gate forces water to flow through wing walls thereby creating a hydraulic jump or turbulent eddy. Gate 16.3 is kept in this lowered position permanently creating a hydraulic jump via the wing walls within the Canal. The lowered gate also creates a venturi effect as water passes under the gate which creates turbulent eddies for a short distance. In theory, the energy generated by these hydraulic jumps can create turbulences small enough and with great enough occurrence to effectively inactivate Quagga veligers by damaging their undeveloped bodies (U.S. Bureau of Reclamation 2008).

3. Ambient Water Temperature:

Studies show Quagga mussels have a temperature tolerance between 0°C (32°F) and 30°C (86°F). **Figure A2** shows that Canal water temperatures typically exceed 86°F during the hottest summer months. During 2011, water temperatures within the canal exceeded 86°F for approximately 101 days. There is some concern that over time Quagga mussels could adapt to higher water temperatures, however, recent research

investigating veligers exposed to 30 degrees C for 4.5 days revealed that their mortality rate approached 100% (Craft and Myrick 2011). Based on this existing research, elevated water temperatures should act to help prevent Quagga mussel colonization during this period of the year.

4. Prohibition of Boats on Lake Cahuilla:

Very soon after the initial 2007 invasion of Quagga mussels into Lake Mead, CVWD extended a prohibition originally implemented by County Parks Department, to launching any boats onto Lake Cahuilla in order to eliminate the risk of Dreissenids being introduced from boating activities. Many kinds of aquatic pests, including both plants and animals, are easily carried by trailered boats which are considered the largest vector for spreading Aquatic Nuisance Species (ANS) into new waterways.

Existing Quagga Mussel Monitoring Measures

Based on an initial vulnerability assessment, CVWD's system can be divided into five separate environments for mussel colonization: (1) Coachella Canal, (2) Subsurface irrigation lines, (3) Siphons, (4) Groundwater recharge basins, and (5) Lake Cahuilla. Each of these components provides a different environment for colonization by Quagga mussels. CVWD's Quagga monitoring program targets life stages that could colonize each of these environments. (See "CVWD Sample Collection and Decontamination Procedures for the Quagga Mussel Control and Monitoring Program," pp. A6-A11.)

CVWD's current Quagga mussel monitoring program consists of microscopic examination of monthly water samples for infant mussels (veligers) and monthly inspection for older mussels that can be observed visually on colonization blocks placed within the Canal and Lake Cahuilla. All equipment, pumps and nets are decontaminated between sample sites and at the end of sampling activities.

1. Monitoring of Colonization Blocks/Plates:

Monitoring for presence/absence of Quagga mussel is accomplished by monthly inspection of monitoring blocks. Quagga mussel monitoring blocks are composed of concrete blocks (CMU), and are suspended in the Canal starting at the Flume at the Coachella Valley Turn Out (MP 0.15) and continuing up to Lake Cahuilla at MP 123.45 as shown in **Figure A3**. These blocks are suspended in the canal approximately 1-2 feet off the bottom in an area of quiet water, usually just above or just below a gate structure and are checked by Canal staff once a month (**Figure A4**). The blocks can provide a suitable location for veligers to attach and colonize, but large amounts of biological growth on the blocks can inhibit an inspector's ability to see newly attached mussels. **Table A2** summarizes the locations for the monitoring blocks.

2. Microscopic Exams:

Monthly water sampling for mussel veligers is currently conducted at three locations shown in **Figure A5**. The monitoring point at the inlet to Lake Cahuilla is proposed to be moved to a deeper section of the lake that is more representative of the water column.

Samples consisting of the filtrate from between 1000 liters of water are submitted to the CDFW Bodega Marine Laboratory for analysis using polymerase chain reaction analyses (PCR) followed by cross-polarization microscopy (CPLM). PCR and CPLM are believed to be of equal sensitivity on a per volume basis. However it is easier to examine more volume using CPLM. Veligers identified by CPLM will also be tested by PCR for confirmation. In this way CPLM and PCR will be used together to support the findings.

This monitoring activity provides an initial warning in terms of detecting veligers within the Canal although it is not known whether these veligers are viable or not. In general, veligers are either not found, or are detected at levels orders of magnitude less than the levels seen in colonized water bodies. Reports from CDFW analysts indicates partial veliger material is more likely to be found in samples from CVWD conveyances when compared to samples collected from colonized water bodies. Results from microscopic veliger monitoring are provided in **Figure A6**. Early detection through monitoring of settlement blocks for invasive mussels is paramount to a successful control and monitoring program since it will give an agency a window of opportunity to evaluate the most at risk locations within their infrastructure and to direct treatment efforts with the highest level of effect. CVWD maintains 13 monitoring blocks along the Canal and at Lake Cahuilla as shown in **Figure A7**.

