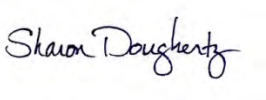
Biological Technical Report in Support of the City of Barstow's 2014 General Plan Master Environmental Impact Report, Barstow, San Bernardino County, California

Job#: 14-005

Prepared by:
Circle Mountain Biological Consultants, Inc.
P.O. Box 3197
Wrightwood, California 92397
PH: (760) 249-4948
FAX: (760) 249-4948
Email: circlemtn@yahoo.com
Contacts: Ed LaRue and Sharon Dougherty, Principal Consulting Biologists

Prepared for:
The City of Barstow
220 East Mountain View St., Suite A
Barstow, California 92311
PH: (760) 255-5152
FAX: (760) 256-1750
Email: gloewenstein@barstowca.org
Contact: Gaither Loewenstein, Economic Development and Planning Manager

We hereby certify that the statements furnished herein, including attached exhibits, present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of our knowledge and belief. Field work conducted for this assessment was performed by us or under our direct supervision. We certify that we have not signed a nondisclosure or consultant confidentiality agreement with the City of Barstow and that we have no financial interest in the project.



Edward L. LaRue, Jr. Sharon E. Dougherty

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LIST OF ABBREVIATIONS

10a Permit	= FESA Section 10(a)(1)(B) incidental take permit issued by USFWS
2081 Permit	= CESA Section 2081 incidental take permit issued by CDFW
ACEC	= Area of Critical Environmental Concern
BCC	= Bird of Conservation Concern (USFWS designation)
BLM	= U.S. Bureau of Land Management
BNSF	= Burlington, Northern and Santa Fe Railroad
Cal-IPC	= California Invasive Plant Council
CDFG	= California Department of Fish and Game
CDFW	= California Department of Fish and Wildlife
CEC	= California Energy Commission
CEQA	= California Environmental Quality Act
CESA	= California Endangered Species Act
CFR	= Code of Federal Regulations
CHIP	= Communities of Highest Inventory Priority
City	= City of Barstow Planning Department
CMBC	= Circle Mountain Biological Consultants, Inc.
CNDDB	= California Natural Diversity Data Base
CNPS	= California Native Plant Society
DWMA	= Desert Wildlife Management Area
DRECP	= Desert Renewable Energy Conservation Plan
FESA	= Federal Endangered Species Act
FP	= Fully Protected (CDFW designation)
HCP	= Habitat Conservation Plan
Master EIR	= Master Environmental Impact Report
MBTA	= Migratory Bird Treaty Act
MMRP	= Mitigation and Monitoring Reporting Program
MOU	= Memorandum of Understanding
NCCP	= Natural Community Conservation Planning program
NEPA	= National Environmental Policy Act
RWQCB	= Regional Water Quality Control Board
SSC	= Species of Special Concern (CDFW designation)
T & E	= Threatened and Endangered (both CDFW and USFWS designations)
UP	= Union Pacific Railroad
USFWS	= U.S. Fish and Wildlife Service
USGS	= U.S. Geological Survey
West Mojave Plan	= West Mojave Coordinated Management Plan
WL	= Watch List species (CDFW designation)
WRCC	= Western Regional Climate Center

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EXECUTIVE SUMMARY

The primary purposes of this report are to provide new information about common and, particularly, uncommon biological resources reported from Barstow and adjacent areas since the previous general plan update in 1996; to update biological goals and objectives consistent with the open-space and conservation elements of the 2014 general plan update; to describe survey protocols to identify special status plant and animal species that may be affected by planned development; to describe impacts and typical mitigation measures to offset them; and, to describe the federal and state regulatory framework that pertain to future development projects within the city. Biological data given herein are intended to serve as baseline information for completion of the City's 2014 General Plan Master Environmental Impact Report.

Appendix A provides cumulative lists of the common plant and animal species observed on 27 sites surveyed within Barstow's city limits between 1990 and 2014. These cumulative lists include 222 plant, 12 reptile, 61 bird, and 13 mammal species observed or detected by CMBC biologists. Appendix B provides in depth species account information, photographs, status designations, seasonal detection information, and regional distributions for 10 plant, 2 reptile, 12 bird, and 4 mammal species designated as special status species by state and federal regulatory agencies. Appendix C includes print-outs of the May 2014 California Natural Diversity Data Base reports on specific observations of these special status species, which supplements CMBC's personal observations. In completing a total of 46 surveys within the region, CMBC biologists found evidence of the desert tortoise on 33 of the 46 surveys (72%), and also detected 3 plant, 11 bird, and 1 mammal species that are considered rare by state and federal regulatory agencies. These observations are augmented by results from other consultants' surveys.

Biological goals and objectives are identified and recommendations given to (1) conserve suitable habitats for Threatened and Endangered species found in the region, with special emphasis on the desert tortoise, Mohave ground squirrel, and burrowing owl; (2) to maintain riparian and other natural habitats along Mojave River, so that it may serve as a travel corridor and protected watershed; (3) to maintain natural areas for aesthetic and low-impact recreational purposes, and to utilize major recreational and open space areas, including BLM-designated vehicle open areas; (4) to avoid actions that lead to federal and/or state listing of additional plant and animal species as Threatened or Endangered; and (5) to identify best management practices to prevent the spread of invasive, exotic plant species into native plant communities.

Specific state and federal survey protocols are identified and referenced for rare plants that may be detected in either the spring and/or the fall; for rare plant communities known or suspected to occur in the region; and for native desert plants protected by county and state ordinances. Survey protocols are also identified for desert tortoise and Mojave fringe-toed lizards; rare birds (particularly burrowing owls) and other birds that are protected by state and federal regulations; and for rare mammals, particularly the Mohave ground squirrel.

Federal and state regulations are then discussed to minimize and mitigate impacts to rare plants, desert tortoises, nesting birds, burrowing owl, Mohave ground squirrel, and desert washes. Two regional plans are discussed: the West Mojave Plan for its regulation of development on public lands managed by the BLM, and the Desert Renewable Energy Conservation Plan that would regulate renewable energy construction on both public and private lands in the region.

Biological Technical Report in Support of the City of Barstow's 2014 General Plan Master Environmental Impact Report, Barstow, San Bernardino County, California

1.0. INTRODUCTION

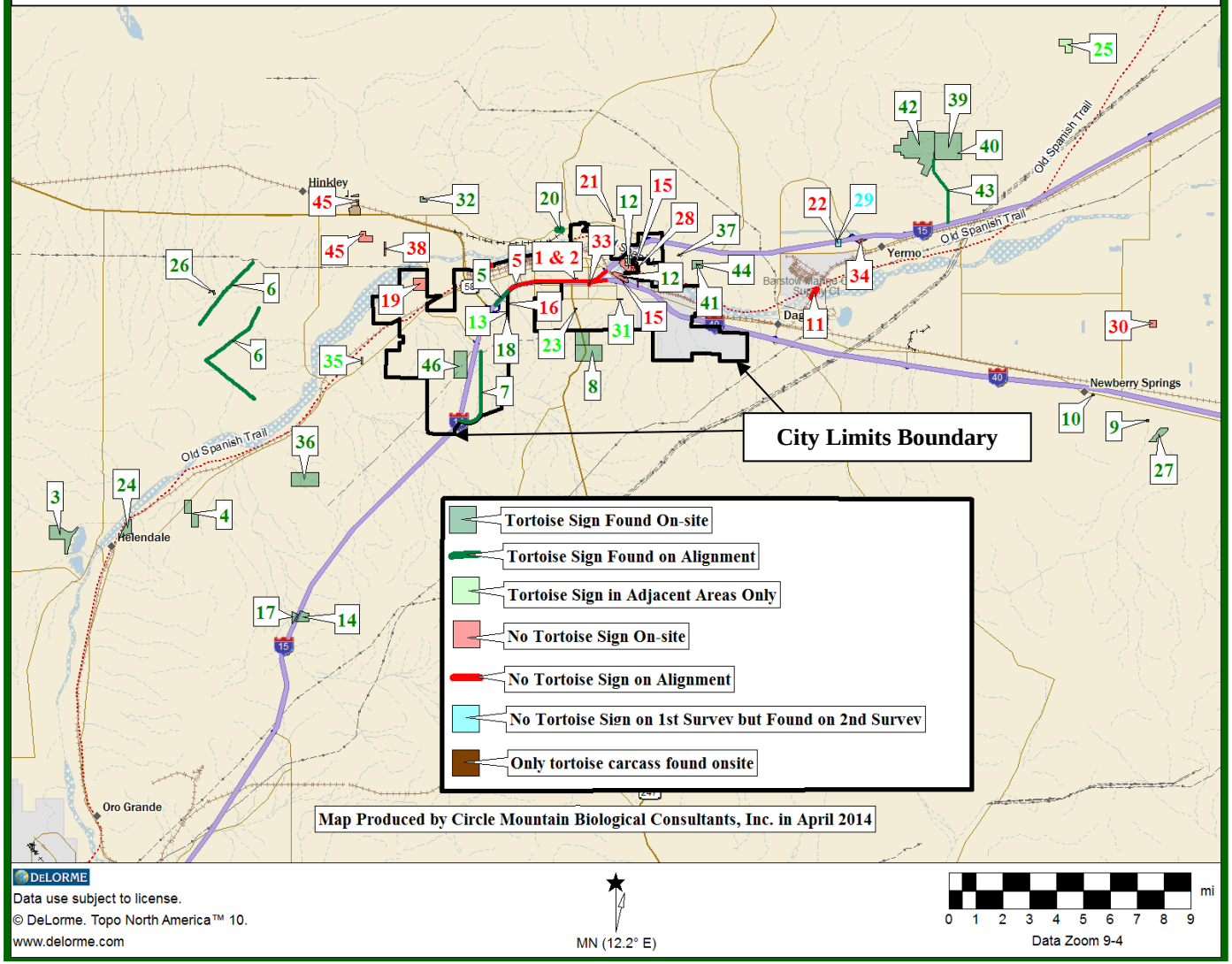
1.1. Purpose and Need for Study

Circle Mountain Biological Consultants, Inc. (CMBC) has been contracted by the City of Barstow Planning Department (City) to provide technical assistance in support of their 2014 General Plan Master Environmental Impact Report (Master EIR). The purpose of this biological technical report is to update the City's analogous biological report (CMBC 1996), which was produced in support of the 1997 general plan update. A primary purpose of this report, then, is to provide new information about common and, particularly, uncommon biological resources reported within the city and adjacent areas (Figures 1 and 2) in the past 18 years; to update biological goals and objectives consistent with the open-space and conservation elements of the 2014 general plan as described in the Governor's Office of Planning and Research (2003); to describe survey protocols to identify special status plant and animal species that may be affected by planned development; to describe impacts and typical mitigation measures to offset them; and, to describe the federal and state regulatory requirements that pertain to future development projects within the city.

Since producing the earlier biological technical report for the 1997 general plan update 18 years ago (CMBC 1996), there have been numerous new biological studies conducted throughout the region encompassing Barstow. These studies provide substantial new information about the distributions of special status species in the region. There have also been changes in state and federal policies that clarify the significance of impacts, and that identify minimization and mitigation measures that are currently acceptable to state and federal regulatory agencies, including U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW; formerly "California Department of Fish and Game" or "CDFG"), and U.S. Bureau of Land Management (BLM). There are also new survey protocols for rare plant and animal species that have been modified since the 1996 report. Finally, the original goals and objectives identified in the earlier report are reconsidered herein for their applicability to planned development for the foreseeable future.

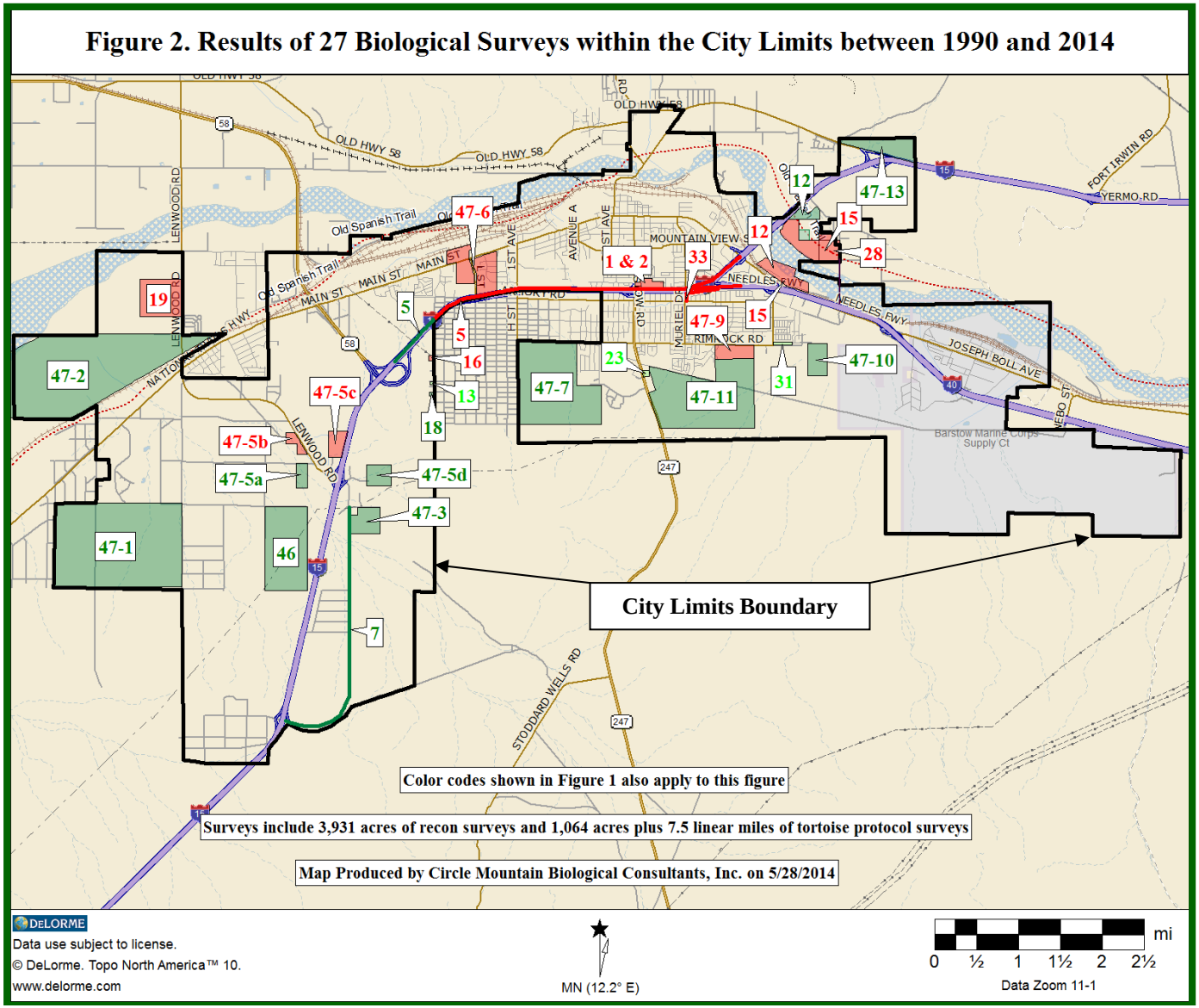
The City has identified 16 potential projects that are in various stages of planning that could be developed between 2014 and about 2020, depending on numerous factors. In a companion report (CMBC 2014), CMBC has performed reconnaissance-level surveys on each of these sites that were sufficient to identify special status species and assess habitats that would likely be affected if the sites were developed in the next few years. The current technical report, then, provides specific information and data not included in the 1996 report that is intended to serve as baseline information for these 16 projects and others so that the City may produce its Master EIR in support of the general plan update.

Figure 1: Results of 46 Biological Surveys on 4,859 acres & 8.2 Linear Miles from 1990 to 2014



(Note: Figure 1 does not include the 15 sites subject to reconnaissance surveys in April 2014; only protocol surveys. The numbers relate to an annotated bibliography maintained by CMBC, part of which is included in Appendix A.)

Figure 2. Results of 27 Biological Surveys within the City Limits between 1990 and 2014



(Note: Figure 2 includes the 15 sites subject to reconnaissance surveys in April 2014.)

2.0. METHODS

2.1. Literature Review

Since 1990, CMBC biologists, Ed LaRue and Sharon Dougherty, and various subcontractors have performed 46 focused surveys for Agassiz's desert tortoise (*Gopherus agassizii*) in the region including and surrounding Barstow (Figure 1); 27 of these surveys were within the city limits (Figure 2). Collectively, the 46 surveys have covered approximately 4,860 acres of private land and 8.2 linear miles of various right-of-ways (e.g., pipeline, flood control, and roadway alignments). CMBC also reviewed the results of eight additional surveys provided by the City, including 1,498 additional acres and 4,500 more linear feet, which are shown in Figure 3. Collectively, then, including reconnaissance surveys shown in Figure 4, a total of about 9,288 acres and 9.0 linear miles have been surveyed.

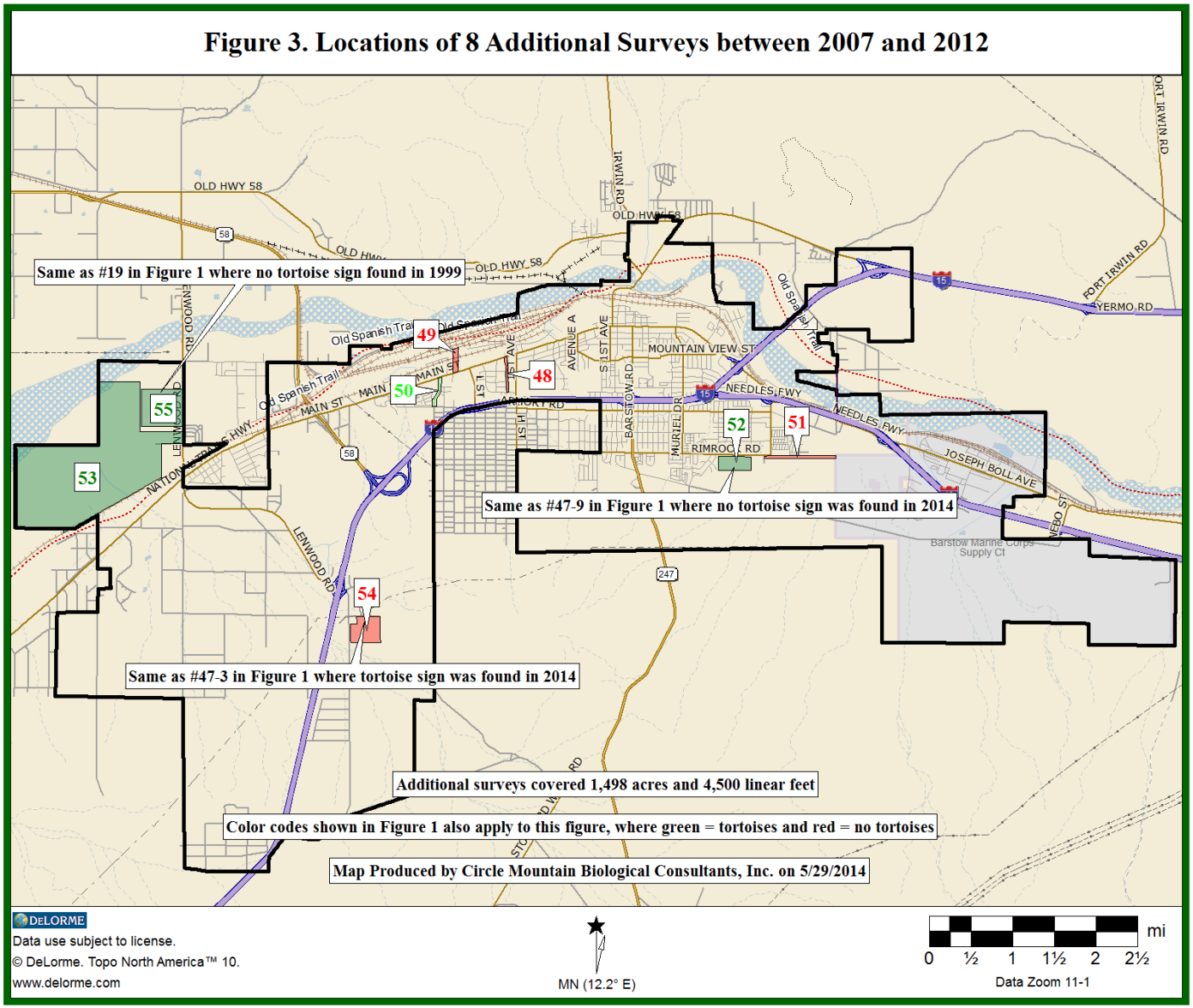
While these surveys were performed to the specifications of USFWS (1992, 2010a) for detection of desert tortoises and their signs (e.g., burrows, fecal droppings called "scat," carcasses, tracks, egg shell fragments), they were also ideally suited for detecting both common and uncommon plant and animal species. The surveys are comprised of a series of linear transects, spaced at 10-meter (30-foot) intervals that are walked throughout the site. For a square mile parcel, this entails approximately 176 linear miles of walking, which at a rate of approximately four acres an hour, takes 160 hours to survey, depending on terrain, the amount of tortoise sign, and other factors. If no tortoise sign is found onsite, a series of peripheral transects, referred to as "zone of influence transects," are surveyed in adjacent areas.

In completing the 46 surveys (see Figure 1) between Hinkley to the west, Yermo to the north, Newberry Springs to the east, and Helendale to the south, not only have CMBC biologists found evidence of tortoises on 33 of the 46 surveys (72%), CMBC also detected 3 plant, 1 reptile, 11 bird, and 1 mammal species that are considered rare by state and federal regulatory agencies. Since all plants and animals – both common and uncommon species – identified on each site are included in lists within each report, we provide cumulative lists of the species observed on those 27 sites found within Barstow's city limits in Appendix A. These cumulative lists include 222 plant, 12 reptile, 61 bird, and 13 mammal species observed or detected by CMBC biologists.

To supplement CMBC's and other consultants' observations of rare plants and animals in the region, we also subscribed to the May 2014 version of the electronic data base produced and updated monthly by CDFW (2014a), which is referred to as the "California Natural Diversity Data Base," or simply, "CNDDB." This has allowed us to identify those rare plant and animal species most often reported from the region. We then provide detailed accounts for each of these species in Appendix B, which are taken from the West Mojave Plan (U.S. Bureau of Land Management 2005), baseline biology reports associated with the Desert Renewable Energy Conservation Plan (Dudek 2012), or authored by Ed LaRue specifically for this report.

The strength of the CNDDB is that it provides a cumulative list and extensive descriptions of all rare plants and animals reported on standardized forms by biologists working in the area. Its weaknesses are that more common, similar-looking species may have been misidentified and subsequently reported, and the CNDDB only includes those records that have been submitted; there are likely numerous confirmed sightings (including most of CMBC's observations documented herein) that have not been formally submitted to CDFW. As a resource contained within this technical report, we provide the latest CNDDB reports in Appendix C for the following U.S. Geological Survey (USGS) 7.5' quadrangles, which encompass Barstow and all surrounding areas: Barstow, Barstow SE, Daggett, Hinkley, Hodge, and Nebo.

Figure 3. Locations of 8 Additional Surveys between 2007 and 2012



USFWS is the federal agency that lists plants and animals as Threatened or Endangered under the Federal Endangered Species Act (FESA), and also has a specific list of birds that are designated as Birds of Conservation Concern (USFWS 2008). Whereas the California Fish and Game Commission is responsible for listing plants and animals as Endangered under the California Endangered Species Act (CESA), they also have other designations, such as California Species of Special Concern, Fully Protected species, and Watch List species that apply to other species that are not formally listed. The CDFW is responsible for issuing permits and otherwise protecting species that are designated by the Commission. CDFW also produces lists of rare plants (CDFW 2014b) and animals (CDFG 2011) that include current state, federal, and California Native Plant Society (CNPS) designations.

Finally, the CNPS (2014) maintains lists of plants considered rare in California. CDFW includes these rare plant species in their CNDDB electronic data base. Each of the 10 rare plants considered below in Section 3.2.2 has been assigned a designation by CNPS. CMBC has provided definitions for these status designations, which are only assigned to plants, at the end of Appendix B.

2.2. Field Reconnaissance Surveys

The City has taken this opportunity to update its existing general plan by producing a Master EIR that specifically identifies 16 sites that may be developed in the foreseeable future (i.e., between 2014 and 2020) (Figure 4) and provides, among other things, biological baseline information, potential impacts, biological constraints, and mitigation measures to minimize those impacts and address the constraints.

Although reconnaissance-level surveys and habitat assessments do not replace the required protocol surveys for special status species reported from the Barstow area, they were sufficient on many sites to positively identify presence of rare species; to assess the likelihood of occurrence for those species when they were not observed; and to identify specific permits and general mitigation measures that will likely be required for site development. As such, CMBC's (2014) companion report serves as both a *reconnaissance survey*, reporting those species that were detected during the abbreviated surveys, and a *habitat assessment*, judging the likelihood of occurrence for those species that may occur but for which signs were not found to confirm their presence.

