Coachella Valley Conservation Commission

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Coachella Valley Multiple Species Habitat Conservation Plan &

Natural Community Conservation Plan

Desert Tortoise and Linkage Conservation Area

Vegetation Map Report

Lynn C. Sweet, Cameron Barrows James Heintz, Roxann Merizan and Robert Johnson

Center for Conservation Biology, University of California, Riverside

Final Report

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EXECUTIVE SUMMARY

The University of California Riverside's Center for Conservation Biology (CCB) has created fine-scale vegetation maps for a number of Conservation Areas under the jurisdiction of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) under contract with the Coachella Valley Conservation Commission (CVCC). The primary purpose for creating these maps is provide a landscape-scale approach to monitoring changes due to land use, invasive species, recreation, hydrology, and climate. These digital maps, documenting changes and their causes, are then tools for prioritizing future conservation actions. The vegetation classification follows Federal Geographic Data Committee (FGDC) and National Vegetation Classification Standards (NVCS; Federal Geographic Data Committee 2008). The classification is meant to align with previous and concurrent efforts previous survey and classification work done by California Department of Fish and Wildlife's Vegetation Classification and Mapping Program (VegCaMP) and Aerial Information Systems (AIS) for the Desert Renewable Energy Conservation Plan Area as well as the southeastern Salton Sea Mid-Desert Area, and by the National Park Service for Joshua Tree National Park. This unit was mapped using the California Department of Fish and Wildlife (CDFW) and California Natural Plant Society Combined (CNPS) Vegetation Classification and Mapping Program protocol (CNPS 2014).

This map and report addresses the Desert Tortoise and Linkage Conservation Area (approximately 90,000 acres). Fieldwork, photo-interpretation and mapping were performed from 2014-2016. Within the study areas, rapid assessment protocol vegetation plots and supplemental reconnaissance observations were obtained within the study at pre-determined points in order to document the plant community, disturbances, and invasive species across space and types. Photo-interpretation of 2013 imagery and field information were combined to produce delineations of vegetation alliances and associations according to the California Department of Fish and Wildlife classification system, outlined in the Manual of California Vegetation Second Edition (Sawyer *et al.* 2009). Thus, the current version of the map best represents the status of vegetation in 2013.

We digitized the vegetation of the Desert Tortoise and Linkage Conservation Area Area from 2013 imagery provided by the Coachella Valley Association of Governments (CVAG) and 2014 imagery from the National Agricultural Imagery Program (NAIP); it includes approximately 881 delineated polygons, each assigned one of 21 vegetation alliances or land-cover types. We assigned the still finer scale association attribute where field plot data (Rapid Assessment Plot or reconnaissance observation) was available within the polygon boundaries, or where the association could be clearly identified from aerial imagery. This unit has several map classes that have less than 2% absolute vegetation cover, including the Desert Pavement/*Geraea canescens* Alliance, Disturbed/Built-Up, and a generic Non-Vegetated Habitat type. The largest amount of land cover is of the *Larrea tridentata—Encelia farinosa Shrubland Alliance* type, encompassing 27,665 acres), followed by *Parkinsonia florida--Olneya tesota Woodland Alliance* (18,255 acres), and *Larrea tridentata—Encelia farinosa Shrubland Alliance* (17,770 acres). This report and accompanying data are to be released at the end of 2017.

INTRODUCTION

This vegetation map is a tool to help aid in species monitoring and management in the Desert Tortoise and Linkage Conservation area within the Coachella Valley MSHCP and Natural Community Conservation Plan. At the end of the twentieth century, 27 species and 27 vegetation communities in the Coachella Valley were identified as being affected by pressures of land development and conversion of habitats. The most direct threat to the biodiversity of the area is habitat loss. From 1996 to 2008, citizens,

scientists, land managers, and federal and state agencies of the Valley developed a conservation plan that offered protection to these species and preserved over 250,000 acres of open space (Figure 1). The plan was approved by federal and state agencies and was implemented in 2008, all cities involved in the collaborative effort.

