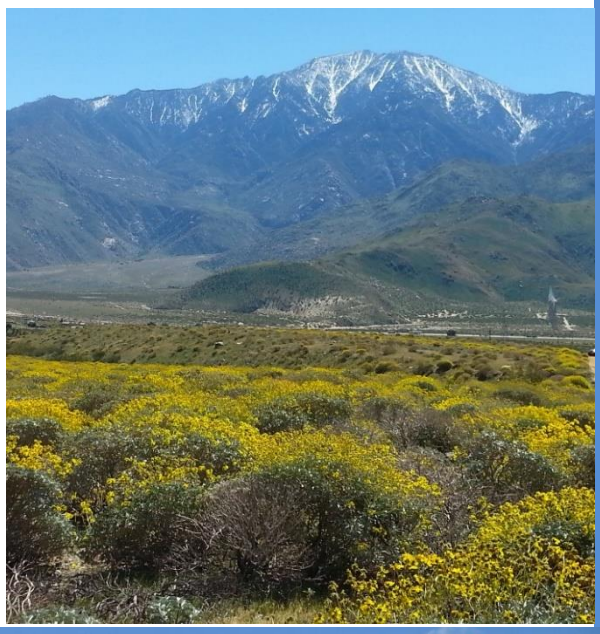
Coachella Valley
Multiple Species Habitat Conservation Plan/
Natural Community Conservation Plan

2015 Annual Report



Submitted by
Coachella Valley Conservation Commission

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I. Introduction

The Coachella Valley Multiple Species Habitat Conservation Plan/Natural Community Conservation Plan (CVMSHCP) is a regional multi-agency conservation plan that provides for the long-term conservation of ecological diversity in the Coachella Valley region of Riverside County. Since state and federal permits were issued in September and October 2008, significant progress has been made in plan implementation. The term of the permits is 75 years, which is the length of time required to fully fund implementation of the CVMSHCP. This report describes the progress made on plan implementation for the 2015 calendar year.

The CVMSHCP includes an area of approximately 1.1 million acres in the Coachella Valley region within Riverside County. The plan area boundaries were established to incorporate the watersheds of the Coachella Valley within the jurisdictional boundaries of CVAG and within Riverside County. Indian Reservation Lands are not included in the CVMSHCP although coordination and collaboration with tribal governments has been ongoing.

The Coachella Valley Conservation Commission (CVCC) is the agency responsible for CVMSHCP implementation. The CVCC is comprised of elected representatives of the Local Permittees including Riverside County, the cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage, the Coachella Valley Water District, and the Imperial Irrigation District. The Riverside County Flood Control and Water Conservation District (County Flood Control), Riverside County Regional Park and Open Space District (County Parks), and Riverside County Waste Resources Management District (County Waste) are also Local Permittees. Other Permittees include three state agencies, the California Department of Parks and Recreation (State Parks), the Coachella Valley Mountains Conservancy (CVMC), and the California Department of Transportation (CalTrans). A major amendment to include all of the City of Desert Hot Springs and Mission Springs Water District as Permittees was approved by the CVCC in March 2014 and all local Permittees approved the major amendment in 2014. The USFWS approved the Major Amendment in December 2015. The final approval of the major amendment by CDFW is expected to occur in 2016.

The CVMSHCP involves the establishment of an MSHCP Reserve System to ensure the conservation of the covered species and conserved natural communities in perpetuity. The existing conservation lands managed by local, state, or federal agencies, or non-profit conservation organizations form the backbone of the MSHCP Reserve System. To complete the assembly of the MSHCP Reserve System, lands are acquired or otherwise conserved by the CVCC on behalf of the Permittees, or by other acquisition partners in three major categories:

- Lands acquired or otherwise conserved by the CVCC on behalf of the Permittees, or through Permittee contributions
- Lands acquired by state and federal agencies to meet their obligations under the CVMSHCP
- Complementary Conservation lands including lands acquired to consolidate public ownership in areas such as Joshua Tree National Park and the Santa Rosa and San Jacinto Mountains National Monument. These acquisitions are not a Permittee obligation but are complementary to the Plan.

In addition to acquisition, land in the MSHCP Reserve System may be conserved through dedication, deed restriction, granting a conservation easement, or other means of permanent conservation. To meet the goals of the CVMSHCP, the Permittees are obligated to acquire or otherwise conserve 100,600 acres in the Reserve System. State and federal agencies are

expected to acquire 39,850 acres of conservation land. Complementary conservation is anticipated to add an additional 69,290 acres to the MSHCP Reserve System. Figure 1 shows the progress as of December 31, 2015 toward the land acquisition goals identified in Table 4-1 of the CVMSHCP, which shows the MSHCP Reserve System Assembly.

Table 1 demonstrates our progress on reserve assembly by showing the acres of conservation land protected since the issuance of the federal permit in October 2008. Significant progress has been made with over 87,000 acres of conservation lands acquired by various local, state and federal partners since 1996.

CVCC completed a major update of the land acquisition database in cooperation with the Coachella Valley Mountains Conservancy, CDFW and USFWS in 2013. Most of the land conserved since 1996 has been accomplished by entities other than CVCC and the records associated with acquisitions have not always been complete or consistent. Additional updates were made in early 2016 which are reflected in this report. As a result, some corrections to the numbers reported in Table 1 in prior annual reports have been made. All acquisition records and the acreage figures used thoughout the 2015 Annual Report have now been updated and made consistent with the rules shown in Appendix 1.

Figure 1: CVMSHCP Progress Toward Conservation Goals

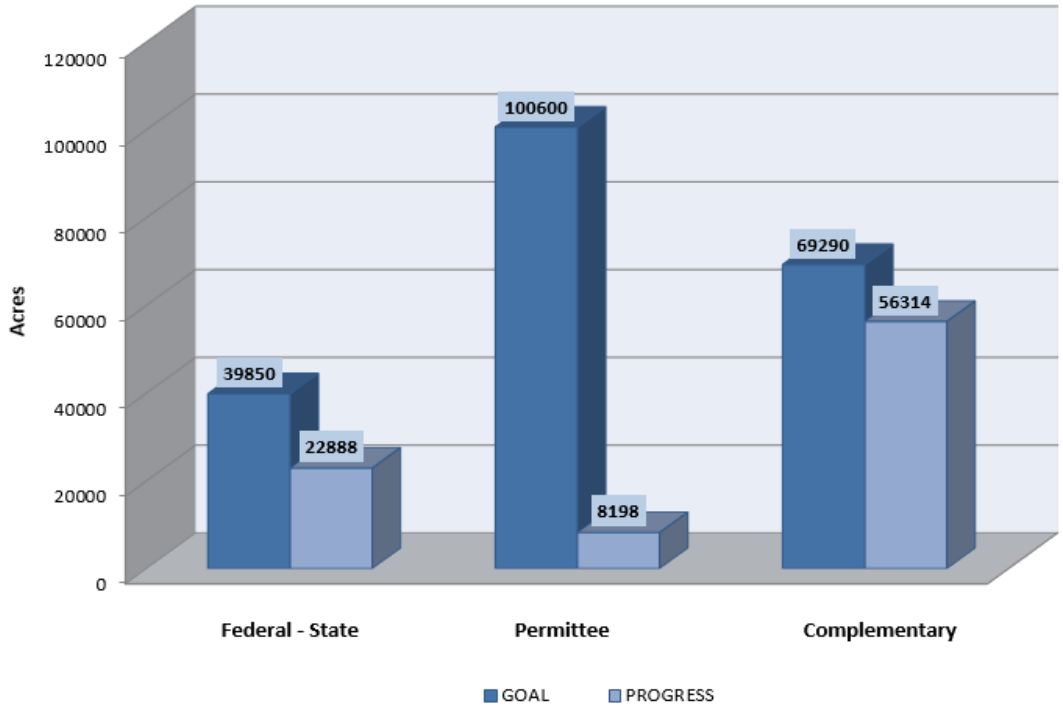


Table 1: Summary of Annual Progress on Reserve Assembly

Conservation Credit	Goal	Total Progress	1996 - 2010	2011	2012	2013	2014	2015
Federal - State	39,850	22,888	17,072	869	1,819	1,151	1681	296
Permittee	100,600	8,198	6,323	383	315	510	251	416
Complementary	69,290	56,314	47,456	4,207	1,760	671	957	1,263
Total	**209,740**	**87,400**	**70,851**	**5,459**	**3,894**	**2,332**	**2,889**	**1,975**

Once acquired, lands within the Conservation Areas are held in public or private ownership and are managed for conservation and/or open space values. Management of these lands contributes to the conservation of the Covered Species and the conserved natural communities included in the Plan. Table 2 identifies the allocation of land management responsibility, based on the entity that ultimately holds title to the land.

Table 2: Acres of Management Credit

Management Credit	Progress (acres)
Federal - State	53,932
Permittee	10,438
Complementary	23,031
Total	**87,400**

Reporting Requirements:

This Annual Report describes the activities for the period from January 1, 2015 to the end of the calendar year on December 31, 2015. As required by Section 6.4 of the CVMSHCP, this Annual Report will be presented at the CVCC meeting of June 9, 2016, where the report will be made available to the public. The report is also posted on the CVMSHCP website, www.cvmshcp.org.

II. Status of Conservation Areas: Conservation and Authorized Disturbance

The CVMSHCP identifies both qualitiative and quantitative conservation goals and objectives that must be met to ensure the persistence of the Covered Species and natural communities. The CVMSHCP is based on a very quantitative approach that is designed to be as objective as possible. The CVMSHCP includes specific acreage requirements for both the amount of authorized disturbance that can occur and the acres that must be conserved within each Conservation Area. These acreage requirements are identified in conservation objectives for each Covered Species and natural community as well as for essential ecological processes and biological corridors and linkages. The conservation objectives provide one measure of the progress toward meeting the requirements of the CVMSHCP under the state and federal permits.

This report provides a detailed accounting of the status of the conservation objectives for each of the Conservation Areas up to December 31, 2015.

The planning process for the CVMSHCP was initiated on November 11, 1996, which is the baseline date for the acreages listed in the tables in Sections 4, 9, 10 and throughout the CVMSHCP document. This Annual Report provides an update of these baseline tables to account for all the Conservation and Authorized Disturbance that has occurred between January 1, 2015 and December 31, 2015.

Table 3 provides a summary of the amount of conservation and the acres of disturbance authorized within Conservation Areas in 2015. Authorized disturbance results from development projects in the Conservation Areas. In 2015, there was 53 acres of Authorized Disturbance reported. The Total Authorized Disturbance in Table 3 includes Authorized Disturbance in years since 1996 that had not been reported to CVCC in the year in which the Disturbance occurred.

Table 3: Conservation and Authorized Disturbance Within Conservation Areas

Conservation Area	Conserva-tion Goal	Conserved in 2015	Conserved Since 1996	Allowed Authorized Disturbance	Authorized Disturbance in 2015	Total Authorized Disturbance since 1996
Cabazon	2,340	0	0	260	0	0
CV Stormwater Channel and Delta	3,870	0	0	430	0	5
Desert Tortoise and Linkage	46,350	231	3,563	5,150	14	14
Dos Palmas	12,870	276	3,393	1,430	0	0
East Indio Hills	2,790	0	0	310	0	0
Edom Hill	3,060	0	2,069	340	0	1
Highway 111/I-10	350	0	54	40	0	0
Indio Hills Palms	2,290	0	1,039	250	0	0
Indio Hills/Joshua Tree National Park Linkage	10,530	20	8,980	1,170	0	5
Joshua Tree National Park	35,600	567	12,625	1,600	0	0
Long Canyon	0	0	0	0	0	0
Mecca Hills/Orocopia Mountains	23,670	467	6,041	2,630	0	0
Santa Rosa and San Jacinto Mountains	55,890	124	30,175	5,110	0	9
Snow Creek/Windy Point	2,340	0	889	260	0	0
Stubbe and Cottonwood Canyons	2,430	0	875	270	0	29
Thousand Palms	8,040	0	3,653	920	8	62

Conservation Area	Conserva-tion Goal	Conserved in 2015	Conserved Since 1996	Allowed Authorized Disturbance	Authorized Disturbance in 2015	Total Authorized Disturbance since 1996
Upper Mission Creek/Big Morongo Canyon	10,810	224	6,562	990	2	23
West Deception Canyon	1,063	0	834	100	0	0
Whitewater Canyon	1,440	0	956	160	0	1
Whitewater Floodplain	4,140	0	567	460	29	61
Willow Hole	4,920	59	2,197	540	0	6
Total	234,793	1,975	84,472	22,420	53	216

III. Biological Monitoring Program

The CVMSHCP outlines a scientifically-based monitoring program for species, natural communities and landscapes listed under the Plan. To ensure long-term conservation goals are attained, monitoring activities are based on a three-phased approach and consist of: 1) assessing baseline conditions and developing threat assessments; 2) performing focused monitoring when/if threats are determined; and, 3) conducting adaptive management actions whereby the scientific method is employed to develop and implement best management practices.

In 2015, the CVCC continued to hold meetings of the CVMSHCP Biological Working Group as a mechanism to improve communication and collaboration with our partners. The Biological Working Group, which includes wildlife agency and other professional biologists, capitalizes on the expertise and resources of all our agency partners as well as the UC Riverside - Center for Conservation Biology. The Biological Working Group meets monthly to discuss updates on biological issues and adaptive management strategies. They assess current monitoring protocols to align them with research goals outlined within the CVMSHCP, and review completed monitoring activities. During the spring the Biological Working Group assesses the monitoring priorities to be brought forth to the Reserve Management Unit Committees and the Reserve Management Oversight Committee as the recommended annual work plan. A three to five year strategic plan provides an outline of what monitoring has been completed, and outlines priorities for the following year's monitoring needs. This strategic monitoring plan lists specific objectives for identifying and managing threats and stressors, environmental variables that influence the persistence of the covered species. The CVCC Habitat Conservation Management Analyst continued to manage contracts and logistics for monitoring and land management efforts, including coordinating meetings of the Reserve Management Unit Committees and the Biological Working Group.

To support these goals, CVCC has actively pursued grant funding for monitoring programs. CVCC received funding for three projects from the Natural Community Conservation Planning Local Assistance Grant (LAG) program of the California Department of Fish and Wildlife. Two of these LAG funded projects began in April 2015, one for $70,000 to support the "*Development of an Effective Agassiz's Desert Tortoise Monitoring Program,*" and the other for $99,236 to support "*Vegetation Mapping of Peninsular Bighorn Sheep Habitat*." CVCC subcontracted with the United States Geological Survey to establish a focal plot in the Desert Tortoise and Linkage Conservation

Area, and carry out monitoring using radiotelemetry to locate the tortoises, and provide population estimates. CVCC subcontracted with Aerial Information Systems, Inc. to map the vegetation within essential bighorn sheep habitat, within the Santa Rosa and San Jacinto Mountains Conservation Area. In October 2015, work continued on the third LAG grant for $40,000 to provide GPS collars for "*Monitoring Peninsular Bighorn Sheep in the Santa Rosa and San Jacinto Mountains*". Collars were placed on bighorn sheep in the Santa Rosa and San Jacinto Mountains Conservation Area in October 2014 and November 2015. A Bureau of Reclamation Grant for $48,750 was also awarded to the CVCC in July 2014 for "*Genetic and Health Profiles of Peninsular Bighorn Sheep in the Northern Peninsular Range*." During the bighorn captures in 2014 and 2015, blood and serum samples were taken. These samples, together with other stored tissue samples from sheep in the Santa Rosa and San Jacinto Mountains, will be analyzed to provide health status and genetic profiles. In July 2015, CVCC was awarded $78,487 in funding from the State of California and US Fish and Wildlife Service Traditional Section 6 Conservation Grant for "*Invasive Species Control and Restoration of Water Sources for the Peninsular bighorn sheep (Ovis canadensis nelsoni) in the Santa Rosa Mountains."*

A contract with UC Riverside (UCR) - Center for Conservation Biology was approved for continued monitoring of aeolian sand species, burrowing owls, Little San Bernardino Mountains linanthus, Jerusalem crickets, and vegetation mapping of the Mecca Hills and Orocopia Mountains Conservation Area. In fall of 2015, UCR also began the task of mapping the vegetation in the Dos Palmas Conservation Area. UCR also assisted in advising the RMUC and BWG on developing focused research questions for protocols through June 2016. In coordination with the Biological Working Group, UCR provides guidance and input on the development of the monitoring program tasks and performs the majority of monitoring efforts with their team of ecologists who have specialties in various aspects of the Coachella Valley desert ecology. UCR also assists with providing support for the desert tortoise and vegetation mapping projects if needed. The 2014-2015 Annual Monitoring Report submitted by UCR can be found in Appendix 2A; the "Mecca Hills /Orocopia Mountains Vegetation Map Report" can be found in Appendix 2B.

2015 Biological Monitoring Activities

Photos: 1 –A burrowing owl captured on a wildlife camera stationed outside its burrow; 2 –USGS team measures a desert tortoise; 3 – Jersusalem cricket found at Snow Creek; 4 –Salt Creek vegetation monitoring, Dos Palmas Conservation Area; 5 – Wildlife biologists taking measurements and samples from a bighorn ram; 6 – graphic of Mecca Hills/Orocopia Mountains Vegetation Map.

IV. Land Management Program

Management of lands acquired by CVCC and other local Permittees is coordinated with management of the existing conservation lands owned by state, federal and non-profit agencies. The Reserve Management Oversight Committee (RMOC) is the inter-agency group that provides a forum for coordination of management and monitoring lands within the Reserve System and makes recommendations to the CVCC. The Reserve Management Oversight Committee is supported by the Reserve Management Unit Committees.

The Reserve Management Oversight Committee held regular quarterly meetings on January 28, and April 22, 2015. Each RMOC meeting included a report regarding the Monitoring Program and the Land Management Program. At the April 22, 2015 meeting the RMOC reviewed the Reserve Management and Monitoring work plans, biological monitoring and management priority activities, and tentative budget. The recommendations from the RMOC were incorporated into the CVCC budget for FY 2015/2016 and presented to the CVCC at their June 2015 meeting. The July and October 2015 RMOC meetings were cancelled due to a lack of agenda items. CVCC staff continues to coordinate with the RMOC and RMUCs to ensure that monitoring and research activities inform and support management of the CVMSHCP Reserve System.

Reserve Management Unit Committees

The six Reserve Management Units (RMUs) facilitate coordinated management by local, state and federal agencies to achieve the Conservation Objectives within the MSHCP Reserve System. The Reserve Management Unit Committee meetings were combined to reduce demands on staff time and provide for better coordination. The combined RMUC met at various field locations on March 10, September 8, and December 8, 2015. The March 10th RMUC meeting included a visit to some of Dos Palmas Conservation Area study sites. The September 8th meeting took place at the Snow Creek/Windy Point Conservation Area, and the December 8th meeting took place at Salt Creek and the Coachella Valley Stormwater Channel and Delta Conservation Area. Because many of the same staff members are involved in both the Biological Working Group and the RMUC and staff resources are limited, the RMUC tried to focus on field visits to better understand the unique issues of each conservation area. The group discussed prioritizing invasive species and off-highway vehicle control management efforts, increasing volunteer activities, and coordination on grant opportunities.

Trails Management Subcommittee

The Trails Management Subcommittee (TMS) meetings were held on January 21, March 18, May 20, October 21, and November 18, 2015. The Subcommittee works with jurisdictions on existing ordinances that relate to trail use. During 2015, the TMS focused on identifying safety and signage needs along the trails, and began working regionally to refine the trails mapping layer, which identifies authorized and unauthorized trails for management and monitoring. In 2015, the Bureau of Land Management National Landscape Conservation System funded a focused research program on human use of trails in the National Monument. Preliminary data was shared with the Subcommittee in 2015 to refine protocols for deployment. The CVCC will continue support for these projects through 2016.

Land Improvement: Acquisition Cleanups

In 2015 the CVCC Acquisitions Manager performed pre-acquisition site inspections and job walks on 18 parcels and 10 projects in multiple Conservation Areas. During these inspections the Land Acquisitions Manager identified illegal dumping, hazardous conditions, OHV & equestrian activity, and the existence of listed species, as well as determined property fencing requirements. As per CVCC's standard Purchase & Sale Agreements, willing sellers are required to clean up illegal dumping and blight prior to closing. Contractors are met in the field by the Acquisitions Manager prior to a required cleanup to review the agency's standards and specifications for the particular site in question. After cleanup, the job site is re-inspected to certify that cleanups meet the requirements, and if they are found lacking, the seller is notified if additional work will be necessary. After closing, CVCC monitors the sites at least annually for ongoing management/fencing requirements. This year, CVCC was directly responsible for removing an estimated 8.63 tons of refuse, including over 127 tires, from the Coachella Valley, covering more than 574.29 acres and generating over $7,270.00 in contractor revenue from sellers' property sales.

Property Management & Monitoring

Monitoring the status of CVCC conservation lands is an essential and ongoing activity. Regular site visits and patrols are conducted on a biweekly basis to various CVCC properties. Unfortunately, illegal dumping and vehicle access continue to be a problem on some of the Reserve lands. In 2014, over 23 tons of illegal dumping and tires on 160 acres in the Upper Mission Creek/Big Morongo Canyon Conservation Area were removed and 13,600 linear feet of post and cable were installed to protect the area. In 2015, the continuous monthly monitoring of the fence and area proved that the fence was successful in dissuading further dumping or OHV activity. There were two acts of vandalism, with a spike in vandalism activity in the fall between October and December. CVCC completed a fencing maintenance contract with a local contractor who will be responsible for fixing the vandalized areas as quickly as possible. Trespassing and illegal squatters occupying CVCC property were a few of the issues in 2015. To legally identify CVCC parcels and to better regulate these properties, 50 signs were placed at various Stubbe Canyon, and Indio Trails properties. A volunteer cleanup was held at the Big Morongo Canyon access road, on CVCC properties in Upper Mission Creek/Big Morongo Canyon with the help of volunteers from the Friends of the Desert Mountains and The North Face outdoor gear retail outlet in Cabazon. Palm Springs Disposal generously donated a rollaway container which the volunteers filled with illegally dumped furniture and debris. The following photos illustrate the management efforts of 2015.

2015 Land Management Activities

Photos: 1 – Signage at Indio Trails in the Thousand Palms Conservation Area; 2 – Volunteers removing debris from Big Morongo Canyon; 3 – Volunteers removing debris from illegal dumpsite west of Hwy. 62, Mission Creek; 4 –Signage at Stubbe Canyon;

V. Land Acquisition to Achieve the Conservation Goals and Objectives of the CVMSHCP

In 2015, CVCC completed 7 transactions acquiring 17 parcels totaling 416 acres at a cost of $793,439 in CVCC funds. Friends of the Desert Mountains acquired 23 parcels totaling 1,032 acres with $217,250 in funds from grants by the State of California Wildlife Conservation Board and the Coachella Valley Mountains Conservancy and approximately $200,000 in private donations. All of these acquisitions are listed in Table 4. A table of CVCC acquisitions and/or otherwise conserved lands recorded during the period from January 1, 2015 to December 31, 2015 can be found in Appendix 3. Parcels acquired are listed by Assessor Parcel Number (APN**).** The acreage listed in Appendix 3 is the recorded acreage from the Riverside County Assessor.

Table 4: Lands Acquired by CVCC in 2015

Project	Acres	Conservation Area	Purchase Price
Fisher	19.46	Upper Mission Creek/Big Morongo Canyon	$ 100,000
Gombar FT - Ken Waxlax	2.45	Willow Hole	$ 9,000
Lena Rabbitt	2.45	Willow Hole	$ 7,500
Mackey-Patterson	2.97	Willow Hole	$ 5,240
Mackey-Patterson	2.96	Willow Hole	$ 6,100
Mackey-Patterson	45.09	Willow Hole	$ 88,660
Maddy - Ken Waxlax	2.60	Willow Hole	$ 7,500
Tax Default Purchase	15.23	Desert Tortoise and Linkage	$ 5,758
Tax Default Purchase	28.28	Desert Tortoise and Linkage	$ 2,776
Tax Default Purchase	10.08	Desert Tortoise and Linkage	$ 23,389
Tax Default Purchase	3.89	Santa Rosa and San Jacinto Mountains	$ 6,354
Tax Default Purchase	36.10	Santa Rosa and San Jacinto Mountains	$ 7,045
Tax Default Purchase	39.90	Joshua Tree National Park	$ 4,518
Tax Default Purchase	0.53	Upper Mission Creek/Big Morongo Canyon	$ 7,676
Tax Default Purchase	20.18	Upper Mission Creek/Big Morongo Canyon	$ 19,910
Tax Default Purchase	20.04	Upper Mission Creek/Big Morongo Canyon	$ 19,769
Tax Default Purchase	163.33	Upper Mission Creek/Big Morongo Canyon	$ 472,244
Total Purchases	**415.55**		$ **793,439**

Funding for land acquisition and CVMSHCP Reserve Assembly comes from a variety of sources including local, state, and federal agencies. CVCC has acquired lands with funding from CVMSHCP development mitigation fees. However, as shown in Figure 4, funding from land acquisition partners continues to be an important source of land acquisition dollars. Significant federal funding has been provided through the U.S. Fish and Wildlife Service's Cooperative Endangered Species Conservation Fund, referred to as Section 6. State funding comes from several sources. The Coachella Valley Mountains Conservancy has contributed significantly to the acquisition of conservation lands through grants provided to various organizations for land acquisition, including CVCC. Another major source of state funding is the Wildlife Conservation Board which acquires land on behalf of the California Department of Fish and Wildlife. The Friends of the Desert Mountains, a local non-profit land trust, has acquired lands using grants from CVMC, private donations, and other sources; many of these lands have been transferred to CVCC. Othere agencies and non-profits have provided funds for land conservation. CVCC gratefully acknowledges the support from our partners.