Discussion

Following the initial invasion at Lake Mead, Southern Nevada Water Authority and MWD hosted a workshop on Quagga mussels involving a diverse set of regional stakeholders and agencies. Individuals with direct experience using the best available control methods convened at a forum for a directed exchange of ideas, opinions, research results, technical applications and future perspectives involving technologies and strategies for controlling quagga mussels in water conveyance systems and in source waters used for drinking water, such as rivers, lakes or reservoirs. Workshop attendees discussed information and data gaps, research priorities and implications for “real world” application of quagga mussel control and monitoring activities. This workshop resulted in many of the current control strategies currently implemented in the western United States. CVWD attended a workshop in 2012 and discussed its current quagga mussel monitoring and control activities with several aquatic invasive species experts to elicit feedback on the approach and to see if any other monitoring or control methods should be incorporated into the current program. Based on these discussions and the lack of viable mussel colonies within CVWD’s water conveyance system it is believed that current monitoring and control efforts coupled with environmental constraints are successfully keeping quagga mussel from colonizing CVWD infrastructure and water conveyance system.



Coachella Valley Water District Sample Collection and Decontamination Procedures for the Quagga Mussel Control and Monitoring Program

1. Scope and applications:

The **quagga mussel** (*Dreissena bugensis*) is one of seven *Dreissena* species. This species is indigenous to the Dnieper River drainage of Ukraine. The quagga mussel was first observed in North America in September 1989 when it was discovered in Lake Erie near Port Colborne, Ontario. It was not identified as a distinct species until 1991. The species was called the quagga mussel after the quagga, an extinct subspecies of African zebra, possibly because, like the quagga, its stripes fade. These mussels are filter feeders that consume large portions of the microscopic plants and animals that form the base of the food web. The removal of significant amounts of phytoplankton from the water can cause a shift in native species and a disruption of the ecological balance of the lake. These mussels often settle in massive colonies that can block water intake and affect municipal water supply and agricultural irrigation and power plant operation. In the United States, Congressional researchers estimated that zebra mussels alone cost the power industry \$3.1 billion in the 1993-1999 period, with their impact on industries, businesses, and communities more than \$5 billion (http://www.azgfd.gov/h_f/zebra_mussels.shtml#5). The quagga also causes many of the same problems (damaging boats, power plants, and harbors and destroying the native mussel population) as the equally invasive Zebra mussel of Russia. The quagga mussel shell is striped, as is that of the Zebra mussel, but the quagga shell is paler toward the hinge (http://en.wikipedia.org/wiki/Quagga_mussel).

The following sample collection procedure is based on the procedure provided by the Bureau of Reclamation's Technical Service Center in Denver, Colorado and are designed to collect the veligers or the free-swimming larval form of zebra and quagga mussels (*Dreissena* spp.) as plankton samples for laboratory detection using cross polarized light microscopy. The volumes of water sampled through the plankton net are needed both for sample size standardization and for calculating the number of veliger density by microscopic methods to confirm the results.

2. Sample collection locations:

The samples will be collected from three locations along the Coachella Canal (**Figure A5**). The first location is where the canal ends at Lake Cahuilla. The second location is at the 88.6 Irrigation Lateral; this is where the first irrigation line splits off of the canal. The third location is from the Avenue 56 bridge where it crosses the canal.

3. Equipment needed:

- Three 63 um Plankton Tow Nets (one dedicated for each location)
- Three spray bottles (one dedicated for each location)
- Ethanol (lab grade, 200 proof for sample preservation)
- Four sample collection bottles (1000 mL Nalgene leak-proof poly (HDPE))

- Disposable diapers
- Plastic electrical tape
- Ziploc bags (1 gallon)
- Plastic garbage bags (large enough to hold 3 sample bottles)
- Waterproof markers and labels
- Chain of Custody
- Ice chest with ice
- Large trash can (decontamination container for sampling equipment)
- 5% acetic acid solution (12L-16L enough to cover the equipment for decontamination)
- Two trucks (to carry all of the equipment)
- Generator (get in advance from stores)
- Three extension cords
- Submersible pump and fittings for hose
- Clear hose (one dedicated for each location)
- Rope (enough to suspend the pump, 100 ft.)
- 5 gallon bucket and stop watch (to determine flow from hose)
- Calculator
- Conversion equations
- Measuring tape (for determining depth of the pump)
- One thin carabineer (to hang the net in place) or zip ties

4. Summary of collection method:

The sample collection equipment must be decontaminated from previous sampling events before using.