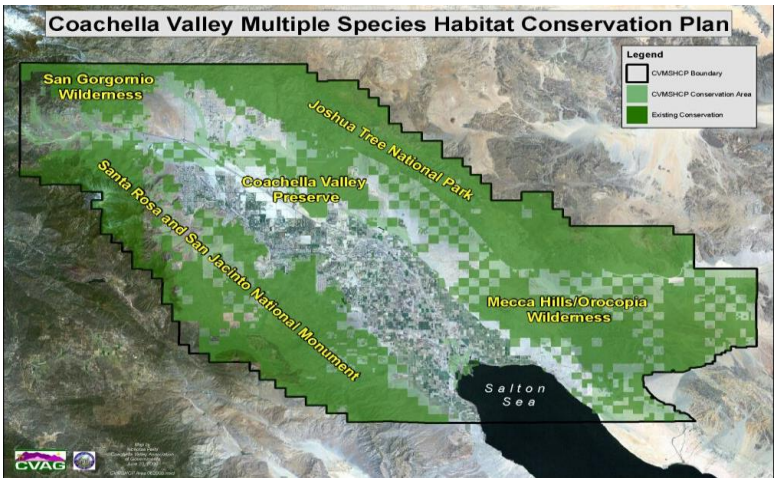

Figure 1: Coachella Valley Multiple Species Habitat Conservation Plan Boundary in relation to Joshua Tree National Park, the Santa Rosa and San Jacinto National Monument, the Coachella Valley USFWS Preserve, Wilderness areas, and the Salton Sea.

This comprehensive land planning essentially protects the ecological drivers and processes to enhance sustainability of community biodiversity. The plan is science-based and investigates hypotheses related to the persistence of species on conservation lands through adapting monitoring and management. The Coachella Valley is situated in the Colorado Desert which is situated on the northwest portion of the much larger Sonoran Desert, and consists of a variety of habitats. One hundred miles east of Los Angeles, it is bordered on the west by the San Jacinto, San Gorgonio, and Santa Rosa Mountain Ranges. The Valley lies at the northwest boundaries of the Colorado Desert, and to the east of the Valley lies the Salton Sea. The Coachella Valley is an extremely arid desert region that is characterized by aeolian sand communities, fan palm oases, creosote shrub, alluvial fan, and salt scrub communities.

Precipitation is the primary driver for vegetation growth in the Coachella Valley, which experiences both summer and winter precipitation events. Rains are highly variable from year to year, but tend to be more frequent at the far west of the Coachella Valley, due to the rain shadow of the San Jacinto, Santa Rosa, and San Bernardino mountain ranges. This causes a gradient of increasing temperature and aridness from west to east, as elevation decreases. During rare monsoonal events in July to September, weather systems that originate in the Gulf of Mexico, bring heavy but isolated thunderstorms to the Valley. During average years, the vast amount of reliable moisture comes from winter rains, which originate in the northwest and move into the area in October through May, contributing the greatest proportion of the annual rainfall.

Desert Tortoise and Linkage Conservation Area (Reserve Management Unit 3)

The Desert Tortoise and Linkage Conservation Area (hereafter, DTLA) comprises over 90,000 acres at the east end of the Coachella Valley, between Joshua Tree National Park to the north and the Mecca Hills and Orocopia Mountains to the south (Figure 2). The elevation at the southern end, within the __ canyon area is approximately 800 feet, and the highest elevation in the Conservation Area are the areas abutting the Park, at about 2900 feet. It is bisected by a major freeway thoroughfare, the I-10 interstate, a feature that plays a role in hydrologic processes influencing vegetation patterns to the north and to the south. It is made up primarily of public lands, Utility permittees (Coachella Valley Water District, Imperial Irrigation District), as well as small county and federal parcels. It is threatened by a proposed development project, sited within its boundaries.

This Conservation Area contains a variety of vegetation types that thrive in lower-elevation areas within the Colorado Desert. The Conservation area supports Plan-defined Core Habitat of the federally-threatened desert tortoise, and the area is part of the functional Core Habitat of the rare Mecca aster (California Rare Plant Rank 1B.2, CNPS 2016b) and Orocopia sage (California Rare Plant Rank 1B.3, CNPS 2016b). Also protected is Other Conserved Habitat for Le Conte's thrasher, round-tailed ground squirrel and the Palm Springs pocket mouse. A general habitat map was produced prior with the inception of the Plan to document the distribution of conserved natural communities, documented at the time as Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, Mojave mixed woody scrub, and desert dry wash woodland, using the Holland Type system (Holland, 1986). This effort updates this outdated map, and provides more specific information about the acreage-extent of habitat in this Conservation Area.