Figure 2: Total Acquisitions in 2015 by Conservation Area

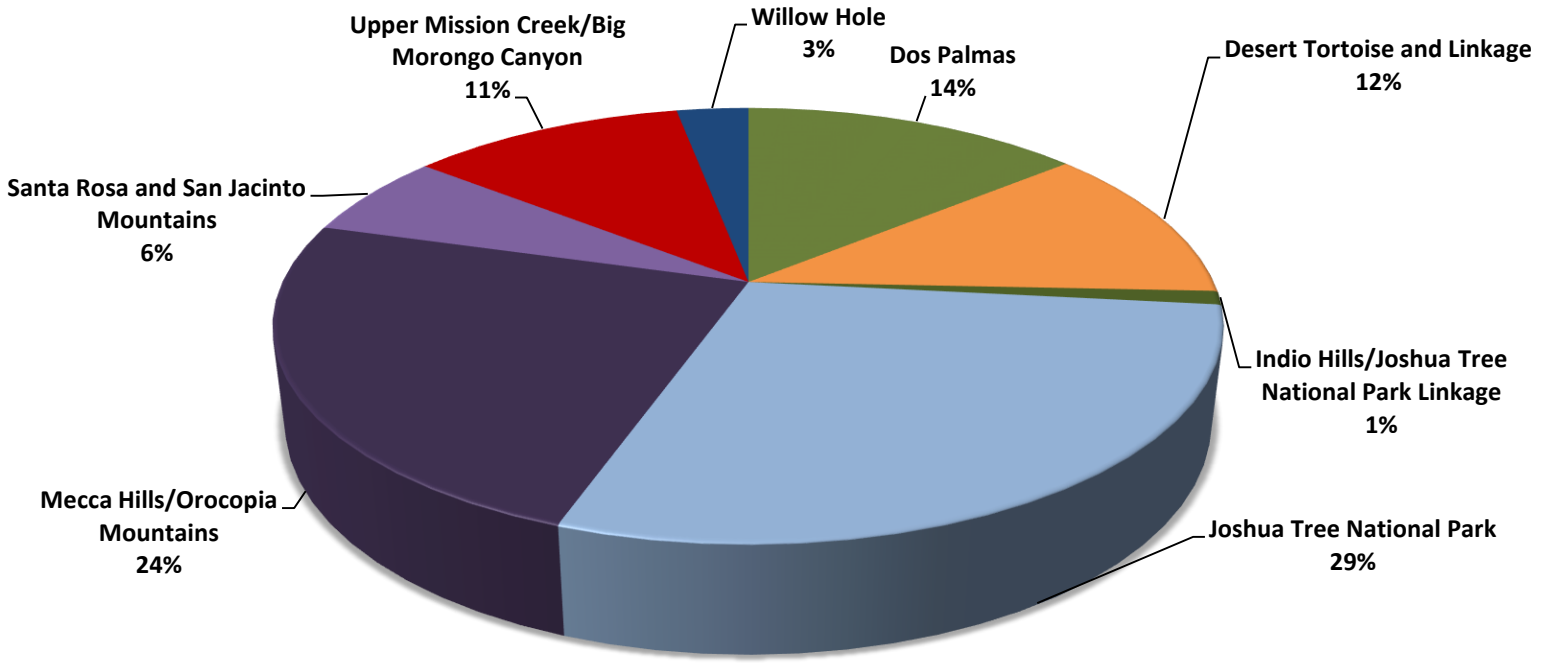


Figure 3: CVCC Acquisitions in 2015 by Conservation Area

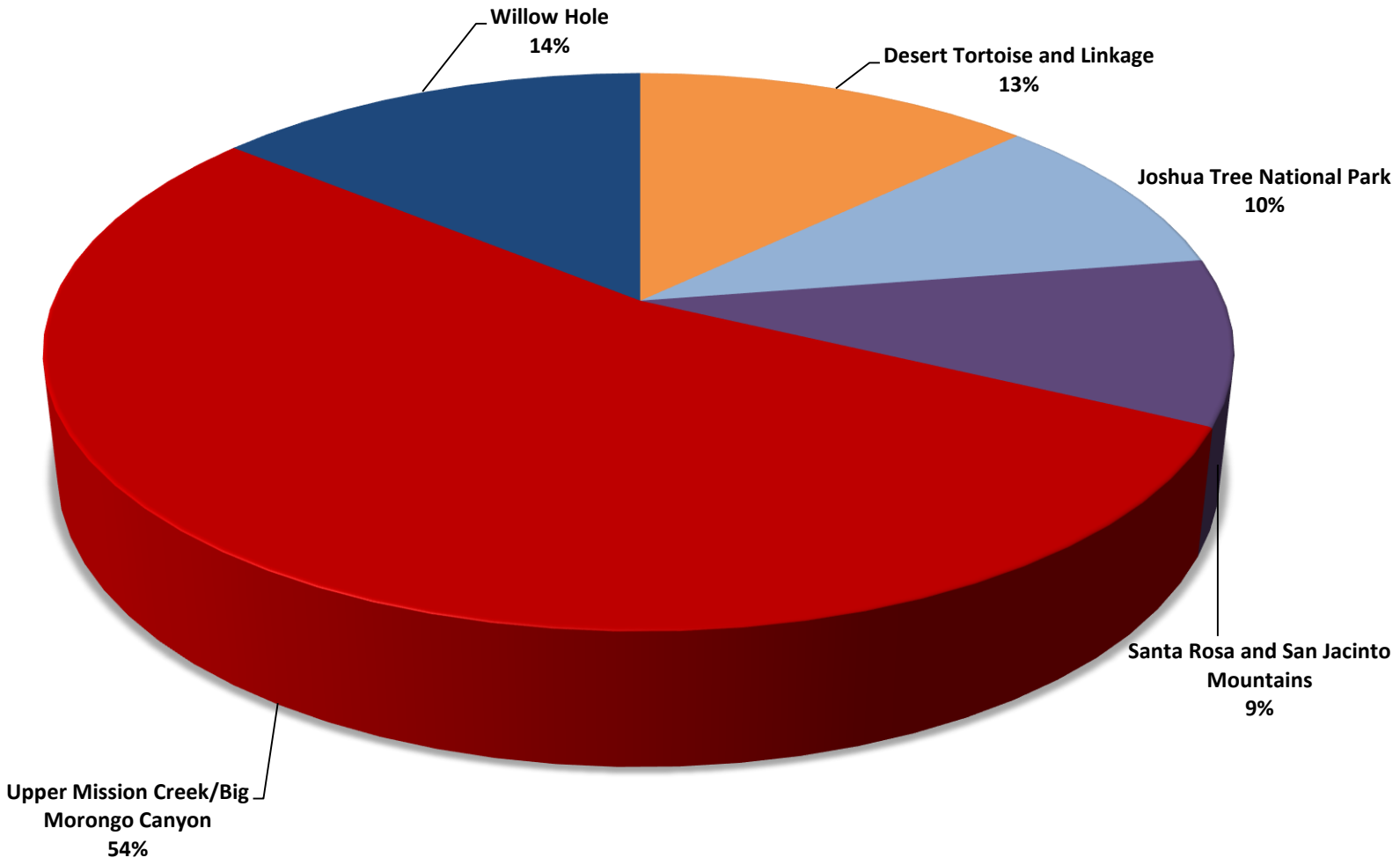
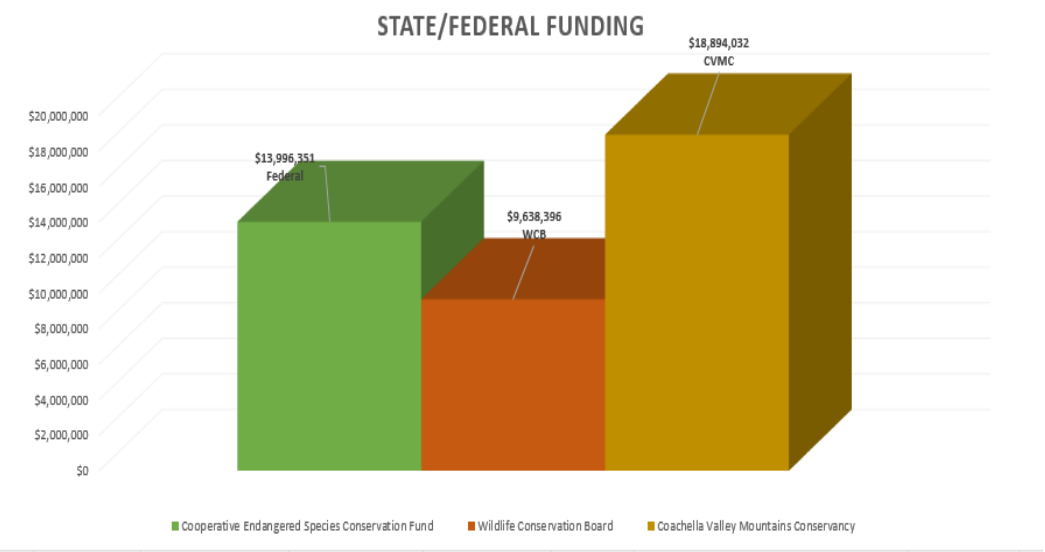
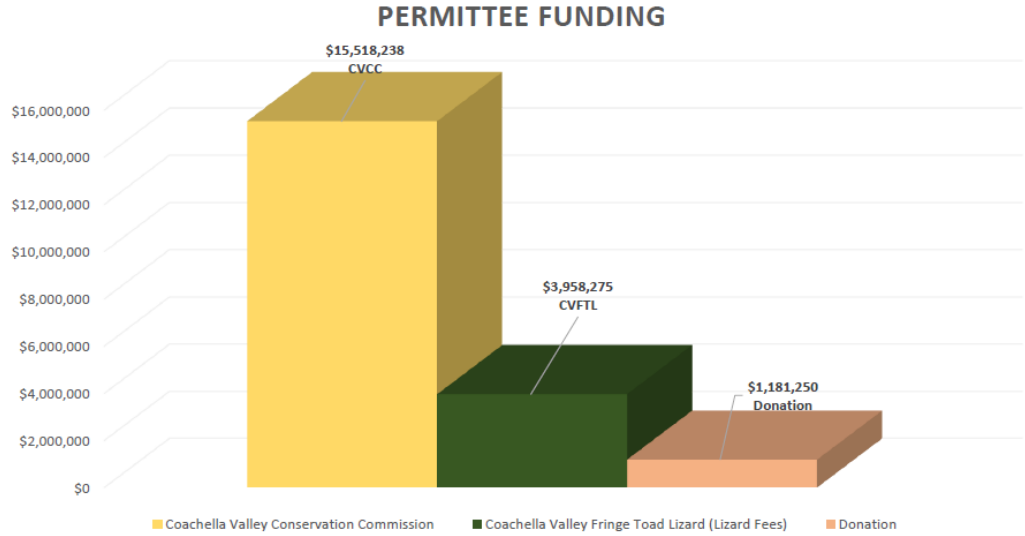


Figure 4: Funding Sources for Land Acquisition and Reserve Assembly





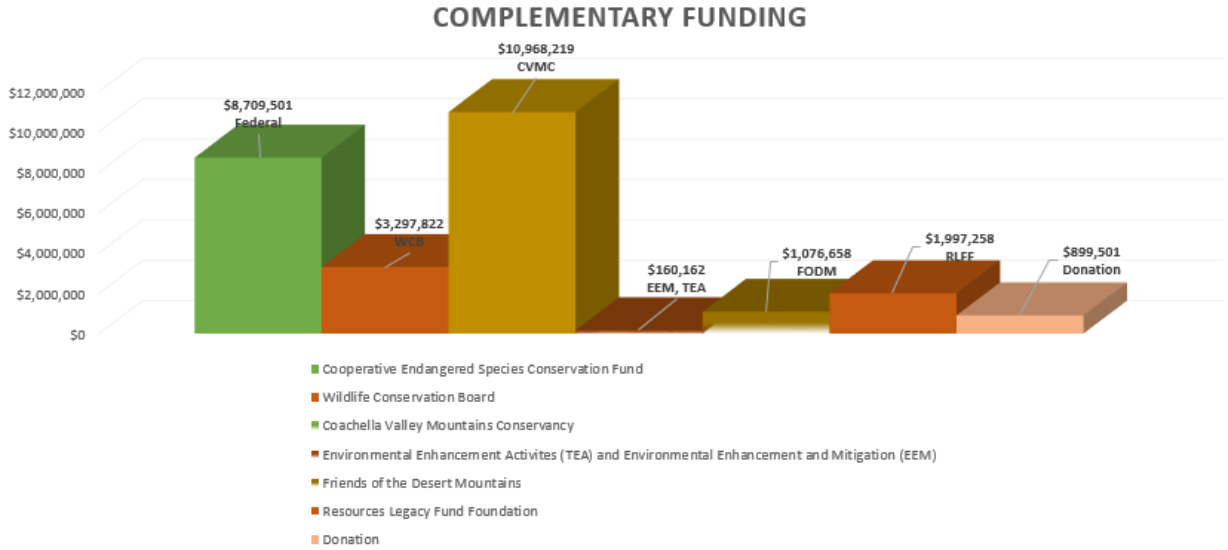
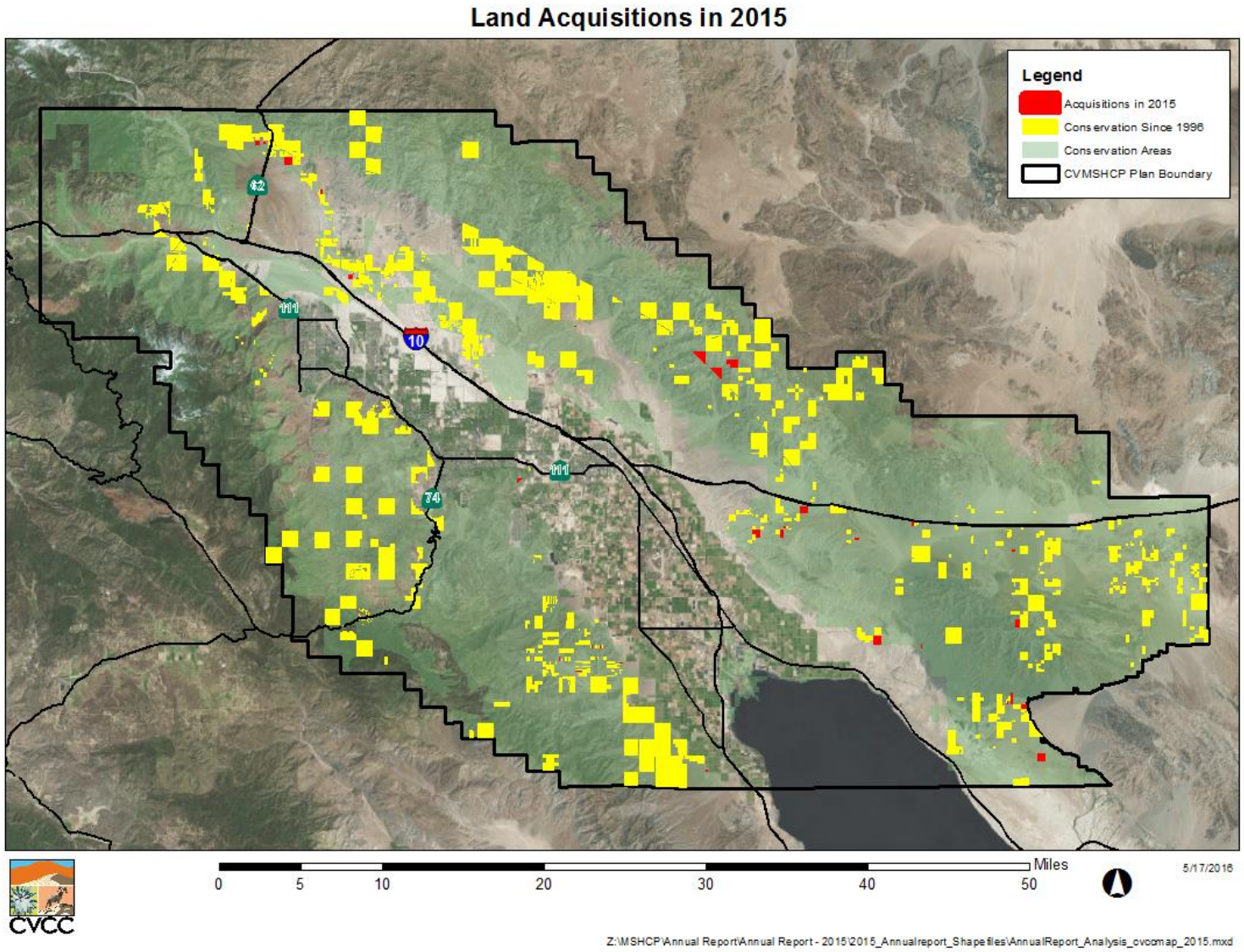


Figure 5: Land Acquisitions in 2015



VI. Conservation and Authorized Disturbance Within Conservation Areas

The progress toward achieving the Conservation Goals and Objectives for the CVMSHCP is reported here from two different perspectives, by Conservation Objective and by Covered Species or natural community. The CVMSHCP includes Conservation Objectives for conserving Core Habitat for Covered Species and conserved natural communities, Essential Ecological Processes necessary to maintain habitat viability, and Biological Corridors and Linkages within each of the 21 Conservation Areas. The amount of conservation and the amount of disturbance are reported in the same tables for comparative purposes. This Annual Report includes the conservation and authorized disturbance from January 1 to December 31, 2015.

The progress toward our goals in terms of the Conservation Objectives is presented in Appendix 4.

VII. Covered Activities Outside Conservation Areas

The CVMSHCP allows for development and other Covered Activities outside the Conservation Areas which do not have to meet specific conservation objectives A table that includes an accounting of the number of acres of Core Habitat and Other Conserved Habitat for the Covered Species and conserved natural communities that have been developed or impacted by Covered Activities outside the Conservation Areas can be found in Appendix 5. This information is listed for each of the Permittees with lands impacted by covered activities outside the Conservation Areas.

Development inside Conservation Areas has been carefully tracked and subject to review under the 1996 Memorandum of Understanding that began the planning process for the CVMSHCP. For development outside Conservation Areas, the acre figures in the table are estimates derived from the Developed area of the California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program GIS coverages from 1996 and 2012.

See http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx for more detail on the Farmland Mapping and Monitoring Program.

VIII. Status of Covered Species

An overview of the status of each of the Covered Species for each Conservation Area can be found in Appendix 4.

IX. Significant Issues in Plan Implementation

On February 28, 2014, the CVCC and the City of La Quinta received a letter from the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife as official notice that

bighorn sheep are using artificial sources of food and water in unfenced areas in the City of La Quinta. The letter referred to the CVMSHCP requirement for a barrier to sheep access to be constructed within two years of the letter. The proposed fencing to limit bighorn sheep access to golf courses in the La Quinta area will require environmental analysis, route planning and approval from property owners/public agencies. A status report was provided to the wildlife agencies in August 2014. Staff developed a list of proposed alternatives that could be considered in the environmental review and submitted these alternatives in a letter to the wildlife agencies in November 2014. In an April 2, 2015 letter, the wildlife agencies provided a response, identifying which alternatives were considered feasible. In October 2015 a request for proposals was circulated for a consultant team to work with the CVCC on the necessary environmental analysis for this project (CEQA and NEPA). A selection process was completed and Terra Nova Planning and Research, Inc. of Palm Desert was selected. We are currently working with the City of La Quinta, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and BLM to review these alternatives and determine those that will be included in the environmental documents. We are working with Coachella Valley Water District and Bureau of Reclamation as fencing associated with the Coachella Canal will require their input and approval. One section of the fence has been installed by CVWD adjacent to SilverRock golf course as part of their work on the canal in fall 2014. CVCC staff will be reaching out to the homeowners' associations in the area to get their input. A draft EIR is anticipated in summer 2016 with final environmental documents in fall 2016. Public meetings and community outreach are planned as part of this process.

X. Expenditures for CVMSHCP: 2015/2016 Budget

http://www.cvag.org/library/pdf_files/admin/CVCC%20Financials%20Reports%20FY_2015_2016/CVCC%2015-16%20Budget.pdf

BUDGET BY PROGRAMS - FY 2015/2016

	MANAGEMENT AND MONITORING	GENERAL ADMINISTRATION	LAND ACQUISITION	ENDOWMENT	LIZARD ENDOWMENT	TRAVERTINE MANAGEMENT	MANAGEMENT CONTINGENCY	TOTAL
BEGINNING FUND BALANCE	$ 350,209	$ 284,753	$ 3,987,666	$ 6,256,370	$ 308,184	$ 502,956	$ 3,452,562	$ 15,142,700
REVENUES:								
Development Mitigation Fees	$ 300,000	$ -	$ 1,500,000	$ -	$ -	$ -	$ -	$ 1,800,000
Agencies Mitigation Fees	-	-	-	570,000	-	-	-	570,000
Tipping Fees	-	420,000	-	-	-	-	-	420,000
Contributions	-	-	-	-	-	-	-	-
Grants	269,986	-	2,500,000	-	-	-	-	2,769,986
Other Revenue	-	-	-	-	-	-	-	-
Investment Income	1,000	600	8,000	17,000	900	1,600	11,000	40,100
Total Revenues	$ 570,986	$ 420,600	$ 4,008,000	$ 587,000	$ 900	$ 1,600	$ 11,000	$ 5,600,086
EXPENDITURES:								
Administrative Fees	$ 3,000	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ 18,000
Accounting - Bank Service Charges	-	3,340	-	-	-	-	-	3,340
Comprehensive Insurance	-	9,633	-	-	-	-	-	9,633
Per Diem Payments	-	10,200	-	-	-	-	-	10,200
Per Diem Taxes	-	885	-	-	-	-	-	885
Office Supplies	-	3,000	-	-	-	-	-	3,000
Printing	-	10,000	-	-	-	-	-	10,000
Land Improvements	1,000,000	-	240,000	-	-	-	-	1,240,000
Legal Services	-	50,000	-	-	-	-	-	50,000
Professional Services	-	8,500	30,000	-	-	-	-	38,500
Consultants (Regular funds)	699,931	365,728	250,872	-	-	-	-	1,316,531
Consultants (Grant funds)	309,986	-	-	-	-	-	-	309,986
Land Acquisitions	-	-	4,500,000	-	-	-	-	4,500,000
Furniture and Equipment	-	2,500	-	-	-	-	-	2,500
Sub-Total Expenditures	$ 2,012,917	$ 463,786	$ 5,035,872	$ -	$ -	$ -	$ -	$ 7,512,575
OTHER								
Operating Transfers Out	$ -	$ -	$ -	$ 404,474	$ -	$ -	$ 1,000,000	$ 1,404,474
Operating Transfers In	(1,404,474)	-	-	-	-	-	-	(1,404,474)
Sub-Total Other	$ (1,404,474)	$ -	$ -	$ 404,474	$ -	$ -	$ 1,000,000	$ -
Total Expenditures and Other	$ 608,443	$ 463,786	$ 5,035,872	$ 404,474	$ -	$ -	$ 1,000,000	$ 7,512,575
Net Excess (Deficit)	$ (37,457)	$ (43,186)	$ (1,027,872)	$ 182,526	$ 900	$ 1,600	$ (989,000)	$ (1,912,489)
ENDING FUND BALANCE	$ 312,752	$ 241,567	$ 2,959,794	$ 6,438,896	$ 309,084	$ 504,556	$ 2,463,562	$ 13,230,211

XI. Compliance Activities of Permittees

All Permittees are in compliance with requirements of the CVMSHCP. CVCC completed one Joint Project Review in 2015.

All the cities are complying with the fee exemption language in the new ordinances (there are no exempted projects under county jurisdiction). All jurisdictions report their Local Development Mitigation Fee (LDMF) activity and remit the revenue to CVCC monthly. CVCC reviews all LDMF reports and receipts monthly. In 2015, a total of $1,447,669 was collected under the LDMF program, a 25% decrease over the 2014 calendar year.

XII. Annual Audit

CVCC approved their Fiscal Year 2015/2016 budget at the June 13, 20143 meeting.