Set up the sample collection equipment properly according to the sample location. In order to avoid cross contamination, each location has its own equipment and the pump is disinfected between uses.

The Lake Cahuilla sample is collected at the end of the canal (GPS 33°38.05, 116°16.66). The bed of the truck holding the generator needs to be closest to the door so that the extension cord will reach. The net will need to be attached to a point where water can flow through it without being blocked. A rope is securely tied onto the pump handle and the correct hose fitting is attached to the pump. Lift the grate on the floor of the platform to submerge the pump.

At the 88.6 Lateral, the pump is submerged in the water between the trough and the white tank on the South side of the canal (GPS 33°33.35, 116°56.76). It is a tight fit, but it works and the water in this area is calm, shaded and deeper than going under the grate on the south side of the tank.

At the Avenue 56 Bridge, the pump is submerged in the water west of the bridge or downstream from the bridge (GPS 33°38.55, 116°05.46). This allows for easier removal of the pump when it is being removed from the water.

While submerged, the pump should not sit on the bottom of the canal. The bottom of the pump should be raised at least three feet off of the bottom to half way down into the water. Be sure to secure the rope from the pump to an immovable source so that it will hang at the same depth in the water for the entire sampling procedure. Record the depth of the pump on the COC.

Completely purge the supply line of any stagnant water. Use a five gallon bucket and a stop watch to determine the flow rate (gallons/minute) through the hose. Calculate the average of at least three replicate runs for determining the flow rate. Record the amount of time in seconds it takes to fill the five gallon bucket with canal water. Divide 5 gallons by the amount of time in seconds recorded and then multiply by 60 seconds/1 minute to get gallons per minute. This number is then divided into 264 gallons. This will give you the amount of time in minutes that it will take to allow 1000 L of water to pass through the hose and through the net (see Calculations below for the formula). A minimum of 1,000 L must pass through the net.

Place the end of the hose into the opening of the plankton tow net, in order to collect all of the water flowing out of the hose without the water splashing out. Keep accurate measures of the volume of water flowing into the net by observing the elapse time. Record the total volume of water going into the net on the COC.

Carefully unscrew the 100 ml collection cup and pour the sample into a 1,000 mL Nalgene leak-proof poly bottle. Using the appropriate spray bottle filled with water from the sample collection location (use the water in the 5 gallon bucket used to determine flow), spray down the net from the outside to concentrate veligers into the collection cup. Again, carefully unscrew the collection cup and pour the rinse water into the 1000 mL bottle. Repeat this step until the net is clean from silt, etc. Thoroughly rinse the collection cup with the spray bottle with minimal volume of water and transfer the rinses into the same sample bottle. Be sure not to exceed 750mls of sample water since the sample must be preserved with 25% of the total volume of sample with ethanol. **Mark the water level on the sample bottle with permanent ink.** (Draw a line on the bottle and label "Level 1.")

The pump and any other equipment being used at each location must be decontaminated for at least one hour in acetic acid between uses. There is a 44 gallon trashcan that can be filled with 12-16L of the acid that the pump can soak in while moving from location to location (it may be necessary to remove the elbow on the pump so that all parts are completely submerged). Please keep track of how much acetic acid is left in the lab so that we can order more when needed. Also, the acid will need to be removed from the lab the night before sampling occurs, since it is kept in the main area of the lab, which is secured by punch code and locked doors.

After all of the samples have been collected, the volume of sample collected in each 1000 ml bottle will need to be determined. The best way to determine how much sample has been collected is to weigh the 1000 ml sample bottle with the sample in it and subtract the weight of an empty sample bottle. This will be an estimated volume.

Next, add the appropriate volume of ethanol (25% of the total volume of sample). This is a visual estimate; it does not have to be exact. Use three parts canal water and one part ethanol. After determining the amount of sample volume is in the 1000ml bottle, multiply this by 0.25 to determine how much ethanol to be added. Replace the bottle cap snugly. (The volume of ethanol will need to be used in the calculation of number of veligers per unit volume; therefore be sure that the sample bottle is marked with a second line to indicate total volume [sample + ethanol] so that the lab can also determine the volume of ethanol that was added.) **Mark the water level on the sample bottle with permanent ink.** (Draw a line on the bottle and label “Level after ETOH.”) Tape the secured bottle cap with black electrical tape to cover the seam between the cap and bottle to prevent leakage.