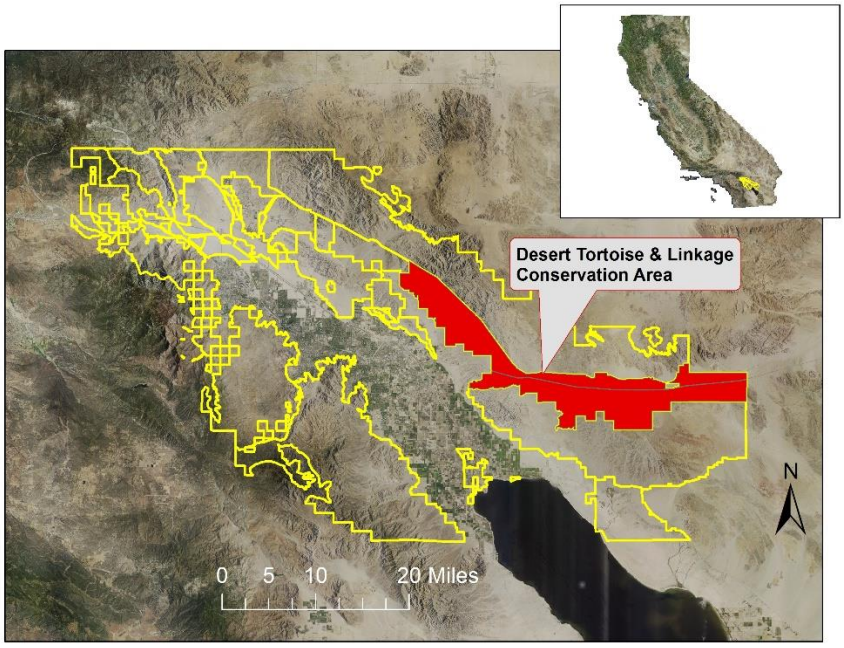

Figure 2: The Desert Tortoise and Linkage Conservation Area (DTLA) is located in Riverside County, California, USA, at the east end of the Coachella Valley. CVMSHCP Conservation Areas boundary shown in yellow, DLTA in red fill. Imagery from the National Agricultural Imagery Program (2014, USDA).

PURPOSE

The primary purpose for creating these maps is provide a landscape-scale approach to monitoring changes due to land use, invasive species, recreation, hydrology, and climate. These digital maps, documenting changes and their causes, are then tools for prioritizing future conservation actions. The outdated map of the Coachella Valley MSHCP areas, created before 1999, was based on the Holland classification system and was inconsistent with current standards prescribed by CDFW's Vegetation Classification and Mapping Program (VegCaMP). As part of the CVMSHCP/NCCP monitoring program, a phased work plan to remap all 746,000 acres of Conservation Areas began in 2012. These mapping areas together nearly complete the remap of the Plan Area, together with other Conservation Lands mapped by other entities, and previous work by UCR CCB. The completion of these maps updates the 2007 CVMSHCP/NCCP natural community map. This section of the map provides critical information to assist in monitoring habitat suitability in conservation areas, and quantifies attributes to help researchers understand the effects of environmental variability, including drought and climate change. An updated vegetation map was required to enhance understanding of species and their habitats, and identify management needs to ensure persistence of target species within the Plan area. The updated vegetation map is an essential element of monitoring for other covered species and natural communities and provides a baseline to monitor natural communities and landscape-scale vegetation change. Quantification of biotic habitat variables help document factors that may influence species population fluctuation. These data are key to conservation of biological diversity in the Plan area, in light of the listed threats to habitats in this management unit: invasive species; threats to hydrological regime/processes; climate change and habitat fragmentation, wildfire management, off-highway vehicle use, and other anthropogenic surface disturbance (CVMSHCP, Section 8). Understanding habitat requirements for species will help to guide the development of land management actions that support recovery and sustainability of healthy populations. Data produced under this effort is publicly available and supports concurrent CVMSHCP/NCCP monitoring.

RECONNAISSANCE VEGETATION ASSESSMENT

Initial research on the vegetation communities present in this Conservation Areas included a search for existing vegetation maps and development of a preliminary database of possible plant species, alliances and associations. The Desert Renewable Energy Conservation Plan map, which overlaps a small portion of the eastern end of the study area became available to the mapping team after Reconnaissance and mapping had begun and this information was incorporated in 2016. Reconnaissance visits in conjunction with monitoring for covered species (Crissal thrasher, burrowing owl) occurred between November and March in both 2014-2015 and in 2016-2017, CCB staff conducted surveys throughout the mapping area as a reconnaissance of vegetation types. The purpose of these field visits was to calibrate the photo-interpretation of aerial imagery to existing vegetation types within the area. The CNPS California Native Plant Society/Department of Fish and Game Protocol for Combined Vegetation and Rapid Assessment and Relevé Sampling Field Form was used for Rapid Assessment surveys (hereafter "RA plots"), in the study areas (CNPS 2014, 2016). The study areas were traversed on foot and by vehicle, and vegetation was assessed at optimal and accessible points, sited according to RA plot protocol (CNPS 2014, 2016). The field staff completed 56 RA plots in 2014-2015 and 42 RA plots in 2016-2017 both opportunistically-located as well as targeted at priority areas according to the photo interpreter's preference and priorities. Some of these RA plots in 2014-2015 were sited for concurrent monitoring of *Xylorhiza cognata* monitoring within DTLA boundaries. In addition, reconnaissance ("Recon") information including dominant species identities and other landscape cover notes were gathered at 62 points throughout the area. A significant effort was made to access areas where little was known about the

vegetation types from previous visits, or where few RA or Recon points existed. At each point, an RA form was completed, resulting in a database containing perennial vegetation percent cover (and annual cover of key species such as *Abronia villosa*, where it was likely to define the alliance); UTM easting and northing coordinates (NAD 1983 datum, Zone 11N); slope, aspect and elevation; percent surface cover of vegetation, litter and abiotic substrates; and other data (see protocol, CNPS 2016). As well, file numbers for photos at each point in four cardinal directions were recorded (photo database available upon request from CCB). For each RA plot, the field team assessed and assigned a Vegetation Alliance and Association, which was subsequently reviewed and formally assigned at the office.