Although other developers are very likely to select parcels that are not addressed in these reconnaissance surveys or CMBC's (2014) report nor specifically covered by the Master EIR, the City anticipates that the 16 sites assessed therein are those most likely to be developed between 2014 and 2020. The information may also be useful to federal and state regulatory agencies, including USFWS and CDFW, respectively, if the City asks them to assess impacts associated with proposed development and to advise them of pertinent permits and typical mitigation measures. Protocol surveys for special status species including desert tortoise and burrowing owl are still required for the 15 sites subjected to reconnaissance surveys (CMBC 2014), and will be necessary on a project- and site-specific basis on any future sites for the issuance of such permits.

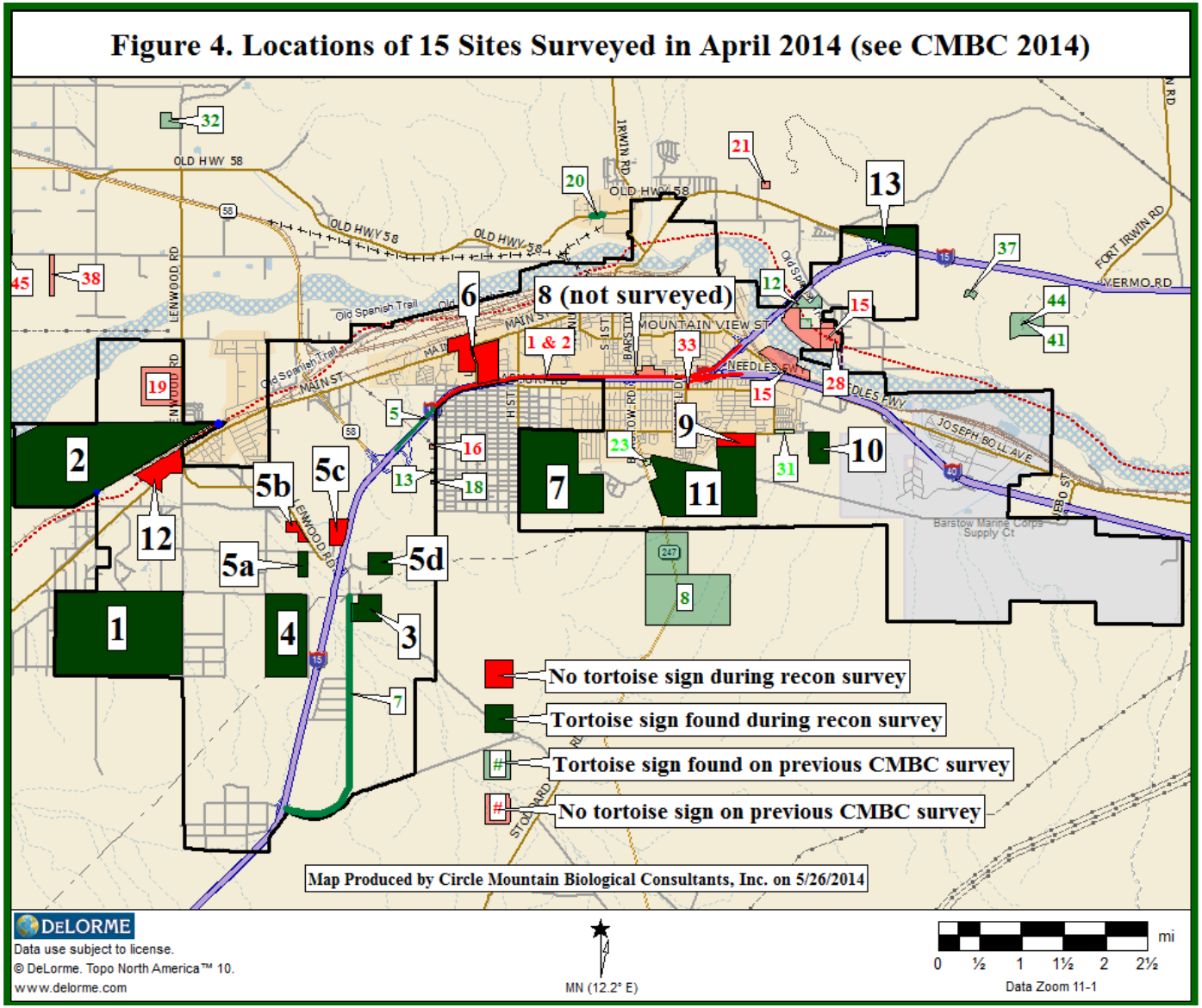
Information for these 16 sites is given in Table 1, which is taken from CMBC (2014).

Table 1. Site Information for 16 Parcels

Site #	Site Name	Acreage	General Plan Land Use
1	2.9 Mil General Industrial	966 acres	General Industrial
2	500,000 SF General Industrial	998	General Industrial
3	Casino Full Service Resort	68	Diverse Use
4	1,575 Single-Family Dwellings	314	Single-Family Residential
5a	Highway Commercial	24	General Commercial
5b	Highway Commercial	20	General Commercial
5c	Highway Commercial	40	General Commercial
5d	Highway Commercial	48	General Commercial
6	Spanish Trails	143	Diverse Use
7	400 Single-Family Dwellings	530	Single-Family Residential
8	30 Medium-Density Housing (Not included in assessment)	2.17	Medium-Density Residential
9	140 Single-Family Dwellings	48	Single-Family Residential
10	40 Medium-Density Housing/ Unspecified Industrial	5.4 of 58	Medium-Density Residential (5.4 acres) General Industrial (53 acres)
11	1,700 Single-Family Dwellings/ 150,000 SF Commercial	543	Single-Family Residential/ General Commercial
12	60 Medium-Density Housing/ 20,000 SF Office	82	Diverse Use
13	Potential Mitigation Parcel	100	Open space
16 sites	**N/A**	**2,931 acres**	**N/A**

Reconnaissance surveys of these sites serve to supplement the biological information collected over the 24-year period between 1990 and 2014. Each of these 16 sites and a subset of those parcels surveyed within the city limits of Barstow are shown on the next page in Figure 4.

Figure 4. Locations of 15 Sites Surveyed in April 2014 (see CMBC 2014)



3.0. EXISTING BIOLOGICAL RESOURCES

3.1. Common Biological Resources

3.1.1. Environmental and Physical Settings. At 41.39 square miles, the city of Barstow is located in the west-central portion of San Bernardino County and northeastern portion of the West Mojave Desert. The northern boundary of the city approximately follows Mojave River, which begins south in San Bernardino Mountains and flows north, through Barstow, ending in Soda (Dry) Lake some 50 miles to the east-northeast. Although there are no major, named mountains within the city limits, Barstow is effectively surrounded by the following ranges: Iron Mountain to the west, Mount General to the northwest, Mitchell Range including Calico Mountains to the north, Lead Mountain to the northeast, Elephant Mountain to the east, Newberry Mountains to the (distant) southeast, and Daggett Ridge to the south. Low-lying areas among these mountains result in Hinkley Valley to the west, Stoddard Valley to the southeast, and Mojave River basin to the southwest and northeast.

Barstow lies within an area that is subject to heavy human uses, particularly along Interstates 15 and 40, which bisect the city, and other highways, including State Routes 247 from the south and 58 from the west, both of which terminate within the city limits. Burlington, Northern and Santa Fe Railroad (BNSF) maintains a large rail classification yard adjacent to Mojave River in Barstow, and the Union Pacific Railroad (UP) also runs through the city on BNSF tracks. The incorporated cities of Apple Valley, Victorville, and Adelanto occur 20 to 22 miles southwest of Barstow, and smaller unincorporated communities of Helendale, Hinkley, Yermo, Nebo, Lenwood, and Daggett are closer.

On a regional scale, Barstow is nearly equidistant from Edwards Air Force Base (21 miles west), China Lake Naval Air Weapons Station (24 miles north), Fort Irwin National Training Center (18 miles northeast), and 29 Palms Marine Corps Air Ground Combat Center (25 miles southeast). The Marine Corps Supply Center occupies approximately seven square miles of the southeastern part of the city. Except for Hinkley Valley to the west and Brisbane Valley to the southwest, both of which are comprised mostly of private lands, Barstow is surrounded by a checkerboard pattern of public lands managed by the BLM, with a few parcels inside the city limits (Figure 14).

3.1.2. Topography and Soils. As determined by ©DeLorme Topo North America™ 10, the southern-most boundary of the city is at about 2,620 feet elevation, the western boundary along Mojave River is at 2,215 feet, the northern-most point is at 2,120 feet, and the southeastern corner is at 2,370 feet elevation. The highest point occurs just south of the community of Barstow Heights, where the elevation is given at 2,820 feet. The only two significant hills within the city limits occur south of Lenwood and west of Interstate 15, where the northern hill (coinciding with Site 4 in CBMC 2014) is at about 2,620 feet, and the hill approximately 1.5 miles farther south is at 2,760 feet, just north of Sidewinder Road.

Barstow occurs on gently-sloping alluvium rising up from Mojave River basin with numerous small dry washes draining the surrounding lands into the basin, particularly from the north and south, and less so from the east and west. The 2010 Geologic Map of California (see website at http://www.conservation.ca.gov/cgs/cgs_history/Pages/2010_geologicmap.aspx) shows that Barstow is comprised of Quaternary Deposits of alluvium, well-dissected alluvial fans, and wash deposits along Mojave River.

3.1.3. Climate. According to the Western Regional Climate Center, (wrcc@dri.edu) for the period between 1913 and 1980, Barstow's average minimum temperatures, which were recorded in December and January, respectively, were 31.1°F and 31.2°F, with an average annual minimum of 47.5°F. The hottest months were July and August, where the average maximum temperatures were given as 102.4°F and 100.3°F, respectively, with an average annual maximum of 80.2°F. January has been the wettest month, with the 67-year average given as 0.75 inches, and May the driest month, with 0.08 inches. Though it rarely snows in Barstow, January is the snowiest month (average total snow fall of 0.7 inches), with trace amounts in December (0.4 inches) and March (0.1 inches).

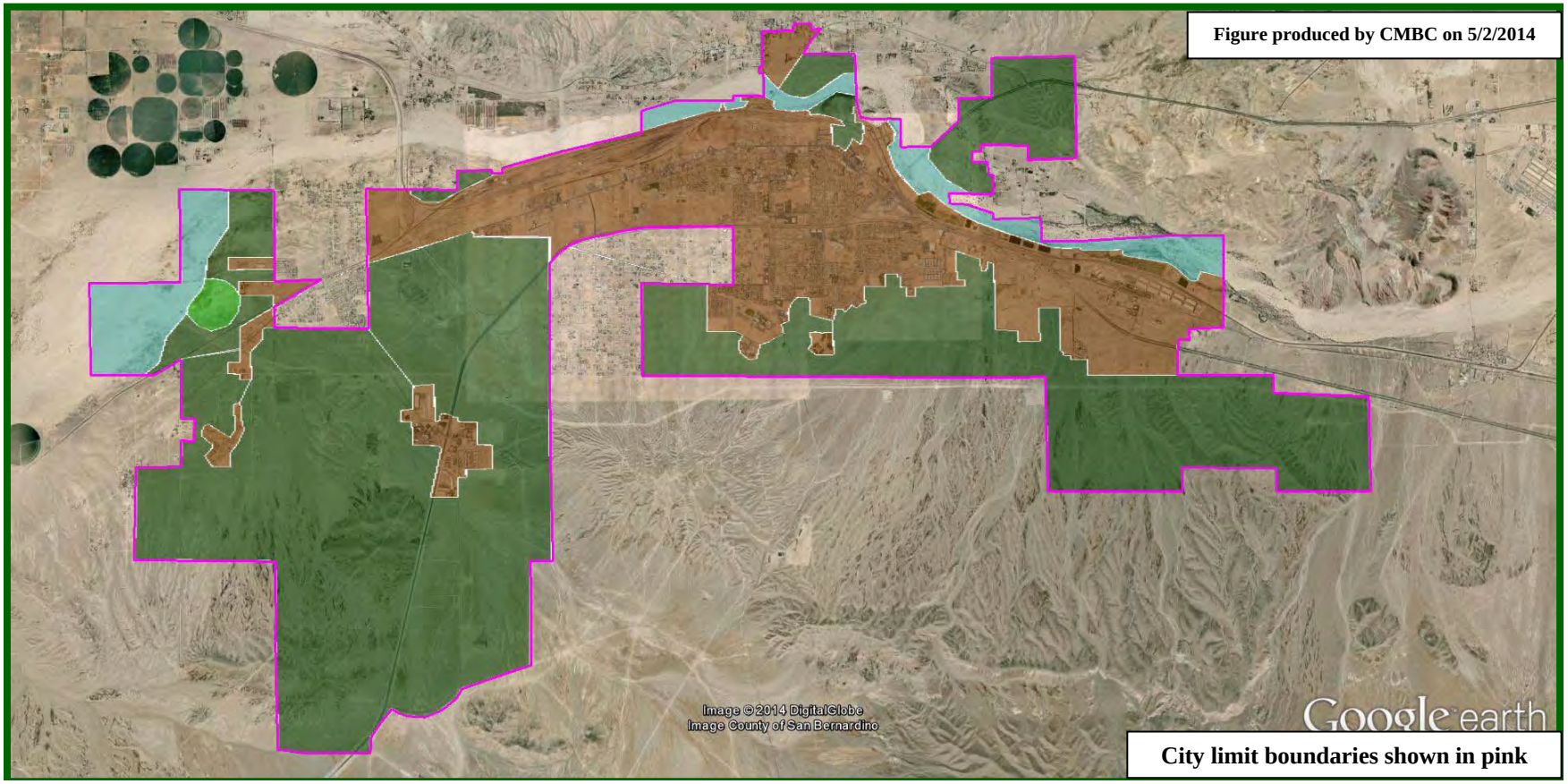
3.1.4. Common Plant Communities. The two native desert plant communities that characterize most of Barstow are Mojavean Creosote Bush Scrub and Saltbush Scrub (shown as darker green polygons in Figure 5). There are mostly degraded Riparian Communities associated with Mojave River (blue polygons in Figure 5). Finally, Ruderal Plant Communities are found in those areas where vegetation has been removed or otherwise heavily degraded, due either to urbanization (brown polygons in Figure 5) or agriculture (light green polygon in Figure 5). General descriptions of these communities follow.

Creosote Bush Scrub is the dominant plant community throughout Barstow. Although there is a Sonoran Creosote Bush Scrub community in the southeastern California deserts, the type found in the Barstow region is referred to as "Mojavean." As reported below, its main components – creosote bush and burrobush – were found on 26 and 25 of the 27 sites, respectively. Except for areas adjacent to Mojave River, the green areas in Figure 5 show the approximate extent of Creosote Bush Scrub in the planning area. In its native, undegraded form, this community may be comprised of 15 to 30 species of perennial shrubs, succulents, and trees [i.e., Joshua tree (*Yucca brevifolia*)] with more than a hundred species of annuals blooming in the spring and fall if there is sufficient rainfall.

In the Barstow area, the dominant perennial species are creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), Anderson's boxthorn (*Lycium andersonii*), senna (*Senna armata*), cheesebush (*Ambrosia salsola*), Mohave yucca (*Yucca schidigera*), desert tea (*Ephedra californica*), several cactus species [e.g., pencil cholla (*Cylindropuntia ramosissima*) and silver cholla (*Cylindropuntia echinocarpa*)], and chenopod species that are typically associated with saltbush scrub, including allscale (*Atriplex polycarpa*) and spiny saltbush (*Atriplex confertifolia*). The community is generally associated with well-drained secondary soils with very low available water-holding capacity on slopes, fans, and valleys rather than upland sites (Holland 1986).

Saltbush Scrub is the other native plant community in Barstow, mostly associated with upland areas immediately adjacent to Mojave River. As its name implies, this plant community is characterized by saltbush shrubs of the Chenopodiaceae, including allscale, spiny saltbushes (both *A. spinifera* and *A. confertifolia*), four-winged saltbush (*Atriplex canescens*), desert holly (*Atriplex hymenelytra*), winter fat (*Krascheninnikovia lanata*), spiny hop-sage (*Grayia spinosa*), and Torrey's sea-blight (*Suaeda moquinii*) in the most alkaline of places. Big saltbush (*Atriplex lentiformis*) is less common in pure saltbush scrub stands, being mostly found in seeps and inundation areas that are both naturally occurring and manmade. Typically, there is less diversity of perennial plants than in the Creosote Bush Scrub community and fewer annual plants due, in part, to the denser canopy that precludes ephemeral plants from germinating. The community is generally confined to fine-textured, poorly drained soils with high salinity and/or alkalinity, usually surrounding playas (dry lakes) on slightly higher ground (Holland 1986).

Figure 5. Locations of plant communities and urbanizing areas



= Creosote Bush Scrub and Saltbush Scrub (latter along Mojave River)

= Sandy habitats and Riparian Communities within and adjacent to Mojave River

= Ruderal Plant Communities in commercial, residential, and industrial development areas

= Crop circle (another Ruderal Plant Community) in west part of city, next to Mojave River

Riparian Communities, where they occur, are found along Mojave River, where the main channels are mostly sandy and typically devoid of vegetation. Excessive groundwater pumping has resulted in the loss of native riparian habitats in Mojave River at Barstow and in other areas (Webb et al. 2001, Webb et al. 2007). Salt cedar (*Tamarix ramosissima*) and athel (*Tamarix aphylla*), which are not native to California, occur in isolated clumps or may form dense, nearly impenetrable stands particularly southwest and east of the city limits. Levees and flood control structures are common in places. The eastern reaches of the river are vegetated by salt cedar, mulefat (*Baccharis glutinosa*), honey mesquite (*Prosopis glandulosa*), both shrub- and tree-like willows (*Salix* ssp.), and other wash-adapted species described below in Section 3.1.5. Individual Fremont cottonwoods (*Populus fremontii*) occur, though never in dense stands like occur near Hinkley Road, southwest of the city limits. Cottonwood, willow, and especially tamarisk are relatively common north of the river and at the Nebo Golf Course (CMBC 1996). These areas are relatively degraded now and invaded by tamarisk but may have once been considered Mojave Riparian Forest (Holland 1986) and Desert Riparian Woodland (Charlton 1992). Historically, Gooddings willow (*Salix gooddingii)* and mesquite were apparently among the dominant species in the Mojave River channel in the Barstow area (Webb et al. 2001).

Ruderal Plant Communities is a term used herein to describe those lands where the native plant community has been removed, as when a site is mechanically bladed, or heavily degraded, as when excessive off-highway vehicle traffic renders an area barren. Within the planning area, urbanization and agriculture are the two primary causes of vegetation removal resulting in this community. If left to naturally regenerate, many of the native perennial plant species that previously occurred will slowly recolonize the area over a period of many years, but shrubs within the community are never as dense or as diverse at they were before the perennial overstory was removed. Several species, including rubber rabbitbrush (*Chrysothamnus nauseosus*), California buckwheat (*Eriogonum fasciculatum*), and cheesebush are considered "early successional" species that readily colonize ruderal plant communities.

Another characteristic of Ruderal Plant Communities is that they are typically vegetated by the many exotic species listed below in Section 3.1.5 and certain native species that are mostly associated with degraded habitats. Some of the native weed species observed during the 27 surveys in Barstow (see Appendix A) include annual bur-sage (*Ambrosia acanthicarpa*), mare's tail (*Conyza canadensis*), fiddleneck (*Amsinckia tessellata*), poverty weed (*Monolepis nuttalliana*), cheeseweed (*Malva parviflora*), desert skeleton weed (*Eriogonum deflexum*), and little trumpet (*Eriogonum trichopes*).

3.1.5. Common Flora. In considering the common plants that have been identified within the city limits of Barstow, CMBC reviewed all species lists for 27 desert tortoise surveys performed between 1990 and 2014 (see Figure 2 for site locations; the comprehensive species list is included in Appendix A). These studies included 12 protocol-level surveys between 1990 and 2014 (see CMBC and Tierra Madre Consultants, Inc. references at the end of Appendix A) plus the 15 sites subjected to reconnaissance-level surveys in 2014 (CMBC 2014).

A total of 222 species of plants was identified during these 27 surveys. The numbers preceding each species in Appendix A indicate the numbers of sites where a particular species was observed. Given these numbers, the following perennial species are listed in descending order of prevalence among the 27 sites: creosote bush was found on 26 of the 27 sites, burrobush on 25 sites, allscale on 17, desert milk-aster (*Stephanomeria pauciflora*) on 17, Anderson's boxthorn on 16, senna on 16, cheesebush on 15, Mojave yucca on 13, desert tea on 12, pencil cholla on 12, silver cholla on 11, spiny saltbush on 11, and tamarisk – a non-native species – on 10 sites.

Though not as commonly encountered as the species listed above, the following perennial species also characterize the native desert plant communities occurring within the city limits: Nevada joint-fir (*Ephedra nevadensis*), desert goldenhead (*Acamptopappus sphaerocephalus*), indigo bush (*Psorothamnus arborescens*), peach thorn (*Lycium cooperi*), and turpentine-broom (*Thamnosma montana*). In rocky places, desert aster (*Xylorhiza tortifolia*) and cottontop cactus (*Echinocactus polycephalus*) are frequently found, while bush peppergrass (*Lepidium fremontii*), beavertail cactus (*Opuntia basilaris*), four-winged saltbush, desert holly, and croton (*Croton californicus*) are common in sandy places.

Species that are adapted to relatively wetter conditions may be found mostly along Mojave River, alongside dry washes, or in inundation areas fed by runoff from adjacent landscaped lots. Native species found in such areas included Emory baccharis (*Baccharis emoryi*), mulefat, wash rabbitbrush (*Chrysothamnus paniculatus*), scale-broom (*Lepidospartum squamatum*), arrow weed (*Pluchea sericea*), desert willow (*Chilopsis linearis* ssp. *arcuata*), big saltbush, Torrey's sea-blight, honey mesquite, screw bean mesquite (*Prosopis pubescens*), paper-bag bush (*Salazaria mexicana*), sandpaper plant (*Petalonyx thurberi*), wild rhubarb (*Rumex hymenosepalus*), Fremont's cottonwood, narrow-leafed willow (*Salix exigua*), arroyo willow (*Salix lasiolepis*), and cat-tail (*Typha latifolia*).

There is also a diverse flora of native annual plant species in the Barstow area. Among the 27 sites, 25 native annual species were identified in the sunflower family (Asteraceae), 15 in the borage family (Boraginaceae), 12 in the buckwheat family (Polygonaceae), 8 in the mustard family, 7 in the phlox family (Polemoniaceae), and 7 in the evening-primrose family (Onagraceae).

During the reconnaissance surveys of April 2014 (CMBC 2014) where 117 plant species were identified, 18 of those species (15%) were not native to California, ranging from as few as 2 species (5% of the 39 species encountered on Site 13, which is the proposed mitigation parcel) to as many as 12 species (29% of the 42 species identified on Site 9). For comparison, 38 of the 222 species (17%) identified on the 27 sites (including the 15 reconnaissance survey sites) are not native to California, which is to be expected given the urbanizing nature of the inner city with its adjacent suburban development and outlying agricultural areas.

The following non-native ("exotic") species are listed in descending order of prevalence among the 27 sites surveyed: red-stemmed filaree (*Erodium cicutarium*) was found on 24 of 27 sites, split-grass (*Schismus* sp) on 23 sites, red brome (*Bromus madritensis* ssp. *rubens*) on 18, Russian thistle (*Salsola tragus*) on 15, Saharan mustard (*Brassica tournefortii*) on 14, hare barley (*Hordeum murinum*) on 13, London rocket (*Sisymbrium irio*) on 11, and cheat grass (*Bromus tectorum*) on 10 sites. Most of the non-native species are either grasses (family Poaceae) with 13 of the 21 species (62%) identified being exotic species and mustards (family Brassicaceae) with 10 of the 18 species (56%) being exotic species.

3.1.6. Common Fauna. Similar to the discussion above for plants, CMBC also maintained complete species lists for all animals detected during the 27 surveys (see latter half of Appendix A). In so doing, 12 reptile, 61 bird, and 13 mammal species were identified during the 24-year period.

Common reptiles, listed in descending order of prevalence, included common side-blotched lizard (*Uta stansburiana*) on 17 of the 27 sites, western whiptail (*Cnemidophorus tigris*) on 9 sites, desert iguana (*Dipsosaurus dorsalis*) on 7, zebra-tailed lizard (*Callisaurus draconoides*) on 5, long-nosed leopard lizard (*Gambelia wislizenii*) on 4, desert spiny lizard (*Sceloporus magister*) and gopher snake (*Pituophis melanoleucus*) each on 2 sites, and the following species each on only 1 site: long-tailed brush lizard (*Urosaurus graciosus*), desert horned lizard (*Phrynosoma platyrhinos*), desert night lizard (*Xantusia vigilis*), and red racer (*Masticophis flagellum piceus*). Other locally common reptile species that likely occur include glossy snake (*Arizona elegans*), western patch-nosed snake (*Salvadora hexalepis*), long-nosed snake (*Rhinocheilus lecontei*), and various rattlesnake species (*Crotalus* ssp.).