The audit of the expenditures for the period July 1, 2014 to June 30, 2015 was approved by CVCC on March 10, 2016. The financial report was designed to provide citizens, members, and resource providers with a general overview of the CVCC's finances, and to show accountability for the money it receives. Questions about this report or for additional financial information can be obtained by contacting the CVCC Auditor, at 73-710 Fred Waring Drive, Suite 200, Palm Desert, CA 92260. Annual CVCC audits are available at http://cvag.org/cvcc_financial_reports.htm.

XIII. Unauthorized Activities and Enforcement

Off-highway vehicles and dumping continue to be issues. In 2015, areas where these problems were reported included Stubbe/Cottonwood Canyon, Willow Hole, Upper Mission Creek/Big Morongo Canyon, and Thousand Palms Conservation Areas. Further discussion of management of these issues is included in section IV. Currently CVCC forwards reports of OHVs and dumping to the appropriate law enforcement agency. CVCC is working to develop an agreement with the Bureau of Land Management (BLM) under which CVCC would contribute funds to hire additional BLM law enforcement rangers to focus on the Conservation Areas.

XIV. In-Lieu Fee Program

In 2014, CVCC completed the Enabling Instrument for an In-Lieu Fee Program (ILFP) with the U.S. Army Corps of Engineers. The ILFP would allow organizations that need to mitigate for unavoidable Impacts to Waters of the U.S. that result from activities authorized under section 404 of the Clean Water Act and section 401 of the Clean Water Act water quality certifications to do so by paying a fee to CVCC. CVCC will perform restoration projects that are pre-approved as mitigation by ACOE and the cost of these projects, including endowment, contingency, planning and staff time would be paid from the ILFP. Much like the CVMSHCP, the ILFP will replace piecemeal mitigations that often require

years to be approved with a coordinated approach that complements other conservation efforts.

In November 2015, CVCC approved a contract with ICF International to create an In-Lieu Fee Program Development Plan. CVCC and ICF International have selected the Coachella Valley Stormwater and Delta Conservation Area as the potential site for the Development Plan. In April 2016, CVCC completed an appraisal of potential sites and is now in the process of the acquiring land. The first Advance Credit was sold in March 2016.

Appendix I
Rules for Land Acquisition and Management Credit

Acquisition Credit

In general, the source of funds for acquisition gets the credit of acres with the following modifications:

1) Per Plan Section 4.2.1 (p. 4-10), purchases with state or federal funding will be considered Complementary in the following Conservation Areas: Joshua Tree National Park, the Santa Rosa and San Jacinto Mountains, the Mecca Hills and Orocopia Mountains, and Snow Creek/Windy Point. Purchases within these areas with CVCC funds will be considered Permittee.
    a. If land purchased with non-federal/state funding in these areas is transferred to CVCC ownership, it will be considered a donation and CVCC will receive Permittee credit if they take title. Examples include:
        i. Purchases by Friends of Desert Mountains (FODM) – only if funds are from private foundations (e.g. Resources Legacy Fund);
        ii. Donations from landowners.

2) Acquisitions in Fluvial Sand Transport Only Areas will be credited to the funding entity (Permittee, Complementary, and Federal/State).
    a. If federal/state funds will be counted as federal/state acquisition
    b. If land purchased with non-federal/state funding in these areas is transferred to CVCC, it will be considered a donation and CVCC will receive Permittee credit.

3) For 2015 Annual Report parcels adjacent to Conservation Areas will not be counted but will be included in the overall database and flagged for consideration after the issue of a legal instrument for conservation is resolved.

4) If a grant requires a matching amount, that portion of the grant will be credited to the source of the match. This includes cash contributions and in-kind contributions from bargain sales (not addressed in the plan). However, as “mitigation” cannot be used as a match for Section 6 grants, Permittees cannot receive acre credit for Section 6 matches.

5) Mitigation for projects outside Plan Area (Wildlands, Inc. is the only current example ~ 7,000 acres) or mitigation for project not Covered as part of the Plan (Southern California Edison purchase of the mitigation value of CVCC in 2014) are included in the database but are zero for all credit and noted “conserved but it does not count for the Annual Report or Plan acreage numbers.”

6) No Acres within any Tribal Land are counted for the CVMSHCP under any circumstances as Tribal Land is “Not A Part” of the CVMSHCP Plan Area.

Appendix 2A
Biological Monitoring Program 2014-2015 Year-End Report

Coachella Valley Conservation Commission

October 2015

Coachella Valley Multiple Species Habitat Conservation Plan &
Natural Community Conservation Plan

Biological Monitoring Program
2014-2015 Year-End Report

**Prepared by the University of California Riverside's
Center for Conservation Biology**

for the Coachella Valley Conservation Commission

Permittees and Partners to the
Coachella Valley Multiple Species Habitat Conservation Plan and
Natural Communities Conservation Plan

Permittees

Coachella Valley Association of Governments
Coachella Valley Conservation Commission
California Department of Parks and Recreation
Coachella Valley Mountains Conservancy
California Department of Transportation

Riverside County Flood Control
Riverside County Waste Resources Management District
Riverside County Regional Park & Open-Space District

City of Palm Springs
City of Cathedral City
City of Rancho Mirage
City of Palm Desert
City of Indian Wells
City of La Quinta
City of Indio
City of Coachella

Coachella Valley Water District
Imperial Irrigation District

Partners

United States Department of Fish and Wildlife
California Department of Fish and Wildlife
United States Bureau of Land Management
United States Forest Service
Joshua Tree National Park
Friends of the Desert Mountains
Center for Natural Lands Management

Table of Contents

I. Biological Monitoring Program Overview

The Coachella Valley Multiple Species Habitat Conservation Plan and Natural Communities Conservation Plan (CVMSHCP/NCCP, or Plan) was established in 2008 to ensure regional conservation of plant and animal species, natural communities and landscape scale ecological processes across the Coachella Valley. Areas where conservation must occur throughout the life of the Plan are designated by a Conservation Area Reserve system which is designed to include representative native plants, animals and natural communities across their modeled natural ranges of variation in the valley. The types and extent of Conservation requirements for covered species, natural communities and landscapes within these reserves are defined by specific goals and objectives that are intended to support the following guiding ecologically-based principles:

1) maintaining or restoring self-sustaining populations or metapopulations of covered species;

2) sustaining ecological and evolutionary processes necessary to maintain the functionality of the natural communities and Habitats for the species included in the Plan;

3) maximizing connectivity among populations and avoiding habitat fragmentation to conserve biological diversity, ecological balance, and connected populations;

4) minimizing adverse impacts from off road vehicle use, illegal dumping, edge effects, exotic species and other disturbances;

5) ensuring management is responsive to short-term and long-term environmental changes, and new science.

The CVMSHCP uses ongoing biological monitoring and land management programs to assure these general conservation principles and species-specific Conservation Goals and Objectives, are met and maintained throughout the life of the Plan. To ensure that ecological drivers and communities are maintained and species populations are vigorous, a biological monitoring framework was designed to inform the Coachella Valley Conservation Commission, wildlife agencies, and resource managers of the status of the plan's covered species, and also to provide clear analysis of the ecological drivers and threats that may explain any spatial and temporal fluctuations observed. The goals and objectives of the monitoring and management programs is prescribed in CVMSHCP Chapter 8, "MSHCP Reserve System Management & Monitoring Program."

Data from the Biological Monitoring program also feed into the Land Management program and assist Reserve managers with developing best management practices that are intended to ensure the Conservation Goals and Objectives for each species are met and maintained. This linkage between the monitoring and management programs enables the capacity to support an adaptive, self-updating process.

As management prescriptions are employed and the biological monitoring program continues evaluating Covered Species, the effects from installed management prescriptions can be measured, evaluated, and fed back into the management program so that managers can review and revise conservation practices, as needed.

Scientific Principles

Section 8.3.2 of the CVMSHCP defines eight scientific principles "that will establish the standard for collection, analysis, and interpretation of data generated in this program. These principles will ensure a program that is scientifically rigorous, question-based, and with the strongest inference possible. These principles will also ensure that monitoring efforts efficiently provide data that are relevant and enable valid comparisons between populations separated by distance and time." The principles are:

1. Define the question. Monitoring strategies will be designed to address specific hypotheses. Conceptual, statistical, and spatially explicit models will define those hypotheses.
2. Define the area, also known as the target population, and create a sampling frame to which the statistical inference will be made.
3. Develop and state the assumptions in the hypotheses and models *a priori* to collecting monitoring data or conducting manipulations such as experiments and adaptive management.
4. When designing an experiment or using adaptive management, randomly select the units, randomize the allocation of treatments to the units, and use controls.
5. Use probability-based sampling to allocate sampling effort and incorporate spatial variation in the data. Using probability-based sampling allows unbiased inferences to the larger area (Morrison et al. 2001).
6. Replicate in space and time the number of sites surveyed during monitoring (e.g. survey sampling) and those receiving a treatment/management action.
7. Adjust the sensitivity of the data to reflect true changes in the resource being sampled. Adjust counts, measures of species richness, and patch occupancy (i.e., presence/absence) with an estimate of detection probability, such as those described by Lancia et al. (1994), Yoccoz et al. (2001), and Pollock et al. (2002).
8. Describe the methods and the assumptions of the methods used to collect and analyze data.

The CVMSHCP Biological Monitoring program developed a novel framework which uses a unique, science-based approach that not only assesses species distributions and population fluctuations but also employs the peer-reviewed scientific research process to develop hypotheses and address information gaps relating to the ecology of covered species. These information gaps are species-dependent and could include (but are not limited to) certain aspects of life-cycle requirements, gene flow barriers, population threats and stressors, resiliency and resistance to threats and stressors, population drivers and responses to drivers. A science-based monitoring framework is a process that follows steps that serve to ensure that the findings meet sufficient rigor. Those steps begin with questions and hypotheses and culminate with external peer review and reporting of results. This final step of peer review and then reporting is an essential means of establishing that the methods, analyses, and interpretations meet currently accepted levels of science. The following are publications based on monitoring-based species scale research

conducted through the development and now implementation of the CVMSHCP that serve as a resource to the CVCC, habitat managers, and regulatory agencies to evaluate both the progress of the CVMSHCP at meeting conservation goals, to set habitat management priorities, and guide actions. The research element of the monitoring program is therefore value-added, as it provides the additional capacity to revise and refine the Plan's habitat models, survey locations, monitoring protocols, and develop additional research questions concurrently with data collection.

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Barrows, C.W. 2006. Population dynamics of a threatened dune lizard. Southwestern Naturalist 51:514-523.

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Barrows, C.W., E.B. Allen, M.L. Brooks, and M.F. Allen. 2009. Effects of an invasive plant on a desert sand dune landscape. Biological Invasions 11:673-686.

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Barrows, C.W. and M.F. Allen. 2010. Patterns of occurrence of reptiles across a sand dune landscape. Journal of Arid Environments 74:186-192.

Barrows, C.W., J. T. Rotenberry, and M. F. Allen. 2010. Assessing sensitivity to climate change and drought variability of a sand dune endemic lizard. Biological Conservation 143:731-743.

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Barrows, C.W. 2012 Temporal abundance of arthropods on desert sand dunes. Southwestern Naturalist 57:263-266.

Barrows, C.W. 2013. An Ecosystem Approach to Defining Conservation Boundaries: Concepts and a Case Study. Natural areas Journal 33:344-347.

Chen, X., C. W. Barrows and B. Li. 2006. Is the Coachella Valley Fringe-toed Lizard (*Uma inornata*) on the Edge of Extinction at Thousand Palms Preserve? Southwestern Naturalist 51: 28-34.

Chen, X., C. W. Barrows and B. Li. 2006. Phase coupling and spatial synchrony of subpopulations of an endangered dune lizard. Landscape Ecology 21:1185-1193.

Hulton, H.L., A.M. Hansen, C.W. Barrows, Q. Latif, M.W. Simon, and K. E. Anderson. 2013. Shifts in arthropod community structure during an invasion of desert ecosystems by Sahara mustard (*Brassica tournefortii*). Biological Invasions 16:1675-1687.

Latif, Q.S., K.D. Fleming, C. Barrows, and J.T. Rotenberry. 2012. Modeling seasonal detection patterns for burrowing owl surveys. Wildlife Society Bulletin 36-1: 155-160.

Ortiz, D. D., and C.W Barrows (in press). Western Yellow Bat, *Lasiurus xanthinus*, occupancy patterns in palm oases in the lower Colorado Desert. Southwestern Naturalist

Prentice, T.R.., R.A. Redak, and C.W. Barrows. 2011. Survey methodology and distribution of a cryptic Jerusalem cricket species, *Stenopelmatus cahuilaensis* Tinkham (Orthoptera, Stenopelmatidae). Pan Pacific Entomologist 87:1-14.

Species Monitoring

Under the CVMSHP, monitoring of 27 individual covered species is required and focuses on addressing specific questions including occupancy, habitat use, measures of abundance and in particular species responses to natural and anthropogenic stressors. To efficiently acquire data for a particular community of species, the CVMSHCP monitoring protocols group together individual species protocols within a "community context". That context means that in addition to species-specific occurrence data, information on resource abundance, substrate, disturbances, invasive species, predators, and potential competitors – the context that may explain the occurrence or abundance of a species – are also collected. This community context requires little additional survey time and generates a wealth of critical data for developing and evaluating hypotheses regarding individual species. Thus species monitoring not only provides scientifically defensible estimates of occurrence and/or measures of abundance but also provides critical ecological information, enabling better management, thus increasing the probability of successful conservation. Regular species monitoring tracks responses to resource fluctuations and, when methods are appropriately sensitive, identifies the level of impacts stressors have on individual species.

The conceptual, and later statistical, relationships between species abundance and/or occurrence with potential stressors can be modeled, and models can be used to focus future monitoring and identify thresholds for management actions. This represents the fundamental difference between the CVMSHCP's biological monitoring framework and monitoring elsewhere. Other monitoring programs focus on documenting species abundances or occurrences but often fail to identify the driver/stressors that influence that abundance or occupancy. This leaves a gap between documenting population change over time and understanding what is driving that change, whether that change warrants management action, and importantly identifying thresholds for initiating a change in management. In addition to tracking performance relative to goals and objectives for covered species, species monitoring should facilitate adaptive management, providing information on local-scale or short-term responses to adaptive management experiments.

For each covered species, a sampling design and monitoring methods are specified in the monitoring protocol for each community in which that species is primarily associated. Each protocol also evaluates alternative sampling methodologies, defines conceptual ecological models for each community, and selects and tests habitat metrics based on those ecological models. The details are different for each protocol but each uses quantitative methods that produce data robust enough for statistical analysis, in a manner consistent with the Plan's scientific principles.

Community and Landscape Monitoring

Monitoring of individual communities is necessary in order to understand the effectiveness of the design and to focus management of the CVMSHCP relative to the goals of maintaining and supporting the recovery of communities. Community monitoring focuses on species associations within a particular set of abiotic conditions and measures the aerial extent, functional attributes, species composition, trophic relationships, key ecosystem processes, and responses to variation in natural and anthropogenic stressors within that community context. Examples of how community monitoring has been applied to the Coachella Valley include Barrows and Allen (2007a, 2010) and Barrows et al. (2009). The components of each community within the CVMSHCP are laid out in conceptual ecosystem models providing data addressing the extent to which conservation goals and objectives for communities are being met. These goals and objectives are described in CVMSHCP Section 4.3 and Table 4-111. Community monitoring involves two primary elements. The first is geographically explicit tracking of the extent and composition of communities. This entails refinement and periodic updates of the natural communities (vegetation) map prepared for the CVMSHCP. The second element for community monitoring is the evaluation of overall health of the community and evaluating CVMSHCP goals relative to maintaining habitat connectivity. Community monitoring includes development, testing, and refinement of conceptual ecological models that increase understanding of the relationships between species composition, habitat condition, and stressors affecting communities. Such models identify metrics for both natural and anthropogenically-induced changes in community structure in time and space. Landscape scale relationships are identified in these models for each community, incorporating spatial factors such as patch size and connectivity. Goals and objectives are evaluated in part by compliance monitoring that demonstrates compliance with land acquisition and recovery goals, in part by research that fills gaps in our knowledge of how covered species and communities are distributed at a landscape scale, and finally by monitoring activities specifically aimed at evaluating community patch size, shape, distribution, connectivity and the dynamics of those spatial patterns.

II. 2014-2015 Monitoring Program Activities & Results

In this section we summarize the year's accomplishments, identify specific tasks from the annual work plan, review current knowledge about various species and natural communities, provide protocols (as appropriate) and explain findings.

2015 Burrowing owl and Palm Springs Pocket Mouse Survey

Introduction

Through discussions and agreement with the Coachella Valley Multiple Species Habitat Conservation Plan's (CVMSHCP) Biological Working Group (BWG), in 2015 we departed from the more traditional burrowing owl surveys. Our goal was to collect data that was actionable, meaning that it should directly inform management potential actions. Traditional surveys resulting in total counts for the survey area lacked that information; changes in owl's numbers from previous years' surveys do not guide what, if anything, should then be done to better manage the owls.

Given that this is a departure from previous efforts there was a preliminary character ("let's see if it works") in how we approached this years' surveys. Our questions were several fold. The burrowing owl population here in the Coachella Valley occupies two very different habitats: they occupy a creosote dominated desert scrub, with concentrations along dry washes with steep banks, especially in the Desert Hot Springs region, but also in dune habitats, and they occupy habitats that border agricultural lands, primarily in the Coachella-Thermal regions and especially along the Whitewater Stormwater Channel and its tributaries. Most of these lands are or will be within the CVMSHCP jurisdiction.

Given this somewhat bimodal distribution, is one habitat more productive, measured by successful fledging of owlets, than the other? The answer could lead to more focused management and protection for those more productive habitats. By unfortunate chance we are in the fourth year of drought and so should not expect high productivity anywhere, however we were still interested in whether differences between the two habitats exist. Additional questions were specific to disturbance factors at the nest sites. Were there feral or unleashed pets (dogs and possibly cats) preying upon or harassing owls at the burrow entrance? Were there ravens, a species that has become increasingly numerous due to human land and waste management practices, preying upon young owls? And was there human disturbance at or around the burrows that could account for differences in reproductive success and/or nest site fidelity? In all these cases, if these are identified as stressors then appropriate management action could be taken to reduce them, either through public education or more direct actions of removing the species causing the problem.

Again, with the input from the BWG, we also wanted to assess the distribution of Palm Springs Pocket mice. However rather than an extensive nocturnal trapping effort that would require permits that can take many months to obtain, as well as creating Hanta virus risks to the biologists involved (not so much from the pocket mice, but from deer mice that may also be captured in the traps), we proposed two indirect methods. First, let the burrowing owls do the surveys and then assess their results through their regurgitated pellets, and secondly within the sand dune habitats conduct track-based surveys to determine occupancy. With the drought conditions, we would expect low numbers of pocket mice, however even low detectability under drought conditions could indicate sustainable populations. We are interested to see whether drought and higher temperatures that may be indicative of climate change are shifting the

populations further west, and whether areas most severely impacted by Sahara mustard in past years are less able to sustain pocket mouse populations.

Methods

We set 11 camera "traps", (Bushnell, Trophy Camera model 119436 in locked metal cases) 2-3 m in front of occupied burrowing owl nest holes along the Little Morongo Wash in Desert Hot Springs, and along the Whitewater Stormwater Channel in Coachella. Cameras were initially set out in early to mid-June, checked and data cards replaced in early July, and then retrieved at the end of July. Cameras were affixed by two metal, self-tapping screw/bolts to 6' long metal "T-posts" driven into the ground so that no more than 2'-2.5' was above ground. The cameras were generally 1.5'-2' off the ground. Cameras were never placed behind the burrow entrance and so could not be used as perches for potential predators without the owls being able to see them, and so then be at higher risk of predation as the exited the burrow. Initially we tried to hide the cameras with vegetation and debris to help avoid them from being stolen or damaged, but found that to be more problematic than helpful. The debris inevitably waived in front of the cameras and resulted in many hundreds of images of nothing but branches shifting back and forth. We removed the debris and no cameras were ever lost or damaged. One, in Desert Hot Springs, survived an attempt to steal it (as evidenced by images of someone grabbing the camera) but they could not extricate it from the T-post and gave up.

Five cameras were placed along the Little Morongo Wash and six along the Whitewater Stormwater Channel. One of the Little Morongo Wash sites consisted of three burrows, each less than 5 m apart and so cameras were placed in front of each burrow (all of which were used by the same owl pair (BUOW2015_LMW2E1, 2 & 3), Table 1). Pellets from these three burrows were combined into a single sample shown on the BUOW2015_LMW2E3 line in the table.

Owl pellets were collected during each visit to install, service, and remove the cameras. The pellets were returned to the UCR office/lab facility in Palm Desert and dissected by and intern. All contents were then identified by Dr. Cameron Barrows, based on available keys, comparisons with archived specimens and experience with the species.

Sand dune track surveys for Palm Springs pocket mice were conducted coincident with surveys for Coachella Valley fringe-toed and flat-tailed horned lizards. Surveys were repeated five times on each of 73 plots distributed randomly across the Thousand Palms, Willow Hole, Whitewater Floodplain, and Windy Point Core Preserves.

Table 1. Results summary from camera traps and pellet analyses at eight burrowing owl nest burrows along the Little Morongo Wash (LMW) and Whitewater Storm Channel (CVWD).

Point	UTM_X	UTM_Y	Date Camera Set	Hatchling Owls from Camera Set to 7/2/2015	Predators from Camera Set to 7/2/2015	Hatchling Owls from 7/2/2015 to 7/28/2015	Predators from 7/2/2015 to 7/28/2015	Total prey analyzed (from pellets)	Percent Vertebrates	Percent Palm Springs Pocket Mouse
BUOW2015_LMW2A	544428	3756101	6/2/2015	0	0	0	roadrunner	24	4	4
BUOW2015_LMW2B	544588	3755538	6/2/2015	0	0	0	0	53	7	6
BUOW2015_LMW2E1	544997	3754709	6/2/2015	0	0	1	0			
BUOW2015_LMW2E2	544997	3754709	6/2/2015	0	0	0	0			
BUOW2015_LMW2E3	544997	3754709	6/2/2015	3	coyote human	0	coyote	56	27	23
BUOW2015_CVWD1	577387	3727498	6/18/2015	0	0	1	0	46	2	0
BUOW2015_CVWD2	578004	3727082	6/18/2015	2	0	1	0	16	6	0
BUOW2015_CVWD3A	578160	3726910	6/18/2015	2	0	1	0	46	11	0
BUOW2015_CVWD5	579706	3723617	6/18/2015	0	coyote	0	coyote	54	5	0
BUOW2015_CVWD6	579574	3723434	7/2/2015	4+ (seen 7/2/2015)		2	roadrunner coyote	14	29	0

Results and Discussion

Burrowing Owls

Our first question was is there differential reproductive success and recruitment between the desert scrub/wash and agricultural edge habitats. Our results, to be taken with some caution due to the small sample size, indicate that 1 of 3 burrow sites along the Little Morongo Wash produced young owls (3 hatchlings) and 4 of 5 burrow sites along the Whitewater Storm Channel produced young (9 hatchlings) (Table 1). Given the drought, these results may not be surprising; the steady water supply in the agricultural and storm water channel areas presumably provides for a constant prey source, whereas in the dry desert prey likely fluctuate with primary productivity. Repeating these surveys in a wetter cycle is recommended in order to see if the greater recruitment shifts to the more natural habitats.

One clear pattern is that the two burrowing owl pairs that produced multiple owlets (BUOW2015_LMW2E and BUOW2015_CVWD6) had diets with far more vertebrate prey. This is consistent with foraging theory, which posits that animals feeding young at a central location (a nest) will forego presumably more abundant small prey in favor of more nutrient-caloric, efficient larger prey. It follows that when more large prey are available (during a wetter climate cycle) the owls will produce more young. We can test that assumption using the same approach during the next wetter series of years. The camera trap approach uses relatively little staff time and so can be employed quickly at low costs. It may be that the agricultural sites provide for some owl recruitment even in the depths of a prolonged drought, and that the more natural habitats multiply that recruitment when conditions are more favorable.

A second set of questions focuses on causes of nest disturbance and possibly nest failure. Only one nest appeared to have failed due to predator activity. Coyotes were seen repeatedly visiting BUOW2015_CVWD5, and while actual predation wasn't observed, no young were ever seen there. No ravens or domestic dogs were detected at burrows, and only one human (who was focused on the camera, not the burrow or owls) was seen. There was no evidence that humans, dog or ravens were responsible for reduced reproduction at either (Desert Hot Springs, Whitewater Storm Channel) location.

Palm Springs Pocket Mice

Palm Springs pocket mice (PSPM) were only found in the diets of those owls in the Desert Hot Springs area, and were especially abundant in the diet of the one pair producing multiple young, BUOW2015_LMW2E. Sand dune track surveys occurred on all of the aeolian sand core preserves; sand dunes are not the only habitat this species occurs on, however their distribution and abundance on the dunes can provide some insights as to the factors affecting Palm Spring pocket mouse population dynamics (Table 2). Precipitation exceeding annual means occurred in 2009 and 2011. The driest year shown was 2013, while winter – spring 2015 precipitation was below average, summer rain in September of 2014 was higher than average. Overall PSPM were more abundant in the wettest year (2009) and least abundant in the driest year (2013).