Because this vegetation map is tied to aerial imagery acquired by CVCC in 2013 (with the goal of a temporally-uniform snapshot of vegetation across the Plan Area), there is a 1 to 3-year gap between the temporal reference period for this map and the state of vegetation as it was recorded on RA plot field surveys. In any other case where field conditions in 2016-2017 differed from those on the aerial imagery in 2013 (dead or dying vegetation, different species composition or extent), the information about likely conditions in 2013 from photo interpretation took precedence.

AERIAL PHOTO INTERPRETATION AND DELINEATION

Mapping Imagery and Photointerpretation: The map was produced by applying heads-up digitizing techniques using the primary source imagery, six-inch resolution true-color (RGB) spring 2013 aerial imagery provided by the Coachella Valley Conservation Commission from local flights for the majority of the mapping area. However, only a small western portion of the DTLA mapping area was covered by the primary 2013 source imagery (Figure 3). For the areas within the DTLA mapping area not covered by the base imagery, NAIP 2014 one meter 4-band and color infrared imagery (CIR) was used as the primary source for identification and delineation. This was supplemented with a variety of other sources such as ESRI WorldImagery (various sources, see: https://www.arcgis.com/home/item.html?id=10df2279f9684e4a9f6a7f08febac2a9). These supplemental sources were not used for delineation unless the primary source imagery was lacking, in which case the imagery with the nearest reliable time stamp was used. These ancillary sources were mostly useful as supporting information to help identify types and photosignatures, as well as boundaries between types, especially where the 2013 photo-imagery had heavy shadows within topographically-diverse areas.

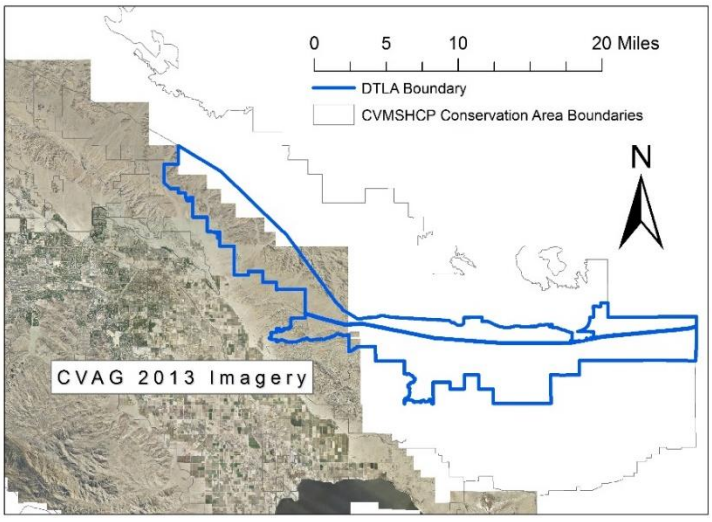

Figure 3: 2013 CVAG true-color 6-inch resolution imagery coverage with the DTLA mapping area boundaries.

The photo interpreter used the verified vegetation type locations (vegetation type photo signatures) to identify vegetation across the landscape, additionally using ecological characteristics of vegetation types in relation to landscape characteristics such as topographic features. Map polygons were assessed for vegetation type, percent cover, presence of exotic plants, anthropogenic alteration, development, and roadedness. Lines were drawn to delineate non-vegetated areas and vegetated areas, and within vegetated areas, to establish boundaries of Alliance and Association types. The photo interpreter drafted boundaries separating vegetation types generally at 1:1500 scale and attributed the type using RA plot information and relevant datasets. A finer visualization scale was used in some cases to delineate wetland types occurring in narrows bands and patchy areas. Absolute cover values from the RA plots was used to assist photo interpreters with delineating boundaries. Cover was quantified as non-vegetated habitat where it was less than 2%. Some coordinates for plots fall outside of the plot boundaries due to the extremely delicate habitat or accessibility challenges. For these surveys, the cover estimates, as they currently stand, apply to the projected coordinate locations indicated in the RA database where applicable.