Of the 61 species of birds identified, the most commonly encountered species included common raven (*Corvus corax*) on 23 of the 27 sites, house finch (*Carpodacus mexicanus*) on 22 sites, rock dove (*Columba livia*) on 14, horned lark (*Eremophila alpestris*) on 13, mourning dove (*Zenaida macroura*) on 11, northern mockingbird (*Mimus polyglottos*) on 11, and European starling (*Sturnus vulgaris*) on 10 sites. Although some of these birds may be found in pristine desert habitats, for the most part, they are relatively more common in urbanizing areas. Other species that are also benefitted by or tolerant of human development include mallard (*Anas platyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), killdeer (*Charadrius vociferus*), Eurasian collared-dove (*Streptopelia decaocto*), common barn owl (*Tyto alba*), western meadowlark (*Sturnella neglecta*), and great-tailed grackle (*Quiscalus mexicanus*).

Finally, many of the species are either seasonal residents, which spend some part of the year (usually either summer or winter) in the Barstow area or are incidental migrants, typically passing through the area in the spring and fall. Some of these species include turkey vulture (*Cathartes aura*), common poorwill (*Phalaenoptilus nuttallii*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus verticalis*), violet-green swallow (*Tachycineta thalassina*), ruby-crowned kinglet (*Regulus calendula*), blue-gray gnatcatcher (*Polioptila caerula*), mountain bluebird (*Sialia currucoides*), orange-crowned warbler (*Vermivora celata*), yellow-rumped warbler (*Dendroica coronata*), Lucy's warbler (*Vermivora luciae*), lark sparrow (*Chondestes grammacus*), Brewer's sparrow (*Spizella breweri*), white-crowned sparrow (*Zonotrichia leucophrys*), northern oriole (*Icterus galbula*), and Scott's oriole (*Icterus parisorum*). The reader is encouraged to visit the eBird Website (http://www.ebird.org) for various species lists of birds reported from the Barstow area.

Small-to-medium-sized mammal species encountered during the 27 surveys included black-tailed hare or jackrabbit (*Lepus californicus*) on 24 of the 27 sites, kangaroo rat (*Dipodomys* sp.) burrows on 23 sites, Audubon cottontail (*Sylvilagus audubonii*) on 14, and California ground squirrel (*Otospermophilus beecheyi*) on 9 sites. Less-frequently encountered species included antelope ground squirrel (*Ammospermophilus leucurus*) on 5 sites, Botta pocket gopher (*Thomomys bottae*) on 3, desert wood rat (*Neotoma lepida*) on 2, and round-tailed ground squirrel (*Spermophilus tereticaudis*) on 1 site. Three larger predators were found within the city limits. These were seldom observed but identified by diagnostic scat (fecal droppings), and included coyote (*Canis latrans*) on 18 sites, bobcat (*Lynx rufus*) on 15 sites, and gray fox (*Urocyon cinereoargenteus*) on 3 sites.

3.2. Uncommon Biological Resources

3.2.1. Uncommon Plant Communities. Whereas common plant communities are addressed above in Section 3.1.4, there are also some rare plant communities that should be identified whenever they are encountered.

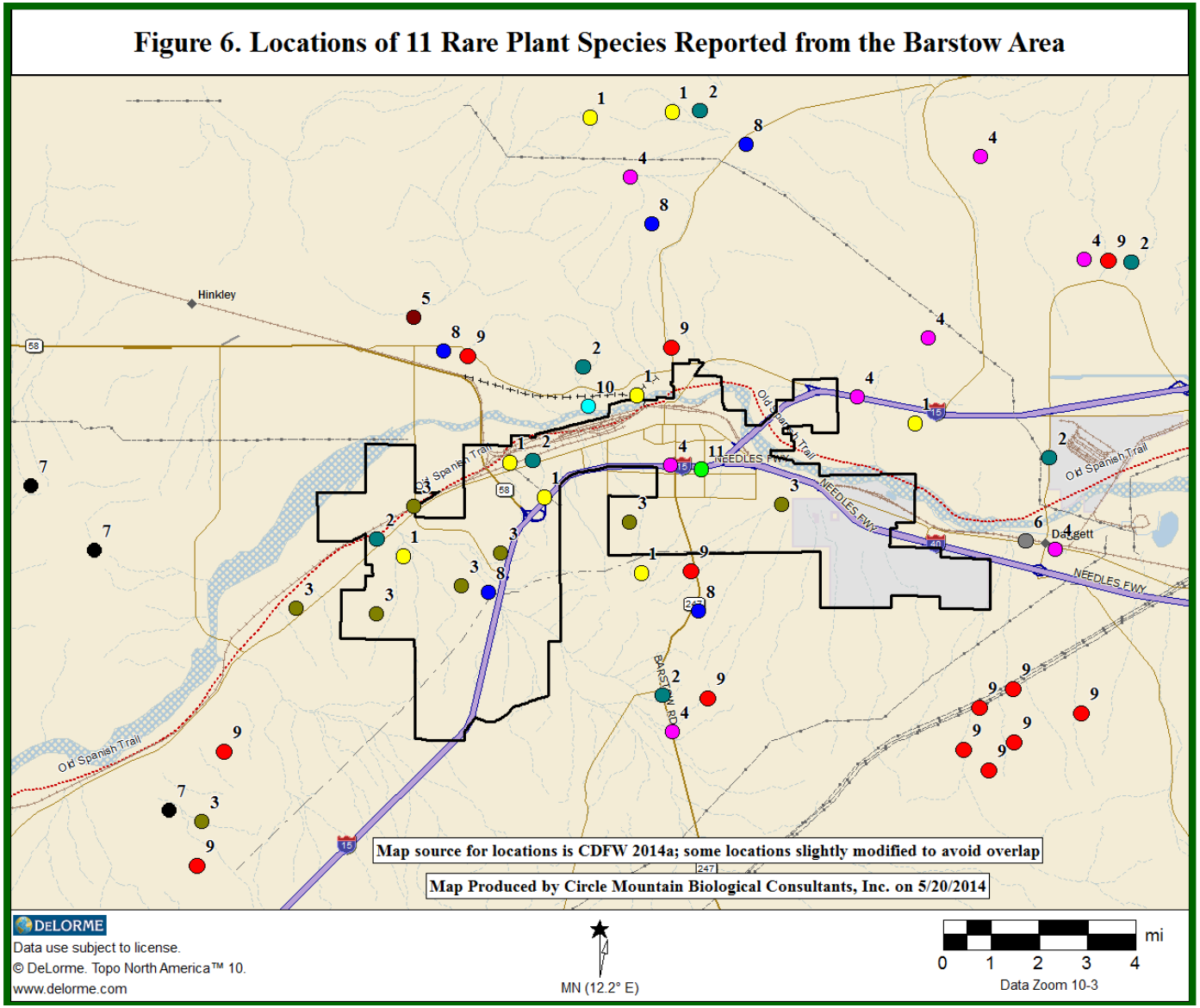
3.2.1.a. Communities of Highest Inventory Priority (CHIP). CDFG (2010) lists hundreds of plant communities occurring through the state, including those that are considered Communities of Highest Inventory Priority, or "CHIPs." The only two that CMBC is aware of that occur in the immediate vicinity of Barstow are Mesquite Thickets and Desert Dunes, which both occur on the western portions of Site 2 (CMBC 2014) and may be elsewhere within and adjacent to Mojave River. Although there may not be any special protection afforded these communities, biologists completing surveys of behalf of the City should document them where they occur. CHIP communities that may occur in the region include the following:

Mesquite Bosque/Mesquite Thickets (Element Number 61.512.00)
Desert Dunes (Element Number 22.100.00)
Alkali Sacaton Grassland (Element Number 41.010.00)
Anderson's Boxthorn Scrub (Element Number 33.360.00)
Arrow Weed Thickets (Element Number 63.710.00)
Arroyo Willow Thickets (Element Number 61.201.00)
Big Galleta Shrub-Steppe (Element Number 41.030.00)
Desert Willow Woodland (Element Number 61.550.00)
Fremont Cottonwood Forest (Element Number 61.130.00)
Sandbar Willow Thickets (Element Number 61.209.00)
Spinescale Scrub (Element Number 36.350.00)
Spiny Hop Sage Scrub (Element Number 33.180.00)
Winterfat Scrubland (Element Number 36.500.00)

3.2.1.b. Aeolian Sand Deposits. Although not technically a plant community, aeolian sand deposits (synonymous with "Desert Dunes" in the above list) associated with the bed of Mojave River and adjacent areas provide a unique substrate and niche that supports special status species, like the Mojave fringe-toed lizard, special status resources, like Mesquite Thickets, and plants either associated with riparian habitats or loose, wind-blown sand. Plant species associated with these sandy areas include honey mesquite, dicoria (*Dicoria canescens*), desert Spanish-needles (*Palafoxia linearis*), desert heliotrope (*Heliotropium curvassivicum*), several coldenia plants (*Tiquilia* ssp.), croton, several primrose plants (*Oenothera* ssp.), willow species, alkali dropseed (*Sporobolus airoides*), sandpaper plant, and desert willow.

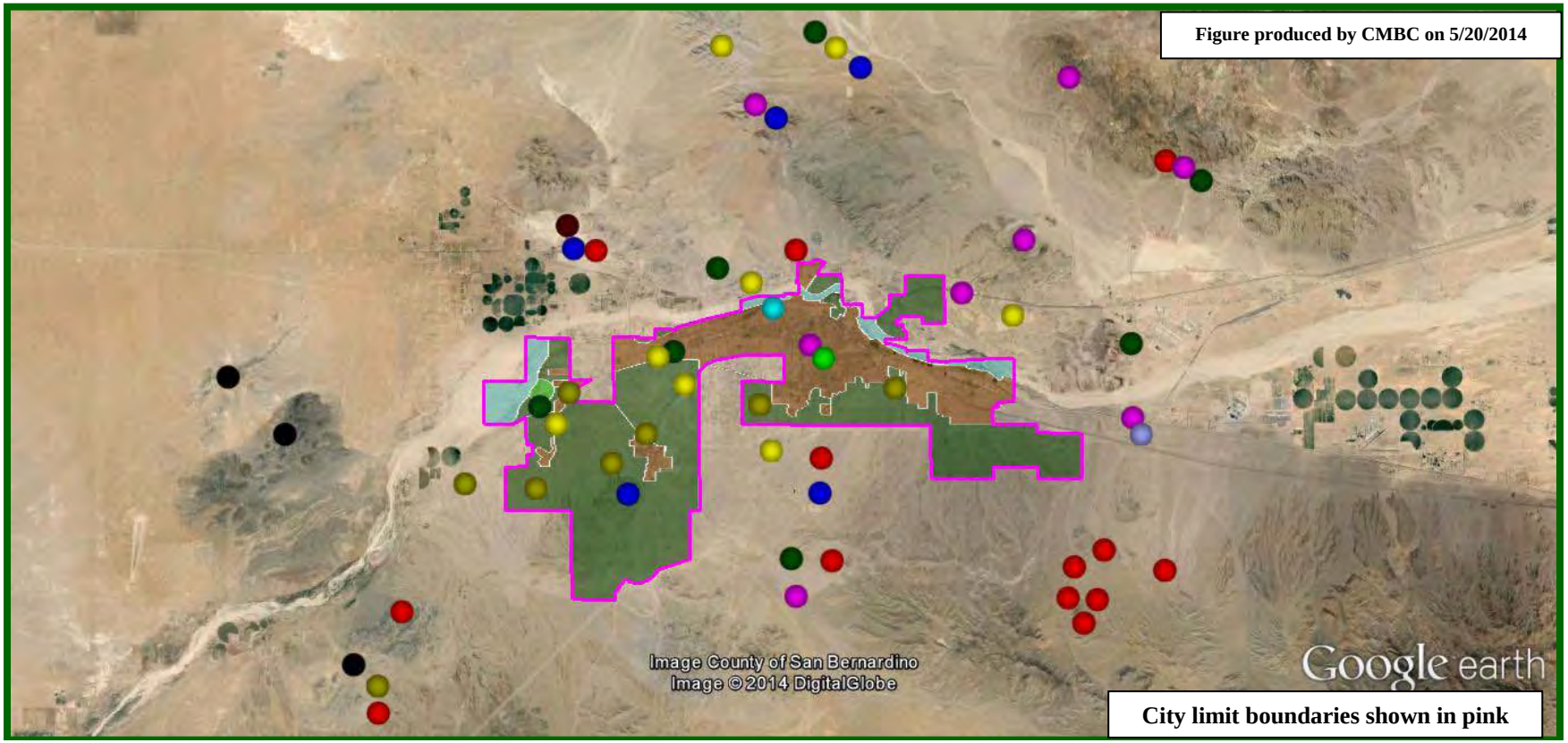
3.2.2. Plants. There are at least 10 special status plant species and 1 special plant resource (i.e., Creosote Bush Rings larger than 10 feet in diameter) found in the Barstow area that should be considered in all future botanical surveys (CDFG 2009). The common and scientific names and status designations are given in Table 2, below, with locations mapped in Figures 6 and 7. Appendix B provides more detailed information about life histories and distributions, including maps for the locations of each species within and adjacent to the city.

Figure 6. Locations of 11 Rare Plant Species Reported from the Barstow Area



1 = Barstow woolly sunflower; 2 = Beaver Dam breadroot; 3 = Creosote ring; 4 = Creamy blazing star; 5 = Chaparral sand-verbena; 6 = Emory's crucifixion thorn; 7 = Mojave fish-hook cactus; 8 = Mojave menodora; 9 = Mojave monkeyflower; 10 = Parish's phacelia; 11 = Spiny-hair blazing star

Figure 7. Locations of rare plant species in relation to habitat types



= Native scrub habitats = Sandy habitats along Mojave River = Urban areas = Fallow agriculture

= Barstow woolly sunflower; = Beaver Dam breadroot; = Creosote ring; = Creamy blazing star; = Chaparral sand-verbena;

= Emory's crucifixion thorn; = Mojave fish-hook cactus; = Mojave menodora; = Mojave monkeyflower;

= Parish's phacelia; = Spiny-hair blazing star

Table 2. Special Status Plant Species Reported from Barstow Area		
Common Name	**Scientific Name**	**State/Federal/CNPS* Designation**
Barstow woolly sunflower	*Eriophyllum mohavensis*	None/None/List 1B.2
Beaver Dam breadroot	*Pediomelum castoreum*	None/None/List 1B.2
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	None/None/List 1B.1
Creamy blazing star	*Mentzelia tridentata*	None/None/List 1B.3
Creosote Bush Rings	*Larrea tridentata*	None/None/County Codes**
Emory's crucifixion thorn	*Castela emoryi*	None/None/List 2B.2
Mojave fish-hook cactus	*Sclerocactus polyancistrus*	None/None/List 4.2
Mojave menodora	*Menodora spinescens* var. *mohavensis*	None/None/List 1B.2
Mojave monkeyflower	*Mimulus mohavensis*	None/None/List 1B.2
Parish's phacelia	*Phacelia parishii*	None/None/List 1B.1
Spiny-hair blazing star	*Mentzelia tricuspis*	None/None/List 2B.1

* Status designations are given in California Native Plant Society (2014) and the end of Appendix B.

** Creosote Bush Rings greater than 10 feet in diameter are protected by the San Bernardino County Development Code, Chapter 88.01 (Plant Protection and Management); Section 88.01.060 (Desert Native Plant Protection); Section 88.01.060(c) (Regulated Desert Native Plants); and Section 88.01.050 (Tree or Plant Removal Permits).

There are various factors affecting the detectability of the 10 species and 1 special status resource reported from the region. Some of the plants, including Creosote Bush Rings, Emory's crucifixion thorn, Mojave fish-hook cactus, and Mojave menodora are perennial species that are detectable throughout the year. Except for chaparral sand-verbena, which blooms from January through September, all of the other species bloom in the spring when they would be most detectable. Even then, there are dry years when the plants never germinate and cannot be detected. Species-specific life history information given in Appendix B is intended to assist consultants and laypersons with baseline information to aide them in detecting and identifying these species.

3.2.3. Fish and Amphibians. **Mojave tui chub** (*Siphateles bicolor mohavensis*) is the only rare fish known historically from the Barstow area. Arroyo chubs, *Gila orcutti*, were introduced into Mojave River headwater reservoirs in San Bernardino Mountains, and first appeared in Mojave River during the 1930s. Aided by the severe floods of March 1938, arroyo chubs invaded Mojave River and subsequently hybridized with Mojave tui chubs. By 1970, genetically pure Mojave tui chubs had been eliminated from Mojave River by hybridization and subsequent introgression. Fortunately, a small population of genetically pure Mojave tui chubs persisted in isolated ponds at Soda Springs, near the terminus of Mojave River (information source at http://www.nps.gov/moja/naturescience/mojave-tui-chub.htm). Currently, the last remaining populations of this federally- and state-listed Endangered species are found in ponds at Zzyzx, China Lake Naval Air Weapons Station, and at the BLM's Desert Discovery Center located along Barstow Road several blocks north of Interstate 15. Since it no longer occurs in the wild in Barstow, it is not further considered in this report.

The **arroyo toad** (*Anaxyrus californicus*) is the only rare amphibian that has been reported to the CNDDB (CDFW 2014a) from the Barstow area. This federally Endangered species, which is designated as a California Species of Special Concern by the state, was only reported one time in the region. There is a record from 1949 described as six miles southwest of Barstow in Mojave River. The nearest known locations of existing populations are from San Bernardino and San Gabriel Mountains, some 60 miles south of Barstow. It is not clear if this was a misidentification or an animal that had been washed into the Barstow area when the river flooded, but in any case, it is no longer considered to occur in the Barstow area, and is not discussed further in this report.

3.2.4. Reptiles. The only two uncommon reptile species occurring in the Barstow area are Mohave fringe-toed lizard (*Uma scoparia*) and Agassiz's desert tortoise (*Gopherus agassizii*). As shown in Figure 8, CMBC found only five confirmed locations of **Mojave fringe-toed lizards** in the Barstow area; all in sandy habitats along Mojave River in the west part of the city, within a mile of each other. In 2007 (Sundance Biology Inc. 2007) found 20 occurrences on Site 2; in June and August of 2010 a total of 16 lizards was observed in sparse creosote bush and mesquite (CDFW 2014a); and another 6 were observed during a survey within a mile of the other two sites in 2013 (Sundance Biology, Inc. 2013.

Although CMBC (1997) sought this species in Mojave River just east of where it crosses under Interstate 15 and during April 2014 reconnaissance surveys of Site 2 (CMBC 2014), none was found. The species likely occurs elsewhere within the river bottom and associated sand dunes, and additional focused surveys for the species are warranted for any proposed development in such habitat. Of the 15 sites where reconnaissance surveys were performed in April 2014 (CMBC 2014), the 998-acre parcel comprising Site 2 (500,000 square foot industrial in Table 1) is the only site where the species is known to occur (Sundance Biology, Inc. 2007).

A significant paper was published in June 2011 (Murphy et al. 2011) whereby the "desert tortoise" of the Mojave Desert was split into two species, including *G. agassizii*, referred to as "**Agassiz's desert tortoise**," and a newly described species, *G. morafkai*, referred to as "Morafka's desert tortoise," which occurs in the Sonoran Desert. According to Murphy et al. (2011), "…this action reduces the distribution of *G. agassizii* to only 30% of its former range. This reduction has important implications for the conservation and protection of *G. agassizii*, which may deserve a higher level of protection." Agassiz's desert tortoise is the Threatened species that occurs in the region surrounding the subject property. Those interested in learning more about tortoises should visit http://www.fws.gov/nevada/desert_tortoise/dt/dt_life.html.

Whereas desert tortoises have been extirpated from entire regions such as Lancaster (Tierra Madre Consultants, Inc. 1991), Phelan and Pinon Hills south of State Route 18, southern Victorville and Apple Valley, Hesperia, central Lucerne Valley, and the urbanizing portions of Ridgecrest (CMBC, unpublished data), the two urbanizing areas in the Mojave Desert where tortoises are persisting (for the time being) are Barstow and the Morongo Basin (inclusive of Yucca Valley, the community of Joshua Tree, and Twentynine Palms).

In spite of the Mojave Population of the desert tortoise, now called the "Agassiz's desert tortoise," being listed as a Threatened species, the desert tortoise is one of the most frequently detected reptile species in Barstow. For example, considering the reptiles observed or detected during the 27 surveys included in Appendix A, only common side-blotched lizard – detected 17 times – was more often identified than tortoise, which was detected on 16 of the 27 sites (59%). Desert tortoises are more detectable than most lizards and snakes due to diagnostic signs, which include burrows, scat, carcasses, courtship rings, egg shell fragments, and tracks.

As shown in Figure 9, desert tortoises occur in very close proximity to both urban and suburban areas of Barstow. Whereas they are absent from the central, developed portions of the city (red circles in Figure 9), they are found in all areas surrounding the city (green circles in Figure 9), and particularly to the south and northeast. The aerial shown in Figure 9 confirms that tortoises continue to be found in the native scrub communities (shown as green in the figure) and are absent from urbanizing, ruderal communities (shown as brown in the figure).