Use a waterproof pen for bottle labels. Be careful to avoid spillage of ethanol (Sharpie ink will run if contacted with ethanol). Insert a piece of paper with the information on the bottle label also be put in the Ziploc bag with the sample, as a backup. Record the following information on both sample bottle and data sheet:

- Sample date
- Sample location (GPS if available)
- Sample depth or pump intake depth
- Volume of water filtered through the plankton net
- Preservative used
- Sampler ID

Put the COC in a Ziploc bag. Wrap the bottle in the disposable diaper and place it in a Ziploc bag (push all air out of the bag before closing). Put on ice in cooler for transport. Samples must be kept cool at all times. Samples may be stored under refrigeration for a few days if a delay is necessary to avoid shipping over a weekend.

5. Decontamination protocol for equipment used to collect plankton tow samples for quagga mussel larvae detection analysis

Decontamination procedures approved by California Department of Fish and Wildlife shall be used to decontaminate equipment (CDFW, 2014). After the tow samples have been collected from a water body all equipment coming into contact with the water will be decontaminated prior to the next sampling event. Each sample point has a dedicated tow net and water pump which will still require decontamination when sampling activities are complete. For thorough decontamination, equipment will be soaked in an acetic acid solution (vinegar) and then sprayed with a 10% bleach solution. The vinegar dissolves the veliger’s shell but will not denature DNA so following the acetic acid bath the equipment will be sprayed with the 10% bleach solution to denature the veligers DNA. Vinegar and bleach can present safety hazards if not used properly. Material Safety Data Sheets (MSDS) for both vinegar and bleach should be reviewed prior to decontamination procedures. Heed all MSDS precautions and follow all MSDS procedures, practices, safeguards and requirements when using vinegar and bleach.

Protocol:

1. Place items to be decontaminated in the 55 gallon Rubbermaid tote.
2. Fill the tote with enough household vinegar to completely cover all of the items.
3. Soak the items in vinegar for a minimum of 2 hours (24 hours is preferred).
4. After soaking in vinegar thoroughly rinse the items in tap water.
5. Spray the items with a 10% bleach solution and allow the items to sit for 15 minutes.
6. Alternatively, a 10% bleach solution can be prepared in a Rubbermaid tote or a similar type of container and used to soak items for 15 minutes following the vinegar soak.
7. After the bleach treatment, thoroughly rinse all of the items off with tap water and allow them to air dry.

The vinegar can be reused multiple times. It's recommended that vinegar be poured back into the original container for storage. The pH of the vinegar should be checked periodically to make sure the value is approximately 2 to 3. This can be done with pH paper.

6. Sample Shipping:

The samples are to be shipped using FedEx Overnight Express (avoiding weekend deliveries) to James Snider, California Department of Fish and Wildlife – Fisheries Branch, Bodega Bay Marine Lab, 2099 Westside Road Bodega Bay, CA 94923. Be sure to give a copy of the shipping invoice to the project manager.

If needed, contact James Snider by email at James.Snider@wildlife.ca.gov, or by phone at (707) 875-2066.

7. Safety Issues:

Use sure footing and walk very carefully around the canal so as not to slip into the water. Use your legs rather than your back when pulling the pump from the canal. Keep away from the fumes of the acetic acid and ethanol.

8. Calculations:

To determine how many gallons per minute are being pumped:

$$\frac{5 \text{ gallons (volume of bucket)}}{\text{Seconds it takes to fill the bucket}} \quad \times \quad \frac{60 \text{ seconds}}{1 \text{ minute}} = \frac{\text{? gallons}}{\text{minute}}$$

To determine how much time to for 1000 L of the water to flow through the net (1000 L = 264 gallons) use the gallons/minute determined above:

$$\frac{264 \text{ gallons}}{\text{? gallons/minute}} = \text{Total minutes to allow water to flow through the net}$$

For example:

$$\frac{5 \text{ gallons (volume of bucket)}}{5.9 \text{ seconds}} \quad \times \quad \frac{60 \text{ seconds}}{1 \text{ minute}} = \frac{50.85 \text{ gallons}}{\text{minute}}$$

$$\frac{264 \text{ gallons}}{50.85 \text{ gallons/minute}} = 5.19 \text{ minutes}$$

$$0.19 \text{ minutes} \times 60 \text{ seconds} = 11 \text{ seconds}$$

Allow the water to flow through the net for 5 minutes and 11seconds.