Geodatabase: The photo interpreter worked with a GIS specialist to establish a geodatabase containing domain tables that relate alliance, group and macrogroup for assigned types in ArcGIS 10.3.1. Vegetation delineation was done using a line feature class, assigned to type using point feature class, and finally, a polygon feature class was created, attributed with alliance and other attributes. A comprehensive quality control effort was conducted by senior GIS staff to finalize polygons, and geodatabase domains (Alliance, Common Name, Association, Group and Macrogroup). Continuous quality control checks were performed using query tools in ArcGIS as well as the utilization of a secondary reviewer from the team (other than the photo-interpreter) to review polygon assignments, identify problematic vegetation assignments errors and discrepancies as monitoring continued, and all were incorporated into the final geodatabase.

Minimum Mapping Unit: For upland alliances occurring in expansive areas, a minimum mapping unit of 10 acres was observed for breaking up classes, or major changes in the vegetation cover class. For the purposes of the CVMSHCP, habitat of sensitive species is of particular concern and therefore to improve the ability of researchers and land managers to target wildlife habitat that is patchily-distributed, there are several alliances where the minimum mapping unit (MMU) is less than an acre. These include *Prosopis glandulosa* Woodland Alliance (habitat for the covered species, *Toxostoma crissalis*, crissal thrasher) and *Washingtonia filifera* Woodland Alliance (supporting Federally endangered *Cyprinodon macularius*, desert pupfish), as well as certain wash types which displayed complexity that necessitated delineation (generally, Groups G499, G531, G533; see "Classification…" section below). Following common vegetation mapping standards, stands that did not meet minimum mapping unit criteria were lumped with, or drawn within the bounds of, the most similar adjacent vegetation type polygon, for example, tree alliances with other tree alliances, shrubs with other shrub types, upland types with upland types, and so forth.

Vegetation Mortality, Land Use and Other Changes: Due to land clearing for electrical or gas transmission, some areas were heavily anthropogenically-altered. These are noted on the vegetation map as indicated above, as an anthropogenic disturbance or invasive plant % cover class. For polygons in which the RA plot data indicated significant mortality of the vegetation or dormant vegetation, the photo interpreter visually assessed the greenness of the vegetation in the aerial imagery from 2013 (or the photo imagery nearest to that date) to decide how much of the dominant alliance vegetation was in fact living in 2013. Often, remaining basal sprouts or small percentage of the vegetation remained alive, with sufficient cover remaining alive to pass the assignment rules for the dominant vegetation type. Where the vegetation could be clearly identified but where it was ambiguous as to whether the dominant vegetation type was

sufficiently alive in 2013 after using the decision process described above, the photo interpreter defaulted to the assumption that the vegetation in question was still alive during the time stamp represented by the map in lieu of assigning a different alliance.

Other cases in which RA plot data differed from photo imagery included: development, fire, expansion or management of invasive species, and other changes in land use or land management activities, and these were assigned to 2013 vegetation status similar to the above. Disturbance codes were entered for stands that were surveyed, per Rapid Assessment protocol, which aided in interpretation of imagery. As well, disturbance types and intensity were assigned for all polygons in the geodatabase: roadedness, development, anthropogenic alteration, as well as invasive species % cover (only if obvious from stand interpretation or as noted in RA plots). Definitions and protocol for assigning disturbance types in the geodatabase were assigned using the criteria set forth in the DRECP vegetation map (CDFW 2013); differing only in that we did not separate hydrologic alteration from other types of anthropogenic alteration.

Time Period Represented: The time period aimed at in this map to classify the vegetation state during the year 2013. This aligns with the overall mapping goal for the CVMSHCP area to have a uniform temporal snapshot of vegetation across the Plan area for this year. However, as a living map, polygons and assignments will be regularly reviewed, updated, or flagged for further field visits as part of ongoing monitoring within the mapping area. It is recommended, due to ongoing changes within the Plan area, that that periodic updates should be published as additional information and newer imagery becomes available.

CLASSIFICATION OF VEGETATION FOR THE MAPPING AREA

The map classification is based largely on work done in areas for previous and ongoing projects: Vegetation Mapping of Anza-Borrego Desert State Park and Environs (Keeler-Wolf *et al.* 1998), the Western Riverside County MSHCP Vegetation Map (2004), Vegetation of Joshua Tree National Park (La Doux *et al.* 2013), and the Vegetation Map in Support of the Desert Renewable Energy Conservation Plan (CDFW, 2013). There are also several new provisional alliances developed from previous work in the CVMSHCP area, including the Mecca Hills and Orocopia Mountains Map (2016) and the Dos Palmas Conservation Area Map (2016); these new provisional alliances are described in the respective reports. Any provisional alliance that has not been yet adopted by CDFW into the MCV schema as reflected in the MCV online (http://vegetation.cnps.org/, accessed June 2017) are still listed as "Provisional" in this map and geodatabase. There was one provisional alliance identified during this study, based on relevé plot observation and subsequent classification, the *Peucephyllum schottii* Scrub Alliance (* in the classification below), though this type needs additional sampling before being proposed to the NVCS. Although field staff frequently encountered Desert Pavement substrate, we were unable to capture the annual flora that identifies the Geraea canescens--Chorizanthe rigida Desert Pavement Annual Herbaceous Alliance due to the early seasonal sampling, although some dried spineflower was located in the field in one RA plot. Thus, this alliance was identified using substrate, micro-topography, and vegetation structural characteristics in the field.