Figure 8: Locations of Rare Reptile Species Reported from the Barstow Area

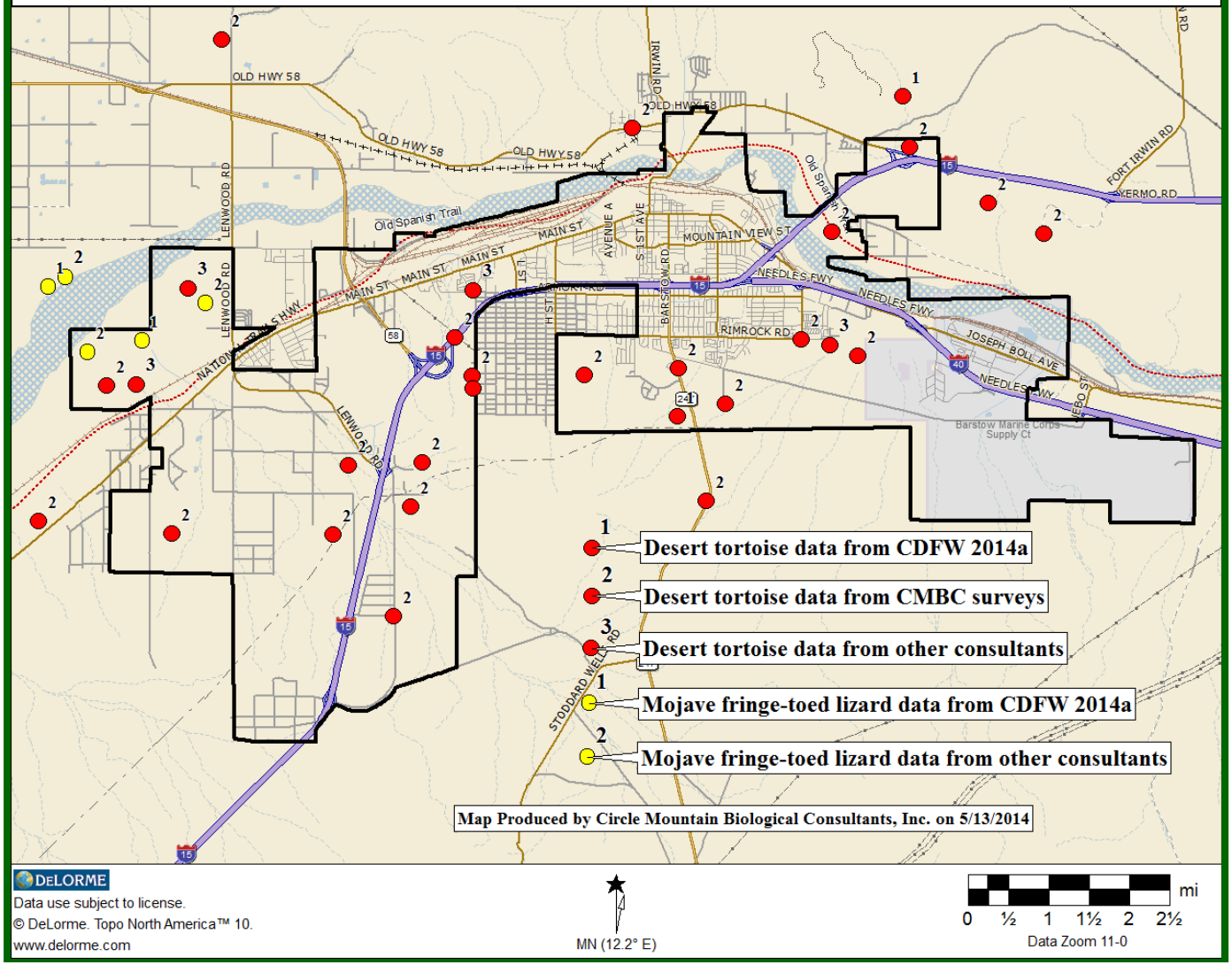
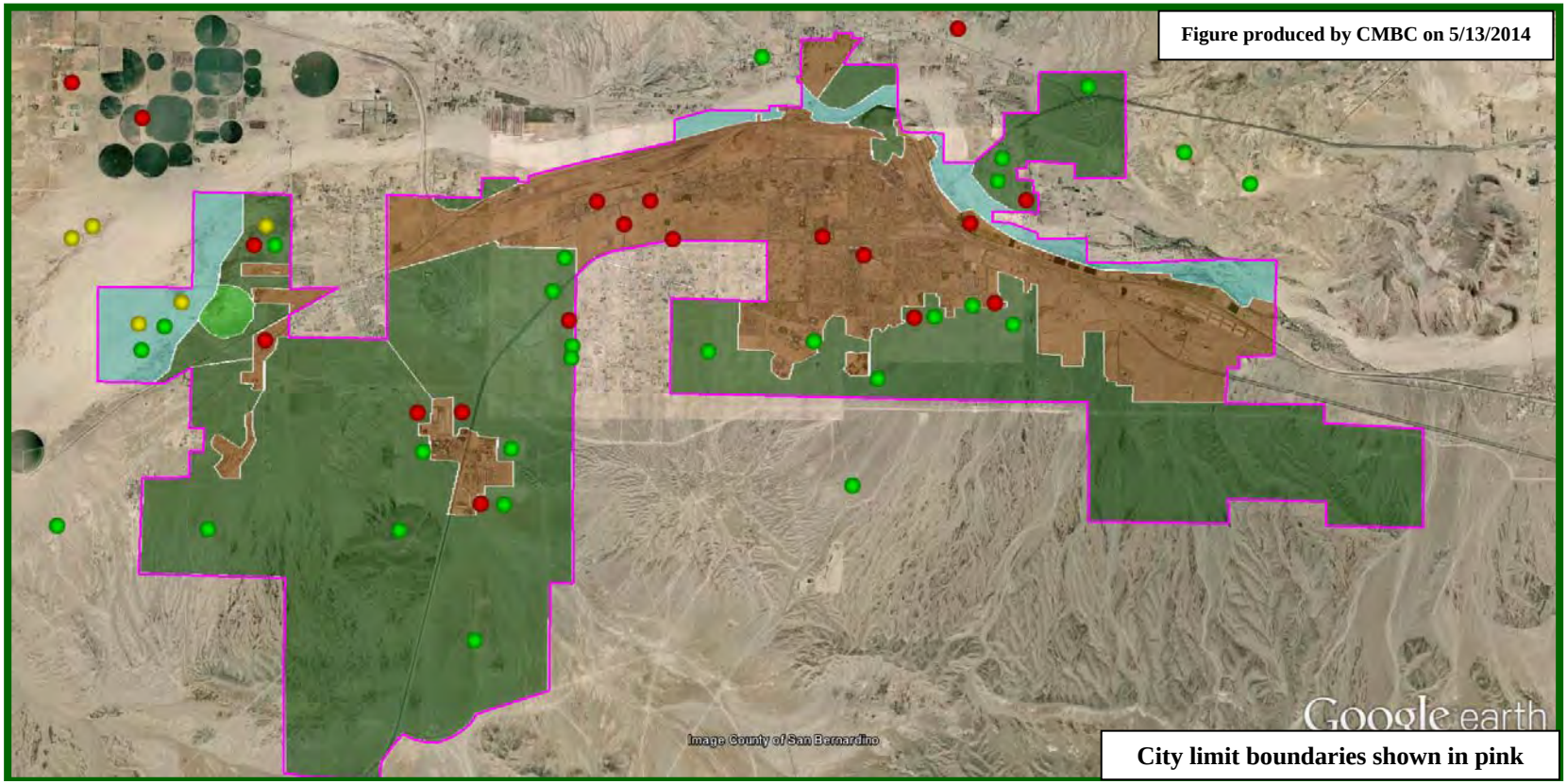


Figure 9. Locations of desert tortoise sign and Mojave fringe-toed lizards



= Native scrub habitats

= Sandy habitats along Mojave River bottom

= Urban areas

= Fallow agriculture

= No tortoise sign

= Tortoise sign present

= Mojave fringe-toed lizard

3.2.5. Birds. Twelve special status bird species have been reported from the area in the materials reviewed for this report, including previous CMBC surveys and the CNDDB (CDFW 2014a), which are listed below in Table 3.

Table 3. Special Status Bird Species Reported from Barstow Area

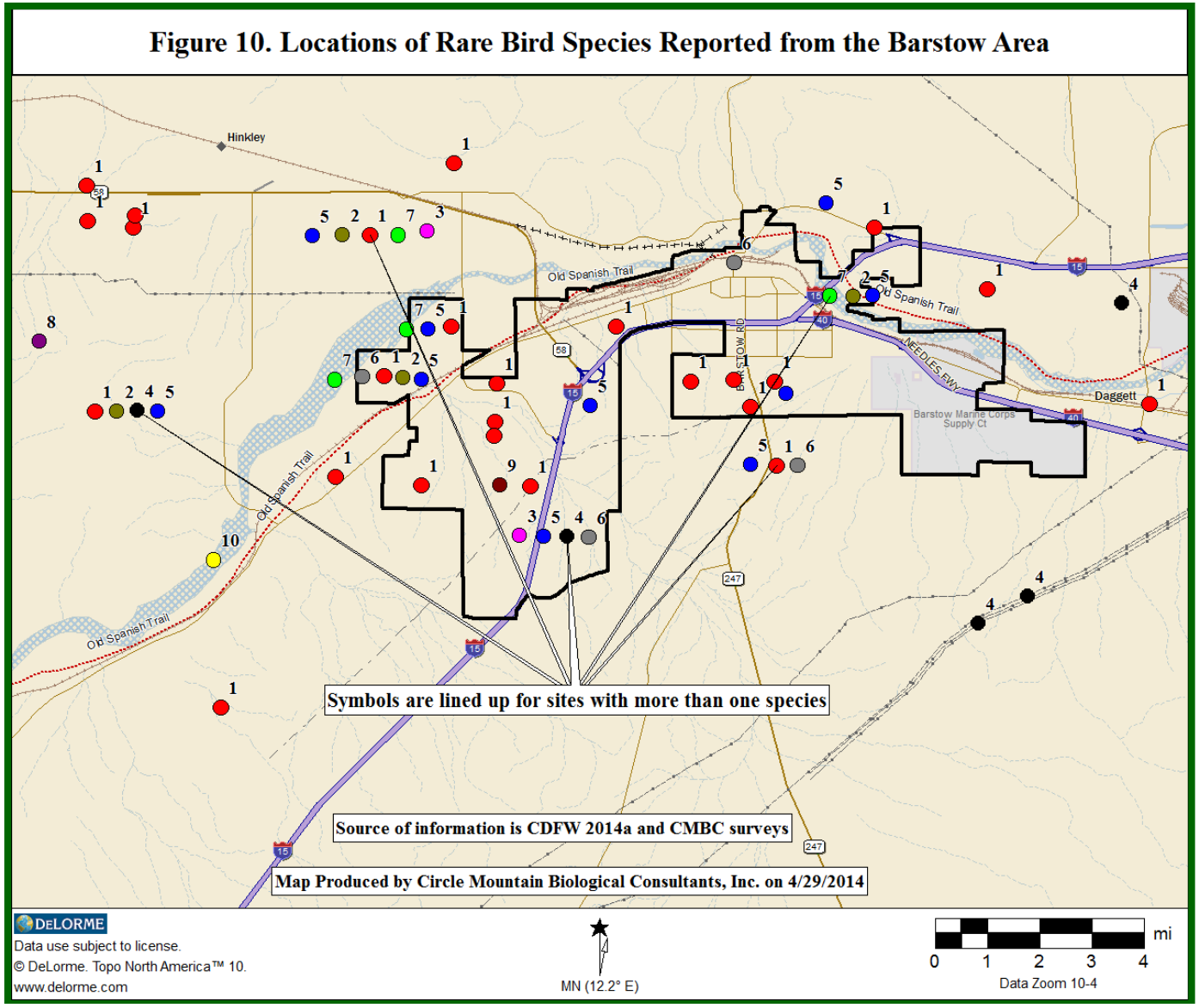
Common Name	Scientific Name	State/Federal Designations*
Burrowing owl	*Athene cunicularia*	SSC/BCC
Cooper's hawk	*Accipiter cooperii*	WL
Ferruginous hawk	*Buteo regalis*	WL/BCC
Golden eagle	*Aquila chrysaetos*	FP, WL/BCC
LeConte's thrasher	*Toxostoma lecontei*	SSC/BCC
Loggerhead shrike	*Lanius ludovicianus*	SSC/BCC
Northern harrier	*Circus cyaneus*	SSC/None
Osprey	*Pandion haliaetus*	WL/None
Prairie falcon	*Falco mexicanus*	WL/BCC
Swainson's hawk	*Buteo swainsoni*	T/BCC
Vaux's swift	*Chaetura vauxi*	SSC/None
Yellow-billed cuckoo	*Coccyzus americanus*	E/BCC

* BCC = USFWS-designated Bird of Conservation Concern; E = Cuckoo is designated as an Endangered species by the California Fish and Game Commission; FP = CDFW-designated Fully Protected species; SSC = CDFW-designated Bird Species of Special Concern; T = Swainson's hawk is designated as a Threatened species by the California Fish and Game Commission; WL = CDFW-designated Watch List species. Status designations are taken from CDFG (2011).

Locations for these 12 species are depicted in Figure 10, and individually in the figures included in Appendix B for each species account. Most of the raptors, including **Cooper's hawk** (may rarely nest), **ferruginous hawk**, **northern harrier**, **osprey**, **Swainson's hawk**, and **Vaux's swift**, which is not a raptor, either overwinter in the region or are incidental migrants passing through in the spring and fall. They may occasionally forage in the area, would not nest (except, possibly, Cooper's hawk), and for the most part would not be affected by future development within the city. There is suitable foraging habitat for both **golden eagle** and **prairie falcon**, which are year-round residents, but neither species would nest within city limits. A male **yellow-billed cuckoo** has been reported southwest of Barstow (see yellow symbol in Figure 10), and there is some limited potential a migrant may pass through, but they would not nest. Given the natural histories of these birds, none of them is likely to be significantly affected by future development within the Barstow city limits.

LeConte's thrasher, loggerhead shrike, and burrowing owl are the three bird species most likely to nest within the city limits and therefore most likely to be impacted. **LeConte's thrasher** is perhaps a little less tolerant of human development and its associated impacts than the others, but there are sufficiently extensive undeveloped lands for this species to occur, particularly throughout the southern part of the city where they may establish territories, breed, nest, and raise young. As shown in Figure 10 (see also page 43 of Appendix B), **loggerhead shrikes** are more widely distributed, including immediately adjacent to urban development, apparently due to a relatively higher tolerance for human impacts. These two species are most likely to be impacted by construction between about January and August when they are breeding, egg-laying, and raising young.

Figure 10. Locations of Rare Bird Species Reported from the Barstow Area



1 = Burrowing owl; 2 = Cooper's hawk; 3 = Ferruginous hawk; 4 = Golden eagle; 5 = Loggerhead shrike;

6 = LeConte's thrasher; 7 = Northern harrier; 8 = Prairie falcon; 9 = Swainson's hawk; 10 = Yellow-billed cuckoo

Burrowing owl is something of a special case among the designated rare bird species, in that it may be found in pristine desert habitats but also may be found in a vacant lot in downtown Barstow or immediately adjacent to developed areas. As depicted in Figure 10, it is the most commonly observed rare bird species among the 12 reported; as depicted in Figure 11, burrowing owls may occur in some relatively urbanized areas where habitats are degraded by dumping, off-highway vehicles, and miscellaneous other uses. This is perhaps the main reason that both impacts (Section 5.1.3.) and mitigation measures (Section 5.2.2.d.) are better defined for burrowing owl than any other rare bird species occurring in the Barstow area.

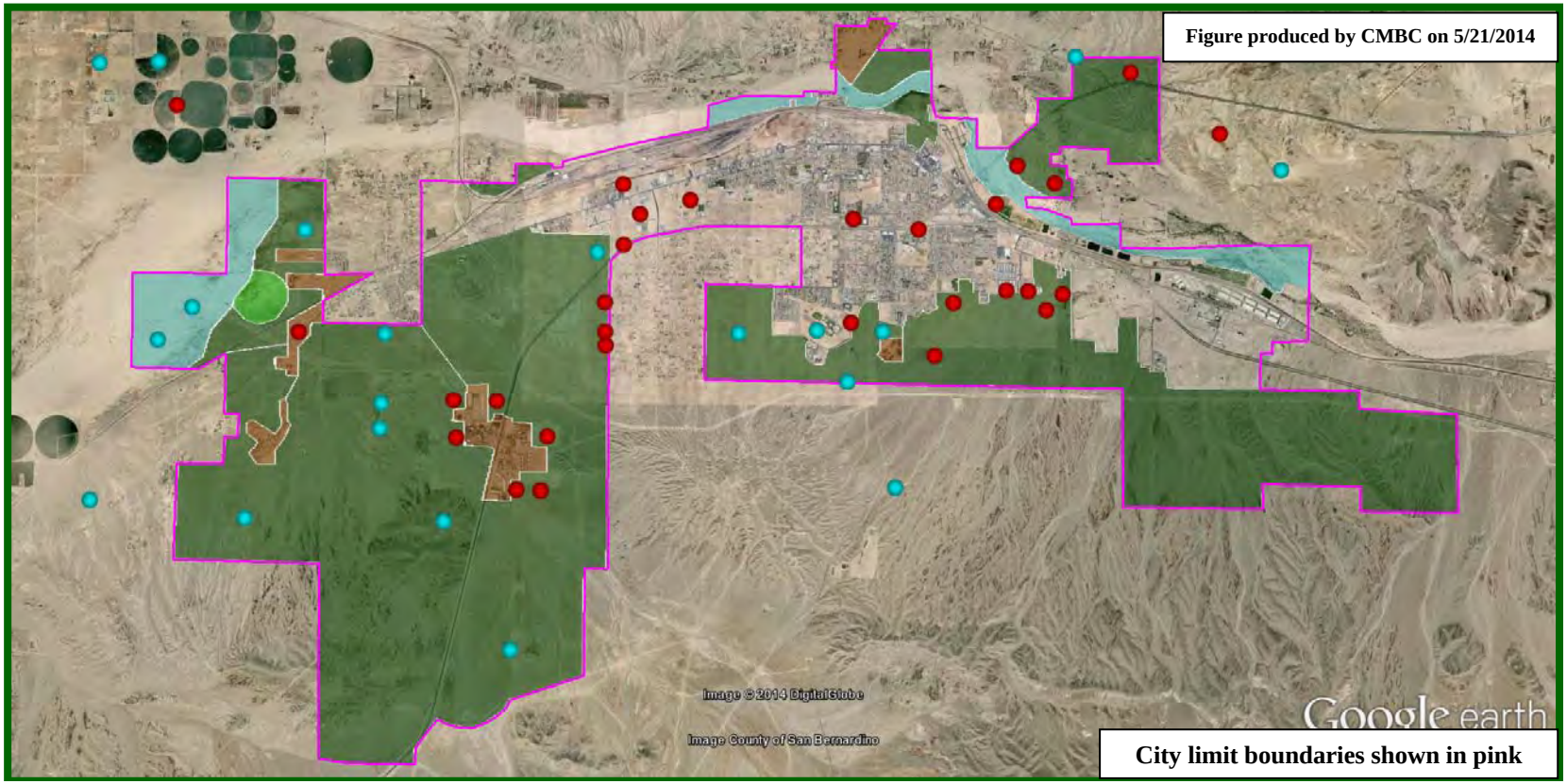
3.2.6. Mammals. The four protected mammal species reported from the region include Mohave ground squirrel (*Xerospermophilus mohavensis*), which is listed as a Threatened species by the California Fish and Game Commission and is not designated by the USFWS; Townsend's big-eared bat (*Corynorhinus townsendii*), which California Fish and Game Commission proposed as a Candidate for Endangered species listing in California on 26 June 2013 and is BLM Sensitive; American badger (*Taxidea taxus*), which is a California Species of Special Concern; and kit fox (*Vulpes macrotis*), which is not listed by either state or federal governments, but is a fur-bearing mammal that is Fully Protected from take under Title 14, California Code of Regulations: Section 460.

Mohave ground squirrel is a species that is endemic (i.e., found only in a certain area) to the West Mojave Desert. Since the presumed eastern boundary of the species' range follows Mojave River, the northern parts of Barstow are within the expected range and the southern parts are not. The one known occurrence within the city limits, which is shown as a red dot in Figures 12 and 13, was reported in 1949, when a female squirrel was reported (see Occurrence No. 456 on the Barstow SE quadrangle report in Appendix C). However, the record indicates that the exact location is unknown and that the animal was observed within about a mile of the mapped location.

Extensive trapping a few years ago in the west part of Lenwood captured only round-tailed ground squirrels; several reports that were included five years ago in the CNDDB as occurring in the eastern and central parts of the city have since been deleted when the biologist submitting the records (Denise LaBerteaux) later concluded that the species she observed in the early 1990's could have been round-tailed ground squirrels (both Dr. Phil Leitner's personal communication to Ed LaRue in April 2014). Finally, there is an anomalous report from the Barstow Landfill, where in 2005 a reputable biologist claimed to have seen a large ground squirrel, which she identified as a Mohave ground squirrel, attempting to enter a burrow. Dr. Phil Leitner, who is the foremost, active expert on the species, believes that this was a round-tailed ground squirrel (personal communication to LaRue in April 2014).

Even though the occurrence of Mohave ground squirrels within the city limits of Barstow remains uncertain, CDFW has a current policy that all development projects within approximately five miles of the extrapolated range for the species (see red line in Figure 12) should be trapped to determine presence or absence of the species. Alternatively, the proponent may assume presence and mitigate accordingly (see discussion in Section 5.2.2.c. of this report).

Figure 11. Locations of burrowing owl sign



= Native scrub habitats

= Sandy habitats along Mojave River bottom

= Urban areas

= Fallow agriculture

= Locations where burrowing owl sign was found

= Locations where NO burrowing owl sign was found

Figure 12. Locations of Rare Mammal Species Reported from the Barstow Area

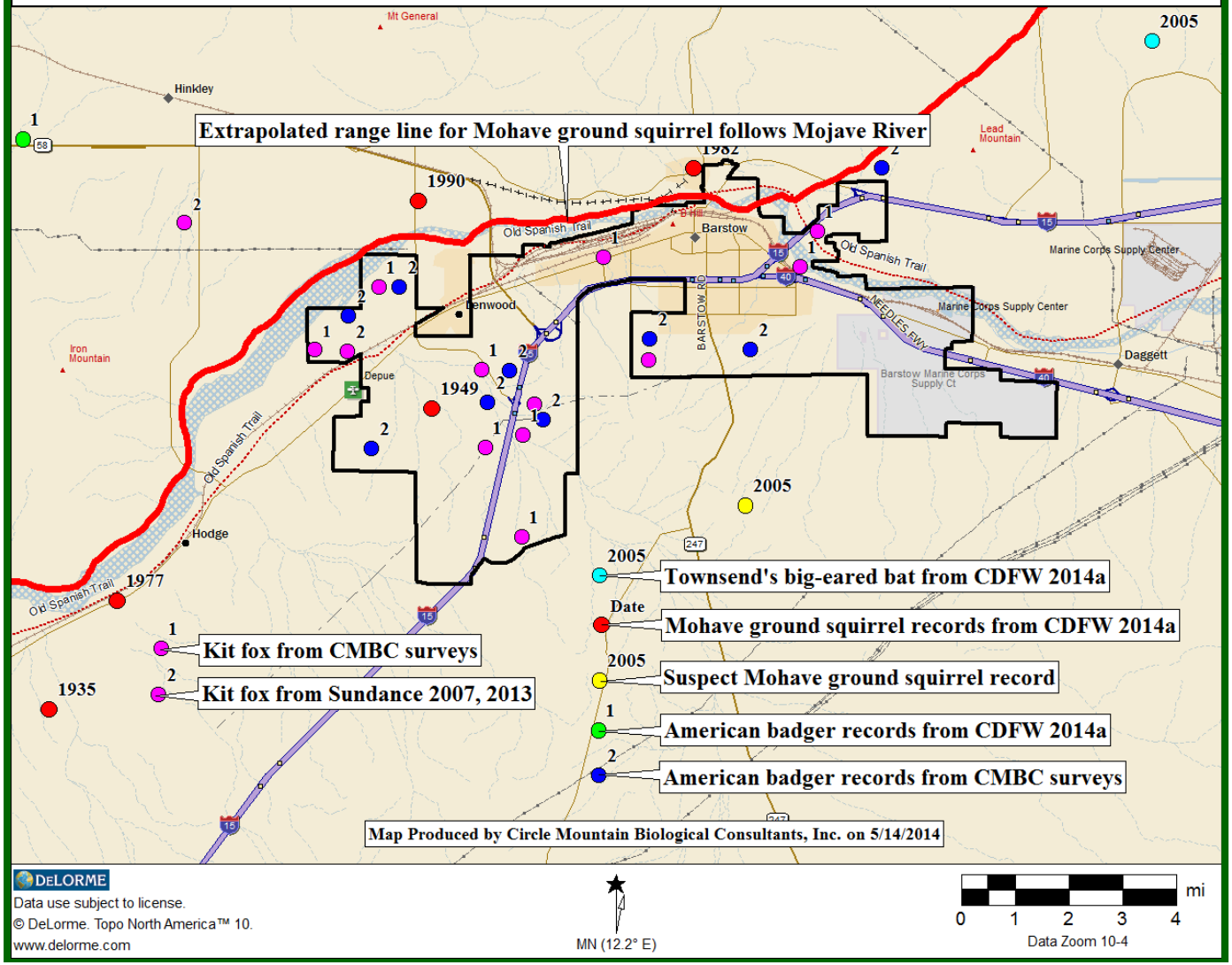
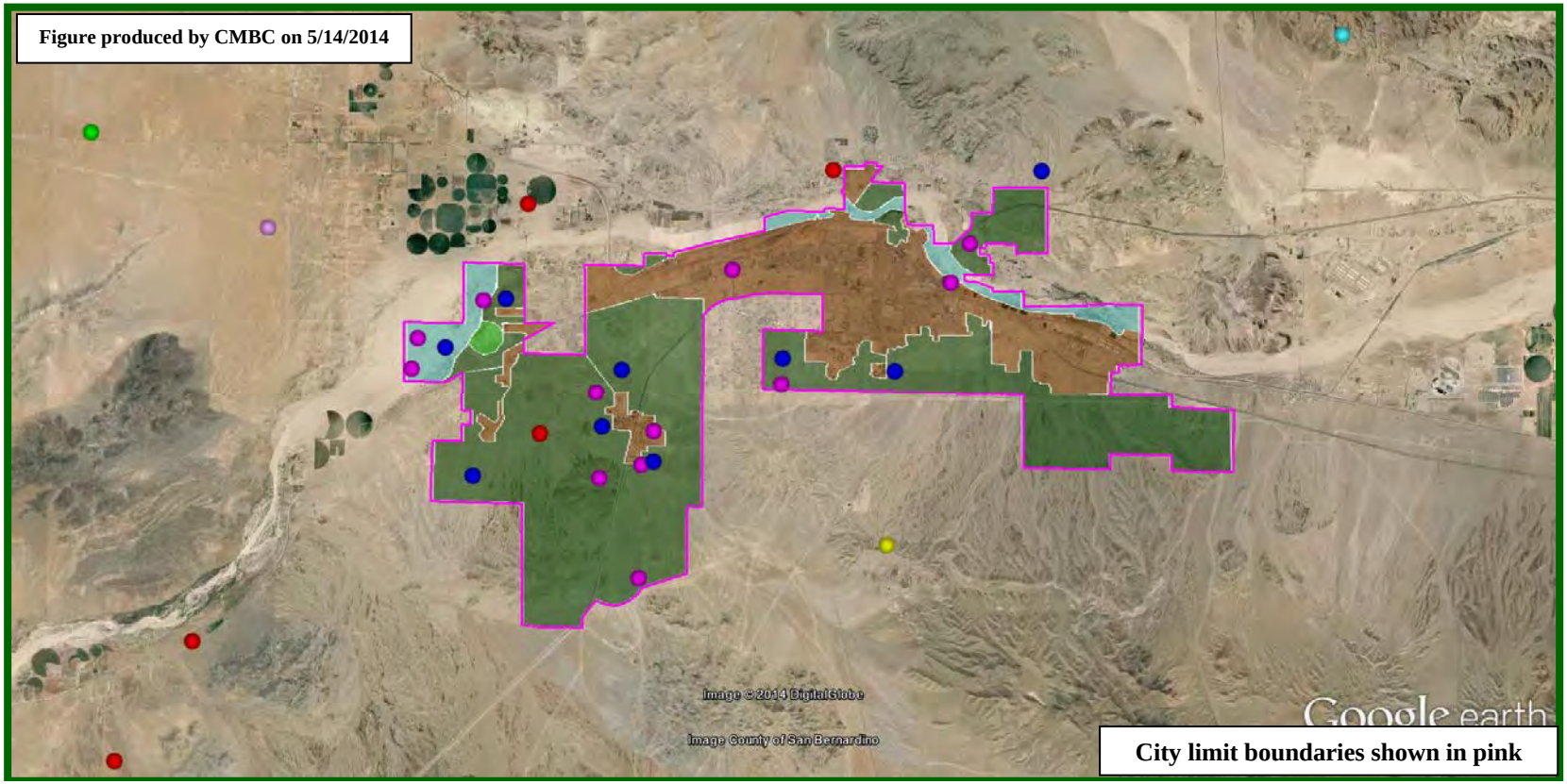


Figure 13. Locations of Mohave ground squirrels, American badger digs, kit fox sign, and Townsend's big-eared bat



= Native scrub habitats = Sandy habitats along Mojave River = Urban areas = Fallow agriculture

= Mohave ground squirrel (CDFW 2014a); = Suspect record of a Mohave ground squirrel (CDFW 2014a)

= American badger (CDFW 2014a); = American badger (CMBC surveys); = Townsend's big-eared bat (CDFW 2014a)

= Kit fox (CMBC surveys); = Kit fox (Sundance Biology, Inc. 2013)

As described in Appendix B, **Townsend's big-eared bats** seek out both winter hibernacula and maternity roosts in caves and mine shafts, none of which occur within the city limits of Barstow. In her species account (U.S. Bureau of Land Management 2005; Appendix B herein), Dr. Patricia Brown indicated that the species establishes colonies in proximity to nearby water and that the species is known to forage along the Mojave River riparian corridor. As such, there are likely foraging big-eared bats in Barstow, and they may occasionally roost in abandoned buildings, but are not likely to establish any sizeable colonies that would be affected by future development.