Importantly, Sahara mustard is also most abundant in the wettest years and so, given the positive correlation with rainfall, the mustard does not have an obvious negative impact on PSPM.

As shown in Figure 1, PSPM were not detected in the eastern Coachella Valley, and were increasingly abundant in the cooler-wetter western valley. Consistent with that spatial pattern, temporally PSPM abundance appears tied to rainfall (Table 2). The relatively high PSPM abundance in 2015 may indicate that summer is a limiting period for this species, and summer rain, when it falls in significant amounts, may increase survivorship during the summer. Another possible explanation for the relatively high PSPM numbers in 2015 was that other Heteromyidae such as *Dipodomys deserti*, *D. merriami*, and *Chaetodipus penicillatus* were at relatively low abundance, and so the much smaller PSPM may also have responded to a lack of competition or harassment from their family members.

Methods Assessment

Especially for the owls, more cameras would have allowed a better assessment of that species in the Coachella Valley. Future efforts should include funding for another 10+ cameras (this year we used only cameras owned by UCR that had been acquired on other grants). Also cameras should have been set up to a month earlier. Juvenile owls were already molted into mostly adult plumage, although enough juvenile plumage was left to identify juveniles when present. Earlier camera placement might have identified additional predation events that could have occurred when the owlets were less mobile and generally more at risk.

Those recommendations aside, overall the data from both using camera traps for burrowing owls, and owl diets + sand tracking for PSPM yielded information that provided a clearer picture of the influence of potential stressors on these species. For the owls, had dogs, cats, or people been observed impacting the owls' reproductive success it would/should have catalyzed increased public outreach and feral pet control. As it was the only apparent predation was one case by coyotes, and so no additional management was indicated. Another outcome was that both the Whitewater Storm Channel and Little Morongo Wash produced young owls, even in a drought. Other habitats where burrowing owls were previously present and bred, such as in and around the sand dune habitats appeared to have few if any owls present this year. As opposed to focusing on one or another, both the Whitewater Storm Channel and Little Morongo Wash appear to be important to sustaining burrowing owls within the CVMSHCP.

For the PSPM, using the two indirect methods, we were able to confirm a general distribution within the CVMSHCP that is consistent with our previous assessment in 2007 (Barrows et al. 2011). We were also able to confirm an expected positive relationship between precipitation and PSPM abundance, and with that show that Sahara mustard does not appear to be a strong stressor for this species.

Table 2. Relative abundance (mean sightings of individual tracks per plot, per year) for Palm Springs pocket mice on aeolian sand habitats within the Coachella Valley.

					Mean PSPM / Plot				
Plot Cluster	Number of Plots	Dune Type	UTM_X	UTM_Y	2009	2011	2013	2015	Mean
AD2	6	Active	563285	3738483	0.000	0.083	0.000	0.042	0.031
AD4	6	Active	561241	3739062	0.033	0.033	0.000	0.042	0.027
CA	5	Stable Sand Field	563517	3737790	0.340	0.100	0.000	0.300	0.185
MH7-12	6	Stable Dune	564382	3737618	0.367	0.067	0.000	1.033	0.367
H	7	Stable Sand Field	564092	3737109	0.314	0.143	0.000	0.114	0.143
J	7	Stable Sand Field	562974	3737216	0.486	0.371	0.047	0.086	0.248
L	7	Stable Sand Field	563936	3737212	0.314	0.329	0.020	0.071	0.184
ESF 7-12	6	Ephemeral Sand Field	545292	3748164	2.250	0.933	0.117	0.167	0.867
ESF13-18	6	Ephemeral Sand Field	544330	3748813	0.617	0.200	0.233	1.083	0.533
MH 19-24	6	Stable Dune	548909	3750053	0.550	0.367	0.367	0.167	0.363
MH 25-29	5	Stable Dune	549104	3749696	0.400	0.280	0.260	0.140	0.270
ESF 19-24	6	Ephemeral Sand Field	530321	3751978	1.133	0.233	0.167	2.333	0.967
				Mean	0.567	0.262	0.101	0.465	

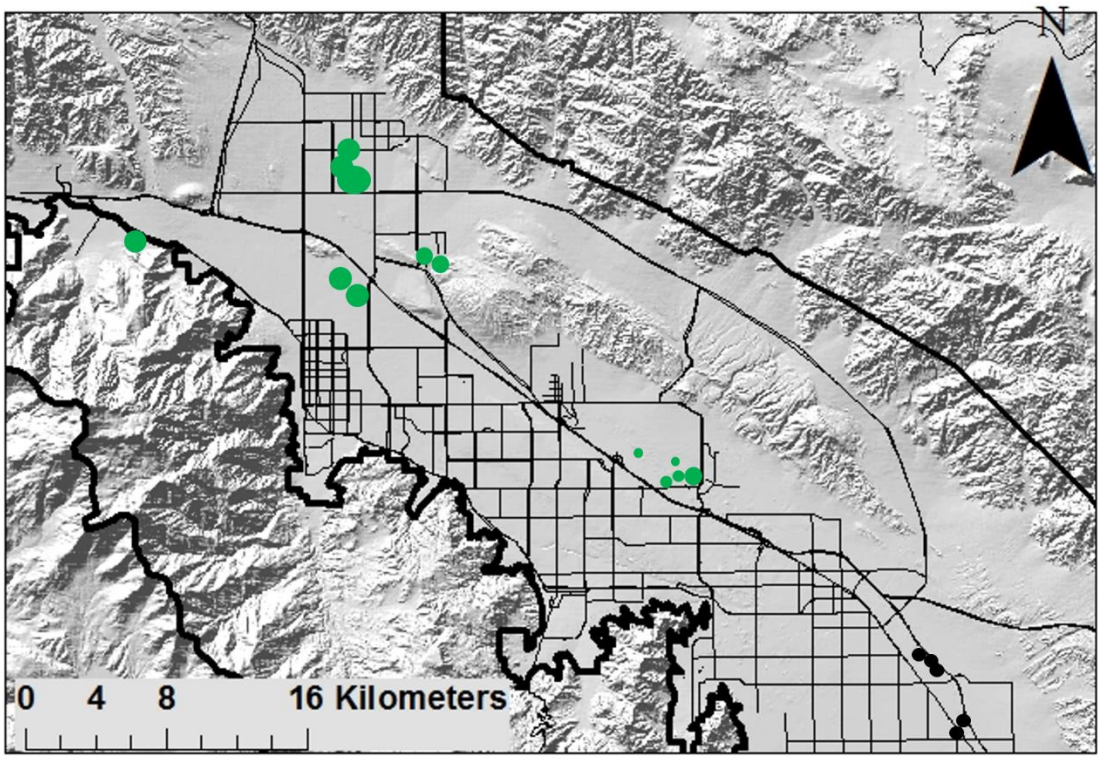

Figure 1. Distribution of Palm Springs pocket mice (PSPM) detections in the Coachella Valley in 2015. Black dots indicate burrowing owl pellet collections but no PSPM present. Green dots indicate positive detections of PSPM, either through tracking on aeolian sand habitats or through burrowing owl pellet analyses (in the Desert Hot Springs area). Size of the green dot corresponds with relative abundance of PSPM, although PSPM abundance in burrowing owl pellets versus tracking abundance relationships were only estimated.

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2015 Aeolian Sands Associated Species Survey Report

Introduction

As recently as the middle of the last century roughly 100 mi^2 of aeolian sands covered nearly all of the Coachella Valley floor. Today the remains of this system provide habitat for what are unquestionably the most at-risk group of endemic species and communities of the Coachella Valley MSHCP (CVMSHCP). Habitat losses to anthropogenic land use changes (Barrows 2006, Barrows et al. 2008), invasive species impacts (Barrows et al. 2009; Barrows and Allen 2010; Hulton et al. 2013), habitat fragmentation (Barrows et al. 2006, Barrows and Allen 2009), and the potential for climate change impacts (Barrows et al. 2010), exceed that for all other communities and species covered under the CVMSHCP. Recent analyses have determined that Coachella Valley fringe-toed lizards have experienced genetic shifts within each of the remaining habitat patches, shifts that in some cases indicate genetic bottlenecks (Vandergast et al., in press).

Monitoring of the various species associated with, and in most cases restricted to the remaining aeolian sand fields and dunes of the Coachella Valley assesses the following critical issues/questions, and for each potential management responses are provided if the data warrant shifts in management strategies:

- Is there is any indication of reduced reproductive success due to identified genetic bottlenecks? Genetic shifts occurred during a severe drought (2000-2004) and may or may not have resulted in genetically tied physiological and/or behavioral adaptations to local conditions. Such drought and heat conditions are likely to become "the norm" under anticipated climate change. Random translocations of individuals to "restore" genetic heterogeneity, unless reductions in fitness/reproductive success are noted, may have un-desired effects if local adaptations have occurred. On-going monitoring will detect whether populations are declining independent of rainfall catalyzed food resource dynamics, and if so may signal a need to augment the lizards' genetic heterogeneity via translocations.

- Edge effects reducing habitat available to flat-tailed horned lizards, from augmented predation as a result of predator nest sites provided on near-by country clubs, have previously been documented (Barrows et al. 2006). That effect remains today. Removing power lines or shifting palm trimming to the early spring could reduce this impact. With the potential State listing of this lizard there should be renewed attention to implementing this management recommendation.

- Data collected to date has shown unequivocally that high densities of Sahara mustard have negative impacts on covered species and food web abundance and diversity (Barrows et al. 2009; Barrows and Allen 2010; Hulton et al. 2013). However, controlling Sahara mustard at the spatial scale necessary to have population-level positive impacts will be logistically and economically challenging. The mustard's impacts are most severe during wet years, and is much less in evidence during dry years and years with later/summer rain. Climate models predict increasing drought and summer rain. The question is, given those predictions, can we opt to not direct resources toward controlling the mustard? On-going monitoring will detect whether dynamic population shifts by the mustard can result in coexistence with covered species, or whether control efforts are warranted.

- Climate change coupled with habitat fragmentation has the potential to cause the extinction of all but the western-most populations of fringe-toed lizards. The eastern-most populations have already been extirpated (Barrows and Allen 2009). The next eastern-most population is the Thousand Palms Preserve. While isolated, it is the largest remaining habitat area, and continues to have the highest population density of any of the remaining core areas. Additionally, this same site includes the last remaining population of flat-tailed horned lizards north of the Salton Sea. Both lizards have continued to successfully recruit and maintain populations at this site. Will the relatively large size and diverse mix of active dune and sand field habitats of this site be a buffer against climate change? Will the synergy of Sahara mustard effects, fragmentation, and climate take its toll and put this population on a trajectory to extinction? Will management of the mustard and/or translocation to increase genetic heterogeneity reverse that trajectory? At this point there is no indication that such actions are warranted, but only with on-going vigilance will we know if such a tipping point is being reached.

The aeolian sands communities of the CVMSHCP are characterized by distinct abiotic features and reptile species associations. The discrete nature of those communities can be illustrated using an Ordination Analysis (DCA) (Figure1). Because of these between-community differences, all analyses were partitioned by communities rather than assuming all sites were the same (and so combining them), with the same responses to potential drivers and stressors.

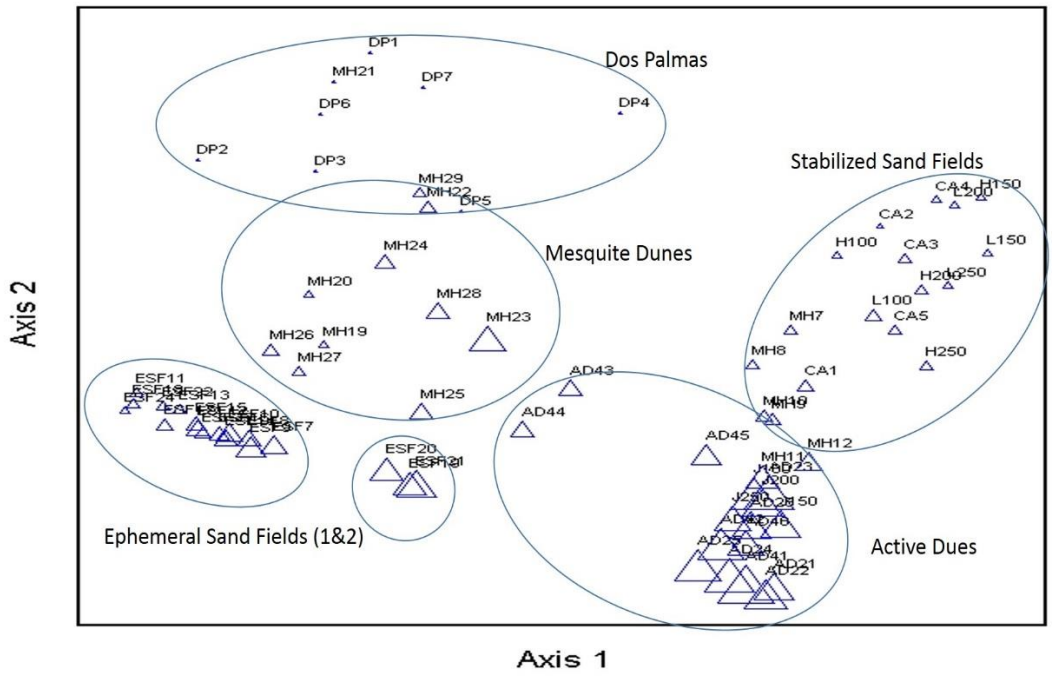

Figure 1. Detrended Correspondence Analysis (DCA) of the reptile communities occurring within aeolian sand community monitoring plots of the CVMSHCP. Triangles represent the relative size of the Coachella Valley fringe-toed lizard populations occurring within each plot.

Flat-tailed Horned Lizard

Flat-tailed horned lizards reach their northern-most distribution within the CVMSHCP, and are currently under consideration to be protected under the California State ESA. These lizards once occurred at least as far west as what is now the Whitewater Floodplain Preserve and along the southern slopes of Edom Hill (Barrows et al. 2008). Today their known CVMSHCP distribution is confined to the southern Thousand Palms Preserve and the Dos Palmas ACEC, east of the railroad and north of Bat Cave Butte. The reasons for their disappearance, or reduction to below detectable levels, from the rest of their original CVMSHCP distribution include:

- Habitat fragmentation. This species periodically will go on long "walkabouts" that can exceed several kilometers or more in length. The reason for these extended movements and often later returns to their original locations are not fully understood, but may be related to searches for mates, food and/or nesting substrates. Fragmentation by roads and powerlines where automobiles and potential predators lurk put the lizards at risk of increased mortality as they approach and attempt to cross these barriers during their "walkabouts". That the two largest areas set aside for this species, the Thousand Palms Preserve and the Dos Palmas ACEC, are the only sites where they still reside supports this hypothesis.
- Predation. Edge effects reducing habitat available to flat-tailed horned lizards, from augmented predation as a result of predator nest sites provided on near-by country clubs, have previously been documented (Barrows et al. 2006). That effect remains today. Removing power lines or shifting palm trimming to the early spring could reduce this impact. With the potential State listing of this lizard there should be renewed attention to implementing this management recommendation. Additionally mesquite dunes tend to be "predator rich" with large numbers of round-tailed ground squirrels, roadrunners, shrikes, coyotes and sidewinders relative to non-mesquite aeolian sand areas; all are known to prey on flat-tailed horned lizards (especially the ground squirrels). No flat-tailed or desert horned lizards have ever been detected in over 30 years of surveys at the particularly dense mesquite dune system at Willow Hole. Planting mesquite for wind breaks or to enhance habitat for other species in areas where flat-tailed horned lizards still occur will likely reduce habitat suitability for this species.
- Recent Climate. This species thrives in the hot and dry Colorado Desert (but not too hot and dry – see below). The cooler-wetter western portions of the Coachella Valley may have been at best peripherally suitable habitat. From 1950 to 1970 there was a decades-long, "mid-century drought" that, in the absence of habitat fragmentation from roads, would have rendered those western valley habitats more suitable for flat-tailed horned lizards. During wetter-cooler periods in the 1980s and 1990s their numbers declined and eventually disappeared from those western areas. Climate alone as an explanation for this species decline in the western valley is likely overly simplistic. Fragmentation (see above), fluctuations in substrate to a more gravel and rock matrix more suitable for desert horned lizards, and comparatively low harvester ant numbers, each likely contributed as well.
- Future Climate Change. The flat-tailed horned lizard population in the Dos Palmas ACEC may represent a harbinger of future conditions for this species elsewhere, including the other occupied habitat within the CVMSHCP. The Dos Palmas habitat is hotter and drier than other occupied

sites. It is too far east and south to benefit as much from the winter rains entering the valley from the northwest, and may not be south enough to be a regular beneficiary of the summer monsoons that typically support resources on occupied habitats farther south. The result is very low harvester ant abundance, and very low flat-tailed horned lizard abundance (Figure 2), as well as observed low hatchling/juvenile growth rates compared to measurements taken at the Thousand Palms Preserve. As climate change progresses, Dos Palmas may no longer be suitable habitat, and sites such as the Thousand Palms Preserve may approach the current Dos Palmas in terms of its ability to sustain this species. This could mean as much as a 60% decline in carrying capacity (based on current differences in density), but nevertheless a persistent, albeit fragile, population.

- Invasive Species. The relationship between flat-tailed horned lizard abundance and rainfall is complicated (Figure 2). Above normal rainfall in 1998 may have catalyzed an extremely high flat-tail population on the Thousand Palms Preserve from 1999-2001 (Barrows and Allen 2009). Similarly above average rainfall in 2005 corresponded to an increased flat-tail population (Figure 2). However above average rainfall from 2009-2011was coincident with a decline in flat-tails, and the subsequent drought has resulted in a population increase. The reason for this more recent negative correlation with rainfall is the impact of Sahara mustard (Barrows et al. 2009; Barrows and Allen 2010; Hulton et al. 2013). Plots with the densest and increasing mustard infestation show the most negative responses by the flat-tails. The question is how climate change will interact with mustard infestations. If droughts prevail and summer monsoons become a more common catalyst for food resource dynamics, the mustard's impacts could become trivial.

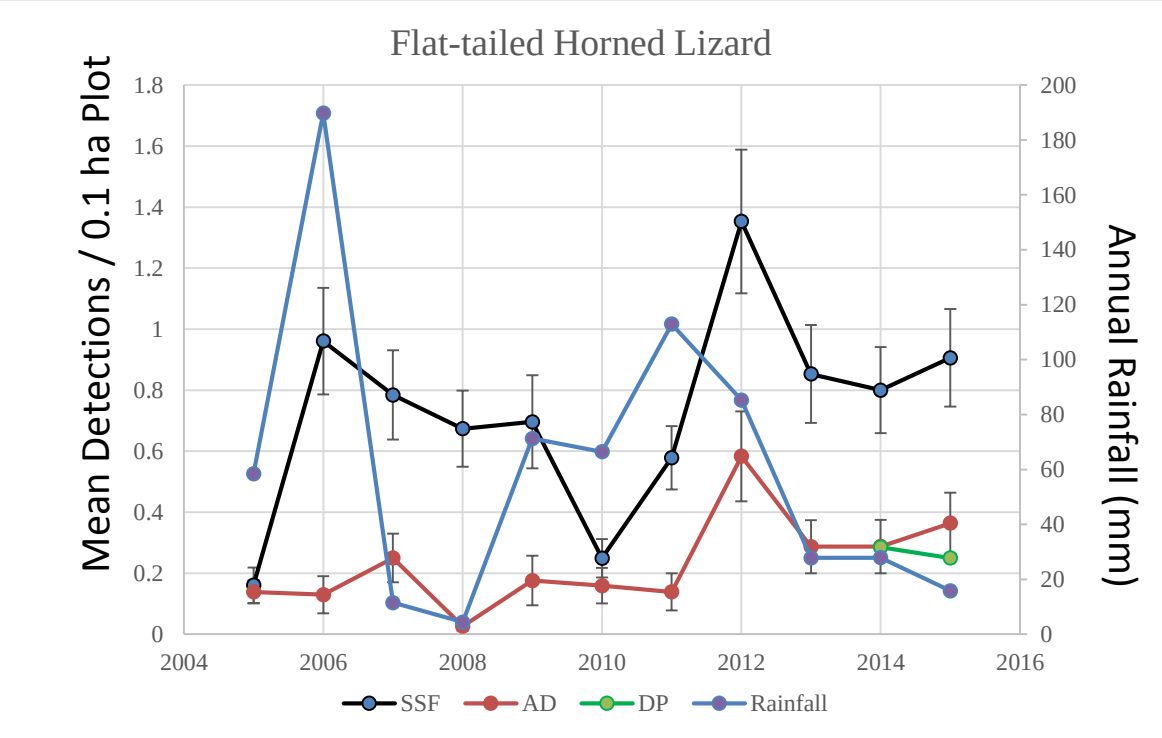

Figure 2. Temporal and spatial patterns of flat-tailed horned lizard abundance within the CVMSHCP. SSF = stabilized sand fields of the Thousand Palms Preserve; AD = active dunes of the Thousand Palms Preserve; DP = stabilized sand fields of the south eastern Dos Palmas ACEC. Rainfall is off-set (forward) by one year to demonstrate reproductive recruitment and survivorship resulting from the previous year's precipitation levels. Error bars represent one standard error.

Coachella Valley Fringe-toed Lizard

Coachella Valley fringe-toed lizards are endemic to the aeolian sand communities of the Coachella Valley. They once occupied a roughly 100 mi^2 expanse of the valley floor, but are now only found in about 5% of that original range (Barrows et al. 2008). This species was the catalyst that initiated conservation efforts in the Coachella Valley. The lizard was listed as Threatened under the federal Endangered Species Act, and Endangered under the California State ESA in 1980, and was the focus for the first implementation of section 10a of the federal ESA resulting in a preserve system in 1986. That preserve system was deemed inadequate both due to insufficient protection for the ecosystem processes that deliver sand to the preserves, as well as because there were many additional species and habitats that warranted protection, and was so expanded into the CVMSHCP in 2008.

Fringe-toed lizards are still present within each of the four core preserves established for this species (Figures 3&4). Outside the core preserves this species is in decline, or has declined to below detectable levels (or is absent) (Barrows and Allen 2007). Within the core preserves there are strikingly different stressors as well as responses to annual rainfall and the food resources that rainfall catalyzes.

- Active Dunes and Stabilized Sand Fields, Thousand Palms Preserve (Figure 3). Despite being at the hottest, driest end of the climate gradient within the Coachella Valley fringe-toed lizard's remaining habitat, the lizard's population is consistently among the highest of all sites (on the active dunes) within the Coachella Valley (Figure 3a). The close correspondence between fluctuations in annual rainfall and the lizards abundance seems to indicate that Sahara mustard, which is more prevalent here than on any of the other core preserves, may have little impact on the lizard's population; peaks in rainfall are mirrored by peaks in mustard density as well as peaks in lizard abundance. However when lizard population growth rates are compared to annual rainfall a different picture emerges (Figure 3b). Fringe-toed lizard population growth in years when the mustard is not dominant is closely aligned with annual rainfall, but in those years when the mustard is dominant that relationship disappears. Sahara mustard reduces the lizard population growth rate; peaks in fringe-toed lizard abundance in wet, high mustard years would be substantially higher if the mustard was not dominant.

  In September 2014 heavy rains (5 cm) fell upon the aeolian sands of the Thousand Palms Preserve. This resulted in annual plant germination in late summer rather than the more typical late winter. Included in this germination event was Sahara mustard, but at lower densities than had been observed for wet winters. Because of the lower densities, as the mustard plants grew and matured they were relatively easily controlled over most of the aeolian sand habitats of the Preserve by hand pulling by volunteers of the Friends of the Desert Mountains and National Wildlife Refuge staff. The following dry winter did not stimulate any additional mustard germination. The positive abundance response by the lizards, both on the active dune and stabilized sand fields, to this event is evident with a significant increase in abundance (Figure 3a). If drought and summer rain become a normal pattern it may be that the mustard will become a tractable if not trivial issue. However, El Niño events could easily shift this system back to a mustard dominated system. Understanding the frequency and impacts of such events will dictate when and how much effort needs to be directed at weed management at this site.