The nested hierarchy below, containing the vegetation types documented in the mapping area, including the Macrogroup and Group, was based on the National Vegetation Classification System (Federal Geographic Data Committee 2008); specifically, the recommendations of Evens (2014) to align the NVCS with the Manual of California Vegetation (Sawyer *et al.* 2009).

Class 2. Shrubland & Grassland
- Subclass 2.B. Temperate & Boreal Grassland & Shrubland
  - Formation 2.B.1. Mediterranean Scrub & Grassland
    - Division 2.B.1.Na. California Scrub
      - Macrogroup M044. California Coastal Scrub
        - Group G264. Central & Southern California Coastal Sage Scrub
          - Eriogonum fasciculatum—Viguiera parishii Provisional Alliance

Class 3. Desert & Semi-Desert
- Subclass 3.A. Warm Desert & Semi-Desert Woodland, Scrub & Grassland
  - Formation 3.A.2. Warm Desert & Semi-Desert Scrub & Grassland
    - Division 3.A.2.Na. North American Warm Desert Scrub & Grassland
      - Macrogroup M088. Mojave-Sonoran Semi-Desert Scrub
        - Group G293. Sonoran Paloverde - Mixed Cacti Desert Scrub
          - Simmondsia chinensis Provisional Alliance
        - Group G295. Mojave-Sonoran Bajada & Valley Desert Scrub
          - Ambrosia dumosa Alliance
          - Encelia farinosa Alliance
          - Larrea tridentata Alliance
          - Larrea tridentata–Ambrosia dumosa Alliance
          - Larrea tridentata–Encelia farinosa Alliance
          - *Psorothamnus schottii Provisional Alliance*
        - Group G296. Mojave Mid-Elevation Mixed Desert Scrub
          - Lycium andersonii Alliance
      - Macrogroup M092. North American Warm-Desert Xero-Riparian Scrub
        - Group G541. Warm Semi-Desert Shrub & Herb Dry Wash
          - Acacia greggii Alliance
          - Ambrosia salsola Alliance
          - Encelia (actoni, virginensis) Alliance
          - Hyptis emoryi Alliance
          - *Justicia californica Provisional Alliance*
          - Parkinsonia florida–Olneya tesota Alliance
          - *Peucephyllum schottii Provisional Alliance* *
          - Psorothamnus spinosus Alliance
- Subclass 3.B. Cool Semi-Desert Scrub & Grassland
  - Formation 3.B.1. Cool Semi-Desert Scrub & Grassland
    - Division 3.B.1.Ne. Western North American Cool Semi-Desert Scrub & Grassland
      - Macrogroup M171. Great Basin & Intermountain Dry Shrubland & Grassland
        - Group G311. Intermountain Semi-Desert Grassland
          - Pleuraphis rigida Alliance

Class 6. Rock Vegetation
- Subclass 6.C. Desert & Semi-Desert Rock Vegetation
  - Formation 6.C.1. Warm Desert & Semi-Desert Cliff, Scree & Other Rock Vegetation
    - Division 6.C.1.Na. North American Warm Semi-Desert Cliff, Scree & Rock Vegetation
      - Macrogroup M117. North American Warm Semi-Desert Cliff, Scree & Rock Vegetation
        - Group G569. North American Warm Semi-Desert Cliff, Scree & Pavement Sparse Vegetation
          - *Geraea canescens—Chorizanthe rigida Desert Pavement Provisional Alliance*

PROVISIONAL ALLIANCE DESCRIPTIONS

Peucephyllum schottii Provisional Alliance

Pygmy-cedar scrub Provisional Alliance

Figure 4: The image on the left shows a *Peucephyllum schottii* shrubland stand. The image on the right shows the photo signature on the 6-inch 2013 true-color imagery, with the location of the left-hand photo identified with a green circle, taken facing eastward. This stand had 5% *Peucephyllum schottii*, 3% *Hyptis emoryi*, 1% *Ambrosia salsola*, and less than 1% of *Parkinsonia florida, Psorothamnus spinosus, Bebbia juncea, Petalonyx thurberi, Ferrocactus cylindraceus, Asclepias albicans, and Fouquieria splendens.*

DESCRIPTION: Polygons mapped as this Provisional Alliance are dominated by *Peucephyllum schottii*, with at least 2 percent absolute cover in the shrub canopy and no other species having greater or equal cover. These stands are typically within fairly gently-sloping, open sections of seasonally-flooded drains that are fairly disturbed, though the species also occurs in upland habitats on rocky slopes. Additional samples should be taken of this stand type.