American badgers dig for small burrowing mammals in such a way that diagnostic "pot holes" are left behind. These digs are typically round, nearly vertical, between 8 and 10 inches in diameter, and, if really fresh, will still have widely-spaced claw marks around the insides of the dig. As shown in Figures 12 and 13, badger digs have been found throughout the southern portions of the city and seldom in more urbanizing areas.

Kit fox (sometimes referred to as "desert kit fox") is not listed or protected under either CESA or FESA; however, take of this species is defined and covered under Title 14 of the California Code of Regulations and Fish and Game Code. Further, California Fish and Game Code (§§ 4000 - 4012) defines kit fox as a fur-bearing mammal and take is not allowed without the proper fur-bearing take permit. As depicted in Figures 12 and 13, kit foxes have been identified (usually by characteristic dens and scat) throughout the southern portions of the city, and even in a few places relatively more developed, such as the formerly proposed municipal golf course site (CMBC 1997) and in April 2014 on Site 6 during reconnaissance surveys (CMBC 2014).

4.0. BIOLOGICAL GOALS AND OBJECTIVES

4.1. Open-Space and Conservation Elements

Open-space and conservation elements for the 1997 Barstow General Plan were defined and discussed in CMBC (1996) and are updated herein. Unless otherwise noted, the following information is taken from the Governor's Office of Planning and Research (2003). The requirements of the various endangered species laws affect the general plan in two ways. First, the plan should include objectives, policies, principles, plan proposals, and standards to address the preservation and protection of any Endangered, Threatened, or Candidate Species. Most often these will be located within the conservation, open-space, and land use elements.

Section 65302(d) requires that the general plan include a conservation element for "the conservation, development, and utilization of natural resources including fisheries [and] wildlife" (see Conservation Element in Chapter 4). Development policies concerning the preservation and protection of Endangered, Threatened, or Candidate Species should therefore be addressed within this element, including the promotion of congruency and cooperation with the management plans and policies of other agencies or organizations and recognition and implementation of enacted habitat conservation plans (HCPs) and natural community conservation plans (NCCP).

Development policies designed to protect Endangered, Threatened, or Candidate Species may also be included in the open-space element. Government Code §65560(b)(1) provides that land designated in the open-space element may include "open-space for the preservation of natural resources including areas required for the preservation of plant and animal life, including habitat for fish and wildlife species" (see Open-Space Element in Chapter 4). Open-space development policies are often used to preserve and protect habitat or to provide land to mitigate for the destruction or adverse modification of habitat by development in other areas. As with the conservation element, congruency and cooperation with management plans and policies of other agencies or organizations should be part of the open-space element.

Areas designated for the preservation and protection of Endangered, Threatened, or Candidate Species, such as HCP and NCCP planning areas, conservation banks, and areas determined as critical habitat, should be identified within the land use element. Government Code §65302(a) requires that the land use element designate "the proposed general distribution and general location and extent of the uses of land" (see Land Use Element in Chapter 4). Other important wildlife habitats, such as migration routes, breeding grounds, and nesting areas for Endangered, Threatened, or Candidate Species may also be identified. The evaluation and regulation of these areas, as well as the impacts to Endangered, Threatened, or Candidate Species from new development allowed by the plan, should also be addressed.

4.2. Goals, Objectives, and Recommendations

Each of the following goals and objectives is followed by recommendations for achieving them.

Goal and Objective 1. The goal is to conserve suitable habitats for Threatened, Endangered, and special status species found in the region, with special emphasis on the desert tortoise, Mohave ground squirrel, and burrowing owl. The objective is to maintain healthy populations of these species in undeveloped areas by enforcing applicable laws and implementing mitigation measures for development projects in a conscientious manner so that impacts are fully mitigated.

To achieve Goal and Objective 1, it is recommended that the City continue to require focal surveys for these and other rare species reported from the region, and work with potential developers to either avoid impacts or minimize them to the extent practicable. On those parcels where an abundance of one or more rare species occurs, the proponent may consider not developing the land. The City may then consider establishing natural open areas by purchasing the land through a third party and/or establishing conservation easements that would benefit both the developer and the natural resources being conserved. If development is pursued on lands where either the desert tortoise and/or Mohave ground squirrel occur(s), the proponent will need to secure incidental take permits prior to any ground disturbance (see discussion in Section 5.2.).

The City may consider pursuing a mitigation bank or programmatic HCP for those projects where Threatened species, including the desert tortoise and/or Mohave ground squirrel are impacted. If a mitigation bank is established, it should be occupied by the species it is intended to conserve. It should consist of private lands and be located within either the Superior-Cronese DWMA and Critical Habitat Unit located to the north or the Fremont-Kramer DWMA and Critical Habitat unit located to the west where contiguous lands are designated by the BLM for recovery of the desert tortoise and higher level management prescriptions for the Mohave ground

squirrel. As of 2014, Mohave ground squirrel has not been detected in the Ord-Rodman DWMA and Critical Habitat Unit, which is located south and southeast of Barstow. A mitigation bank in that area could function to offset impacts to the desert tortoise but would not be suitable for Mohave ground squirrel unless the species is confirmed to occur in that region. Where possible, links between proposed mitigation lands and other protected habitats should be established.

The bank must be sufficiently large that it can effectively offset impacts of multiple projects for the foreseeable future. If the bank were to function at a 1:1 ratio, for example, so that each acre developed would be compensated with one acre conserved (be aware that CDFW often requires mitigation ratios as high as 3:1 outside DWMAs), it would need to be relatively large. Ideally the bank should be several thousand contiguous acres surrounded by public lands managed by the BLM at DWMA-level management (i.e., DWMAs are designated by the BLM as Areas of Critical Environmental Concern or ACECs).

If, for example, the 16 sites considered in the City's Master EIR were developed over the next five-to-six years, each one required compensation for loss of tortoise-occupied habitats, and the regulatory agencies were willing to allow mitigation at a 1:1 ratio, the mitigation bank would need to be a minimum of 3,000 acres to compensate for the 2,931 acres that would be lost to development. This figure would be closer to 9,000 acres if CDFW were to require compensation at the 3:1 ratio.

In addition to acquisition, the land would also need to be managed by an entity acceptable to the regulatory agencies, including USFWS and CDFW. At the time of this writing, the three primary groups actively managing compensation lands where desert tortoises and/or Mohave ground squirrels have been impacted are Desert Tortoise Preserve Committee, Mojave Desert Land Trust, and Transition Habitat Conservancy.

Goal and Objective 2. The goal is to maintain riparian and other natural habitats along Mojave River. The objective is to maintain the river as a travel corridor and protected watershed that will function to connect natural areas located north and south of the city.

To achieve Goal and Objective 2, it is recommended that the City regulate development in such a way that no new structures, agriculture, and other major development (excluding flood control) be located within the 100-year flood plain of Mojave River. The City should develop a policy of no net loss of riparian habitat from the river, so that all existing cottonwoods, willows, and native riparian vegetation, including mesquite, mulefat, and arrow weed, be avoided and left in place.

While it is understood that the City has limited influence over existing ground water pumping upstream, given current California water law, removal of salt cedar (*Tamarix ramosissima*) has been shown to result in higher ground water levels and reestablishment of native riparian species at Afton Canyon, north of Barstow on Mojave River, and other areas (Egan 1996, Inglis et al. 1996). When applicable, the City should identify and require mitigation measures that would result in the restoration of riparian habitats in suitable areas along the river, including eradication of salt cedar wherever it occurs. Planting of cottonwoods, willows, mulefat, and other riparian scrub species in combination with tamarisk eradication may help recolonize the community that once occurred.

These recommendations complement San Bernardino County Development Code 88.01.080, which "…provides regulations to promote healthy and abundant riparian habitats that protect watersheds; control transmission and storage of natural water supplies; provide unique wildlife habitats for rare, endangered and threatened plants and animals; provide attractive environments; control natural soil erosion and sedimentation to protect stream banks subject to erosion and undercutting; and provide sufficient shade to reduce temperature and evaporation and the growth of algae in streams. The provisions of this Section are intended to augment and coordinate with the responsibilities of the CDFW."

Goal and Objective 3. The goal is to maintain natural areas for aesthetic and low-impact recreational purposes, and to utilize major recreational and open space reservations, including BLM-designated vehicle open areas, trails, and scenic highway corridors. The objective is to minimize impacts in undesignated habitats while promoting recreational uses in those areas designated for those purposes.

To achieve Goal and Objective 3, it is recommended that the City enforce the County's ordinance of no off-road motorized vehicle use on private lands within the city limits without the owner's written permission (San Bernardino County Code of Ordinances, Chapter 4, Sections 28.0401 to 28.0409). The BLM manages large recreational vehicle open areas immediately south of Barstow in the Stoddard Valley Open Area, 25 miles southeast in the Johnson Valley Open Area, 25 miles southwest in the El Mirage Open Area, 40 miles northeast in the Rasor Open Area, and 50 miles northwest in the Spangler Hills Open Area, among others. In so far as possible, the City should publicize the locations of these and other regional vehicular recreational areas and encourage off-highway vehicle enthusiasts to use them.

Goal and Objective 4. The goal is to avoid actions that lead to federal and/or state listing of additional plant and animal species as Threatened or Endangered. Once a species is listed or proposed for listing, state and federal incidental take permits are typically required, leading to delays in the start of projects, and additional costs for mitigation, monitoring, and other associated measures. The objective is to carefully manage non-listed special status species on a regional scale to prevent their listing and in so doing avoid significant costs in the long run.

To achieve Goal and Objective 4, it is recommended that impacts to rare and special status species, such as California Species of Special Concern and CNPS-listed plants should be considered in environmental review of projects. Cumulative effects of projects on the long term health of local populations of special status species should be highlighted. CMBC recommends that the City and/or project proponent consult with the USFWS and CDFW on a case-by-case basis when species such as burrowing owl and rare plant species are identified to determine appropriate mitigation and avoidance measures for unlisted, special status species.

Goal and Objective 5. The goal is to develop and implement ordinances and policies to prevent the spread of invasive, exotic plant species into native plant communities. The objective is to protect those native plant communities that are not being developed from invasion by exotic weed species. To achieve this goal and objective, it is recommended that the City implement California Invasive Plant Council's (Cal-IPC) Best Management Practices for Land Managers 3rd Edition (http://www.cal-ipc.org/ip/prevention/landmanagers.php) for various actions that could be applied to new and existing projects within the city limits in order to curtail the spread of exotic weed species.

Goal and Objective 6. The goal is to develop and implement ordinances and policies consistent with state and county regulations to preserve and protect native plants and plant communities in Barstow. The objective is to minimize and mitigate development impacts to those plant species identified as high priority for protection. To achieve this goal and objective, it is recommended that the City either enforce state and county ordinances or develop their own to minimize and mitigate impacts to the list of protected native plants identified in Section 5.1.1. of this report.

5.0. BIOLOGICAL CONSTRAINTS AND MITIGATION MEASURES

5.1. Protocol Surveys and Impacts Analysis

5.1.1. Plant Surveys. Although plant species lists should always be collected as part of desert tortoise surveys and biological inventories and documented in subsequent reports, depending on the size and profile of the proposed development, it may also be necessary to perform focused rare plant surveys. Both BLM and CDFW have protocols for rare plant surveys, which are described below.

- Bureau of Land Management. 2009. Survey protocols for NEPA/ESA compliance for BLM special status plant species. Sacramento, CA.

The protocol presents requirements for literature review, survey methodology, surveyor qualifications, and report contents to ensure that all projects on public lands managed by the BLM are adequately analyzed to meet requirements of the National Environmental Policy Act (NEPA) and FESA with regards to special status plant species.

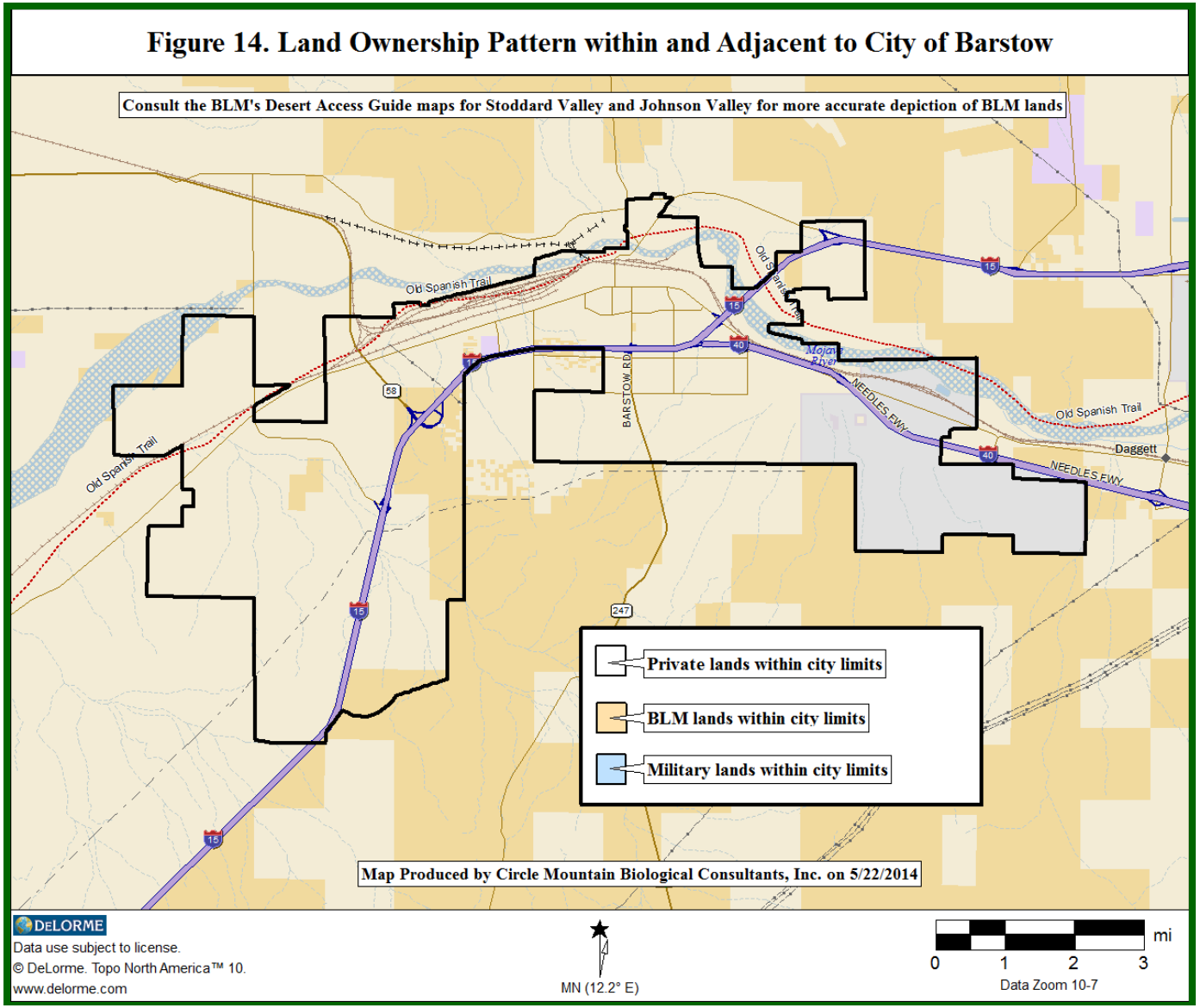
Timing of surveys is driven by the results of the literature review. If, for example, the literature search reveals that one annual plant species blooms in the spring and that another species is only detectable in the fall, two surveys would be required to satisfy the protocol.

The protocol is intended for all federal lands managed by the BLM within the California Desert Conservation Area, inclusive of both Mojave and Sonoran deserts. The protocol specifically identifies proposed energy right-of-way development on federal lands managed by the BLM throughout California deserts and northwestern Nevada. Approximate land ownership shown in Figure 14 indicates there are a few scattered parcels of public lands within the city limits. The BLM's Desert Access Guide maps for Stoddard Valley to the south and Johnson Valley to the east should be consulted for more accurate locations of BLM public lands.

- California Department of Fish and Game. 2009. Protocols for surveying and evaluating impacts to special status native plant populations and natural communities. California Natural Resources Agency, Department of Fish and Game, 24 November 2009. Sacramento, CA.

The protocol presents requirements for literature review, survey methodology, surveyor qualifications, and report contents to ensure that all projects subject to the California Environmental Quality Act (CEQA), CESA, and FESA are sufficiently analyzed with regards to special status plant species and natural communities (CHIPs).

Figure 14. Land Ownership Pattern within and Adjacent to City of Barstow



Surveys should be conducted at the time of year when species are both evident and identifiable. Usually this is during flowering or fruiting. Space visits throughout the growing season to accurately determine what plants exist on site. Many times this may involve multiple visits to the same site (e.g. in early-, mid-, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special status plants are present. The timing and number of visits are determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which the surveys are conducted. The protocol is intended for all projects requiring CEQA review in California.

- California Department of Fish and Game. 2010. Natural communities list arranged alphabetically by life form. Sacramento, CA.

This computerized list shows all natural vegetation communities occurring in California, with an asterisk beside those communities that are considered Communities of Highest Inventory Priority. Consultants performing surveys within the city limits should indicate if any of these plant communities occurs on the subject property, and if so, report them to the CDFW's California Natural Diversity Data Base. The webpage is accessed through the following URL: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_list.asp

- California Department of Fish and Wildlife. 2014a. Electronic database of rare plant and animal species reported to The State Resources Agency, Natural Heritage Division, California Natural Diversity Data Base. Sacramento, CA. Published May 2014.

This electronic data base is updated monthly with new reports of special status plant and animal species reported to the CDFW on a continual basis. Current status designations, scientific names, and common names are given for each species. In addition to specific location information (though only general locations are often given for historic records), the accounts indicate when the species was observed, how many, and other qualitative information about the observation. The data base is available through subscription only, either as a monthly or annual service.

- California Department of Fish and Wildlife. 2014b. Special vascular plants, bryophytes, and lichens list. 124 pp. Published in April 2014.

This regularly updated list includes common and scientific names of all plants in California considered rare by the California Fish and Game Commission, USFWS, and CNPS. At the time of this writing, the list published by CDFW in April 2014 replaced the previous one, dated May 2012. It is important that consultants consider the latest available list to ensure that special status designations have not changed since publication of the previous list.

- California Native Plant Society. 2011. A list of summer and/or fall flowering rare plants of California's deserts as reported in the CNPS inventory. Sacramento, CA.

This 13-page table lists 178 rare plants that flower in the summer and/or fall when they may be most (if not only) detectable. The table includes common and scientific names, seasonality for detection and flowering, heritage ranks, low and high elevations for known occurrences, and distributions both inside and outside California. Desert rare plants that are reported to flower between July and November are included in the list; many of the plants are likely to go undetected in the spring. Emory's crucifixion thorn and Mojave fish-hook cactus are two species reported from the Barstow area that are listed in the table. All information in this table is publically available via the Online CNPS Inventory of Rare and Endangered Plants (7th edition) (http://www.cnps.org/cnps/rareplants/inventory).

● San Bernardino County (Chapter 88.01 Plant Protection and Management, Section 88.01.020) and State of California (1998 Food and Agricultural Code, Division 23: California Desert Native Plants, Chapter 3: Regulated Native Plants, Section 80073) plant regulations.

At the County level, the San Bernardino County Development Code was revised and adopted on 12 April 2007. Chapter 88.01 Plant Protection and Management, Section 88.01.020 states, "The provisions of this Chapter apply to the removal and relocation of regulated trees or plants and to any encroachment (for example, grading) within the protected zone of a regulated tree or plant on all private land within the *unincorporated* areas of the County and on public lands owned by the County, unless otherwise specified..." [italics emphasis added]

Section 88.01.060 Desert Native Plant Protection states, "This Section provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources…"

Section 88.01.060(c) Regulated Desert Native Plants states, "The following desert native plants or any part of them, except the fruit, shall not be removed except under a Tree or Plant Removal Permit in compliance within Section 88.01.050 (Tree or Plant Removal Permits):

(1) The following desert native plants with stems two inches or greater in diameter or six feet or greater in height:
(A) *Dalea spinosa* (smoke tree).
(B) All species of the genus *Prosopis* (mesquites).
(2) All species of the family *Agavaceae* (century plants, nolinas, yuccas).
(3) Creosote Rings, 10 feet or greater in diameter.
(4) All Joshua trees.
(5) Any part of the following species, whether living or dead:
(A) *Olneya tesota* (desert ironwood).
(B) All species of the genus *Prosopis* (mesquites).
(C) All species of the genus *Cercidium* (palo verdes)."

At the state level, the 1998 Food and Agricultural Code, Division 23: California Desert Native Plants, Chapter 3: Regulated Native Plants, Section 80073 states: The following native plants, or any parts thereof, may not be harvested except under a permit issued by the commissioner or the sheriff of the county in which the native plants are growing:

(a) All species of the family Agavaceae (century plants, nolinas, yuccas).
(b) All species of the family Cactaceae (cacti), except for the plants listed in subdivisions (b) and (c) of Section 80072 (i.e., saguaro and barrel cacti), which may be harvested under a permit obtained pursuant to that section.
(c) All species of the family Fouquieriaceae (ocotillo, candlewood).
(d) All species of the genus *Prosopis* (mesquites).
(e) All species of the genus *Cercidium* (palo verdes).
(f) *Senegalia (Acacia) greggii* (catclaw acacia).
(g) *Atriplex hymenelytra* (desert holly).
(h) *Dalea (Psorothamnus) spinosa* (smoke tree).
(i) *Olneya tesota* (desert ironwood), including both dead and live desert ironwood.

While County statutes specifically apply to unincorporated areas, it is important that the City enforce those statutes or enact native plant protection ordinances that would serve to protect those plants and plant resources that are identified by San Bernardino County and/or the state of California. Both focused plant surveys and general biological inventories should indicate if these species are present. It may then be necessary to perform a Desert Native Plant Assessment to identify the numbers and locations of protected plants so the City may ensure that the development project is in compliance with pertinent ordinances.

5.1.2. Reptile Surveys. The two reptile species requiring specialized surveys are desert tortoise and Mojave fringe-toed lizard.

5.1.2.a. Desert Tortoise

- U.S. Fish and Wildlife Service. 2010a. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). USFWS Desert Tortoise Recovery Office. Reno, NV.

This is the definitive document that describes the survey methodologies for all projects occurring within the known range of the listed population of the desert tortoise. The USFWS differentiates between "Authorized Biologists" and "Environmental Monitors," and may accept or reject results of a given survey, even though a formal permit is not required to survey for tortoises in California. If the consultant plans to deviate in any way from the proposed survey protocol, it is strongly advised that they seek concurrence from both CDFW and USFWS biologists. Negative findings are valid for only one year; positive findings may last beyond one year to serve as baseline data for incidental take permits.