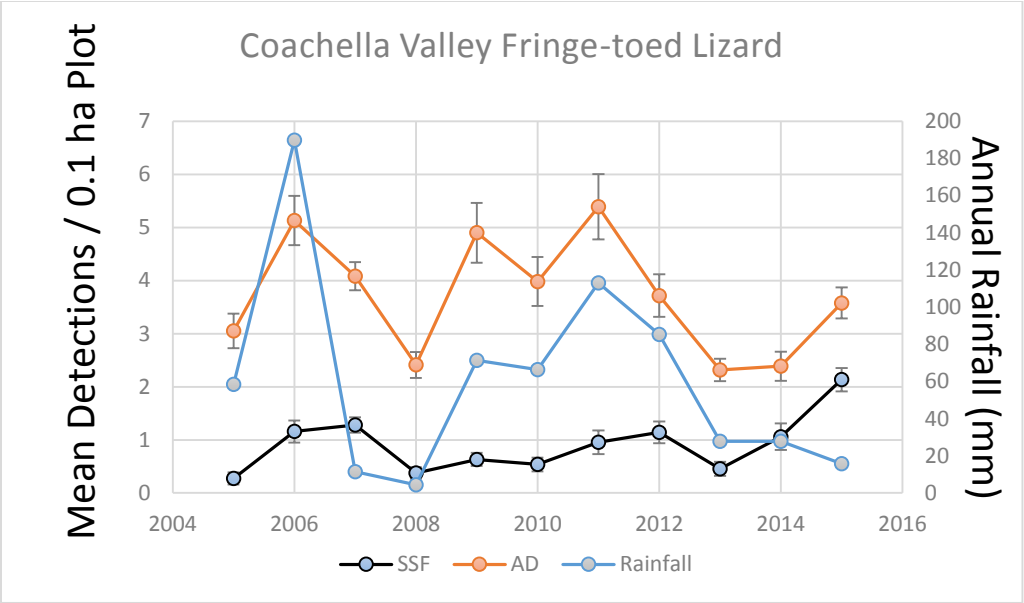

Figure 3a. Temporal and spatial patterns of fringe-toed lizard abundance within the CVMSHCP. SSF = stabilized sand fields of the Thousand Palms Preserve; AD = active dunes of the Thousand Palms Preserve. Rainfall is off-set (forward) by one year to demonstrate reproductive recruitment and survivorship resulting from the previous year's precipitation levels. Error bars represent one standard error.

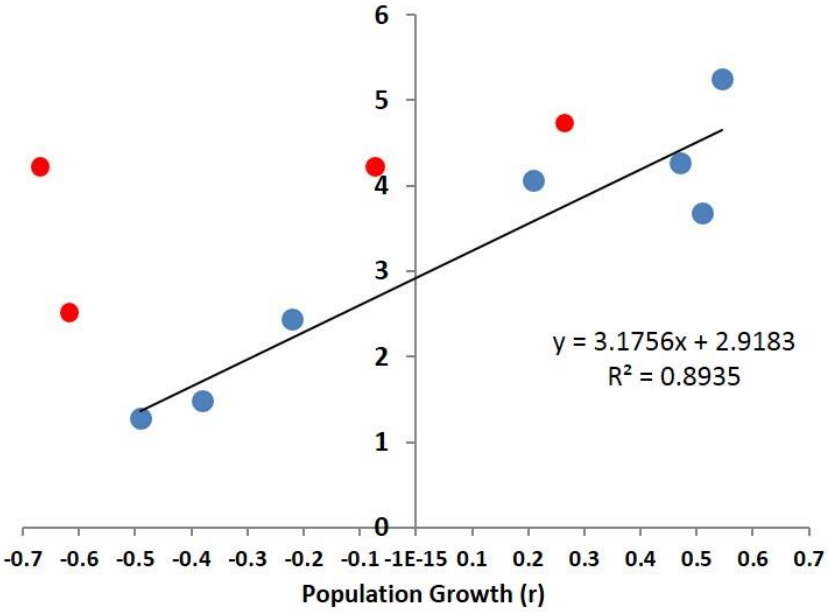

Figure 3b. Population growth (r) regressed against the natural log (ln) of annual precipitation. Blue circles indicate years when Shara mustard was not dominating the annual plant cover, red circles indicate years when the mustard was dominant. The regression equation and R^2 value describe only the years when the mustard was not dominant.

- Mesquite Dunes at Willow Hole (Figure 4). This is by far the smallest habitat in areal extent, with less than 50 ha of suitable habitat. This population has shown the least inter-annual variation. This lack of fluctuations can be explained by the fact that the mesquite, the main source of primary productivity and base of the food web, are very deep rooted and are connected to a somewhat permanent water source along the earthquake fault. Annual rainfall may add to that productivity but not significantly, resulting in consistent, invariable food resources. Why aren't the lizard densities higher? It is almost certainly a result of high predator densities (see flat-tailed horned lizard discussion).

  There is an apparent, though not statistically significant decline in this population over time. If the decline is real, possible reasons could be 1) a lack of genetic heterogeneity, 2) less productivity in the mesquite due to a declining aquifer, or 3) the result of increasing Sahara mustard on this site. Being a relatively small site, mustard control is possible and should be planned and implemented. Otherwise, follow-up genetic analyses should occur within the next five years.

- Ephemeral Sand Field (2) Windy Point Preserve (Figure 4). This is the farthest west of the core areas and the site with the greatest likelihood of sustaining a fringe-toed lizard population even if climate change reaches wort-case scenarios (Barrows et al. 2010). The greatest threats here include 1) off-road vehicles, 2) a need to acquire additional suitable habitat currently in private, non-conservation ownership, and 3) a question about sand sources. BLM rangers have stemmed the ORV trespass, but this is an on-going need. The question about sand source is not so much whether or not it is the San Gorgonio wash (it is) but that in 30 years there has been little large-scale movements of sand, into the habitat. The habitat is in good shape for the most part except that the western most areas, west of Snow Creek Road, that are stabilized and heavily infested with non-native annual plants. Closer to Windy Point weeds do not seem to be an issue. As this is the potential worst-case climate change refugia, on-going monitoring is needed to identify any other stressors that can be managed (like ORV trespass or if weeds get established). This site continues to have consistently high fringe-toed lizard densities on those areas where the habitat is still active (Figure 1&4).

- Ephemeral Sand Field (1) Whitewater Floodplain Preserve (Figure 4). This site has the greatest amplitude in fringe-toed lizard population dynamics. That amplitude is tied in part to precipitation, in how precipitation impacts the native perennial shrubs that the lizards depend on for food. No other populations of fringe-toed lizards in the Coachella Valley have diets so skewed to being vegetarian and heavily dependent of perennial shrubs as food sources. (Barrows 2006). The other source driving population dynamics is the stochastic input of sand from the Whitewater River. The effect of this can be seen in Figure 4, storms and flooding in 2005 resulted in a large influx of sand. Sand entering the Whitewater Floodplain preserve must first pass the CVWD percolation ponds. The original design included a means for the larger floods and associated sand to bypass the ponds, however that design has been modified over the years and should be regularly assessed to ensure that it still functions as intended.

Other issues associated with this site include sand and flooding that leads into and exits this Preserve, across Indian Avenue and Gene Autry Trail, creating road hazards and recent deaths. A certain but expensive solution to this problem is to build overpasses that allow blowing sand and flooding to pass underneath those roadways. Otherwise there are going to be ongoing calls to stabilize the sand onsite. Such approaches should be viewed with caution as the habitat depends on active sand transport.

Another concern for this population is its genetic heterogeneity following a recent bottleneck (Vandergast et al. in press). The question is whether there is reduced fitness as a result of that bottleneck; that fitness should be expressed as shifts in reproductive success, mortality and population density that are otherwise inconsistent with resource fluctuations. To date such inconsistences are not apparent (Figure 4). If they do become apparent, translocating lizards with greater genetic heterogeneity to this site could be warranted. Translocating lizards before there is a measured loss in fitness should be considered with caution as genetic shifts could be adaptive; the unique diet and food resources found at this site may require behavioral if not genetic specificity.

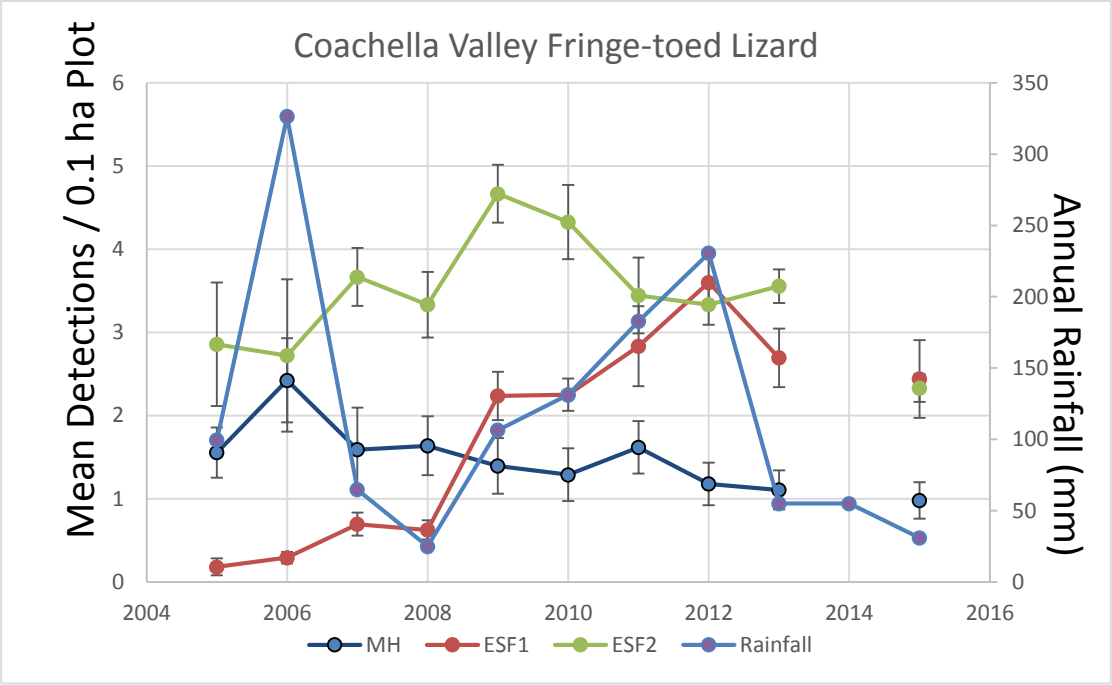

Figure 4. Temporal and spatial patterns of fringe-toed lizard abundance within the CVMSHCP. MH = Mesquite Dunes at the Willow Hole Preserve; ESF1 = Ephemeral Sand Fields at the Whitewater Floodplain Preserve; and ESF2 = Ephemeral Sand Fields at the Windy Point Preserve. Missing data for 2014 were the result of no funding being allocated for surveys that year. Thousand Palms Preserve surveys were conducted at no charge the the CVMSHCP inorder to maintain some portion of this critical data set. Rainfall is off-set (forward) by one year to demonstrate reproductive recruitment and survivorship resulting from the previous year's precipitation levels. Error bars represent one standard error.

Coachella Valley Milkvetch

Coachella Valley milkvetch occurs on each of the four core Preserves, however its abundance varies temporally and spatially. Temporally there needs to be sufficient precipitation to germinate seeds. Spatially there are two factors: 1) the west to east gradient in rainfall amounts and 2) a parallel gradient in wind velocity. High wind velocity and associated sand transport are critical to scarify the milkvetch seeds and promote germination. This pattern is illustrated by the patterns of Coachella Valley milkvetch abundance recorded on the 2015 surveys (Figure 5). The lowest milkvetch abundance occurred at the largely stabilized mesquite dunes at Willow Hole. This species is only slightly more abundant on the Thousand Palms Preserve, with lower precipitation and lower wind speeds, but still active sand movement and so scarification levels exceed that at Willow Hole. When Sahara mustard dominates this site, despite being sufficiently wet, the stabilization influence of the mustard still retards milkvetch abundance there (Barrows et al. 2009). Both The Whitewater Floodplain Preserve and Windy Point Preserves have ample wind speeds and low invasive species so scarification rates are sufficient. Differences between these sites are then a reflection of different rainfall levels.

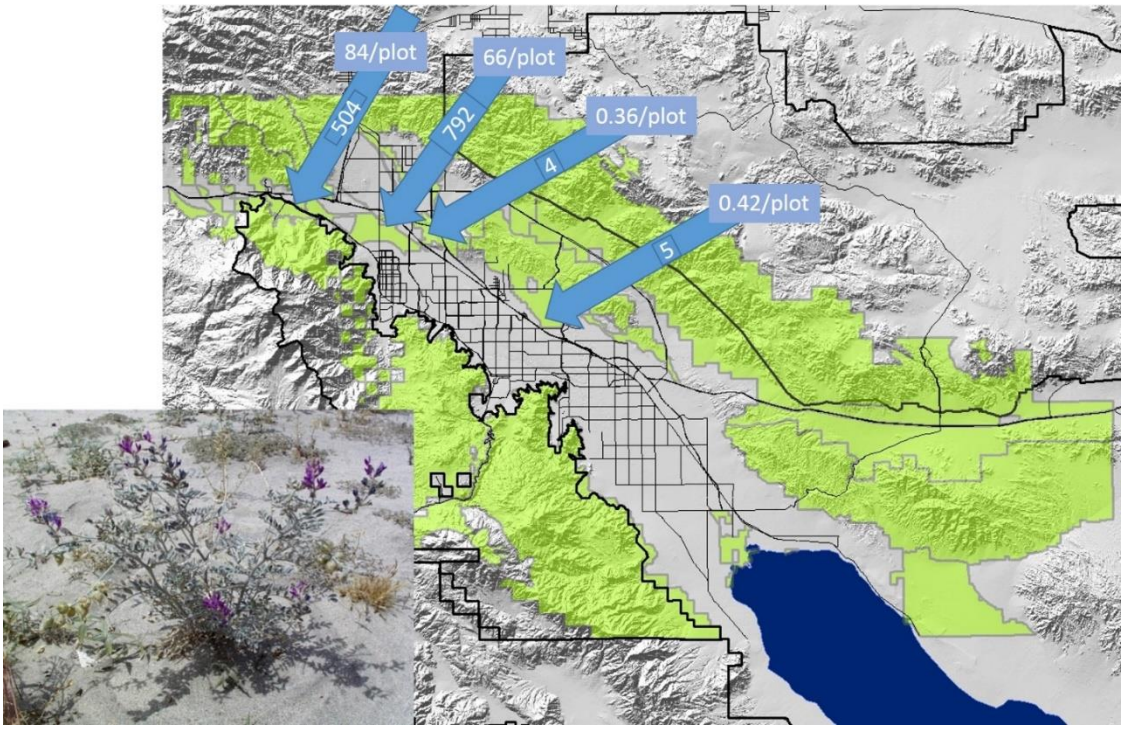

Figure 5. Patterns of abundance, total number and density/plot, of Coachella Valley milkvetch across the four aeolian sand core preserves in 2015. Plot size in all cases are 0.1 ha

Coachella Valley Round-tailed Ground Squirrel

Coachella Valley round-tailed ground squirrels are clearly most abundant on the mesquite dunes of the Willow Hole core preserve (Figure 6). Nevertheless they occur on all the aeolian sand core preserves at lower numbers, and where they can reach high numbers in response to high rainfall years. Unlike the fringe-toed lizards on the mesquite dune habitat, the squirrel numbers do fluctuate with annual rainfall.

This indicates that while the squirrels live in the stabilized dunes, their food resources are tied to responses to annual rainfall rather than the mesquite whose roots tap into a more stable water source. Food certainly includes annual plants, but also includes animal protein derived from preying upon lizards and snakes. Because Sahara mustard can eliminate most native annual plant growth in wet years, during those wet years the squirrel populations were unable to show positive population responses on sites where the mustard is dominant, such as the active dunes and stabilized sand fields of the Thousand Palms Preserve. If weather patterns return that foster the dominance of the mustard, this squirrel along with all of the species in this report will decline or not otherwise have the degree of population growth that they would in the absence of the mustard.

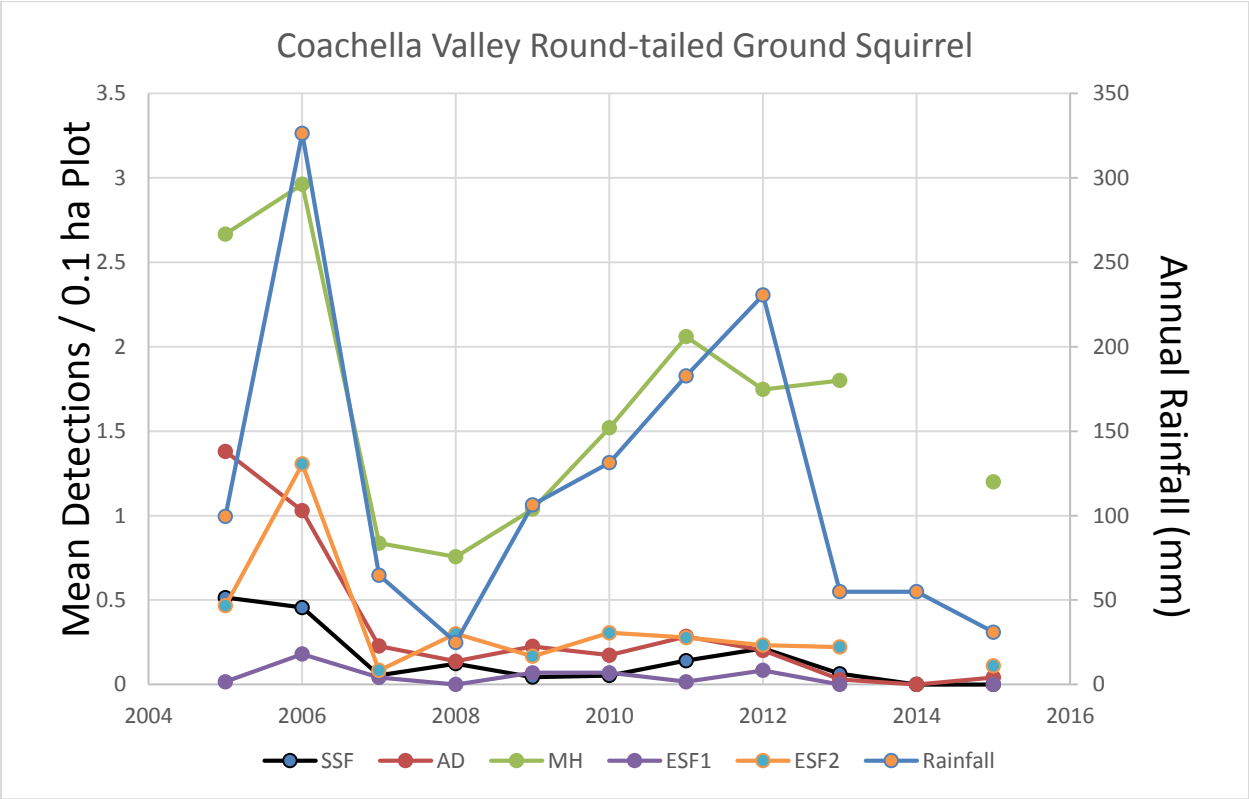

Figure 6. Temporal and spatial patterns of Coachella Valley round-tailed ground squirrels within the CVMSHCP. MH = Mesquite Dunes at the Willow Hole Preserve; ESF1 = Ephemeral Sand Fields at the Whitewater Floodplain Preserve; and ESF2 = Ephemeral Sand Fields at the Windy Point Preserve; SSF = Stabilized Sand Field of the Thousand Palms Preserve, and AD= Active Dunes at the Thousand Palms Preserve. Missing data for 2014 were the result of no funding being allocated for surveys that year. Thousand Palms Preserve surveys were conducted at no charge the the CVMSHCP inorder to maintain some portion of this critical data set. Rainfall is off-set (forward) by one year to demonstrate reproductive recruitment and survivorship resulting from the previous year's precipitation levels.

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2015 Coachella Valley Jerusalem Cricket Species Survey Report

The Coachella Valley Jerusalem Cricket, *Stenopelmatus cahuilaensis* Tinkham 1968, has a poorly defined yet narrow distribution, restricted to southern California's western Coachella Valley (Fig. 1). The species has no official California State or Federal status; however, because of its exceptionally narrow distribution, it has been designated by Coachella Valley Association of Governments (CVAG) as one of 27 focal conservation species in their Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP). Within its known range there are distinct east to west gradients in both mean annual temperature and precipitation. Temperatures decline and annual precipitation increases along this east to west gradient. This temperature-precipitation gradient may be a key to understanding the current and future distribution of *S. cahuilaensis*. The species occurs in a region expected to experience among the largest temperature and precipitation shifts related to climate change within temperate North America *Stenopelmatus cahuilaensis* may serve as an important indicator of climate change in this region.

Methods

Our study included the current known range of this species in western Coachella Valley, from near Windy Point, west to the area between Cabazon and Banning, Riverside County, California (Table 1, Figure 1) (Prentice at al. 2012).

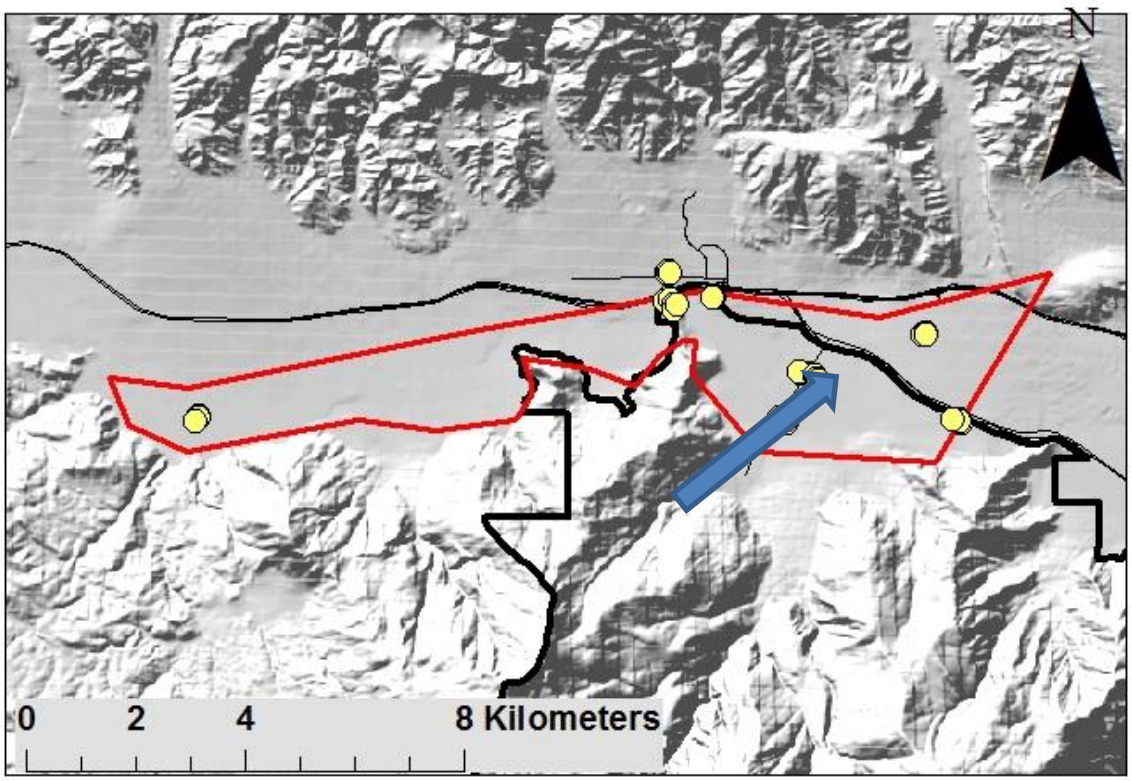

Figure1. Location of the known current range of the Coachella Valley Jerusalem cricket (red border) and areas where cover boards were placed (yellow circles). Blue arrow indicated the location where the single CVJC was found in 2015.

Forty-six cover boards were placed, usually in groups of three, on conservation lands within that known range. Cover boards were made by cutting 1.22 m x 2.44 m sheets of 1.1 cm pressboard (OSB board) into roughly 60 cm x 60 cm sections and placing a second layer, consisting of a 60 cm x 60 cm section of dropped ceiling fiberboard tile, on top of each as an insulation layer. Using the sturdy pressboard section as a grader or plow, the top-layer of dry sand was removed from the soil surface, both exposing the moist sand below and flattening the surface for cover-board placement. The double layered cover-board was then positioned and moist sand was shoveled over the entire surface and packed tightly such that the final structure resembled a flat-topped sand pyramid approximately 10–16 cm in depth. Sand that had spilled over the edges during compaction was removed leaving the edges exposed. The packing of the sand usually prevented (or at least delayed) strong winds from blowing the sand layer away and the sand itself stabilized the cover-boards and helped to prevent moisture loss from under the bottom OSB board component. The presence of packed sand on top of the cover-boards as well as the fiberboard ceiling tile component proved even more effective in retaining moisture beneath the cover-boards than originally anticipated because when saturated by rains, both components were very slow to thoroughly dry so that even when the surface of the surrounding soil had dried to a depth of several centimeters the surface beneath the cover-board structure remained quite moist. Each set of cover-boards was checked three times between January 1, 2015-February 15, 2015 for the presence of *S. cahuilaensis*. Cover boards were then replaced and repacked with fresh moist sand as above.