ALLIANCES AND LANDSCAPE ATTRIBUTES IDENTIFIED

Vegetation Alliance or Land Cover Type	Area (ha)	Area (acres)
Larrea tridentata--Encelia farinosa Shrubland Alliance	11,195.67	27,665.06
Parkinsonia florida--Olneya tesota Woodland Alliance	7,387.56	18,255.02
Larrea tridentata--Ambrosia dumosa Shrubland Alliance	7,191.46	17,770.46
Larrea tridentata Shrubland Alliance	3,692.17	9,123.55
Non-vegetated Habitat (less than 2% absolute cover)	2,534.68	6,263.31
Encelia farinosa Shrubland Alliance	1,575.18	3,892.36
Geraea canescens--Chorizanthe rigida Desert Pavement Annual Herbaceous Alliance	1,285.22	3,175.84
Psorothamnus schottii Shrubland Provisional Alliance	401.72	992.67
Hyptis emoryi Shrubland Alliance	275.41	680.56
Ambrosia salsola Shrubland Alliance	254.56	629.03
Disturbed/built-up	175.46	433.58
Ambrosia dumosa Shrubland Alliance	160.68	397.04
Acacia greggii Shrubland Alliance	146.86	362.89
Psorothamnus spinosus Woodland Alliance	93.11	230.07
Eriogonum fasciculatum--Viguiera parishii Shrubland Alliance	53.81	132.97
Justicia californica Shrubland Alliance	30.20	74.63
Peucephyllum schottii Provisional Shrubland Alliance	20.26	50.07
Lycium andersonii Shrubland Alliance	11.24	27.78
Pleuraphis rigida Herbaceous Alliance	9.01	22.25
Simmondsia chinensis Provisional Shrubland Alliance	8.34	20.62
Encelia (actoni, virginensis) Shrubland Alliance	8.25	20.38
TOTAL	**36,510.86**	**90,220.15**

ASSOCIATIONS IDENTIFIED

Vegetation Association or Land Cover Type
Acacia greggii / (Bebbia juncea / Hyptis emoryi) Association
Acacia greggii--Bebbia juncea Association
Ambrosia salsola--Acacia greggii--(Bebbia juncea--Hyptis emoryi) Association
Ambrosia salsola--Hyptis emoryi Association
Ambrosia salsola--Larrea tridentata--Encelia farinosa--Ambrosia dumosa Association
Ambrosia salsola--Peucephyllum schottii Association
Chilopsis linearis / Ericameria paniculata--Ambrosia salsola Association
Chilopsis linearis--Xylorhiza cognata Association
Encelia farinosa - Pleuraphis rigida Association
Encelia farinosa--Ambrosia dumosa Association
Encelia farinosa--Peucephyllum schottii Association
Hyptis emoryi Association
Hyptis emoryi--Ambrosia salsola Association
Larrea tridentata / wash Association
Larrea tridentata Association
Larrea tridentata--Ambrosia dumosa / Olneya tesota Association
Larrea tridentata--Ambrosia dumosa Association
Larrea tridentata--Ambrosia dumosa--Ambrosia salsola Association
Larrea tridentata--Ambrosia dumosa--Encelia farinosa Association
Larrea tridentata--Ambrosia dumosa--Hyptis emorii Association
Larrea tridentata--Ambrosia dumosa--Krameria grayi Association
Larrea tridentata--Ambrosia dumosa--Psorothamnus schottii--Encelia farinosa Association
Larrea tridentata--Ambrosia salsola Association
Larrea tridentata--Encelia farinosa / Parkinsonia florida Association
Larrea tridentata--Encelia farinosa Association
Larrea tridentata--Encelia farinosa--Ambrosia dumosa Shrubland Association
Larrea tridentata--Encelia farinosa--Ambrosia salsola Association
Larrea tridentata--Encelia farinosa--Fouquieria splendens Association
Larrea tridentata--Encelia farinosa--Psorothamnus schottii Association
Larrea tridentata--Encelia farinosa--Psorothamnus schottii--Association
Larrea tridentata--Fouquieria splendens Association
Larrea tridentata--Hoffmannseggia microphylla Association
Lycium andersonii--Larrea tridentata--Hyptis emoryi Association
Non-vegetated habitat / Encelia farinosa Association
Non-vegetated Habitat / Larrea tridentata Association
Non-vegetated habitat / Larrea tridentata Association--Xylorhiza cognata Association
Olneya tesota / Ambrosia salsola--Hyptis emoryi Association
Olneya tesota / Justicia californica Association
Olneya tesota / Larrea tridentata Association
Olneya tesota / Larrea tridentata--Encelia farinosa Association
Parkinsonia florida / Acacia greggii Association
Parkinsonia florida / Acacia greggii--Hyptis emoryi Association
Parkinsonia florida / Ambrosia salsola Association
Parkinsonia florida / Bebbia juncea Association
Parkinsonia florida / Hyptis emoryi Association
Parkinsonia florida / Larrea tridentata--Peucephyllum schottii Association
Parkinsonia florida / Larrea tridentata--Psorothamnus schottii Association
Parkinsonia florida / Psorothamnus schottii Association
Parkinsonia florida--Olneya tesota / Acacia greggii Association
Parkinsonia florida--Olneya tesota / Cylindropuntia sp. Association
Parkinsonia florida--Olneya tesota / Hyptis emoryi Association
Parkinsonia florida--Olneya tesota / Larrea tridentata--Ambrosia dumosa Association
Parkinsonia florida--Olneya tesota Association
Parkinsonia florida--Olneya tesota--Psorothamnus spinosus Association
Peucephyllum schottii / Hyptis emoryi Association
Pleuraphis rigida / Encelia farinosa Association
Pleuraphis rigida / Hyptis emoryi Association
Psorothamnus schottii Association
Psorothamnus schottii--Senna armata Association
Psorothamnus spinosus / Ambrosia salsola--Bebbia juncea Association
Psorothamnus spinosus / Hyptis emoryi--Acacia greggii Association