Protocol-level surveys must be performed in April-May and September-October unless the site is equal to or less than 40 acres, in which case it may be surveyed year round. Depending on the nature and size of the project, surveys may be performed outside these survey times but only with prior authorization from both CDFW and USFWS. All public and private lands in all California counties within the known range, up to 5,000-feet elevation, are subject to protocol surveys, which includes all of Barstow. The protocol recommends that transects spaced at 10-meter (30-foot) intervals be surveyed throughout the subject property and adjacent "action area." The action area is defined by regulation as all areas to be affected directly or indirectly and not merely the immediate area involved in the action (50 CFR §402.02). It is advisable to consult with USFWS to determine an appropriate action area for larger, high-profile projects.

If no tortoise sign is found onsite, peripheral transects (also referred to as "zone of influence transects") are surveyed at 655-foot (200-meter), 1,310-foot (400-meter), and 1,970-foot (600-meter) intervals parallel to and/or encircling the project perimeter. If tortoises longer than 160 mm (+/- 6.25 inches) are found within the action area (not including smaller tortoises or those animals found on zone of influence transects), USFWS (2010a) provides a formula that will allow the consultant to estimate the number of adult tortoises occurring within the action area (so long as the surveys were within the April-May and September-October time frames and all other methods are followed).

- U.S. Fish and Wildlife Service. 2010b. Field manual for tortoise surveys, monitoring, etc. at http://www.fws.gov/ventura/species_information/protocols_guidelines/index.html. Reno, NV.

The purpose of the Desert Tortoise Field Manual is to update and consolidate existing survey and handling protocols, procedures, and applicable federal regulations related to the federally Threatened Mojave desert tortoise into one document. The Desert Tortoise Field Manual supersedes all previous handling guidelines and procedures documents for the Mojave desert tortoise and was developed specifically for the desert tortoise. Additional information on the desert tortoise, including its biology, ecology, and federal status, can be downloaded at http://www.fws.gov/nevada/desert_tortoise/dt/dt_life.html.

- California Department of Fish and Wildlife Memorandum of Understanding (MOU).

Although an MOU is not required for tortoise *surveys*, CDFG does require that all consultants *handling* tortoises are listed on a project-specific MOU. This MOU is required in addition to federal biological opinions and incidental take permits issued by the USFWS [FESA 10(a)(1)(B) permit], BLM (project specific approval of all persons handling tortoises), and CDFW (CESA 2081 permit). The MOU is required year round and therefore has no seasonality. This requirement pertains to all public and private lands throughout California within the known range where tortoises are to be handled.

- Desert Tortoise Council. 1999 (revised from 1994 version). Guidelines for handling desert tortoises during construction projects. Edward L. LaRue, Jr., editor. San Bernardino, California.

Since first drafted in 1994, the "Handling Guidelines" have been identified in federal biological opinions and incidental take permits as the recommended procedure for handling and processing tortoises during authorized projects. These guidelines should not be implemented unless proper state and federal authorizations have been obtained. Although USFWS (2010b) replaced the Handling Guidelines with their Desert Tortoise Field Manual, Chapter 7 tortoise handling protocol (see http://www.fws.gov/ventura/species_information/protocols_guidelines/index.html), CDFW still relies on them as of May 2014.

The Handling Guidelines, originally developed by Ed LaRue in 1994, have been in place for 20 years, and are intended to instruct consultants on how to handle and process tortoises displaced by authorized development, so seasonality depends on the timing of ground disturbance. If tortoises are to be translocated some distance from the development site, it is advisable that translocation activities occur in early spring although some fall projects have been authorized by USFWS. These Guidelines apply to all projects on public and private lands throughout California within the known range where prior authorization has been granted from one of the resource agencies, usually including CDFW, USFWS, and/or BLM.

5.1.2.b. Mojave Fringe-toed Lizard

- University of California Riverside, Center for Conservation Biology. 2005. Coachella Valley Multiple Species Habitat Conservation Plan Monitoring Program (Final Report). 2002-2005 unpublished progress report to Coachella Valley Association of Governments. Riverside, CA. 164 pp. (Coachella Valley fringe-toed lizard survey protocol revised in 2007).

University of California Riverside's Center for Conservation Biology reports on a 2005 survey protocol that was revised in 2007 for detection of Coachella Valley fringe-toed lizard, which is herein given as an appropriate method to apply for detection of Mojave fringe-toed lizard, which is the species occurring in the Barstow area. The survey requires six visits, where transects are surveyed at 5-meter intervals, and at least two qualified biologists working together tap the vegetation to flush lizards. One person focuses on the substrate/habitat 30-40 meters in front while the other one focuses in the area 2-10 meters in front. Surveys are conducted only when winds are 10 mph or less and it is not raining. The surveys should occur between April and October (inclusive of both months) between 7:30-11:00 a.m. when the temperature 1 centimeter above the open (unshaded) sand surface is greater than 95 degrees Fahrenheit and less than 110 degrees Fahrenheit (35 to 43 degrees Celsius), with at least two surveyors working together.

5.1.3. Bird Surveys. The two main issues in the Barstow area with regards to birds are impacts to burrowing owls and protection of nesting birds under the Migratory Bird Treaty Act.

5.1.3.a. Burrowing Owl

- California Department of Fish and Game. 2012. Staff report on burrowing owl mitigation. 7 March 2012 memo replacing 1995 staff report, State of California Natural resources Agency, Department of Fish and Game. Sacramento, CA.

For burrowing owl, the CDFG (2012) survey protocol recommends transects be surveyed at 30-meter intervals throughout a given site, with five additional transects surveyed at 30-meter intervals out to 150 meters in adjacent areas in potential habitat (i.e., excluding areas substantially developed for commercial, residential, and/or industrial purposes). Importantly, this methodology is considered a formal *habitat assessment* for presence of burrowing owls, which can be conducted any time of the year. With its narrower transect intervals, a protocol tortoise survey would be sufficient to cover a given site for burrowing owl as well.

If burrowing owl sign is found, it would then be necessary to perform breeding burrowing owl surveys during the spring and summer as outlined in CDFG (2012). Spring focused surveys for burrowing owl require four survey visits including: "1) at least one site visit between 15 February and 15 April, and 2) a minimum of three survey visits, at least three weeks apart, between 15 April and 15 July, with at least one visit after 15 June." Surveys are "conducted by walking straight-line transects spaced 7 m to 20 m apart, adjusting for vegetation height and density ..." "Surveys between morning civil twilight and 10:00 AM and two hours before sunset until evening civil twilight provide the highest detection probabilities."

CDFG (2012) has stipulated that the following should be considered impacts to the species:

> • *Disturbance within 50 meters (approximately 160 feet), which may result in harassment of owls at occupied burrows;*
>
> • *Destruction of natural or artificial burrows (i.e., culverts, concrete slabs, and debris piles that provide shelter to burrowing owls); and*
>
> • *Destruction and/or degradation of foraging habitat adjacent [within 100 meters (approximately 320 feet)] of an occupied burrow(s).*

5.1.3.b. Migratory Bird Treaty Act (MBTA). The federal MBTA of 1918, as amended, makes it unlawful, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or *any part, nest, or egg of any such bird*." (16 U.S.C. 703) In addition, the California Fish and Game Code Sections 3503 and 3505.5 make it unlawful to *take, possess, or needlessly destroy the nest or eggs of any bird.*

5.1.4. Mammals. Diagnostic signs of American badger and kit fox may be observed and recorded during protocol surveys for the desert tortoise, as described above. The locations of these digs and dens should be mapped and documented in biological technical reports. Surveys for bats require specialized expertise and equipment for their detection and to identify which species occur. As such, these surveys are not performed during general biological inventories, and specialists will need to be contracted for larger projects that may affect bats.

5.1.4.a. Mohave Ground Squirrel. The first step in assessing habitats for suitability is to consider the nature of the subject property and surrounding areas. San Bernardino County has recently required that these habitat assessments be performed by individuals certified by CDFW with a species-specific MOU for trapping the species. In recent years, the CDFW has considered three criteria in assessing potential impacts to the Mohave ground squirrel (Adrienne Disbrow, personal communication to CMBC in 2004): (1) Is the site within the range of the species? (2) Is there native habitat with a relatively diverse shrub component? (3) Is the site surrounded by development and therefore isolated from potentially occupied habitat? If the certified consultant determines that the habitat is suitable, the proponent may need to trap the site as per the trapping protocol that follows.

- California Department of Fish and Game. 2003 (minor process and contact changes in 2010). Mohave ground squirrel survey guidelines. Sacramento, CA.

Mohave ground squirrel is the one mammal species in the Barstow area for which a specialized trapping survey is required. CDFG 2003 (revised 2010) is the definitive document that describes the survey methodologies for all projects occurring within the known range of the state-listed population of the Mohave ground squirrel. Specific CDFW authorization in an MOU is required to trap for and handle Mohave ground squirrels, which identify Principal Investigators, Independent Researchers, and Field Assistants.

Visual surveys are performed from March 15 through April 15, and if no Mohave ground squirrels are observed, trapping begins. Each trapping term consists of five consecutive days unless a Mohave ground squirrel is trapped, in which case trapping stops. A given term may only begin at least two weeks after the end of the previous term. The first term is March 15 through 30 April; the second term is May 1 through May 31; and the third term is June 15 through July 15.

Trapping is required within the known range including Inyo, Kern, Los Angeles, and San Bernardino counties including all cities in those counties. CDFW routinely requires trapping of a given site that is within approximately five miles of the known range, which would include all portions of Barstow. Like desert tortoise surveys, if no Mohave ground squirrels are trapped during the 15-day period, the proponent may conclude – for the period of one year – that the species is absent. If the site is not developed during that year, another trapping effort will be required. If Mohave ground squirrel is trapped, the proponent will need to secure an incidental take permit. As described below in Section 5.2.2.c, if desert tortoises are found on a site, it is advisable that the proponent assumes presence of Mohave ground squirrel and mitigates accordingly, which will save them thousands of dollars in unnecessary trapping fees.

5.2. Regulatory Framework to Minimize and Mitigate Impacts

5.2.1. Federal Regulations

5.2.1.a. Desert Tortoise. The only federally-listed species in the Barstow area that is likely to be affected by future development is the Threatened desert tortoise, which, as described above, occurs within the city's limits in most undeveloped habitats, particularly to the south, west, and northeast. In the past, the regulatory agencies have equated tortoise sign with occupied habitat; there is no requirement that an animal be observed onsite. The USFWS has required incidental take permits when tortoise sign (not animals) was the only evidence found.

If any tortoise sign (including carcasses) is found onsite, development of the property may impact the Agassiz's desert tortoise, which, as a federally-listed species, would require that the Proponent avoid or mitigate the impact. At the time of development, landowners will likely need an incidental take permit from the USFWS. Tentative tract maps, parcel splits, etc. are paper transactions that will have no immediate direct impacts on the species. However, later development of the property could result in the loss of occupied habitat and potential injury or death to animals occurring on the site, which would constitute "take" under FESA. As the CEQA lead agency, the City should advise proponents that take must be permitted before any ground disturbance can occur in occupied habitats.

For those projects where tortoises occur, the USFWS must authorize incidental take for all City-approved activities for them to be lawful. Although there may be stream courses onsite that will likely require a *Streambed Alteration Agreement* from the CDFW (see Section 5.2.2.e.), these watercourses are not under the jurisdiction of the U.S. Army Corps of Engineers. Given this, and no other federal involvement, the site could not be developed under Section 7 of FESA, which is available when a federal action agency *funds, authorizes, or carries out* some portion of the project that *may affect* the Agassiz's desert tortoise. Any development on BLM lands occurring within the city limits must be authorized under Section 7 of FESA.

Given no federal involvement, development of the site, then, would need to be authorized under authority of a FESA Section 10(a)(1)(B) incidental take permit (i.e., 10a permit). Traditionally, it has taken several years to obtain a federal 10a permit from the USFWS for projects in California deserts. The take permit will identify both *minimization measures* and *mitigation measures* to offset the impacts.

Minimization measures are applied onsite at the time of construction. As the name implies, the intent of these measures is to minimize direct impacts to tortoises and occupied habitat. These measures typically include hiring a biological monitor to remove all tortoises from the fenced construction area. Tortoise awareness programs are given to construction personnel who are prohibited from driving cross-country, littering, bringing pets into the area, etc. *Mitigation measures* are applied off-site. FESA 10a permits for tortoises typically require that the proponent purchase compensation lands in tortoise conservation areas. The compensation may be as low as 1:1 for USFWS or as high as 3:1 for CDFW for projects in the Barstow area.

Collectively, these measures are part of a *conservation strategy* that is intended to *fully mitigate impacts to the maximum extent practicable*, as required by the USFWS. For the 10a permit, the Proponent would need to develop a *Habitat Conservation Plan* (HCP) to identify minimization and mitigation measures. Additionally, an *Implementing Agreement* would be drafted to serve as the legal document binding all parties to specified actions. An *Environmental Assessment* would be drafted and circulated to the local community to inform residents of the USFWS' proposed action to issue an incidental take permit and authorize development.

The above discussion is based on past experience with federal permitting processes. However, due to agency personnel changes and other factors, there is no guarantee that past experience will necessarily reflect future permitting processes. Between 1990, when the tortoise was listed, and 2003, the USFWS issued only a dozen 10a permits in California for the authorized take of tortoises. LaRue drafted the HCP and supporting documents for the first, second, and fourth 10a permits issued in California for the tortoise. Construction of two churches in eastern Yucca Valley occurred in 1993 under authority of California's first 10a permit for the Agassiz's desert tortoise.

5.2.1.b. Migratory Bird Treaty Act (MBTA). Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests, including raptors and other migratory nongame birds listed under the MBTA. Typically, CDFW requires that vegetation not be removed from a project site between March 15 and September 15 to avoid impacts to nesting birds. If it is necessary to commence project construction between March 15 and September 15, a qualified biologist should survey all shrubs and structures within the project site for nesting birds, prior to project activities (including construction and/or site preparation).

Surveys should be conducted at the appropriate time of day during the breeding season, and surveys would end no more than three days prior to clearing. CDFW is typically notified in writing prior to the start of the surveys. Documentation of surveys and findings should be submitted to the CDFW within ten days of the last survey. If no nesting birds were observed project activities may begin. If an active bird nest is located, the plant in which it occurs should be left in place until the birds leave the nest. No construction is allowed near active bird nests of Threatened or Endangered species.

5.2.2. State Regulations

5.2.2.a. Protected Plants. Sections 1900 through 1913 of the Fish and Game Code define rare plant species and provide for their protection. Section 1911 defines the state's role in protecting rare native plants: "All state departments and agencies shall, in consultation with the department, utilize their authority in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered or rare native plants. Such programs include, but are not limited to, the identification, delineation and protection of habitat critical to the continued survival of endangered or rare native plants."

5.2.2.b. Desert Tortoise. Most of the information given above in Section 5.2.1.a. for federal permitting also pertains to state regulations, with the few differences that follow. As a state-listed Threatened species, impacts to desert tortoises would be considered a *significant impact* under CEQA. In addition to the FESA 10a incidental take permit, the proponent's project would also need to be authorized under authority of a CESA Section 2081 incidental take permit, which may take six to nine months to obtain. Although the CDFW has the option under CESA Section 2080.1 to adopt the federal permit and allow it to authorize take at the state level as well, in practice it rarely occurs because CDFW always requires land compensation whereas USFWS does not for projects approved under FESA Section 7 take authorization.

The discussion given above for *minimization* and *mitigation measures* also applies at the state level. Whereas USFWS has the standard, to *fully mitigate impacts to the maximum extent practicable*, the CDFW's standard is that *authorized take shall be minimized and fully mitigated*; the conservation strategy outlined in the CESA 2081 permit would be similar to the one in the FESA 10a permit. CDFW requires that Mitigation and Monitoring Reporting Program (MMRP) tables be produced that collectively show the protective measures implemented before, during, and after construction of authorized construction projects.

The importance of involving CDFW and USFWS biologists in coordination meetings, perhaps with a City planner in attendance, to discuss and coordinate mitigation strategies cannot be overemphasized. The meeting would occur after the site has been surveyed and desert tortoise and/or Mohave ground squirrel determined to occur and before incidental take permits are solicited. It is advisable that the proponent's biological consultant draft a preliminary conservation strategy for all listed and unlisted rare species that would be affected to determine the acceptability of those proposed measures to offset impacts. This conservation strategy would be discussed and modified by those regulatory biologists in attendance so the incidental permit applications are comprehensive and acceptable to all pertinent regulatory agencies at the time of issuance.

5.2.2.c. Mohave Ground Squirrel. Since both desert tortoise and Mohave ground squirrel are listed by the state as Threatened, the discussion given above in Section 5.2.2.b. also pertains to take of Mohave ground squirrel. Importantly, for those projects where the tortoise has been identified and an incidental take permit will be required, it is highly advisable that the proponent have CDFW draft its incidental take permit to identify both the tortoise and Mohave ground squirrel as "covered species." The USFWS cannot do this, because the Mohave ground squirrel is not federally listed. By including Mohave ground squirrel on state incidental take permits for the tortoise, it will ensure that the project is not delayed or stopped should the state-Threatened squirrel be found onsite at the time of development.

Another reason for this suggestion is to avoid the high costs of trapping for Mohave ground squirrels. Consultants have charged as little as $18,000/grid and as much as $35,000/grid to trap for this squirrel. Since a grid is comprised of 100 traps per 80 acres, a 240-acre site would cost between $54,000 at the low end up to $105,000 at the high end, depending on the consultant. If tortoises are already present, these trapping costs would be avoided by including Mohave ground squirrel on the state's 2081 incidental take permit. This approach is generally referred to as "assuming presence and mitigating accordingly."

5.2.2.d. Burrowing Owls. Although burrowing owls are not formally listed as either Threatened or Endangered, they are protected by Sections 3503, 3503.5, and 3513 of the Fish and Game Code. If impacts cannot be avoided, specified mitigation measures include (a) avoiding occupied burrows during the breeding season, between February 1 and August 31; (b) purchasing and permanently protecting 6.5 acres of foraging habitat per pair or unpaired resident bird impacted; (c) creating new burrows or enhancing others when destruction of occupied burrows is unavoidable; (d) implementing passive relocation if owls must be moved; and (e) provide funding for long-term management and monitoring of protected lands.

Given this information, it is highly advisable (and cost effective) to avoid impacts. CDFG (2012) states the following:

> *If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approximately 250 feet) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be permanently preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department* [CDFW].

5.2.2.e. Streambed Alteration Agreement. The following is taken from CDFW website found at http://www.dfg.ca.gov/habcon/1600/. Fish and Game Code Section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW before beginning any activity that will do one or more of the following: (1) substantially divert or obstruct the natural flow of any river, stream or lake; (2) substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state, including many dry washes in desert regions.

The consultant will generally collect data along each potential jurisdictional stream course, including measurements of the channels; dominant plants comprising the forb, shrub, and tree strata; and photographs at regular intervals, depending on the length of the watercourse (100-foot intervals works well). As per Section 1603 of the Fish and Game Code, if CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a Streambed Alteration Agreement (Agreement) will be required.

The Agreement includes reasonable conditions necessary to protect those resources and must comply with CEQA. The proponent may proceed with the activity in accordance with the final Agreement after it has been issued. The application form is available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3754&inline=1. The completed Agreement application form is sent along with the baseline field data to CDFW, Inland Deserts Region, Streambed Alteration, 3602 Inland Empire Boulevard, Suite C-220, Ontario, California 91764.

5.2.2.f. Regional Water Quality Control Board (RWQCB). The following information is taken from Alden Environmental, Inc. (2013). The RWQCB is the primary agency responsible for protecting water quality in California. The RWQCB regulates discharges to surface waters under Section 401 of the Clean Waters Act of 1972 and the California Porter-Cologne Water Quality Control Act of 1969. The RWQCB's jurisdiction extends to all waters of the state as identified by CDFW. Section 401 of the Clean Water Act and the state Porter-Cologne Water Quality Control Act give the RWQCB the authority to regulate any proposed activity that may affect water quality. Water quality certification and/or a Report of Waste Discharge must be based upon a finding that the proposed discharge will comply with water quality standards.

5.2.3. Regional and Local Regulations. As given above in Section 4.1., the Governor's Office of Planning and Research (2003) requires that general plans compliment other regional planning efforts. Several of these planning efforts are complete or are currently underway with regards to conservation planning by the BLM, CDFW, and USFWS

5.2.3.a. Plant Protection. It is prudent that the City enacts similar ordinances or enforces San Bernardino County Development Code, Section 88.01.050.i.8. (Land Disturbance), which states: "No person, except as provided in this Chapter, shall commence with a disturbance of land (e.g., grading or land clearing) without first obtaining approval to assure that said disturbance will not result in the removal of any regulated native trees or plants. Said approval may be in the form of a development permit or a Tree or Plant Removal Permit issued by the appropriate authority."

5.2.3.b. West Mojave Coordinated Management Plan (West Mojave Plan). At the time of the 1996 general plan update (CMBC 1996), the BLM's West Mojave Plan was still in its early planning stages. The Final Environmental Impact Report was completed in 2005 and the BLM issued its Record of Decision in 2006 (U.S. Bureau of Land Management 2005 and 2006, respectively). The plan pertains to only those public lands managed by the BLM (not private lands), which would include those few parcels that occur within the city limits. At this time, there is no intent to modify the West Mojave Plan to permit development on private lands.

Among other things, the West Mojave Plan designated DWMAs to the north (Superior-Cronese DWMA), southeast (Ord-Rodman DWMA), and southwest (Fremont-Kramer DWMA) as regional areas to be managed for the recovery of desert tortoise populations. Assuming there is no mitigation bank or regional HCP established by the City and Mohave ground squirrels are deemed absent by a protocol trapping survey, any development project within the city limits of Barstow that affects tortoises would have any one of these three DWMAs in which to secure and manage compensation habitats.

5.2.3.c. Desert Renewable Energy Conservation Plan (DRECP). The DRECP planning process was effectively initiated when an MOU was signed by managers of the USFWS, CDFW, BLM, and California Energy Commission (CEC) in November 2008. An administrative draft was circulated among the participating regulatory agencies in early 2014 and the draft plan is tentatively scheduled to be released for public review in the summer of 2014. As envisioned, the DRECP would serve as a streamlined process for permitting renewable energy projects throughout the California deserts, inclusive of Barstow. In the Barstow area, it would pertain to solar and wind development (which assumes no geothermal resources are present). It would apply to renewable energy development on private lands where the City is the CEQA lead agency and on public lands managed by the BLM.

5.3. Future Monitoring and Data Compilation

Hopefully the reader can see the importance and usefulness of maintaining and compiling good records and publishing them in data bases, annotated bibliographies, and maps. CMBC feels that these exercises are important enough that we are willing to update these materials for the foreseeable future without expense to the City. As such, if the City will send all focused, protocol surveys to us, we will amend our annotated bibliography and base maps to reflect all future surveys performed within the city limits. As presented herein, we will show both positive and negative results, which show the presence and absence of targeted species on a regional scale. We feel that this will be a valuable resource to the City as new projects are identified, pursued, and developed (or not). It will also serve as invaluable baseline data should the City decide to pursue a regional Habitat Conservation Plan to address future development.

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APPENDIX A. PLANT SPECIES DETECTED

The following plant species were identified during 27 surveys within the city limits of Barstow between 1990 and 2014. They do not represent a comprehensive list of all species that occur, but do provide a reasonable indication of plants that are readily detectable (depending on survey timing) during protocol surveys for tortoises (U.S. Fish and Wildlife Service 2010a), where transects are surveyed throughout a site at 10-meter (30-foot) intervals. Numbers preceding the scientific names indicate the number of surveys on which a given species was identified. Those plant and animal species that are protected by pertinent County and/or State ordinances are shown in red font and signified by "(SC)" following the common name. The literature cited at the end of this appendix lists the projects on which the species were tallied.