Results

In 2015, of the 46 cover boards placed within the known range of *S. cahuilaensis,* just one cricket was detected. That one cricket repeatedly observed was for a period of about three weeks following a heavy rain. This success rate was not unlike surveys in 2003 and 2009, when a detection rate for these cover board searches was approximately 1 individual per 73 searches or a 1.4% success rate while at 17 additional single cover-board sites was approximately 1 individual per 36 searches or a 3.4% success rate (Prentice et al. 2012). Nevertheless, the detection of just a single individual could be indicative of the effects of the long-term drought. With the potential of increased rains with the predicted El Niño for the winter of 2015-2016, additional searches should occur in 2016 or 2017 to determine if a wetter cycle results in increased detections.

Coachella Valley Jerusalem Cricket 2015 Plot Locations					
site	**datum**	**utm_x**	**utm_y**	**site_notes**	**location_notes**
CVJC1A	NAD83	519183	3751420		Main Street exit -> left on Broadway, right on Esperanza
CVJC1B	NAD83	519181	3751367	Most western 2015 site; within known current and historic distribution; near 2009 plot site	
CVJC1C	NAD83	519114	3751311		
CVJC2A	NAD83	527715	3754008		Tamarack road, north of Stubbe underpass
CVJC2B	NAD83	527739	3754053	2009 debris plot site; outside (north) of current known distribution	
CVJC2C	NAD83	527787	3754016		
CVJC3A+B	NAD83	528591	3753552	within known current and historic distribution	Haugen Lehman exit, head south, park on curve of utility road; place coverboards near railroad. Survey
CVJC3C	NAD83	528547	3753571		
CVJC4A	NAD83	527731	3753552	within known current and historic distribution	Haugen Lehman exit, head south on utility road; park near small utility shed
CVJC4B	NAD83	527692	3753495		
CVJC4C	NAD83	527779	3753522		
CVJC5A	NAD83	527849	3753421		Near tip of Fingal's Finger; 5A near active wash, 5B and 5C on stabilized alluvial fan
CVJC5B	NAD83	527848	3753338	2009 tile plot site (no CVJC); current known distribution	
CVJC5C	NAD83	527896	3753435		
CVJC6A	NAD83	530353	3752138		Snow Creek Road (existing transects where the wooden stakes and weather station are)
CVJC6B	NAD83	530331	3752158		
CVJC6C	NAD83	530277	3752173		
CVJC6D	NAD83	530239	3752167		
CVJC7A	NAD83	530200	3752185		Snow Creek Road (existing transects where the wooden stakes and weather station are)
CVJC7B	NAD83	530151	3752196		
CVJC7C	NAD83	530117	3752206		
CVJC8A	NAD83	530431	3752144		Snow Creek road (east of established lizard plot)
CVJC8B	NAD83	530443	3752097	2003 tile plot site (3 CVJC found); current known distribution; ESF27B	
CVJC8C	NAD83	530479	3752065		
CVJC9A	NAD83	529846	3751270		Snow Creek Road
CVJC9B	NAD83	529913	3751277		
CVJC9C	NAD83	529896	3751349		
CVJC10A	NAD83	529776	3751338		Snow Creek Road
CVJC10B	NAD83	529776	3751376		
CVJC10C	NAD83	529831	3751379		
CVJC11A	NAD83	532397	3752905		North Tipton
CVJC11B	NAD83	532457	3752929		
CVJC11C	NAD83	532459	3752873	within known current and historic distribution	
CVJC12A	NAD83	533082	3751328		South Tipton (beyond Tamarisk tree line)
CVJC12B	NAD83	533096	3751276		
CVJC12C	NAD83	533044	3751323		
CVJC12D	NAD83	532925	3751350	within known current and historic distribution	
CVJC13A	NAD83	544132	3748985		Mark and Al existing transects
CVJC13B	NAD83	544192	3748966		
CVJC13C	NAD83	544255	3748958		
CVJC14A	NAD83	545399	3748403		Gene Autry existing transects
CVJC14B	NAD83	545420	3748308		
CVJC14C	NAD83	545316	3748404		
CVJC15A	NAD83	545313	3748352		Gene Autry existing transects
CVJC15B	NAD83	545203	3748408		
CVJC15C	NAD83	545108	3748427		

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2014-2015 protocol surveys for the Little San Bernardino Mountains Linanthus (Linanthus maculatus) within the Coachella Valley

Introduction

Little San Bernardino Mountains Linanthus (*Linanthus maculatus*, hereafter LSBML; Fig. 1) is a small annual herb endemic to southern California. Within the Coachella Valley it is restricted to the mouth of Dry Morongo Canyon near Desert Hot Springs, Whitewater Canyon, and from Whitewater to Palm Springs (Sanders 2006). Populations also exist on the north side of the San Bernardino Mountains at the mouth of Rattlesnake Canyon, and at the northern edge of Joshua Tree National Park in the Little San Bernardino Mountains; these localities are part of the West Mojave Planning Area (Sanders 2006). LSBML is categorized as California Rare Plant Rank 1B.2 (fairly endangered in California and elsewhere, with 20-80% occurrences threatened / moderate degree and immediacy of threat); CNPS 2015). This species is elusive and little understood. During the century following this species first collection and description in 1889 only a few populations were discovered; however, over the last few decades more populations have been identified and the species' habitat has become better understood (Sanders 2006). It grows in loose, well aerated sand flats on low sandy benches at the margins of washes, dry canyons and alluvial fans in Sonoran and Mojave desert scrub and Joshua tree woodland communities at elevations between 195-2075m (CNPS 2015, Sanders 2006). It does not occupy substrates with hard surface layers of clay or rock, or loose blow sand away from washes. The open microsites this species occupies are absent of shrubs or trees, and contain few competing species or dense stands of weedy annuals (Sanders 2006). To germinate, the species requires sheet floods that inundate the soil with moisture but do not incise wash channels or erode the sandy topsoil. Most aspects of this species' biology, including mode of pollination, dispersal, germination requirements, and seed longevity, are not known (Patterson 1989). Threats to this species include urban development and OHV recreation.

Figure 1. A large LSBML plant, with a mechanical pencil for size reference (left). The image in the red box has been enlarged to show the bloom in greater detail (right).

In 2002, a master database of historic occurrence records was compiled for all five plant species covered under the Coachella Valley Multiple Species Habitat Conservation Plan (Allen et al. 2005). Data were mined querying various herbaria and museums and required considerable effort to remove duplicate points and identify points that were precise enough for geo-referencing. A research team then attempted to visit historic occurrence locations occurring on public land for each species and document the existing populations through 500m^2 vegetation relevés. For LSBML, only 2 unique historic records occurred on public lands. In 2003 no LSBML were found at either site, however in 2004 individuals were observed at one of those sites (n = 1781), and the population was found again in 2005 (n = 2800; Allen et al. 2005).

Objectives

Surveys for LSBML were carried out as part of the Coachella Valley Multiple Species Habitat Conservation Monitoring Plan by the UC Riverside Center for Conservation Biology. Surveys were conducted following the guidelines and objectives outlined by the MSHCP and carried out using the Alluvial Fan Monitoring Protocol developed in 2012 for this species. The primary objectives for this monitoring effort were to assess the current presence and distribution for populations of this species, document habitat attributes, and identify potential stressors (such as invasive species, off-road vehicles, trampling) that may affect its persistence. Information about the presence of LSBML was integrated into a habitat suitability model. The model will help facilitate the expansion of future monitoring and adaptive management efforts, and may increase our understanding of the current and anticipated distribution of this species, particularly with regards to climate change.

Methods

Data Collection

LSBML were surveyed within twelve 10x100-m plots that were selected based upon previous occurrence records along the Mission Creek and Dry Morongo drainages (Fig. 2). Surveyors walked the length of each plot twice each monitoring year from March–April (at least two weeks apart) and recorded the maximum length (along longest axis), and width (perpendicular to the length) of each stand of LSBML occurring within the plot. GPS locations of incidental occurrences of populations in between survey sites were also recorded and were incorporated into the habitat suitability model.

Habitat Suitability Models

Following the Allen et al. (2005) procedure, regional occurrence records were collected for LSBML from the Consortium of California Herbaria in 2014. Additional records were provided by the National Park Service (Joshua Tree National Park) and the University of California Riverside. After investigating the source and description of each record, records that were found to be duplicates or considered invalid due to lack of precision or occurrence upon lands that are now developed were deleted resulting in 122 records.

Habitat suitability models are place-based, using a species' location data to construct a spatial model that synthesizes environmental features (such as land cover, soil types, climate, and topography) selected by that species in that area (see Table 1 for the variables used to construct the LSBML habitat model). For the modeling process, a GIS (ArcGIS v.10.2, ESRI Inc. Redlands, California) map of the study area was divided into 180 m ×

180 m cells and each cell was scored for underlying environmental variables. Cells containing a species observation were used to create a calibration data set. This dataset is then used to construct the habitat suitability model using the Mahalanobis distance statistic (D^2) (Clark et al. 1993, Browning et al. 2005, Rotenberry et al. 2002, 2006). Habitat suitability models are iterative tools that allow us to better understand the extent of suitable habitat and the potential distribution of a species. As additional information pertaining to a species is gained over time, the respective model for that species can, and should, be refined. This LSBML model may be utilized in future focused surveys for this species to identify areas of suitable habitat which may be incorporated into the survey protocol.

Results

Surveys for this covered species were conducted March-April during the years 2013-2015, however no populations were discovered in 2013 or 2014. In mid-March, LSBML were successfully found upon three transects (sites 7, 11 and 12) during 2015 survey efforts (Table 1). LSBML occurred most abundantly at site 7 along Mission Creek and occurrences decreased in density towards the east, with site 12 having very few individuals. Populations at sites 11 and 12 are previously unreported on the California Consortium of Herbaria and CalFlora databases. Extrapolating from the data that was collected at the survey sites, over 1,000 plants were counted along the transects. A similar number were likely encountered incidentally (M. Mariscal, *pers obs*). LSBML occurred in open, sandy microhabitats, beyond the shade of large shrubs (Fig. 3A). Several native annual species co-occurred with LSBML (e.g., *Cryptantha* sp., *Filago depressa*, Fig. 3B), however weedy annuals, particularly *Schismus barbatus*, occurred in higher density adjacent to the LSBML patches but very low density within patches.

Habitat Suitability Models

When species occurrence records are joined to the map data to create the calibrate file, as part of the modeling process, the multivariate mean of every cell is calculated resulting in a shift of the occurrence record to the center of each occupied cell. In order to determine the capture rate, any occurrence point that was within 180-m was deemed as being captured. Because the occurrence point originated anywhere within an occupied cell, setting an 180-m capture radius ensures that any suitable habitat occurring within the cell is accounted for.

The selected habitat niche model for this species is comprised of average maximum summer temperature, ruggedness and median ruggedness, elevation, available soil water content, soil sand percentage, and average precipitation December through March (Table 2) indicating that these variables best identify this species' habitat characteristics and constrain this species' distribution. The model had an area of suitable habitat that encompassed 75% of the 122 occurrence records used to calibrate the model (Table 2, Fig. 4). Over 40,000-ha of land were modelled as potentially suitable habitat for this species, however the actual habitat that this species may occupy is likely far more constrained due to site-specific microsite, microclimate, and edaphic conditions and therefore difficult to capture with a model at this scale. Although this species was documented in Snow Creek, there was no potentially suitable habitat modelled in that area. Future survey efforts that lead to the re-documentation of LSBML in the Snow Creek area should result in occurrence points that may be used to refine the model. This species is unlikely to occur in the habitat that was modeled as potentially suitable upon the slopes of the San Jacinto and Santa Rosa Mountains (A. Sanders, *pers comm*).

Discussion

Surveys for LSBML at the 12 sites were intensive and resulted in several discoveries of new populations, the majority of which were incidental (not occurring upon the survey transects). Two LSBML occurrences were found upon land that is not currently conservation owned (the southwestern-most points in Fig. 2). These populations are directly between a well-travelled dirt access road and a wide wash that experiences high levels of OHV recreational activities. There was no evidence of OHV activity observed adjacent to any LSBML occurrence point or survey transect occurring on conservation lands during the 2015 survey period. In regard to this species' interannual variability, LSBML populations have been recorded as undergoing "booms and busts"; while some populations have been estimated to range into the 1000s of plants, several years or decades may pass before another population is recorded (Sanders 2006). For example, in Dry Morongo Canyon a few hundred plants were recorded in 1992 and 1995, but only six were found in 1996. Approximately 10,000 individuals were recorded near the mouth of Big Morongo Canyon, north of Indian Avenue, in 1996 (Sanders 2006), however no individuals were found there during the three years of monitoring for this species. Based on these observations it is apparent that this species is particularly responsive to environmental conditions between years. The 2013 and 2014 survey years were the second and third years of an extreme drought in southern California. Precipitation levels preceding the 2015 spring season were adequate for germination of this species at several of the study sites, however late summer-early fall rain in 2014 caused mud flows in the mouth of Dry Morongo Canyon; the resulting hard silt layer in the wash and on the wash benches has likely prevented successful germination of LSBML at sites 1-5. Populations of LSBML have been recorded in the Whitewater Canyon during the 1990's, as well as Snow Creek in 2008 (CalFlora 2015). Attempts during the 2013-2015 survey periods to locate incidental LSBML at the coordinates where those records were taken have not been successful.

It is recommended that surveys continue on a yearly basis to establish the precipitation threshold required for this species to germinate successfully, and to better understand its current range within the Coachella Valley. Sites with known occurrence locations should continue to be revisited with every future survey effort, and the environmental variables documented should be reanalyzed for change. This information will enable surveys to be timed more effectively, cited appropriately, and allow for continued evaluation of OHV recreational activity impacts to this species.

Despite using confirmed occurrence records to construct the habitat suitability model, the model was not a perfect representation of the known distribution of LSBML's range. Habitat suitability models are hypotheses of where potential habitat may occur for the species based on abiotic associations of that species. However, there are other factors that may constrain species distributions (e.g. biotic interactions, soil pH) that may not be adequately addressed with the model parameters currently available. Models for this species should be refined after every survey effort, and areas where suitable habitat was not highlighted by the model but where focal species are known to occur should be sampled further in future surveys to increase our understanding of their ecology.

Table 1. Occurrence records for LSBML counted during the 2015 survey season.

Record	Site	Date	UTM_X	UTM_Y	Site comments
LIMA_1	7	3/10/2015	539430	3761963	Approx. 250 plants counted in a 25m x 5m area; Patchy but abundant along wash bench; 25% of individuals appear desiccated; *Schismus barbatus* is abundant surrounding LSBML patches, but not within patches.
LIMA_2	incidental	3/12/2015	541299	3759642	Not on conservation lands
LIMA_3	incidental	3/12/2015	541430	3760148	Locally abundant
LIMA_4	incidental	3/12/2015	541391	3760187	Locally abundant
LIMA_5	incidental	3/12/2015	541419	3760239	
LIMA_6	incidental	3/12/2015	541387	3760285	
LIMA_7	incidental	3/12/2015	541405	3760396	
LIMA_8	11	3/12/2015	541417	3760527	Approx. 50 plants counted in a 25m x 10m area, density concentrated near the middle of transect.
LIMA_9	11	3/12/2015	541472	3760502	Density very low; five plants counted in a 25m x 10m area
LIMA_10	incidental	3/12/2015	541363	3760228	
LIMA_11	incidental	3/12/2015	541251	3759663	Not on conservation lands
LIMA_12	12	3/12/2015	542270	3759518	Only one patch, approx. 10 plants in a $1m^2$ area

Table 2. Environmental variables selected to construct the habitat suitability model.

Variable descriptions	
Available water content	
Percent sand contents of soil	
Average total precipitation from December-March during years 1971-2000	
Sappington ruggedness analysis of a 18 x 18 10m neighborhood	
Median value from a 18 x 18 neighborhood of Sappington analysis results based on a 3x3 neighborhood of 10m cells	
Median elevation above mean sea level for a 18 x 18 neighborhood of 10m cells from USGS National Elevation Database 0.3 arc-second series	
Average max. temperature occurring July-August during years 1971 - 2000	
Model performance	
# records (known occurrences)	122
# partitions (equal to variables used)	7
Partition selected	4
P-Value	0.797
HSI value	0.7
Capture rate	75%
Area of modeled suitable habitat (ha)	40,720

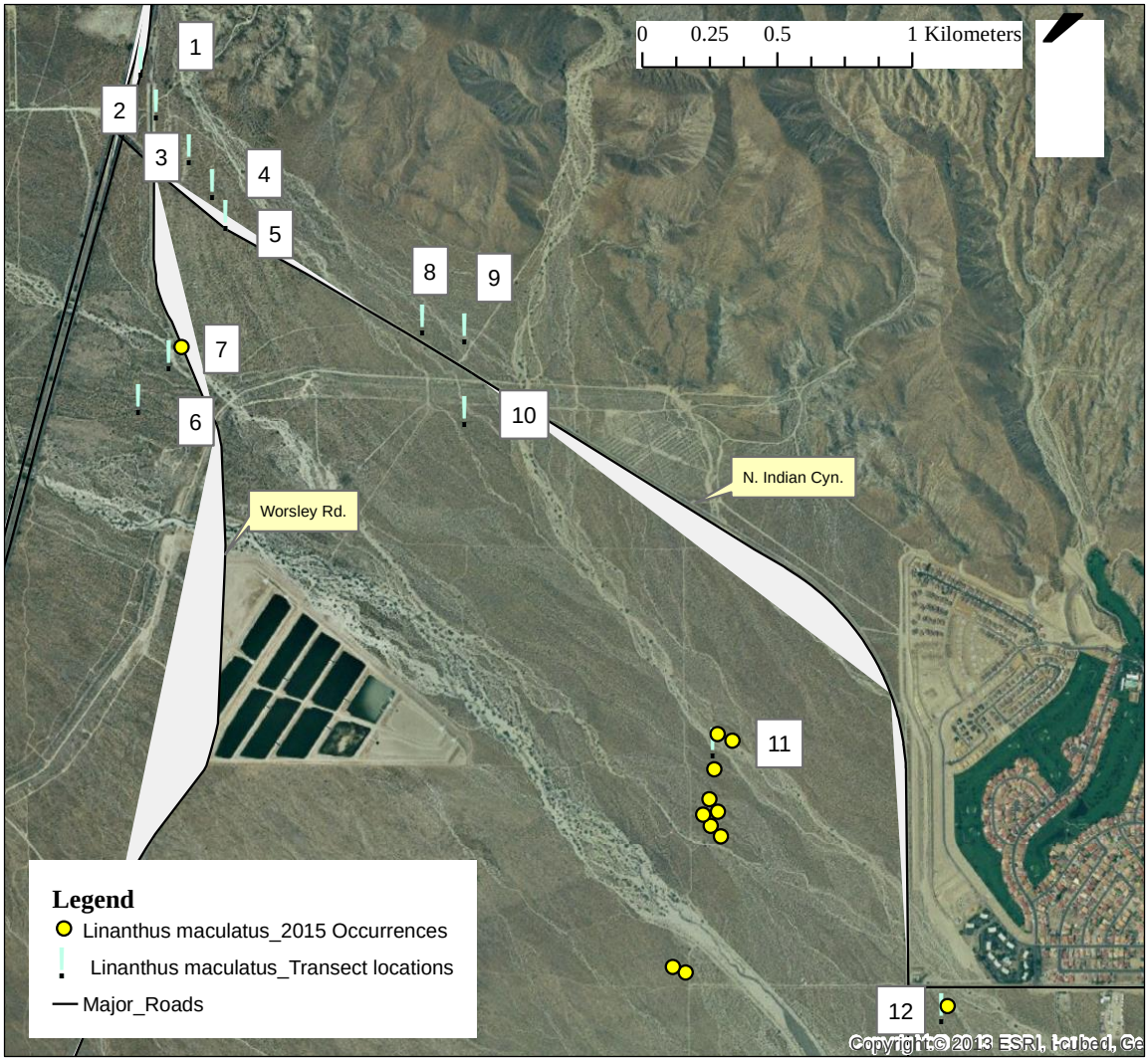

Figure 2. Transect locations (light blue circles) for 2013-2015 LSBML surveys within the Upper Mission Creek / Big Morongo Canyon Conservation Area. LSBML occurrences recorded during the 2015 survey efforts are indicated by yellow circles.

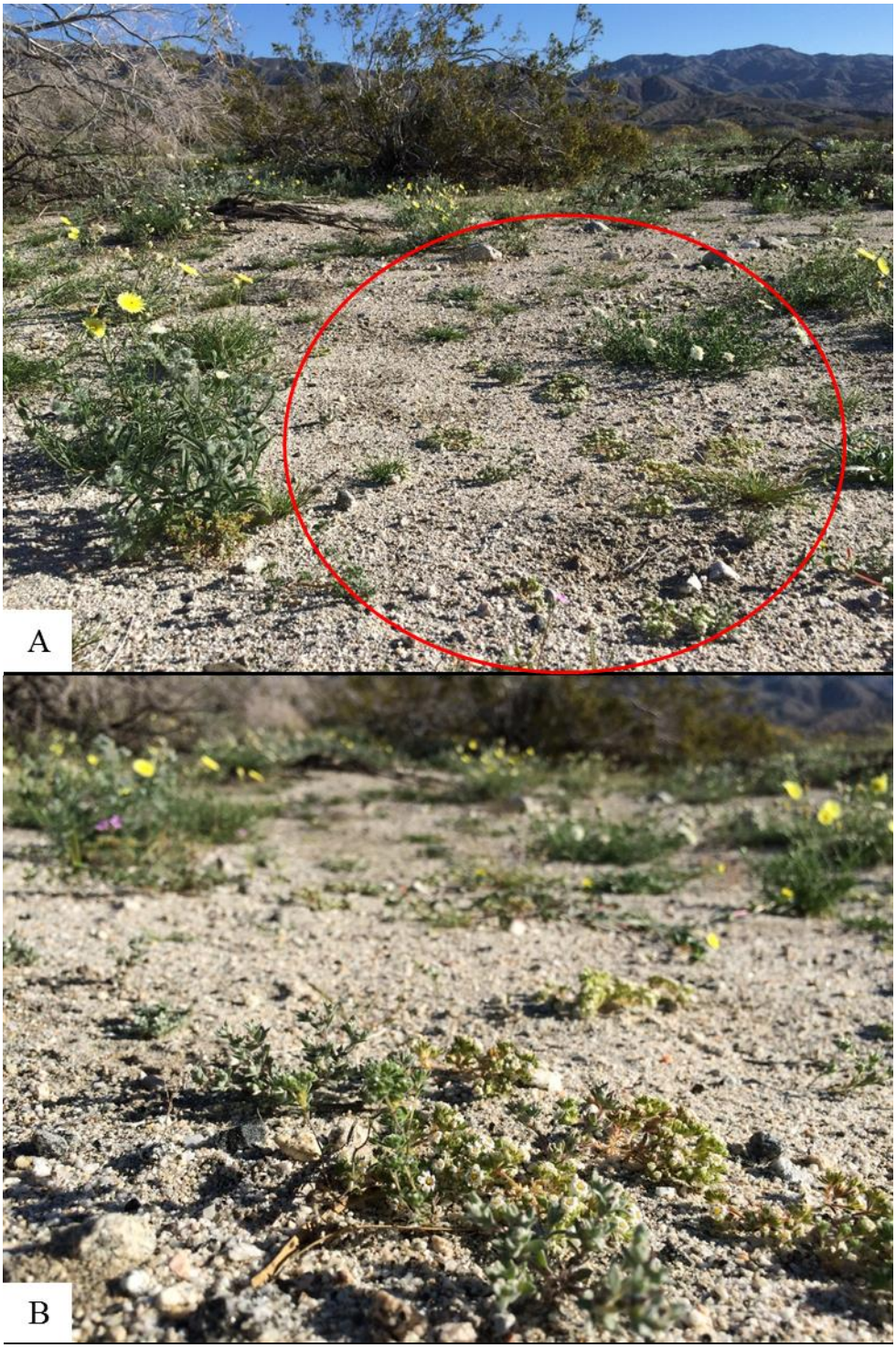

Figure 3. Patches of LSBML (A) occurring in open, sandy microhabitats beyond the shade of larger shrubs, and (B) in the foreground, co-occurring with other small, native annual species.