To determine the amount of ethanol to add:

Weight of the bottle and the sample – weight of an empty sample bottle and lid =
estimated volume of sample

Estimated volume of sample x 0.25 = volume of ethanol to add

For example:

$$465.21 \text{ (with sample) g} - 88.17\text{g (empty)} = 337.04 \text{ g}$$

$$337.4 \text{ g} \times 0.25 = 94.26 \text{ g}$$

Add 94 mls of ethanol to the sample for preservation. Again, this is only an estimated value.

Table A1. Chlorine Residual Down Stream of Dosing Station

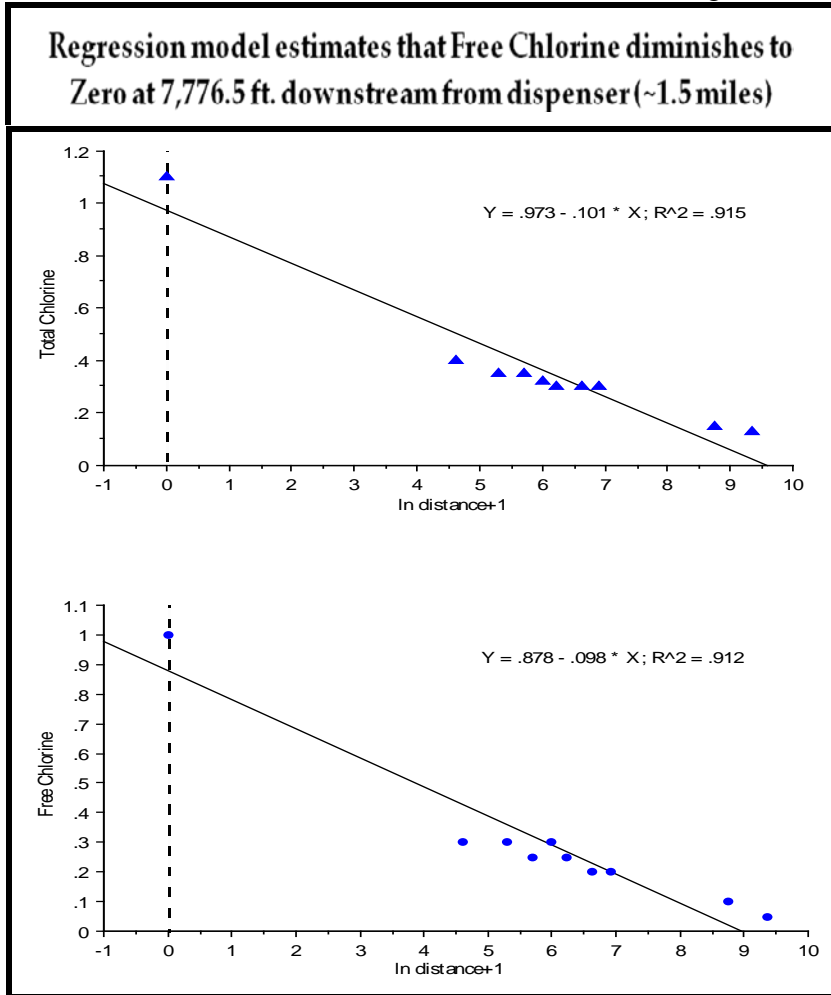


Table A2. Location of Monitoring Blocks within the Coachella Canal

Canal Mile Post	Structure
0.15	Flume C.V.T.O
3.8	Gate Structure
11.4	Gate Structure
23.1	Glamis Road HWY 78
37.8	Scheu Ranch
41.9	Siphon 2
48.3	Flume Slab City
88.6	Demossing Screen
97.1	Gate Structure
108.2	Gate Structure
115.5	Gate Structure
123.45	Lake Cahuilla next to two Traveling Screens
123.50	Lake Cahuilla outfall to irrigation lateral

Figure A1. Chlorination Dosing Station at Drop One (Tanker offloading Chlorine)