VEGETATION MAP

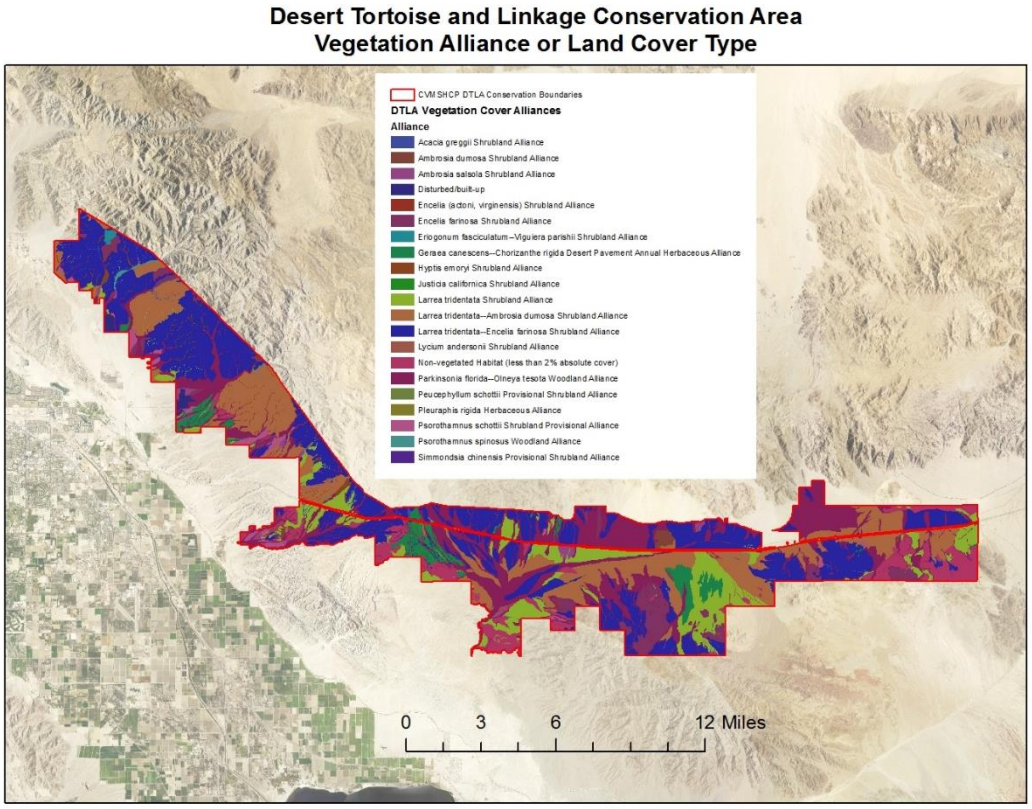

Figure 5: Vegetation map of the Desert Tortoise and Linkage Conservation Area.

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APPENDICES

Appendix A: Vegetation Geodatabase 2017

Geodatabase components:

"DTLA_RA_plots" (Rapid Assessment Database)
"DTLA_Recon_points" (Reconnaissance Information Database)
"DTLA_Veg_Poly_postAA" (Vegetation and Land Cover)
"CVAG_DTLA_MappingBoundary" (Mapping Area Boundary)

File name and type: CVAG_DLTA_Vegmap_2017.gdb
ArcGIS 10.3.1 Geodatabase

Appendix B: Desert Tortoise and Linkage Conservation Area Alliance Map

File name and type: UCR_CCB_CVAG_DTLA_Vegetation_2017.pdf
File name and type: PDF