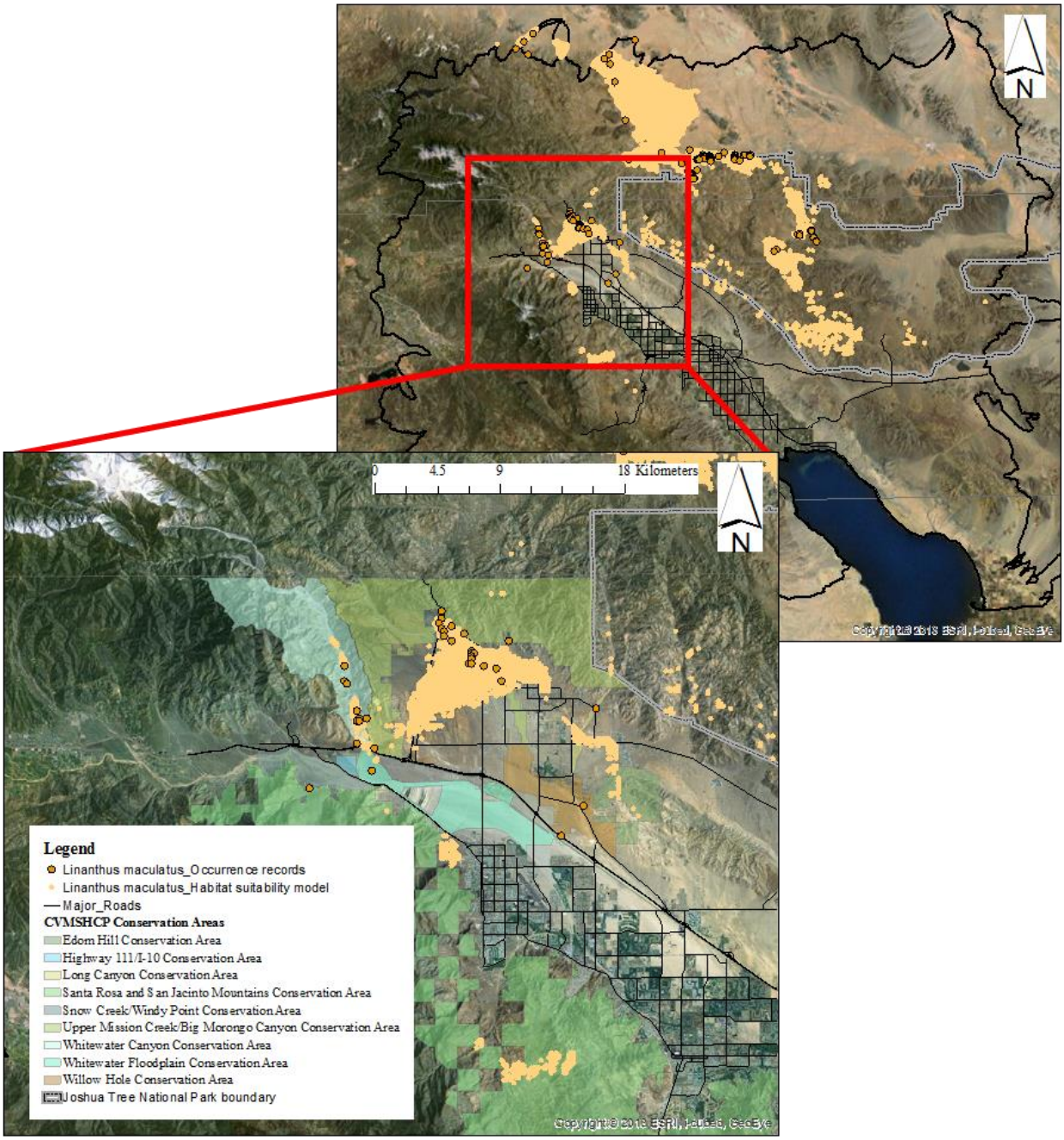

Figure 4. LSBML habitat suitability model based on occurrence records collected within the Coachella Valley, Joshua Tree National Park, and the Mojave Desert.

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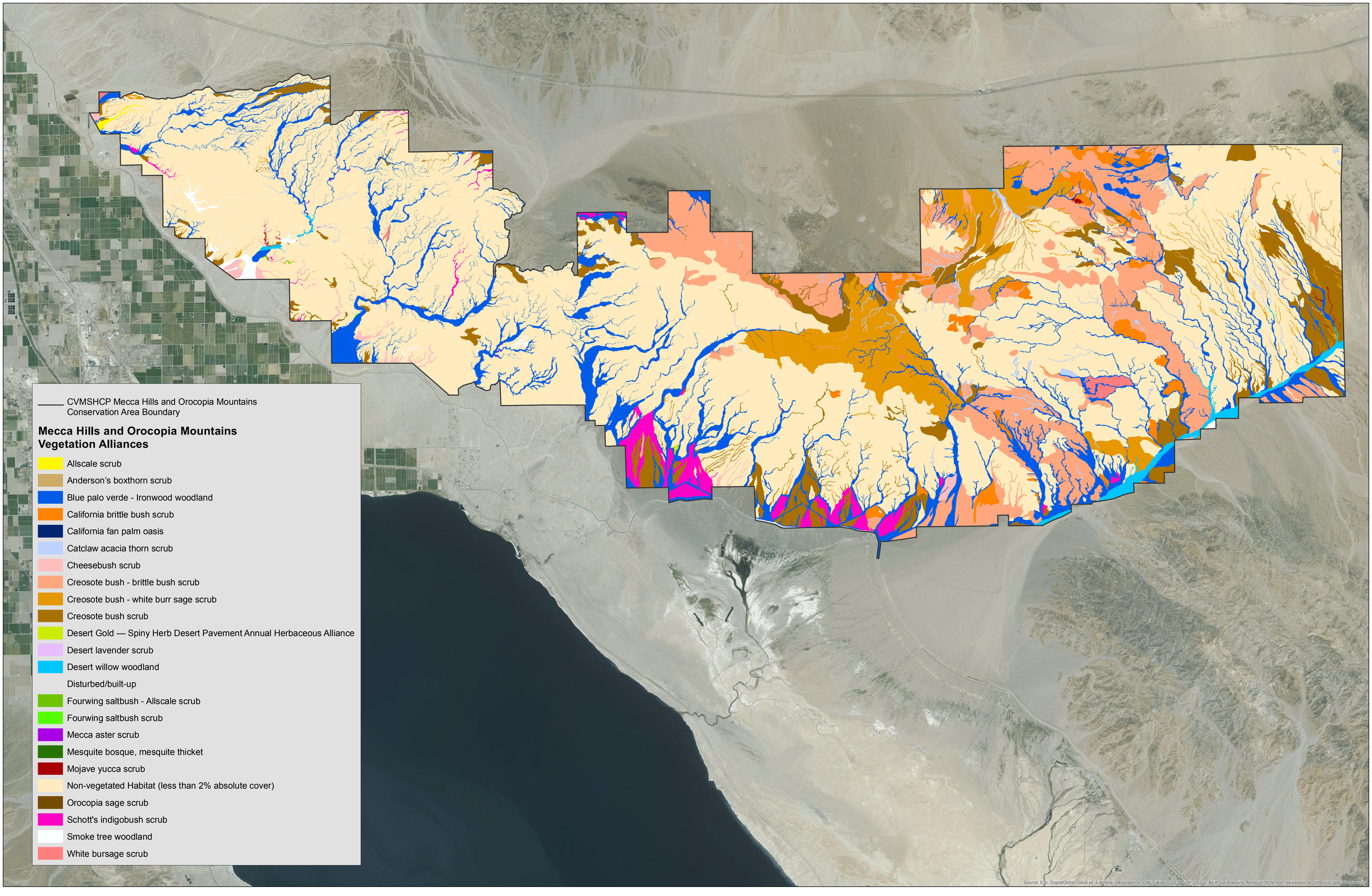
Appendix 2B
Mecca Hills /Orocopia Mountains
Vegetation Map Report


CVMSHCP Mecca Hills and Orocopia Mountains Conservation Area Boundary
Mecca Hills and Orocopia Mountains Vegetation Alliances
Allscale scrub
Anderson's boxthorn scrub
Blue palo verde - Ironwood woodland
California brittle bush scrub
California fan palm oasis
Catclaw acacia thorn scrub
Cheesebush scrub
Creosote bush - brittle bush scrub
Creosote bush - white burr sage scrub
Creosote bush scrub
Desert Gold — Spiny Herb Desert Pavement Annual Herbaceous Alliance
Desert lavender scrub
Desert willow woodland
Disturbed/built-up
Fourwing saltbush - Allscale scrub
Fourwing saltbush scrub
Mecca aster scrub
Mesquite bosque, mesquite thicket
Mojave yucca scrub
Non-vegetated Habitat (less than 2% absolute cover)
Orocopia sage scrub
Schott's indigobush scrub
Smoke tree woodland
White bursage scrub
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Appendix 3
Table of Acquisitions for Conservation in 2015

Conservation Area	Acquisition Made By	APN	Total Acres
Dos Palmas	**Friends of the Desert Mountains**	731050003	58
		731140003	160
		733060006	17
		733080006	20
		733090005	20
	Friends of the Desert Mountains		**276**
Dos Palmas Total			**276**
Desert Tortoise and Linkage	**Coachella Valley Conservation Commission**	715150012	28
		733090003	15
		750090027	10
	Coachella Valley Conservation Commission		**54**
	Friends of the Desert Mountains	709450003	20
		717060002	157
	Friends of the Desert Mountains		**177**
Desert Tortoise and Linkage Total			**231**
Indio Hills Palms	**Friends of the Desert Mountains**	713120003	20
	Friends of the Desert Mountains		**20**
Indio Hills Palms Total			**20**
Joshua Tree National Park	**Coachella Valley Conservation Commission**	707120011	40
	Coachella Valley Conservation Commission		**40**
	Mojave Desert Land Trust	707120017	160
		743310006	199
		743320003	168
	Mojave Desert Land Trust		**527**
Joshua Tree National Park Total			**567**
Mecca Hills/Orocopia Mountains	**Friends of the Desert Mountains**	717120006	10
		717170001	120
		717170017	80
		719080040	84
		719210005	9
		721080002	161
		709420041	10
	Friends of the Desert Mountains		**476**
Mecca Hills/Orocopia Mountains Total			**476**
Santa Rosa and San Jacinto Mountains	**Coachella Valley Conservation Commission**	516120055	4
		623310008	36
	Coachella Valley Conservation Commission		**40**
	Friends of the Desert Mountains	753160010	21
		753220002	10
		753220007	10
		753290012	19
		753310010	10
		755310003	5
		755310022	5
		755310024	5
	Friends of the Desert Mountains		**84**
Santa Rosa and San Jacinto Mountains Total			**124**

Willow Hole	**Coachella Valley Conservation Commission**	660200007	2
		660200017	2
		660200028	3
		660200034	45
		660200035	3
		660200036	3
	Coachella Valley Conservation Commission		**59**
Willow Hole Total			**59**

Upper Mission Creek/Big Morongo Canyon	**Coachella Valley Conservation Commission**	661020001	163
		663250001	19
		664060030	1
		671170003	20
		671170005	20
	Coachella Valley Conservation Commission		**224**
Upper Mission Creek/Big Morongo Canyon Total			**224**

Appendix 4
Status of Conservation Objectives by Conservation Area

CVMSHCP Annual Report 2015 - Conservation Objectives by Conservation Area

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Cabazon Conservation Area - Riverside County								
Peninsular Bighorn Sheep - Essential Habitat	264	181	83	0	0	0%	0	18
Mesquite hummocks	13	1	12	0	0	0%	0	0
Southern sycamore-alder riparian woodland	9	1	9	0	0	0%	0	0
Sand Source	7,683	181	1,629	0	0	0%	0	18
Sand Transport	4,538	0	0	0	0	0%	0	0
Fornat Wash Corridor	641	10	631	0	0	0%	0	1
Coachella Valley Stormwater Channel and Delta Conservation Area - Riverside County								
Desert Pupfish - Core Habitat	25	0	25	0	0	0%	0	0
Crissal Thrasher - Core Habitat	896	87	781	0	0	0%	5	4
California Black Rail - Other Conserved Habitat	62	6	52	0	0	0%	0	1
Yuma Clapper Rail - Other Conserved Habitat	62	6	52	0	0	0%	0	1
Le Conte's Thrasher - Other Conserved Habitat	784	78	706	0	0	0%	5	3
Mesquite hummocks	74	7	67	0	0	0%	0	1
Coastal and valley freshwater marsh	61	6	63	0	0	0%	0	1
Desert sink scrub	1,349	114	1,026	0	0	0%	0	11
Desert saltbush scrub	792	79	713	0	0	0%	5	3

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Desert Tortoise and Linkage Conservation Area - Coachella								
Desert Tortoise - Core Habitat	300	30	270	0	0	0%	0	3
Le Conte's Thrasher - Other Conserved Habitat	300	30	270	0	0	0%	0	3
Desert dry wash woodland	121	12	109	0	0	0%	0	1
Desert Tortoise and Linkage Conservation Area - Riverside County								
Desert Tortoise - Core Habitat	88,878	4,998	44,978	3,242	205	7%	14	810
Orocopia Sage - Core Habitat	779	44	398	0	0	0%	0	4
Mecca Aster - Core Habitat	4,731	206	1,852	224	65	12%	0	43
Le Conte's Thrasher - Other Conserved Habitat	49,114	2,813	25,319	1,022	127	4%	14	369
Desert dry wash woodland	13,443	752	6,771	472	14	7%	6	116
Desert Tortoise and Linkage Corridor	26,122	1,572	14,144	895	185	6%	0	247

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Dos Palmas Conservation Area - Riverside County								
Crissal Thrasher - Core Habitat	536	38	343	161	8	47%	0	20
Desert Pupfish - Refugia Locations	0	0	0	0	0	0%	0	0
California Black Rail - Other Conserved Habitat	597	37	334	271	0	81%	0	31
Le Conte's Thrasher - Other Conserved Habitat	14,882	743	6,689	2,373	171	35%	0	312
Yuma Clapper Rail - Other Conserved Habitat	682	42	374	292	0	78%	0	34
Predicted Flat-tailed Horned Lizard - Other Conserved Habitat	5,537	403	3,631	560	0	15%	0	96
Desert fan palm oasis woodland	125	6	50	29	0	58%	0	4
Arrowweed scrub	277	13	121	0	0	0%	0	1
Mesquite bosque	482	36	320	150	8	47%	0	19
Desert sink scrub	7,195	487	4,381	1,013	0	23%	0	150
Desert dry wash woodland	1,856	83	746	242	14	32%	0	33
Cismontane alkali marsh	321	23	205	200	0	98%	0	22
Mesquite hummocks	55	3	23	10	0	43%	0	1
East Indio Hills Conservation Area - Coachella								
Le Conte's Thrasher - Other Conserved Habitat	62	6	56	0	0	0%	0	1
Palm Springs Pocket Mouse - Other Conserved Habitat	8	1	7	0	0	0%	0	0
Coachella Valley Round-tailed Ground Squirrel - Other Conserved Habitat	6	1	5	0	0	0%	0	0
Predicted Flat-tailed Horned Lizard - Other Conserved Habitat	6	1	5	0	0	0%	0	0

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
East Indio Hills Conservation Area - Indio								
Le Conte's Thrasher - Other Conserved Habitat	120	12	105	0	0	0%	0	1
Palm Springs Pocket Mouse - Other Conserved Habitat	117	11	103	0	0	0%	0	1
Coachella Valley Round-tailed Ground Squirrel - Other Conserved Habitat	117	11	103	0	0	0%	0	1
Predicted Flat-tailed Horned Lizard - Other Conserved Habitat	114	11	100	0	0	0%	0	1
Mesquite hummocks	2	0	2	0	0	0%	0	0
Stabilized shielded sand fields	114	11	100	0	0	0%	0	1
East Indio Hills Conservation Area - Riverside County								
Le Conte's Thrasher - Other Conserved Habitat	1,960	139	1,253	0	0	0%	0	14
Mecca Aster - Core Habitat	1,594	116	1,045	0	0	0%	0	12
Coachella Valley Round-tailed Ground Squirrel - Other Conserved Habitat	1,353	100	896	0	0	0%	0	10
Predicted Flat-tailed Horned Lizard - Other Conserved Habitat	525	46	415	0	0	0%	0	5
Palm Springs Pocket Mouse - Other Conserved Habitat	1,526	105	944	0	0	0%	0	11
Active desert dunes	5	1	4	0	0	0%	0	0
Desert saltbush scrub	8	1	7	0	0	0%	0	0
Stabilized desert sand fields	331	33	295	0	0	0%	0	3
Mesquite hummocks	43	4	39	0	0	0%	0	0
Stabilized shielded sand fields	401	28	256	0	0	0%	0	3
***modified acres conserved since 1996 because of a BOR Parcel that was removed.**								

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Edom Hill Conservation Area - Cathedral City								
Coachella Valley Round-tailed Ground Squirrel - Other Conserved Habitat	134	13	121	102	0	84%	0	11
Coachella Valley Milkvetch - Other Conserved Habitat	151	15	136	102	0	75%	0	12
Palm Springs Pocket Mouse - Other Conserved Habitat	114	11	103	87	0	84%	0	9
Le Conte's Thrasher - Other Conserved Habitat	344	34	310	224	0	72%	0	26
Sand Source	345	34	310	224	0	72%	0	26
Edom Hill Conservation Area - Riverside County								
Coachella Valley Giant Sand-treader Cricket - Other Conserved Habitat	103	5	40	43	0	100%	0	5
Coachella Valley Milkvetch - Other Conserved Habitat	1,637	134	1,205	1,029	0	85%	0	116
Coachella Valley Fringe-toed Lizard - Other Conserved Habitat	103	5	40	43	0	100%	0	5
Coachella Valley Round-tailed Ground Squirrel - Other Conserved Habitat	1,701	145	1,302	1,115	0	86%	0	126
Palm Springs Pocket Mouse - Other Conserved Habitat	1,228	104	935	794	0	85%	0	90
Le Conte's Thrasher - Other Conserved Habitat	2,238	194	1,745	1,334	0	76%	1	152
Active sand fields	73	4	37	41	0	100%	0	4
Stabilized desert sand fields	29	1	3	2	0	67%	0	1
Sand Source	2,665	197	1,770	1,468	0	83%	0	167
Sand Transport	628	63	565	377	0	67%	1	43

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Highway 111/I-10 Conservation Area - Riverside County								
Coachella Valley Round-tailed Ground Squirrel - Other Conserved Habitat	389	39	350	54	0	15%	0	9
Coachella Valley Jerusalem Cricket - Other Conserved Habitat	372	37	335	51	0	15%	0	9
Le Conte's Thrasher - Other Conserved Habitat	389	39	350	54	0	15%	0	9
Coachella Valley Milkvetch - Other Conserved Habitat	372	37	335	51	0	15%	0	9
Palm Springs Pocket Mouse - Other Conserved Habitat	389	39	350	54	0	15%	0	9
Indio Hills Palms Conservation Area - Riverside County								
Mecca Aster - Core Habitat	6,091	255	2,290	1,039	0	45%	0	130
Le Conte's Thrasher - Other Conserved Habitat	106	1	7	0	0	0%	0	0
Desert fan palm oasis woodland	93	5	42	7	0	17%	0	1
Desert dry wash woodland	79	4	33	36	0	100%	0	4
Mesquite hummocks	3	1	1	0	0	0%	0	0
Indio Hills/Joshua Tree National Park Linkage Conservation Area - Riverside County								
Desert Tortoise - Core Habitat	10,308	859	7,735	6,542	0	85%	0	740
Le Conte's Thrasher - Other Conserved Habitat	6,396	606	5,457	5,450	0	100%	0	605
Sand Transport	7,304	681	6,132	5,771	0	94%	5	640
Sand Source	5,823	460	4,135	3,205	0	78%	0	367
Indio Hills / Joshua Tree National Park Corridor	13,127	1,141	10,267	8,976	0	87%	5	1,007

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Joshua Tree National Park Conservation Area - Riverside County								
Gray Vireo - Other Conserved Habitat	30,653	134	1,208	1,822	0	100%	0	195
Le Conte's Thrasher - Other Conserved Habitat	4,330	25	222	76	0	34%	0	10
Desert Tortoise - Core Habitat	127,161	1,708	15,367	12,244	567	80%	0	1,396
Desert dry wash woodland	2,195	13	119	192	0	100%	0	20
Mojave mixed woody scrub	57,099	800	7,195	6,583	567	91%	0	739
Desert fan palm oasis woodland	5	0	0	0	0	0%	0	0
Mojavean pinyon & juniper woodland	30,653	134	1,208	1,822	0	100%	0	195
Mecca Hills/Orocopia Mountains Conservation Area - Riverside County								
Desert Tortoise - Core Habitat	112,575	2,624	23,617	6,050	317	26%	0	867
Le Conte's Thrasher - Other Conserved Habitat	17,467	652	5,866	1,376	0	23%	0	203
Orocopia Sage - Core Habitat	66,180	1,803	16,227	4,124	42	25%	0	593
Mecca Aster - Core Habitat	31,655	465	4,181	828	232	20%	0	129
Desert fan palm oasis woodland	1	0	0	0	0	0%	0	0
Desert dry wash woodland	9,317	318	2,861	1,150	60	40%	0	147
Santa Rosa and San Jacinto Mountains Conservation Area - Cathedral City								
Desert Tortoise - Other Conserved Habitat	107	11	95	4	0	4%	0	2
Le Conte's Thrasher - Other Conserved Habitat	13	1	11	4	0	36%	0	0
Peninsular Bighorn Sheep - Rec Zone 2 - Essential Habitat	112	11	97	4	0	4%	0	2
Desert dry wash woodland	20	2	18	5	0	28%	0	1

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Santa Rosa and San Jacinto Mountains Conservation Area - Indian Wells								
Desert Tortoise - Other Conserved Habitat	4,375	111	999	0	0	0%	0	11
Le Conte's Thrasher - Other Conserved Habitat	419	23	206	0	0	0%	0	2
Peninsular Bighorn Sheep - Rec Zone 3 - Essential Habitat	4,617	114	1,158	0	0	0%	0	11
Desert dry wash woodland	128	7	66	0	0	0%	0	1
Santa Rosa and San Jacinto Mountains Conservation Area - La Quinta								
Desert Tortoise - Other Conserved Habitat	5,936	157	1,409	371	0	26%	7	46
Le Conte's Thrasher - Other Conserved Habitat	683	43	387	122	0	32%	0	17
Peninsular Bighorn Sheep - Rec Zone 3 - Essential Habitat	6,185	159	2,545	386	0	15%	0	38
Desert dry wash woodland	147	8	76	15	0	20%	0	2
Santa Rosa and San Jacinto Mountains Conservation Area - Palm Desert								
Le Conte's Thrasher - Other Conserved Habitat	43	4	33	0	0	0%	0	0
Desert Tortoise - Other Conserved Habitat	581	48	436	784	0	100%	0	82
Peninsular Bighorn Sheep - Rec Zone 3 - Essential Habitat	78	7	65	0	0	0%	0	1
Peninsular Bighorn Sheep - Rec Zone 2 - Essential Habitat	492	7	65	762	0	100%	0	75
Desert dry wash woodland	38	3	29	1	0	3%	0	0

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Santa Rosa and San Jacinto Mountains Conservation Area - Palm Springs								
Le Conte's Thrasher - Other Conserved Habitat	793	103	560	384	0	69%	0	74
Peninsular Bighorn Sheep - Rec Zone 1 - Essential Habitat	9,195	226	2,511	2,001	0	80%	0	185
Desert Tortoise - Other Conserved Habitat	22,571	1,317	8,856	4,388	0	50%	0	719
Peninsular Bighorn Sheep - Rec Zone 2 - Essential Habitat	18,426	866	4,700	3,495	0	74%	0	666
Gray Vireo - Other Conserved Habitat	8,416	431	3,883	1,837	0	47%	0	227
Desert dry wash woodland	40	4	36	41	0	100%	0	5
Peninsular juniper woodland & scrub	7,682	353	3,177	1,837	0	58%	0	219
Semi-desert chaparral	733	51	571	0	0	0%	0	5
Southern sycamore-alder riparian woodland	30	2	24	0	0	0%	0	0
Sonoran cottonwood-willow riparian forest	58	0	58	4	0	7%	0	0
Desert fan palm oasis woodland	218	9	76	52	0	68%	0	6
Southern arroyo willow riparian forest	16	0	0	0	0	0%	0	0
Santa Rosa and San Jacinto Mountains Conservation Area - Rancho Mirage								
Desert Tortoise - Other Conserved Habitat	5,249	147	1,326	1,206	0	91%	0	135
Le Conte's Thrasher - Other Conserved Habitat	19	2	17	0	0	0%	0	0
Peninsular Bighorn Sheep - Rec Zone 2 - Essential Habitat	5,262	42	450	1,209	0	100%	0	106
Desert dry wash woodland	19	1	9	4	0	44%	0	1

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Santa Rosa and San Jacinto Mountains Conservation Area - Riverside County								
Peninsular Bighorn Sheep - Rec Zone 2 - Essential Habitat	14,558	647	4,269	2,315	0	54%	0	380
Le Conte's Thrasher - Other Conserved Habitat	9,123	911	5,508	5,327	10	97%	0	884
Triple-ribbed Milkvetch - Known Locations	0	0	0	0	0	0%	0	0
Peninsular Bighorn Sheep - Rec Zone 1 - Essential Habitat	24,840	830	7,252	1,221	0	17%	0	209
Gray Vireo - Other Conserved Habitat	58,985	881	7,930	5,362	0	68%	0	624
Peninsular Bighorn Sheep - Rec Zone 3 - Essential Habitat	50,972	683	5,359	4,722	105	88%	0	610
Desert Tortoise - Other Conserved Habitat	86,875	2,950	23,856	15,433	120	65%	7	2,006
Peninsular Bighorn Sheep - Rec Zone 4 - Essential Habitat	34,597	258	2,325	7,522	0	100%	0	777
Southern sycamore-alder riparian woodland	518	12	117	5	0	4%	0	2
Red shank chaparral	12,514	253	2,274	1,810	0	80%	0	207
Semi-desert chaparral	16,869	233	2,093	928	0	44%	0	116
Peninsular juniper woodland & scrub	29,547	418	2,899	2,628	0	91%	0	383
Southern arroyo willow riparian forest	16	2	15	0	0	0%	0	0
Desert dry wash woodland	3,566	298	1,244	1,284	0	100%	0	307
Desert fan palm oasis woodland	716	45	404	0	0	0%	0	5