Figure A2. Maximum Daily Coachella Canal Water Temperature

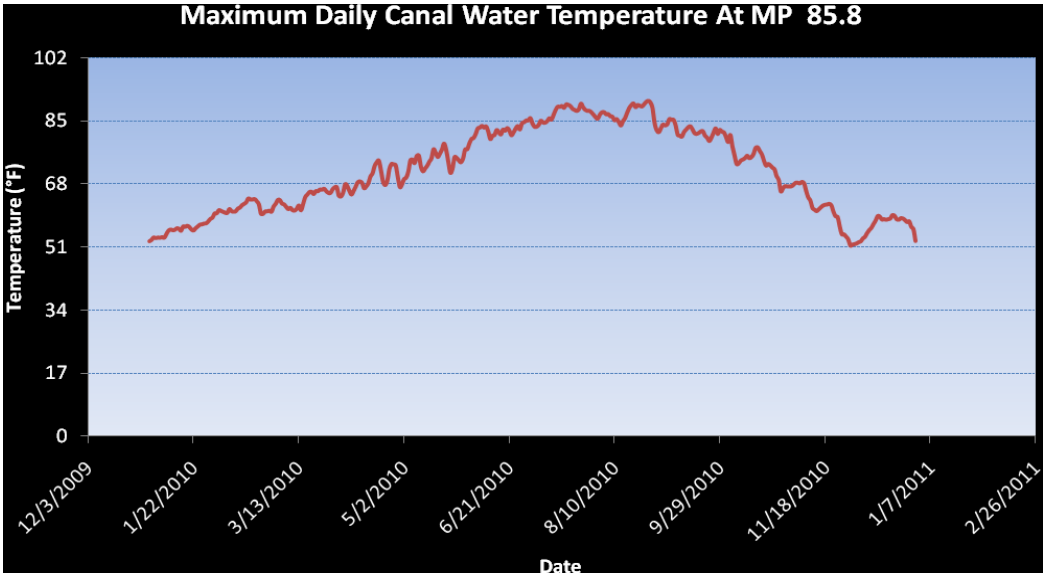


Figure A3. Quagga Monitoring Locations Along the Coachella Canal



Figure A4. Typical Monitoring Block Location in Coachella Canal

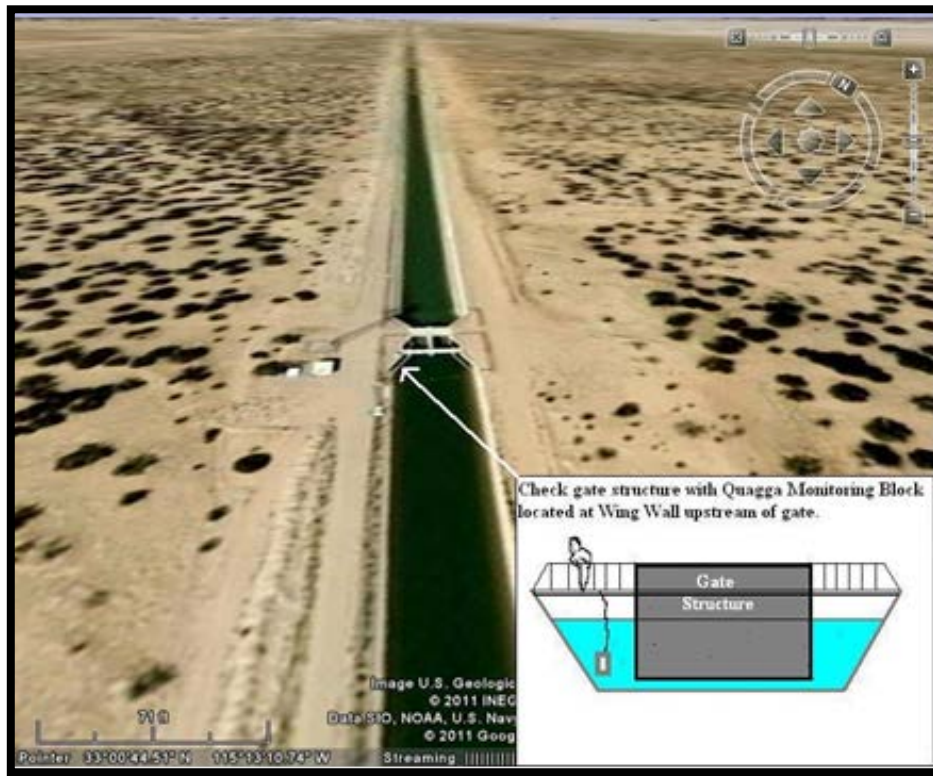


Figure A5. Veliger Sampling Points

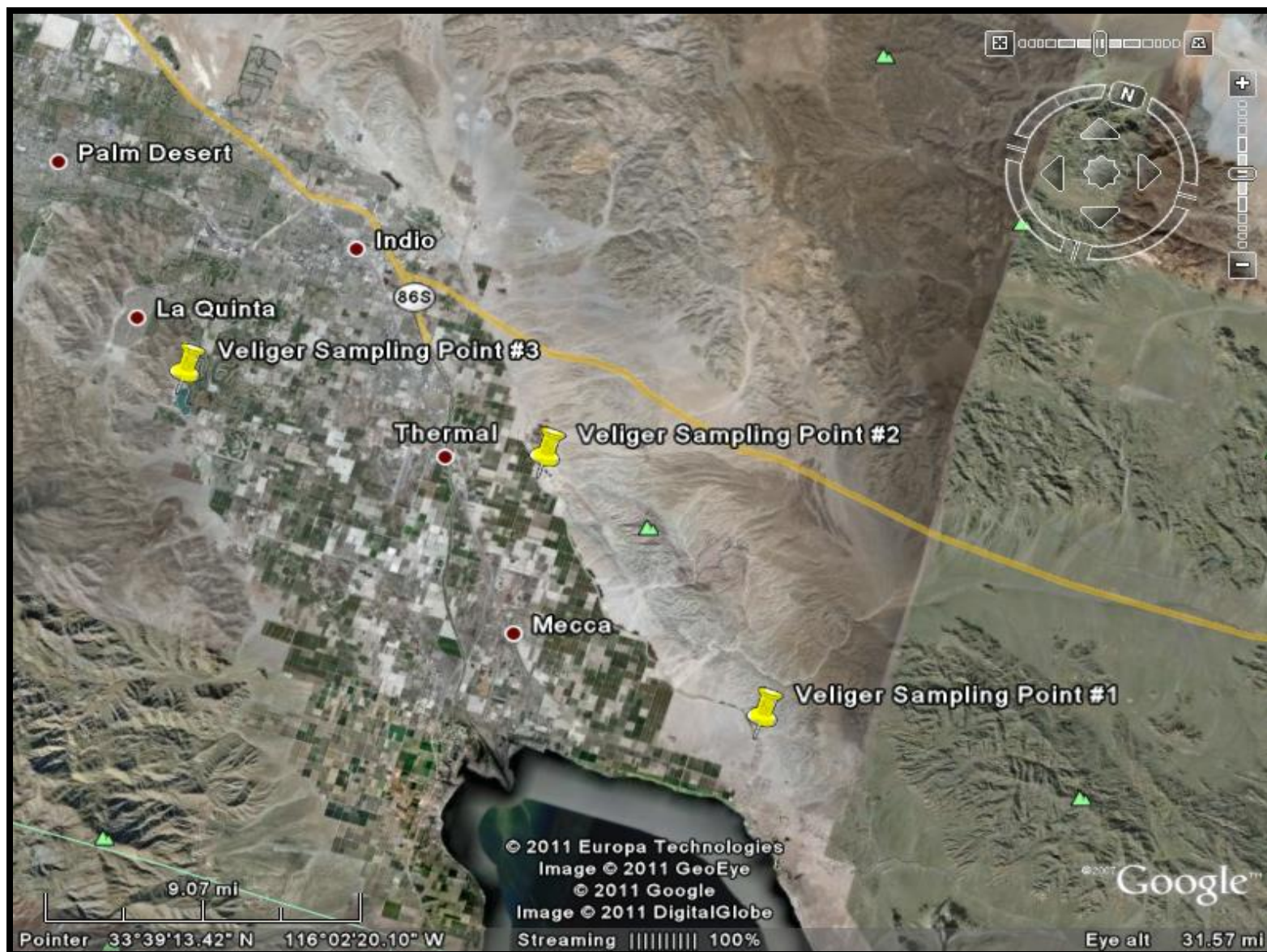


Figure A6. CVWD *Dreissena* Veliger Monitoring Summary

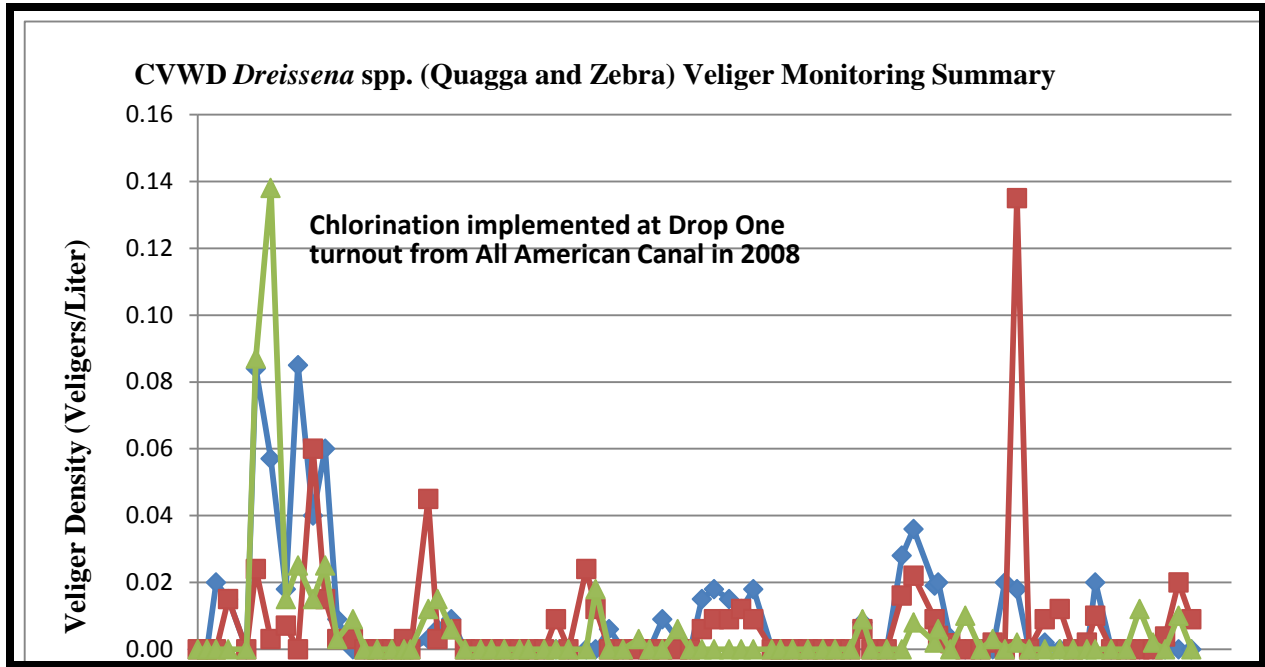


Figure A7. Additional Monitoring Points within Lake Cahuilla



Figure A8. Buildup of Organic Growth on Monitoring Block





Figure A9. Coachella Canal Quagga Mussel Monitoring Block Inspection Record

Date:							
Inspector(s):							
Procedure: Inspect all surfaces of the block and tether for adult and juvenile stages of Quagga mussel							
Block #	Mile Post	Location	Monitoring Block Present / Absent	Quagga Mussel Observation	Observed Block Condition	Estimated # of Mussels	NOTES/COMMENTS
Block 1	0.15	Flume CVTO	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 2	3.8	Gate	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 3	11.4	Gate	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 