GNETAE	GNETAE
Ephedraceae	**Joint-fir family**
12 *Ephedra californica*	Desert tea
7 *Ephedra nevadensis*	Nevada joint-fir
ANGIOSPERMAE: DICOTYLEDONES	DICOT FLOWERING PLANTS
Amaranthaceae	**Amaranth family**
3 **Amaranthus albus*	White tumbleweed
1 *Tidestromia oblongifolia*	Honeysweet
Apiaceae	**Carrot family**
2 *Lomatium mohavense*	Lomatium
Asclepiadaceae	**Milkweed family**
1 *Asclepias erosa*	Milkweed
Asteraceae	**Sunflower family**
3 *Acamptopappus sphaerocephalus*	Desert goldenhead
1 *Adenophyllum cooperi*	Adenophyllum
12 *Ambrosia acanthicarpa*	Annual bur-sage
2 *Ambrosia psilostachya*	Western ragweed
25 *Ambrosia dumosa*	Burrobush
15 *Ambrosia salsola*	Cheesebush
1 *Anisocoma acaulis*	Scale bud
1 *Baccharis emoryi*	Emory baccharis
2 *Baccharis glutinosa*	Mulefat
3 *Chaenactis carphoclinia*	Pebble pincushion
17 *Chaenactis fremontii*	Desert pincushion
4 *Chrysothamnus nauseosus*	Rubber rabbitbrush
1 *Chrysothamnus paniculatus*	Wash rabbitbrush
4 *Conyza canadensis*	Mare's tail
3 *Coreopsis bigelovii*	Bigelow coreopsis
1 *Coreopsis calliopsidea*	Coreopsis

4 *Dicoria canescens*	Dicoria
1 *Encelia fructescens*	Rayless encelia
1 *Eriophyllum pringlei*	Pringle's woolly daisy
2 *Geraea canescens*	Desert sunflower
2 *Helianthus* sp.	Sunflower
5 **Lactuca serriola*	Wild lettuce
1 *Lasthenia californica*	California goldfields
1 *Lepidospartum squamatum*	Scale-broom
1 *Malacothrix coulteri*	Snake's-head
13 *Malacothrix glabrata*	Desert dandelion
1 *Monoptilon bellioides*	Gray desert star
1 *Monoptilon bellidiforme*	Daisy desert star
1 *Nicolettia occidentalis*	Nicolettia
1 *Palafoxia linearis*	Desert Spanish-needles
1 *Pectis papposa*	Chinch weed
1 *Pluchea sericea*	Arrow weed
1 *Psilostrophe cooperi*	Paper daisy
6 *Rafinesquia neomexicana*	Desert chicory
1 **Sonchus oleraceus*	Common sow-thistle
4 *Stephanomeria exigua*	Milk aster
17 *Stephanomeria pauciflora*	Desert milk aster
1 *Stylocline* sp.	Nest-straw
3 **Taraxacum officinale*	Common dandelion
1 **Xanthium strumarium*	Cocklebur
4 *Xylorhiza tortifolia*	Desert aster
Bignoniaceae	**Bigonia family**
4 *Chilopsis linearis* ssp. *arcuata*	Desert willow
Boraginaceae	**Borage family**
17 *Amsinckia tessellata*	Fiddleneck
12 *Cryptantha angustifolia*	Narrow-leaved forget-me-not
1 *Cryptantha barbigera*	Fuzzy forget-me-not
4 *Cryptantha circumscissa*	Capped cryptantha
1 *Cryptantha dumetorum*	Forget-me-not
2 *Cryptantha micrantha*	Forget-me-not
2 *Cryptantha nevadensis*	Nevada forget-me-not
6 *Cryptantha pterocarya*	Wing-nut forget-me-not
3 *Heliotropium curvassivicum*	Desert heliotrope
1 *Pectocarya linearis*	Comb-bur
4 *Pectocarya penicillata*	Slender combseed
1 *Pectocarya platycarpa*	Broad-margined combseed
8 *Pectocarya recurvata*	Curved combseed
3 *Tiquilia plicata*	Plicate coldenia
1 *Tiquilia nuttallii*	Nuttall coldenia

Brassicaceae		**Mustard family**
14	**Brassica tournefortii*	Saharan mustard
1	**Capsella bursa-pastoris*	Shepard's purse
1	*Caulanthus cooperii*	Cooper's mustard
7	**Descurainia pinnata*	Tansy
6	**Descurainia sophia*	Flixweed
1	*Diplotaxis muralis*	Sand rocket
1	**Eruca vesicaria sativa*	Garden rocket
9	*Guillenia lasiophylla*	California mustard
3	**Hirschfeldia incana*	Short-pod mustard
8	*Lepidium fremontii*	Bush peppergrass
2	*Lepidium nitidum*	Peppergrass
4	*Lepidium lasiocarpum*	Sand peppergrass
1	**Raphanus sativus*	Wild radish
9	**Sisymbrium altissimum*	Tumble mustard
11	**Sisymbrium irio*	London rocket
3	**Sisymbrium orientale*	Sisymbrium
2	*Streptanthella longirostris*	Streptanthella
1	*Thelypodium lasiocarpum*	Thelypodium
Cactaceae		**Cactus family**
11	*Cylindropuntia echinocarpa*	Silver cholla (SC)
12	*Cylindropuntia ramosissima*	Pencil cholla (SC)
6	*Echinocactus polycephalus*	Cottontop cactus (SC)
1	*Echinocereus engelmannii*	Hedgehog cactus (SC)
9	*Opuntia basilaris*	Beavertail cactus (SC)
Capparaceae		**Caper family**
1	*Cleomella obtusifolia*	Cleomella
Chenopodiaceae		**Goosefoot family**
9	*Atriplex canescens*	Four-winged saltbush
11	*Atriplex confertifolia*	Spiny saltbush
6	*Atriplex hymenelytra*	Desert holly (SC)
2	*Atriplex lentiformis*	Big saltbush
1	*Atriplex phyllostegia*	Arrowscale
17	*Atriplex polycarpa*	Allscale
1	**Atriplex sembiccata*	Australian saltbush
4	*Atriplex spinifera*	Spiny saltbush
1	**Chenopodium album*	Lamb's quarters
2	*Grayia spinosa*	Spiny hop-sage
1	*Krascheninnikovia lanata*	Winter fat
1	*Monolepis nuttalliana*	Poverty weed
15	**Salsola tragus*	Russian thistle
3	*Suaeda moquinii*	Torrey's sea-blight

Cucurbitaceae		**Gourd family**
1	*Cucurbita foetidissima*	Coyote melon
5	*Cucurbita palmata*	Coyote gourd
Euphorbiaceae		**Spurge family**
1	*Euphorbua albomarginata*	Rattlesnake weed
3	*Euphorbia polycarpa*	Sandmat
4	*Croton californicus*	Croton
Fabaceae		**Pea family**
1	*Senegalia greggii*	Catclaw acacia (SC)
3	*Astragalus lentiginosus*	Milk-vetch
2	*Caesalpinia virgata*	Caesalpinia
1	*Dalea mollis*	Dalea
1	*Dalea mollissima*	Dalea
4	*Lupinus* sp.	Lupine
1	*Lupinus arizonicus*	Arizonia lupine
1	*Medicago sativa*	Alfalfa
4	**Parkinsonia aculeata*	Mexican palo verde
7	*Prosopis glandulosa*	Honey mesquite (SC)
2	*Prosopis pubescens*	Screw bean mesquite (SC)
9	*Psorothamnus arborescens*	Indigo bush
1	*Psorothamnus emoryi*	Indigo bush
16	*Senna armata*	Senna
Geraneaceae		**Geranium family**
24	**Erodium cicutarium*	Red-stemmed filaree
2	*Erodium texanum*	Desert filaree
Hydrophyllaceae		**Water-leaf family**
1	*Eriodictyon trichocalyx*	Yerba santa
1	*Phacelia campanularia*	Canterbury bells
3	*Phacelia crenulata*	Purple phacelia
2	*Phacelia distans*	Common phacelia
1	*Phacelia tanacetifolia*	Phacelia
Krameriaceae		**Krameria family**
1	*Krameria erecta*	Pima rhatany
2	*Krameria grayi*	White rhatany
Lamiaceae		**Mint family**
3	*Salazaria mexicana*	Paper-bag bush
1	*Salvia columbariae*	Chia
Loasaceae		**Stick-leaf family**
5	*Mentzelia albicaulis*	Little blazing star
3	*Petalonyx thurberi*	Sandpaper plant

Malvaceae	**Mallow family**
3 *Eremalche exilis*	Trailing mallow
1 *Eremalche rotundifolia*	Desert fivespot
2 *Malva parviflora*	Cheeseweed
Nyctaginaceae	**Four o'clock family**
5 *Mirabilis bigelovii*	Desert wishbone plant
Oleaceae	**Olive family**
1 *Forestiera neomexicana*	Desert olive
1 *Menodora spinescens* var. *mohavensis*	Mojave menadora (SC)
Onagraceae	**Evening-primrose family**
12 *Camissonia boothii*	Red primrose
6 *Camissonia brevipes*	Yellow cups
2 *Camissonia californica*	Camissonia
3 *Camissonia campestris*	Mojave sun-cups
11 *Camissonia claviformis*	Brown-eyed primrose
1 *Camissonia refracta*	Narrow-leaved primrose
4 *Oenothera deltoides*	Devil's lantern
1 *Oenothera primiveris*	Yellow evening-primrose
Papaveraceae	**Poppy family**
2 *Eschscholzia glyptosperma*	Desert gold-poppy
4 *Eschscholzia minutiflora*	Little gold-poppy
Plantaginaceae	**Plantain family**
5 *Plantago ovata*	Plantain
Polemoniaceae	**Phlox family**
2 *Eriastrum eremicum*	Woolly star
5 *Eriastrum sapphirinum*	Woolly star
2 *Gilia latiflora*	Broad-flowered gilia
3 *Gilia stellata*	Dotted-throat gilia
1 *Langloisia setosissima*	Langloisia
3 *Loeseliastrum matthewsii*	Sunbonnets
1 *Loeseliastrum schottii*	Loeseliastrum
Polygonaceae	**Buckwheat family**
14 *Chorizanthe brevicornu*	Brittle spineflower
12 *Chorizanthe rigida*	Rigid spineflower
10 *Eriogonum deflexum*	Desert skeleton weed
3 *Eriogonum fasciculatum*	California buckwheat
5 *Eriogonum inflatum*	Desert trumpet
4 *Eriogonum maculatum*	Spotted buckwheat
3 *Eriogonum nidularium*	Whiskbroom

1	*Eriogonum plumatella*	Yucca buckwheat
2	*Eriogonum pusillum*	Buckwheat
1	*Eriogonum reniforme*	Kidneyleaf buckwheat
7	*Eriogonum trichopes*	Little trumpet
3	*Eriogonum viridescens*	Buckwheat
2	*Oxytheca perfoliata*	Punctured bract
2	**Polygonum aviculare*	Yard knotweed
1	*Rumex hymenosepalus*	Wild rhubarb
Portulaceae		**Purslane family**
1	*Calyptridium monandrum*	Sand cress
Ranunculaceae		**Crowfoot larkspur**
2	*Delphinium parishii*	Larkspur
Resedaceae		**Mignonette family**
2	*Oligomeris linifolia*	Narrowleaf oligomeris
Rubiaceae		**Madder family**
4	*Thamnosma montana*	Turpentine-broom
Salicaceae		**Willow family**
2	*Populus fremontii*	Fremont's cottonwood
1	*Salix* sp.	Unidentified willow
2	*Salix exigua*	Narrow-leaf willow
1	*Salix lasiolepis*	Arroyo willow
Solanaceae		**Nightshade family**
5	*Datura wrightii*	Jimsonweed
16	*Lycium andersonii*	Anderson's box-thorn
6	*Lycium cooperi*	Peach thorn
2	*Lycium pallidum*	Rabbit thorn
1	**Nicotiana glauca*	Tree tobacco
Tamaricaceae		**Tamarisk family**
3	**Tamarix aphylla*	Athel
10	**Tamarix ramosissima*	Tamarisk
Viscaceae		**Mistletoe family**
2	*Phorodendron californicum*	Mesquite mistletoe
Zygophyllaceae		**Caltrop family**
26	*Larrea tridentata*	Creosote bush
3	**Tribulus terrestris*	Puncture vine

ANGIOSPERMAE: MONOCOTYLEDONES	MONOCOT FLOWERING PLANTS
Liliaceae	**Lily family**
13 *Yucca schidigera*	Mojave yucca (SC)
Poaceae	**Grass family**
2 *Aristida* c.f. *purpurea*	Three-awned grass
2 **Arundo donax*	Giant reed
2 **Avena barbata*	Slender wild oat
1 *Bouteloua aristidoides*	Needle grama
5 **Bromus diandrus*	Common ripgut-grass
1 **Bromus hordeaceus*	Soft chess
18 **Bromus madritensis* ssp. *rubens*	Red brome
10 **Bromus tectorum*	Cheat grass
1 **Cenchrus pauciflorus*	Sandbur
5 **Cynodon dactylon*	Bermuda grass
2 *Distichlis spicata*	Salt grass
1 **Echinochloa* sp.	Barnyard grass
1 *Elymus elymoides*	Squirreltail
13 **Hordeum murinum*	Hare barley
2 *Leptochloa uninervia*	Mexican sprangletop
1 *Panicum urvilleanum*	Panicgrass
2 **Polypogon monspeliensis*	Rabbitfoot grass
23 **Schismus* sp.	Split-grass
3 *Sporobolus airoides*	Alkali dropseed
3 *Stipa hymenoides*	Indian ricegrass
1 **Triticum aestivum*	Wheat
Typhaceae	**Cat-tail family**
1 *Typha latifolia*	Cat-tail

* - indicates a non-native (introduced) species.
c.f. - compares favorably to a given species when the actual species is unknown.

Some species may not have been detected because of the seasonal nature of their occurrence. Common names are taken from Beauchamp (1986), Hickman (1993), Jaeger (1969), and Munz (1974).

ANIMAL SPECIES DETECTED

The following animal species were identified during 27 surveys within the city limits of Barstow between 1990 and 2014. They do not represent a comprehensive list of all species that occur, but do provide a reasonable indication of animals that are readily detectable (depending on survey timing) during protocol surveys for tortoises (U.S. Fish and Wildlife Service 2010a), where transects are surveyed throughout a site at 10-meter (30-foot) intervals. Numbers preceding the scientific names indicate the number of surveys on which a given species was identified. Those animal species that are designated with a special status by the U.S. Fish and Wildlife Service (2008) and/or California Department of Fish and Wildlife (2014a) are signified by "(SC)" following the common name and shown in red font. The literature cited at the end of this appendix lists the projects on which the species were tallied.

REPTILIA	REPTILES
Testudinidae	**Land tortoises**
16 *Gopherus agassizii*	Agassiz's desert tortoise (SC)
Iguanidae	**Iguanids**
7 *Dipsosaurus dorsalis*	Desert iguana
5 *Callisaurus draconoides*	Zebra-tailed lizard
4 *Gambelia wislizenii*	Long-nosed leopard lizard
2 *Sceloporus magister*	Desert spiny lizard
17 *Uta stansburiana*	Common side-blotched lizard
1 *Urosaurus graciosus*	Long-tailed brush lizard
1 *Phrynosoma platyrhinos*	Desert horned lizard
Xantusiidae	**Night lizards**
1 *Xantusia vigilis*	Desert night lizard
Teiidae	**Whiptails**
9 *Cnemidophorus tigris*	Western whiptail
Colubridae	**Colubrids**
1 *Masticophis flagellum piceus*	Red racer
2 *Pituophis melanoleucus*	Gopher snake
AVES	BIRDS
Anatidae	**Ducks, geese and swans**
1 *Anas platyrhynchos*	Mallard
Cathartidae	**Vultures**
3 *Cathartes aura*	Turkey vulture
Accipitridae	**Hawks, eagles, harriers**
2 *Circus cyaneus*	Northern harrier (SC)
2 *Accipiter cooperii*	Cooper's hawk (SC)
1 *Buteo swainsoni*	Swainson's hawk (SC)
5 *Buteo jamaicensis*	Red-tailed hawk
1 *Buteo regalis*	Ferruginous hawk (SC)
1 *Aquila chrysaetos*	Golden eagle (SC)

Falconidae	**Falcons**
4 *Falco sparverius*	American kestrel
Phasianidae	**Grouse and quail**
1 *Alectoris chukar*	Chukar
3 *Callipepla californica*	California quail
Charadriidae	**Plovers**
4 *Charadrius vociferus*	Killdeer
Columbidae	**Pigeons and doves**
14 *Columba livia*	Rock dove
3 *Streptopelia decaocto*	Eurasian collared-dove
11 *Zenaida macroura*	Mourning dove
Cuculidae	**Cuckoos**
4 *Geococcyx californianus*	Greater roadrunner
Tytonidae	**Barn Owls**
5 *Tyto alba*	Common barn owl
Strigidae	**Typical owls**
3 *Bubo virginianus*	Great horned owl
6 *Athene cunicularia*	Burrowing owl (SC)
Camprimulgidae	**Nightjars**
1 *Phalaenoptilus nuttallii*	Common poorwill
Trochilidae	**Hummingbirds**
1 *Calypte anna*	Anna's hummingbird
5 *Calypte costae*	Costa's hummingbird
Picidae	**Woodpeckers**
2 *Colaptes auratus*	Northern flicker
Tyrannidae	**Tyrant flycatchers**
4 *Sayornis saya*	Say's phoebe
1 *Myiarchus cinerascens*	Ash-throated flycatcher
2 *Tyrannus verticalis*	Western kingbird
Alaudidae	**Larks**
13 *Eremophila alpestris*	Horned lark
Hirundinidae	**Swallows**
2 *Tachycineta thalassina*	Violet-green swallow

Corvidae	**Crows and jays**
23 *Corvus corax*	Common raven
Remizidae	**Verdins**
8 *Auriparus flavipes*	Verdin
Troglodytidae	**Wrens**
1 *Campylorhynchus brunneicapillus*	Cactus wren
1 *Salpinctes obsoletus*	Rock wren
1 *Thryomanes bewickii*	Bewick's wren
Muscicapidae	**Thrushes and allies**
2 *Regulus calendula*	Ruby-crowned kinglet
2 *Polioptila caerula*	Blue-gray gnatcatcher
2 *Sialia currucoides*	Mountain bluebird
Mimidae	**Mockingbirds and thrashers**
11 *Mimus polyglottos*	Northern mockingbird
1 *Oreoscoptes montanus*	Sage thrasher
1 *Toxostoma lecontei*	LeConte's thrasher (SC)
Ptilogonatidae	**Silky flycatchers**
2 *Phainopepla nitens*	Phainopepla
Laniidae	**Shrikes**
5 *Lanius ludovicianus*	Loggerhead shrike (SC)
Sturnidae	**Starlings**
10 *Sturnus vulgaris*	European starling
Emberizidae	**Sparrows, warblers, tanagers**
1 *Vermivora celata*	Orange-crowned warbler
1 *Vermivora luciae*	Lucy's warbler
9 *Dendroica coronata*	Yellow-rumped warbler
6 *Spizella breweri*	Brewer's sparrow
1 *Pooecetes gramineus*	Vesper sparrow
2 *Chondestes grammacus*	Lark sparrow
11 *Amphispiza bilineata*	Black-throated sparrow
7 *Amphispiza belli*	Sage sparrow
1 *Melospiza melodia*	Song sparrow
9 *Zonotrichia leucophrys*	White-crowned sparrow
2 *Agelaius phoeniceus*	Red-winged blackbird
4 *Sturnella neglecta*	Western meadowlark
5 *Euphagus cyanocephalus*	Brewer's blackbird
1 *Quiscalus mexicanus*	Great-tailed grackle
1 *Icterus galbula*	Northern oriole
1 *Icterus parisorum*	Scott's oriole

Fringillidae	**Finches**
22 *Carpodacus mexicanus*	House finch
1 *Carduelis tristis*	American goldfinch
Passeridae	**Weavers**
6 *Passer domesticus*	House sparrow
MAMMALIA	MAMMALS
Leporidae	**Hares and rabbits**
24 *Lepus californicus*	Black-tailed hare
14 *Sylvilagus audubonii*	Audubon cottontail
Sciuridae	**Squirrels**
9 *Otospermophilus beecheyi*	California ground squirrel
1 *Spermophilus tereticaudis*	Round-tailed ground squirrel
5 *Ammospermophilus leucurus*	Antelope ground squirrel
Geomyidae	**Pocket gophers**
3 *Thomomys bottae*	Botta pocket gopher
Heteromyidae	**Pocket mice**
23 *Dipodomys* sp.	Kangaroo rat
Cricetidae	**Rats and mice**
2 *Neotoma lepida*	Desert wood rat
Canidae	**Foxes, wolves and coyotes**
18 *Canis latrans*	Coyote
11 *Vulpes macrotis*	Kit fox
3 *Urocyon cinereoargenteus*	Gray fox
Mustelidae	**Weasels and skunks**
11 *Taxidea taxus*	American badger (SC)
Felidae	**Cats**
15 *Lynx rufus*	Bobcat

Nomenclature follows Stebbins, *A Field Guide to Western Reptiles and Amphibians* (2003), third edition; Sibley, National Audubon Society, the Sibley Guide to Birds (2000), first edition; and Ingles, Mammals of the Pacific States (1965), second edition.

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APPENDIX B.
SPECIES ACCOUNTS FOR SPECIAL STATUS PLANTS AND ANIMALS

This appendix provides species account information for 10 plant species, 2 reptile, 12 bird, and 4 mammal species reported from the Barstow area that have been assigned a special status designation by either U.S. Fish and Wildlife Service (2008), California Department of Fish and Wildlife (2014a), and/or California Native Plant Society (2014; see the end of this appendix for an explanation of CNPS' status designations). Unless otherwise noted, the species have either been observed in the region by CMBC personnel between 1990 and 2014 or have been reported to the California Natural Diversity Data Base (CDFW 2014a).

The information is intended to inform both laypersons and scientists of background information sufficient to help identify the species and to determine if it may occur on a given site. The latest federal, state, and CNPS status designations are also provided to indicate how rare a given species is. The primary information source for each species is given, either in the header at the top of the page or within the text when Ed LaRue was the primary author. Species are alphabetized according to their common names; scientific names are provided in the species accounts that follow. With few exceptions, the author's verbatim wording is used; all species accounts are significantly abbreviated from the complete versions in the main information source; references are those given in the main information source and were mostly not reviewed for accuracy of the author's cited information.

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PLANTS

Plants

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

BARSTOW WOOLLY SUNFLOWER

Eriophyllum mohavense

© 2010 Lara Hartley

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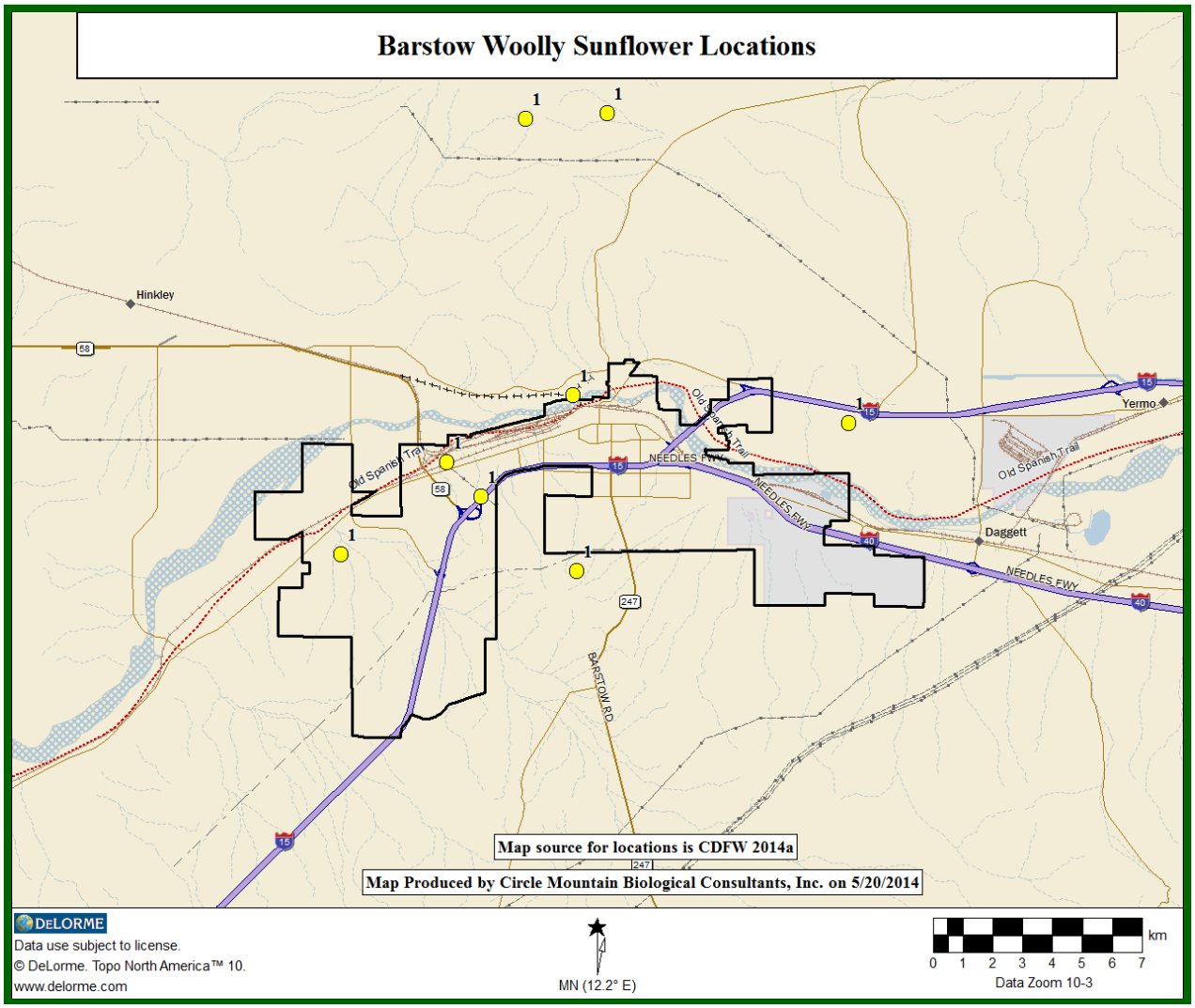

BARSTOW WOOLLY SUNFLOWER

Authors: James M. André and Barbara Pitzer

Status Designation: USFWS = None; BLM Sensitive; CDFW = None; Heritage Rank = G2/S2; CNPS (2014) = List 1B.2

General Distribution: Barstow woolly sunflower is endemic to the west-central Mojave Desert, and is generally known from within an area bound on the east by a point near the exit of Interstate 15 (I-15) at Camp Irwin Road (in the vicinity of Lead Mountain) west to Buckhorn Butte on Edwards Air Force Base, a distance of approximately 60 mi. (97 km), and from the north at a point near Almond Mountain south to the southeastern corner of Edwards Air Force Base, approximately 45 mi. (73 km) (Tetra Tech, 1995; Davis, 1998).