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Snow Creek/Windy Point Conservation Area - Palm Springs								
Coachella Valley Milkvetch - Core Habitat	910	91	816	179	0	22%	0	27
Peninsular Bighorn Sheep - Essential Habitat	180	16	144	22	0	15%	0	4
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	934	93	838	182	0	22%	0	27
Coachella Valley Fringe-toed Lizard - Core Habitat	749	75	672	174	0	26%	0	25
Coachella Valley Giant Sand-treader Cricket - Core Habitat	749	75	672	174	0	26%	0	25
Coachella Valley Jerusalem Cricket - Core Habitat	908	90	815	178	0	22%	0	27
Palm Springs Pocket Mouse - Core Habitat	934	93	838	182	0	22%	0	27
Le Conte's Thrasher - Other Conserved Habitat	864	86	775	145	0	19%	0	23
Ephemeral sand fields	680	68	610	136	0	22%	0	20
Active desert dunes	69	7	62	40	0	65%	0	5
Highway 111 - Whitewater River Biological Corridor	276	27	247	182	0	74%	0	21

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Snow Creek/Windy Point Conservation Area - Riverside County								
Coachella Valley Milkvetch - Core Habitat	1,700	134	1,210	546	0	45%	0	68
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	1,880	152	1,371	788	0	57%	0	94
Coachella Valley Fringe-toed Lizard - Core Habitat	625	55	502	334	0	67%	0	38
Peninsular Bighorn Sheep - Essential Habitat	525	49	443	0	0	0%	0	5
Coachella Valley Giant Sand-treader Cricket - Core Habitat	625	56	501	334	0	67%	0	39
Le Conte's Thrasher - Other Conserved Habitat	1,924	162	1,453	848	0	58%	0	101
Coachella Valley Jerusalem Cricket - Core Habitat	782	60	538	347	0	64%	0	41
Ephemeral sand fields	468	45	409	339	0	83%	0	38
Stabilized shielded sand fields	157	10	93	0	0	0%	0	1
Highway 111 - Whitewater River Biological Corridor	474	46	415	0	0	0%	0	5
Stubbe and Cottonwood Canyons Conservation Area - Riverside County								
Desert Tortoise - Core Habitat	5,735	253	2,276	851	0	37%	29	81
Le Conte's Thrasher - Other Conserved Habitat	1,265	123	1,111	647	0	58%	0	77
Desert dry wash woodland	289	26	229	112	0	49%	0	14
Sonoran cottonwood-willow riparian forest	267	3	25	0	0	0%	0	0
Sand Transport	1,375	125	1,129	651	0	58%	0	77
Stubbe Canyon Wash Corridor	1,181	117	1,058	696	0	66%	0	81

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Thousand Palms Conservation Area - Riverside County								
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	8,513	468	2,974	1,589	0	53%	39	233
Coachella Valley Milkvetch - Core Habitat	4,403	111	1,001	748	0	75%	5	81
Desert Pupfish - Refugia Locations	0	0	0	0	0	0%	0	0
Coachella Valley Fringe-toed Lizard - Core Habitat	3,962	93	834	682	0	82%	0	78
Le Conte's Thrasher - Other Conserved Habitat	11,058	552	3,879	1,999	0	52%	34	277
Predicted Flat-tailed Horned Lizard - Core Habitat	4,148	97	877	713	0	81%	1	80
Mecca Aster - Core Habitat	11,745	297	2,676	951	0	36%	5	120
Coachella Valley Giant Sand-treader Cricket - Core Habitat	3,962	93	834	682	0	82%	0	78
Palm Springs Pocket Mouse - Core Habitat	11,707	518	3,588	1,969	0	55%	38	270
Desert dry wash woodland	748	4	34	0	0	0%	0	0
Active sand fields	3,543	91	820	677	0	83%	0	77
Active desert dunes	421	2	14	6	0	43%	0	1
Desert fan palm oasis woodland	137	0	0	0	0	0%	0	0
Sonoran cottonwood-willow riparian forest	4	0	0	0	0	0%	0	0
Mesquite hummocks	58	0	0	0	0	0%	0	0
Sand Transport	12,550	573	4,100	2,017	0	49%	52	259
Sand Source	13,056	412	3,712	1,635	0	44%	5	200
Thousand Palms Linkage	25,607	983	7,816	3,654	0	47%	57	455

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Upper Mission Creek/Big Morongo Canyon Conservation Area - Desert Hot Springs								
Coachella Valley Jerusalem Cricket - Other Conserved Habitat	49	0	49	30	0	61%	1	-1
Le Conte's Thrasher - Other Conserved Habitat	1,832	288	1,409	747	0	53%	2	164
Palm Springs Pocket Mouse - Core Habitat	1,748	270	1,403	736	0	52%	2	152
Little San Bernardino Mountains Linanthus - Core Habitat	1,020	53	967	440	0	46%	0	27
Desert Tortoise - Core Habitat	3,554	0	1,429	736	0	52%		0
Desert dry wash woodland	135	6	58	0	0	0%	0	1
Sand Transport	1,869	286	1,399	755	0	54%	2	166
Sand Source	343	0	6	0	0	0%	0	0
Highway 62 Corridor	73	7	66	0	0	0%	0	1
Upper Mission Creek/Big Morongo Canyon Conservation Area - Palm Springs								
Le Conte's Thrasher - Other Conserved Habitat	24	2	22	0	0	0%	0	0
Palm Springs Pocket Mouse - Other Conserved Habitat	24	2	22	0	0	0%	0	0

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Upper Mission Creek/Big Morongo Canyon Conservation Area - Riverside County								
Desert Tortoise - Core Habitat	24,122	887	7,984	5,169	60	65%	23	583
Triple-ribbed Milkvetch - Core Habitat	819	47	426	421	0	99%	0	47
Coachella Valley Jerusalem Cricket - Other Conserved Habitat	666	52	460	53	0	12%	11	0
Le Conte's Thrasher - Other Conserved Habitat	1,871	146	1,323	855	21	65%	3	97
Palm Springs Pocket Mouse - Core Habitat	1,937	151	1,363	902	45	66%	2	103
Little San Bernardino Mountains Linanthus - Core Habitat	1,390	122	1,100	826	2	75%	0	95
Southern sycamore-alder riparian woodland	104	6	52	60	0	100%	0	7
Desert dry wash woodland	125	8	76	49	0	64%	0	5
Sonoran cottonwood-willow riparian forest	100	8	76	78	0	100%	0	8
Sand Transport	2,279	168	1,509	888	45	59%	0	106
Sand Source	19,789	721	6,488	4,496	16	69%	0	522
Highway 62 Corridor	907	79	715	569	60	80%	0	64
West Deception Canyon Conservation Area - Riverside County								
Sand Source	1,302	118	1,063	864	0	81%	0	98
Whitewater Canyon Conservation Area · Desert Hot Springs								
Desert Tortoise - Core Habitat	56	0	0	0	0	0%	0	0
Sand Source	56	0	0	0	0	0%	0	0

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Whitewater Canyon Conservation Area · Riverside County								
Desert Tortoise - Core Habitat	4,438	120	1,084	742	0	68%	1	85
Arroyo Toad - Core Habitat	2,082	78	706	676	0	96%	0	75
Little San Bernardino Mountains Linanthus - Other Conserved Habitat	579	39	348	277	0	80%	0	32
Triple-ribbed Milkvetch - Core Habitat	1,295	41	368	277	0	75%	0	32
Desert fan palm oasis woodland	1	0	0	0	0	0%	0	0
Sonoran cottonwood-willow riparian forest	166	11	107	105	0	98%	0	11
Sand Transport	1,392	48	435	338	0	78%	0	38
Sand Source	12,616	94	850	618	0	73%	1	70
Whitewater Canyon Corridor	223	22	201	0	0	0%	1	1
Whitewater Floodplain Conservation Area - Cathedral City								
Coachella Valley Milkvetch - Core Habitat	107	7	61	0	0	0%	0	1
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	105	7	59	0	0	0%	0	1
Coachella Valley Fringe-toed Lizard - Core Habitat	107	7	61	0	0	0%	0	1
Le Conte's Thrasher - Other Conserved Habitat	107	7	61	0	0	0%	0	1
Palm Springs Pocket Mouse - Core Habitat	107	7	61	0	0	0%	0	1
Coachella Valley Giant Sand-treader Cricket - Core Habitat	107	7	61	0	0	0%	0	1
Active sand fields	49	5	43	0	0	0%	0	1
Whitewater River Corridor	28	2	18	0	0	0%	0	0

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Whitewater Floodplain Conservation Area - Palm Springs								
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	5,825	328	2,955	538	0	18%	42	45
Coachella Valley Milkvetch - Core Habitat	5,432	297	2,671	514	0	19%	37	44
Palm Springs Pocket Mouse - Core Habitat	6,173	347	3,122	555	0	18%	61	29
Coachella Valley Fringe-toed Lizard - Core Habitat	5,418	295	2,659	514	0	19%	37	44
Coachella Valley Giant Sand-treader Cricket - Core Habitat	5,418	295	2,659	514	0	19%	37	44
Le Conte's Thrasher - Other Conserved Habitat	6,495	381	3,433	569	0	17%	61	34
Ephemeral sand fields	2,873	132	1,185	213	0	18%	10	25
Stabilized desert sand fields	577	44	394	5	0	1%	0	5
Active sand fields	436	44	392	300	0	77%	0	35
Whitewater River Corridor	1,183	90	809	50	0	6%	13	1

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Whitewater Floodplain Conservation Area - Riverside County								
Coachella Valley Milkvetch - Core Habitat	96	6	58	0	0	0%	0	1
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	185	11	100	0	0	0%	0	1
Coachella Valley Giant Sand-treader Cricket - Core Habitat	92	6	57	0	0	0%	0	1
Coachella Valley Fringe-toed Lizard - Core Habitat	92	6	57	0	0	0%	0	1
Palm Springs Pocket Mouse - Core Habitat	701	53	477	0	0	0%	10	-5
Le Conte's Thrasher - Other Conserved Habitat	706	53	480	0	0	0%	10	-5
Ephemeral sand fields	86	6	52	0	0	0%	0	1
Stabilized desert sand fields	5	1	4	0	0	0%	0	0
Whitewater River Corridor	701	53	475	0	0	0%	10	-5

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Willow Hole Conservation Area - Cathedral City								
Coachella Valley Round-tailed Ground Squirrel - Core Habitat	1,485	140	1,256	600	4	48%	0	74
Coachella Valley Milkvetch - Core Habitat	938	87	782	177	4	23%	0	26
Coachella Valley Fringe-toed Lizard - Core Habitat	264	24	212	113	0	53%	0	14
Palm Springs Pocket Mouse - Core Habitat	1,147	107	959	596	0	62%	0	71
Le Conte's Thrasher - Other Conserved Habitat	1,795	167	1,505	614	5	41%	0	78
Ephemeral sand fields	227	20	178	91	0	51%	0	11
Active sand fields	37	4	33	22	0	67%	0	3
Stabilized desert sand fields	57	6	51	0	0	0%	0	1
Stabilized desert dunes	1	0	1	0	0	0%	0	0
Sand Transport	966	89	798	581	0	73%	0	67
Sand Source	833	79	710	33	0	5%	0	11

	Total Acres in Conservation Area	Acres of Disturbance Authorized (1996)	Remaining Acres To Be Conserved (1996)	Acres Conserved Since 1996	Acres Conserved in 2015	Percentage of Required Conservation Acquired	Acres of Permitted Disturbance	Acres of Rough Step
Willow Hole Conservation Area - Riverside County								
Coachella Valley Fringe-toed Lizard - Core Habitat	633	50	454	331	2	73%	6	32
Coachella Valley Milkvetch - Core Habitat	2,228	195	1,751	1,182	2	68%	6	132
Palm Springs Pocket Mouse - Core Habitat	3,465	298	2,684	1,586	20	59%	6	182
Le Conte's Thrasher - Other Conserved Habitat	3,601	298	2,677	1,571	20	59%	6	181
Desert saltbush scrub	169	17	152	137	0	90%	0	15
Mesquite hummocks	125	11	98	94	0	96%	0	11
Desert fan palm oasis woodland	1	0	0	0	0	0%	0	0
Stabilized desert sand fields	144	14	128	70	0	55%	2	6
Stabilized desert dunes	383	35	319	249	0	78%	4	24
Ephemeral sand fields	906	81	728	236	2	32%	0	32
Sand Transport	3,500	304	2,734	1,585	0	58%	6	183
Sand Source	186	2	17	8	0	47%	0	1
Mission Creek / Willow Wash Biological Corridor	509	44	397	11	6	3%	0	5

***Please note: Some numbers changed from last year due to the sale of Mitigation Values**

Appendix 5
Covered Activity Impact Outside Conservation Areas

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Arroyo Toad	
Riverside County	0
Arroyo Toad Total	**0**
California Black Rail	
Coachella	0
Indio	0
Riverside County	0
California Black Rail Total	**0**
Coachella Valley Fringe-toed Lizard	
Cathedral City	568
Coachella	9
Indian Wells	589
Indio	960
La Quinta	542
Palm Desert	874
Palm Springs	1362
Rancho Mirage	936
Riverside County	580
Coachella Valley Fringe-toed Lizard Total	**6420**
Coachella Valley Giant Sand-treader Cricket	
Cathedral City	568
Coachella	9
Indian Wells	589
Indio	960
La Quinta	542
Palm Desert	874
Palm Springs	1362
Rancho Mirage	936
Riverside County	580
Coachella Valley Giant Sand-treader Cricket Total	**6420**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Coachella Valley Jerusalem Cricket	
Cathedral City	577
Desert Hot Springs	5
Palm Desert	6
Palm Springs	1368
Rancho Mirage	887
Riverside County	107
Coachella Valley Jerusalem Cricket Total	**2950**
Coachella Valley Milkvetch	
Cathedral City	499
Desert Hot Springs	8
Indian Wells	493
La Quinta	1
Palm Desert	862
Palm Springs	956
Rancho Mirage	936
Riverside County	329
Coachella Valley Milkvetch Total	**4084**
Coachella Valley Round-tailed Ground Squirrel	
Cathedral City	804
Coachella	23
Desert Hot Springs	494
Indian Wells	918
Indio	1475
La Quinta	1409
Palm Desert	1218
Palm Springs	1646
Rancho Mirage	1089
Riverside County	1999
Coachella Valley Round-tailed Ground Squirrel Total	**11076**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Crissal Thrasher	
Cathedral City	0
Coachella	35
Desert Hot Springs	0
Indian Wells	21
Indio	236
La Quinta	670
Riverside County	253
Crissal Thrasher Total	**1215**
Desert Pupfish	
Indian Wells	0
NULL	0
Desert Pupfish Total	**0**
Desert Tortoise	
Cathedral City	15
Coachella	0
Desert Hot Springs	488
Indian Wells	220
Indio	0
La Quinta	438
Palm Desert	458
Palm Springs	32
Rancho Mirage	169
Riverside County	576
Desert Tortoise Total	**2396**
Gray Vireo	
Palm Springs	0
Riverside County	29
Gray Vireo Total	**29**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Le Conte's Thrasher	
Cathedral City	943
Coachella	45
Desert Hot Springs	1053
Indian Wells	1176
Indio	1476
La Quinta	1767
Palm Desert	1828
Palm Springs	1601
Rancho Mirage	1179
Riverside County	3189
Le Conte's Thrasher Total	**14257**
Least Bell's Vireo - Breeding Habitat	
Cathedral City	0
Coachella	2
Desert Hot Springs	0
Indian Wells	21
Indio	30
La Quinta	30
Palm Springs	0
Rancho Mirage	0
Riverside County	3
Least Bell's Vireo - Breeding Habitat Total	**86**
Least Bell's Vireo - Migratory Habitat	
Cathedral City	0
Coachella	4
Desert Hot Springs	0
Indian Wells	187
Indio	173
La Quinta	55
Palm Desert	167
Palm Springs	0
Rancho Mirage	45
Riverside County	201
Least Bell's Vireo - Migratory Habitat Total	**832**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Little San Bernardino Mountains Linanthus	
Desert Hot Springs	1
Riverside County	0
Little San Bernardino Mountains Linanthus Total	**1**
Mecca Aster	
Indio	1
Riverside County	0
Mecca Aster Total	**1**
Orocopia Sage	
Riverside County	7
Orocopia Sage Total	**7**
Palm Springs Pocket Mouse	
Cathedral City	809
Coachella	15
Desert Hot Springs	515
Indian Wells	937
Indio	1367
La Quinta	1268
Palm Desert	1292
Palm Springs	1682
Rancho Mirage	1136
Riverside County	2109
Palm Springs Pocket Mouse Total	11129
Peninsular Bighorn Sheep	
Cathedral City	4
Indian Wells	2
La Quinta	126
Palm Desert	209
Palm Springs	5
Rancho Mirage	5
Riverside County	23
Peninsular Bighorn Sheep Total	**375**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Potential Flat-tailed Horned Lizard	
Cathedral City	0
Desert Hot Springs	0
Palm Springs	12
Riverside County	7
Potential Flat-tailed Horned Lizard Total	**19**
Predicted Flat-tailed Horned Lizard	
Cathedral City	538
Coachella	3
Indian Wells	2
Indio	589
La Quinta	842
Palm Desert	545
Palm Springs	874
Rancho Mirage	1360
Riverside County	924
Predicted Flat-tailed Horned Lizard Total	**6452**
Southern Yellow Bat	
Cathedral City	0
Desert Hot Springs	1
Palm Springs	0
Rancho Mirage	0
Riverside County	0
Southern Yellow Bat Total	**1**
Southwestern Willow Flycatcher - Breeding Habitat	
Cathedral City	0
Coachella	0
Desert Hot Springs	0
Indio	0
Palm Springs	0
Rancho Mirage	0
Riverside County	0
Southwestern Willow Flycatcher - Breeding Habitat Total	**0**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Southwestern Willow Flycatcher - Migratory Habitat	
Cathedral City	5
Coachella	35
Desert Hot Springs	2
Indian Wells	209
Indio	236
La Quinta	731
Palm Desert	194
Palm Springs	7
Rancho Mirage	46
Riverside County	253
Southwestern Willow Flycatcher - Migratory Habitat Total	**1717**
Summer Tanager - Breeding Habitat	
Cathedral City	0
Coachella	0
Desert Hot Springs	0
Indio	0
Palm Springs	0
Rancho Mirage	0
Riverside County	0
Summer Tanager - Breeding Habitat Total	**0**
Summer Tanager - Migratory Habitat	
Cathedral City	5
Coachella	35
Desert Hot Springs	2
Indian Wells	209
Indio	236
La Quinta	731
Palm Desert	194
Palm Springs	7
Rancho Mirage	46
Riverside County	253
Summer Tanager - Migratory Habitat Total	**1717**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Triple-ribbed Milkvetch	
Palm Springs	0
Riverside County	0
Triple-ribbed Milkvetch Total	**0**
Yellow Warbler - Breeding Habitat	
Cathedral City	0
Coachella	0
Desert Hot Springs	0
Indio	0
Palm Springs	0
Rancho Mirage	0
Riverside County	0
Yellow Warbler - Breeding Habitat Total	**0**
Yellow Warbler - Migratory Habitat	
Cathedral City	5
Coachella	35
Desert Hot Springs	2
Indian Wells	209
Indio	238
La Quinta	731
Palm Desert	194
Palm Springs	7
Rancho Mirage	46
Riverside County	253
Yellow Warbler - Migratory Habitat Total	**1720**
Yellow-breasted Chat - Breeding Habitat	
Cathedral City	0
Coachella	0
Desert Hot Springs	0
Indio	0
Palm Springs	0
Rancho Mirage	0
Riverside County	0
Yellow-breasted Chat - Breeding Habitat Total	**0**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Yellow-breasted Chat - Migratory Habitat	
Cathedral City	5
Coachella	35
Desert Hot Springs	2
Indian Wells	209
Indio	236
La Quinta	731
Palm Desert	194
Palm Springs	7
Rancho Mirage	46
Riverside County	253
Yellow-breasted Chat - Migratory Habitat Total	**1717**
Yuma Clapper Rail	
Coachella	0
Indio	0
Riverside County	0
Yuma Clapper Rail Total	**0**
Active desert dunes	
Palm Springs	0
Riverside County	2
Active desert dunes Total	**2**
Active sand fields	
Cathedral City	0
Palm Springs	0
Riverside County	256
Active sand fields Total	**256**
Arrowweed scrub	
Riverside County	0
Arrowweed scrub Total	**0**
Chamise chaparral	
Riverside County	0
Chamise chaparral Total	**0**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Cismontane alkali marsh	
Riverside County	0
Cismontane alkali marsh Total	**0**
Coastal and valley freshwater marsh	
Coachella	0
Indio	0
Riverside County	0
Coastal and valley freshwater marsh Total	**0**
Desert dry wash woodland	
Cathedral City	0
Coachella	0
Desert Hot Springs	2
Indian Wells	187
Indio	0
La Quinta	55
Palm Desert	167
Palm Springs	0
Rancho Mirage	45
Riverside County	268
Desert dry wash woodland Total	**724**
Desert fan palm oasis woodland	
Cathedral City	0
Desert Hot Springs	0
Palm Springs	0
Rancho Mirage	0
Riverside County	0
Desert fan palm oasis woodland Total	**0**
Desert saltbush scrub	
Coachella	4
Indio	173
La Quinta	0
Riverside County	52
Desert saltbush scrub Total	**229**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Desert sink scrub	
Riverside County	60
Desert sink scrub Total	**60**
Ephemeral sand fields	
Cathedral City	0
Palm Springs	72
Riverside County	7
Ephemeral sand fields Total	**79**
Interior live oak chaparral	
Palm Springs	0
Riverside County	0
Interior live oak chaparral Total	**0**
Mesquite bosque	
Riverside County	0
Mesquite bosque Total	**0**
Mesquite hummocks	
Cathedral City	0
Coachella	2
Desert Hot Springs	0
Indian Wells	21
Indio	568
La Quinta	30
Riverside County	3
Mesquite hummocks Total	**624**
Mojave mixed woody scrub	
Desert Hot Springs	0
Riverside County	0
Mojave mixed woody scrub Total	**0**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Mojavean pinyon & juniper woodland	
Riverside County	0
Mojavean pinyon & juniper woodland Total	**0**
Peninsular juniper woodland & scrub	
Palm Springs	0
Riverside County	0
Peninsular juniper woodland & scrub Total	**0**
Red shank chaparral	
Riverside County	0
Red shank chaparral Total	**0**
Semi-desert chaparral	
Palm Springs	0
Riverside County	0
Semi-desert chaparral Total	**0**
Sonoran cottonwood-willow riparian forest	
Coachella	0
Indio	0
Palm Springs	0
Riverside County	0
Sonoran cottonwood-willow riparian forest Total	**0**
Sonoran creosote bush scrub	
Cathedral City	0
Coachella	47
Desert Hot Springs	0
Indian Wells	24
Indio	243
La Quinta	172
Palm Desert	183
Palm Springs	2
Rancho Mirage	20
Riverside County	524
Sonoran creosote bush scrub Total	**1215**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Sonoran mixed woody & succulent scrub	
Cathedral City	9
Desert Hot Springs	0
Indian Wells	0
Indio	1
La Quinta	7
Palm Desert	0
Palm Springs	242
Rancho Mirage	0
Riverside County	413
Sonoran mixed woody & succulent scrub Total	**672**
Southern arroyo willow riparian forest	
Palm Springs	0
Riverside County	0
Southern arroyo willow riparian forest Total	**0**
Southern sycamore-alder riparian woodland	
Palm Springs	0
Riverside County	0
Southern sycamore-alder riparian woodland Total	**0**
Stabilized desert dunes	
Cathedral City	0
Riverside County	0
Stabilized desert dunes Total	**0**
Stabilized desert sand fields	
Cathedral City	0
Indio	0
Palm Springs	0
Riverside County	0
Stabilized desert sand fields Total	**0**

CVMSHCP Annual Report 2015 - Covered Activity Impact Outside Conservation Areas

Conservation Objective / Jurisdiction	Estimated Acres Disturbed Outside Conservation Areas
Stabilized shielded sand fields	
Cathedral City	356
Coachella	0
Indian Wells	589
Indio	358
La Quinta	402
Palm Desert	315
Palm Springs	260
Rancho Mirage	534
Riverside County	67
Stabilized shielded sand fields Total	**2881**