4	23.1	Hwy 78	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 5	37.8	Scheu Ranch	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 6	41.9	Siphon 2	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 7	48.3	Flume Slab City	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 8	88.6	Demossing Screen	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 9	97.1	Gate Structure	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 10	108.2	Gate Structure	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 11	115.5	Gate Structure	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 12	123.45	Lake Cahuilla Traveling Screen	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Block 13	123.50	Lake Cahuilla	<input type="checkbox"/> Present <input type="checkbox"/> Missing	<input type="checkbox"/> Present <input type="checkbox"/> Absent	<input type="checkbox"/> Intact <input type="checkbox"/> Damaged		
Other organisms present:							

APPENDIX REFERENCES

California Department of Fish and Wildlife. Aquatic Invasive Species Decontamination Protocol. Retrieved from <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=43333&inline>. 2014.

Craft, Christopher D. and Christopher A. Myrick, Ph.D. Evaluation of Quagga Mussel Veliger Thermal Tolerance. Department of Fish, Wildlife, and Conservation Biology, Colorado State University. 2011.

De Leon, Ricardo (Dr.). Personal Communications regarding Early Research Involving Dyes and Stains Used to Determine Veliger Viability. Metropolitan Water District. 2011.

Kelly, K., Hosler, D., and Nibling, F. "Collecting Water Samples for *Dreissena* spp. Veliger PCR Analysis," U.S. Bureau of Reclamation, Sampling Protocol, Technical Services Center, Denver, CO. 2007.

Simms, Alan, La Bounty, Jim, Johnson, Dave, Roeffer. Prevention of Attachment at Pre-Treatment Plant. See Southern Nevada Water Authority powerpoint. August 2, 2007.

United States Geological Survey. Quagga and Zebra Mussel Eradication and Control Workshop. <http://nas2.er.usgs.gov/viewer/omap.aspx?SpeciesID=95>, San Diego, CA. February 1-2, 2012.

Willett, Leonard. Personal Communications regarding Monitoring Block Observation and Maintenance Practices. Quagga Mussel Coordinator, U.S. Bureau of Reclamation. December 2011.