Natural History: Barstow woolly sunflower is a small woolly annual in the sunflower family (Asteraceae) which forms small tufts 0.5-1.5 in. (1-2.5 cm) high and 0.5-1.5 in. (1-3 cm) wide. Duration of flowering is typically limited to 2-3 weeks, from late March or April through May, depending on the year (Hickman, 1993). Barstow woolly sunflower rapidly dries out and decomposes, becoming nearly impossible to detect by the end of May or beginning of June (Bagley, 1987). Little or no germination occurred during the three years with below average precipitation, indicating the "boom or bust" nature of this annual species (Tetra Tech 1995). Their data indicate that spring emergence and growth is strongly correlated with amount of winter precipitation, and that clusters of plants tended to have high site-specific recurrence from year to year, suggesting short effective dispersal distances.

Habitat Requirements: Barstow woolly sunflower usually occurs in creosote bush scrub (sometimes adjacent to or with an overstory of Joshua trees), and in arid-phase saltbush scrub, with an elevation range of about 2,000 to 3,600 ft. (600 to 1100 m) (Rutherford and Bransfield, 1991a). It is most often associated with sparse occurrences of Mojave spineflower (*Chorizanthe spinosa*) and yellow peppergrass (*Lepidium flavum*), but has also been recorded less frequently with Fremont's phacelia (*Phacelia fremontii*), leafy tickseed (*Coreopsis calliopsida*), snake's head (*Malacothrix coulteri*), red-stemmed filaree (*Erodium cicutarium*) and desert dandelion (*Malacothrix glabrata*) (Henry, 1983; Rutherford and Bransfield, 1991; Tetra Tech, 1995; André, 1998).

In general, this species requires open, flat, barren sites, and is most commonly found on the sandy margins of alkali depressions distributed among the more common creosote bush plant community. In some cases, it has been found on gentle slopes or slight rises, or on ridges and terraces with firm sandy, clayey loam or sandy-silty soils, often with coarser sand or fine gravel on the surface (Bagley, 1987; Rutherford and Bransfield, 1991; Tetra Tech, 1995).

Literature Cited:

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Bagley, M. 1987. Vegetation Survey for the Luz Engineering Corporation Solar Generating Facility, Kramer Junction, California. (unpublished).

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Rutherford, C. and R. Bransfield. 1991. Survey for Four Annual Plants: Parish's phacelia (*Phacelia parishii*), Mohave monkeyflower (*Mimulus mohavensis*), Barstow woolly sunflower (*Eriophyllum mohavense*), Lane Mountain milkvetch (*Astragalus jaegerianus*) in the Ft. Irwin/ BLM proposed land acquisition. Prepared for the U.S. Army Corps of Engineers, Los Angeles District.

Tetra Tech, Inc. 1995. Inventory and population characterization study of Barstow woolly sunflower on Edwards Air Force Base, California. (unpublished)

U.S. Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan, a Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Moreno Valley, CA.

BEAVER DAM BREADROOT

Pediomelum castoreum

© 2005 James M. André

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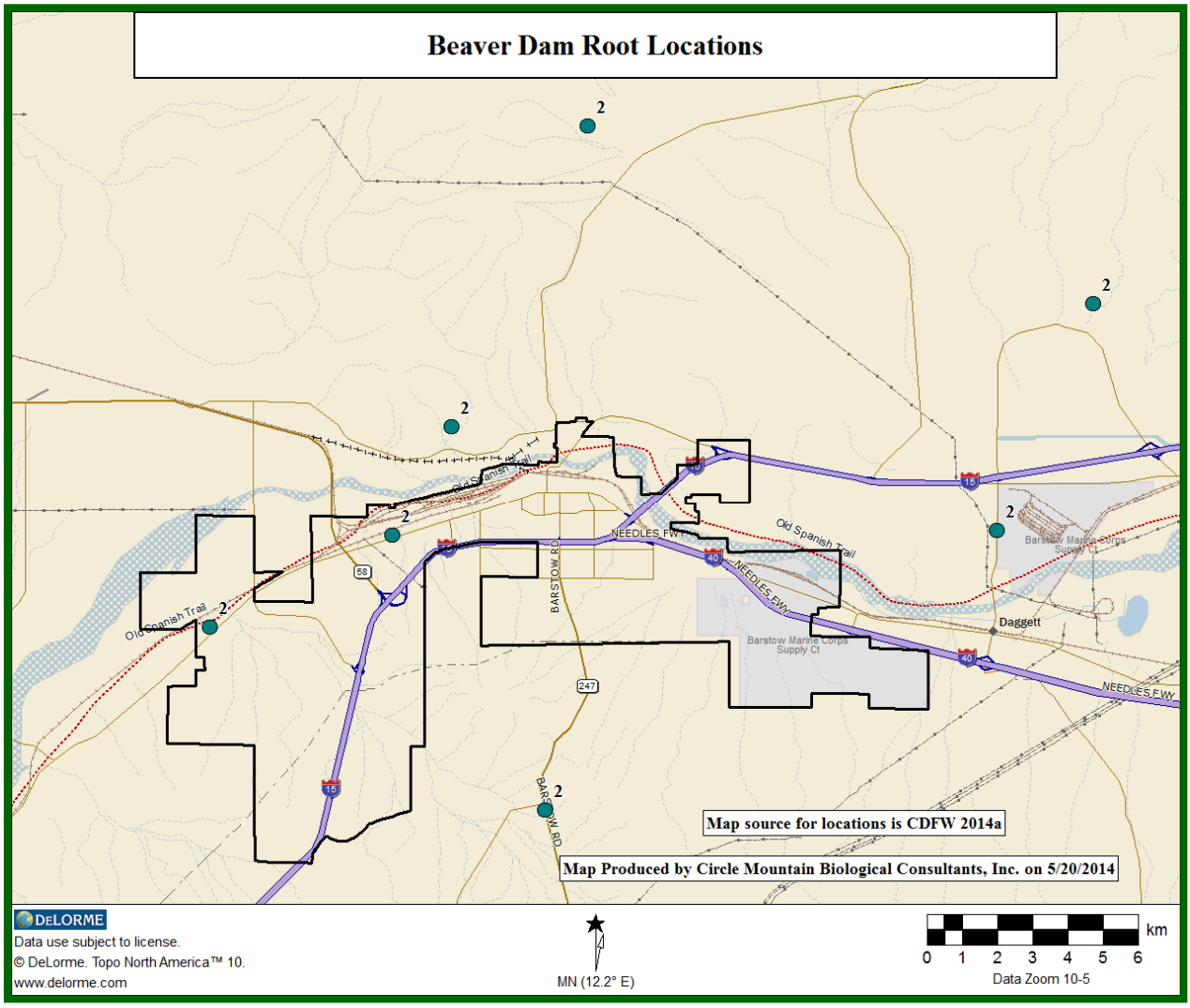

BEAVER DAM BREADROOT

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = None; Heritage Rank = G3/S2; CNPS (2014) = List 1B.2

General Distribution: In California, Beaver Dam breadroot is known from only 22 occurrences and is mostly reported east of Highway 395, south of Highway 58 (except immediately north of Barstow), south to Victorville, and southeast into Lucerne Valley (CNPS 2014). So Barstow is very near the center of its range in California.

Natural History: Beaver Dam breadroot is a low-growing, spreading perennial herb in the pea family (Fabaceae), which blooms from April to May. It has been reported on sandy substrates, including washes, and in road cuts. It is generally found in Joshua tree woodland and Mojave desert scrub, between 2000 feet (610 meters) and 5000 feet (1,525 meters).

Habitat Requirements: The plants found by LaRue alongside Highway 395, two miles north of Shadow Mountain Road in June of 1998, were in creosote bush scrub with Joshua trees (*Yucca brevifolia*), burrobush (*Ambrosia dumosa*), saltbush (*Atriplex confertifolia*), creosote bush (*Larrea tridentata*), and red-stemmed filaree (*Erodium cicutarium*). Soils were sandy with a pebbly surface layer.

Literature Cited:

California Native Plant Society, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 30 April 2014].

CHAPARRAL SAND-VERBENA

Abronia villosa var. *aurita*

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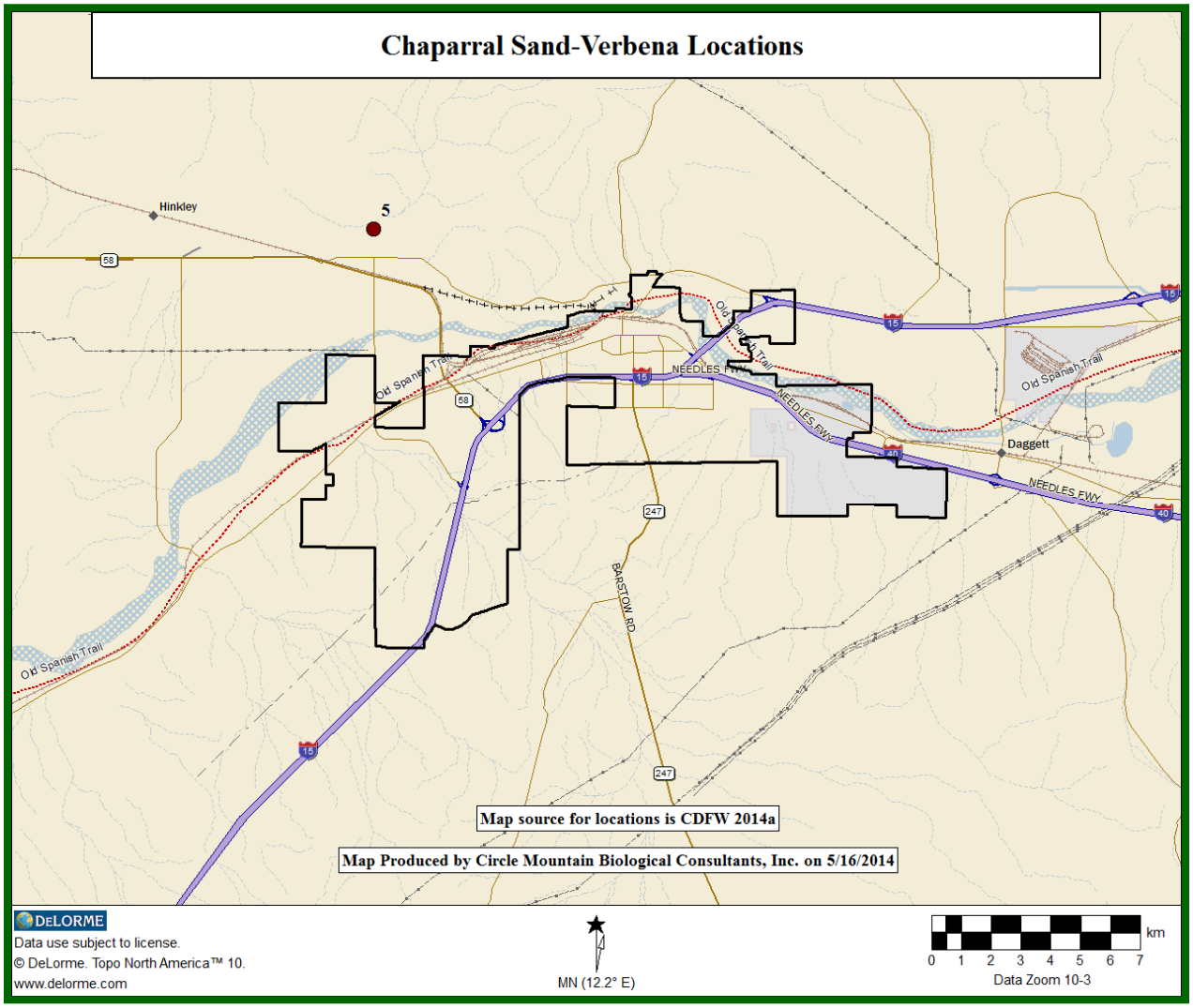

CHAPARRAL SAND-VERBENA

Author: Ed LaRue

Status Designation: USFWS = None; BLM Sensitive; CDFW = None; Heritage Rank = G5T3T4/S2; CNPS (2014) = List 1B.1

General Distribution: The species is widely dispersed south of the San Bernardino and San Gabriel mountains, from eastern Coachella Valley to Anaheim. In the desert, there is one location in Los Angeles County and records from Barstow and to the west (CNPS 2014).

Natural History: Chaparral sand-verbena is an annual herb, blooming from January to September if conditions are favorable. Its preferred habitat in the desert is sandy, dune areas, where it has been found between 245 feet (75 meters) and 5,250 feet (1,600 meters) elevation.

Habitat Requirements: In one report from Palen sand dunes (see Record RSA787701 by Duncan Bell 2012 occurrence from Consortium of California Herbaria in CNPS 2014), it was associated with mesquite (*Prosopis* sp.), four-winged saltbush (Atriplex canescens), creosote bush (Larrea tridentata), burrobush (*Ambrosia dumosa*), indigo bush (*Psorothamnus emoryi*), desert lily (*Hesperocallis undulata*), and dune primrose (*Oenothera deltoides*).

Literature Cited:

California Native Plant Society, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 2 May 2014].

CREAMY BLAZING STAR

Mentzelia tridentata

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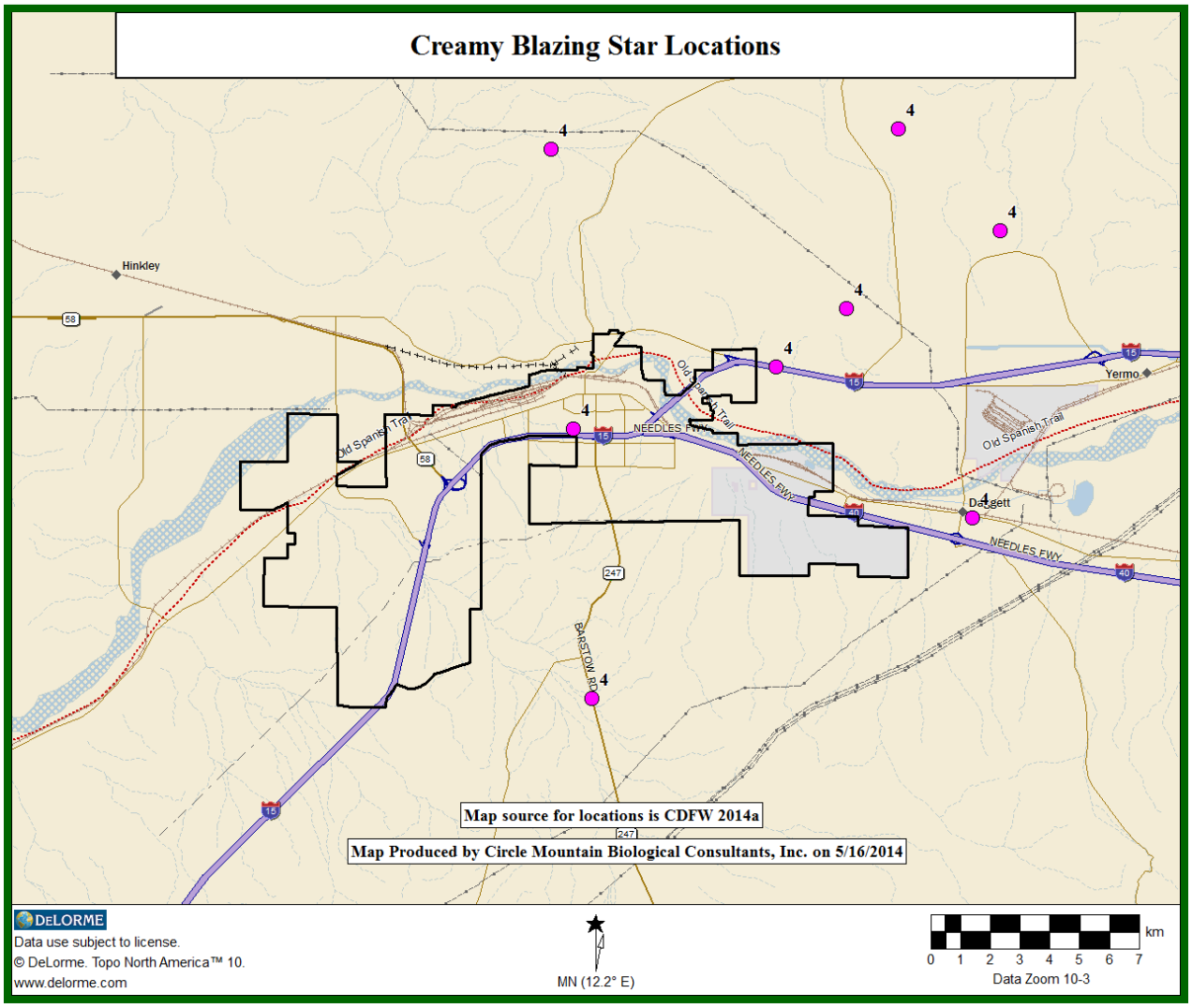

CREAMY BLAZING STAR

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = None; Heritage Rank = G2/S2.3; CNPS (2014) = List 1B.3

General Distribution: Reported as far north as the Owens Valley and as far south as El Centro, it has been reported from 11 USGS 7.5' quadrangles centered on Barstow, and found north to Fort Irwin and south to Apple Valley.

Natural History: Also referred to as "Threetooth blazing star," creamy blazing star, in the stick-leaf family (Loasaceae), is an annual herb that blooms from March through May. It has been found in a range of substrates, from sandy, to gravelly, to rocky in Mojavean desert scrub. Its preferred elevational range is approximately 2,300 feet (700 meters) to 3,800 feet (1,160 meters).

Habitat Requirements: At one location approximately five miles northeast of Barstow, Jim André found the plant in 2011 (see Record UCR225859 in Consortium of California Herbaria as reported in CNPS 2014) growing on tan-colored clay hills, with creosote bush (*Larrea tridentata*), desert holly (*Atriplex hymenelytra*), sun-cups (*Camissonia brevipes*), and buckwheat (*Eriogonum thomasii*).

Literature Cited:

California Native Plant Society, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 2 May 2014].

Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

EMORY'S CRUCIFIXION THORN

Castela emoryi

© Bob Patterson and CNPS

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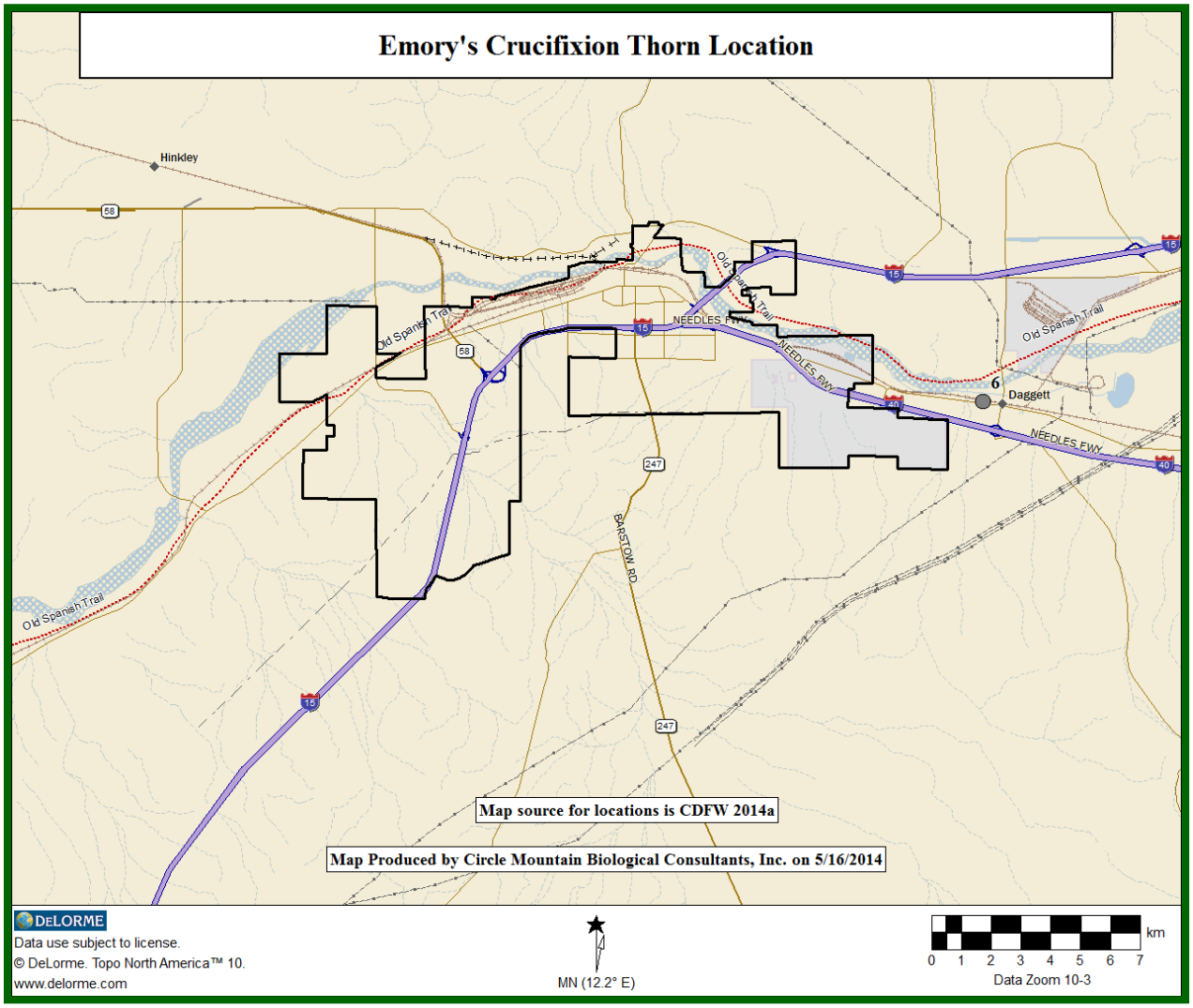

EMORY'S CRUCIFIXION THORN

Author: Andrew C. Sanders

Status Designation: USFWS = None; CDFW = None; Heritage Rank = G4/S2S3; CNPS (2014) = List 2B.2

General Distribution: Crucifixion thorn is endemic to the Sonoran Desert and southern Mojave Desert, is widely scattered in southwestern Arizona (e.g., along Interstate 10) and reaches its western limits as a few populations in the deserts of southeastern California (Turner, et al, 1995).

Natural History: The plants are often 3-6 ft. (1-2 m) tall but are generally taller, to 12-19 ft. (4-6 m), in optimum frost-free areas (specifically, at the CTNA). Plants flower as early as April (Turner, et al., 1995) and late May (Jaeger, 1941), but apparently mainly in June and July (Munz, 1974). Crucifixion thorn is leafless shrub or small tree of washes and other sites where water accumulates. It is mostly restricted to outwash plains and reported not to occur on rocky slopes (Shreve, 1964; Turner, et al., 1995). Plants occur as scattered colonies of fairly small size that never extend far across the landscape (Shreve, 1964).

Habitat Requirements: Crucifixion thorn occupies low, 350-2100 ft. (115-640 m), seasonally moist sites where water accumulates, but which are not saline. Plants occur along washes, at non-saline playas and often in drainage ways around basalt flows, at least in the southern Mojave. Crucifixion thorn occurs on fine-textured soil of plains and alluvial bottomlands (not even on upper alluvial slopes) and has been reported on dunes (Turner, et al., 1995). The species is most common in areas where summer rainfall is common or predominant, but extends sparsely into areas of the western Mojave where winter rainfall is the dominant mode (Turner et al., 1995) and summer rainfall is infrequent.

Literature Cited:

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Shreve, F. 1964. Vegetation of the Sonoran Desert, part 1 of F. Shreve and I. Wiggins, Vegetation and Flora of the Sonoran Desert., Stanford Univ. Press, Stanford, California.

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MOJAVE FISH-HOOK CACTUS

Sclerocactus polyancistrus

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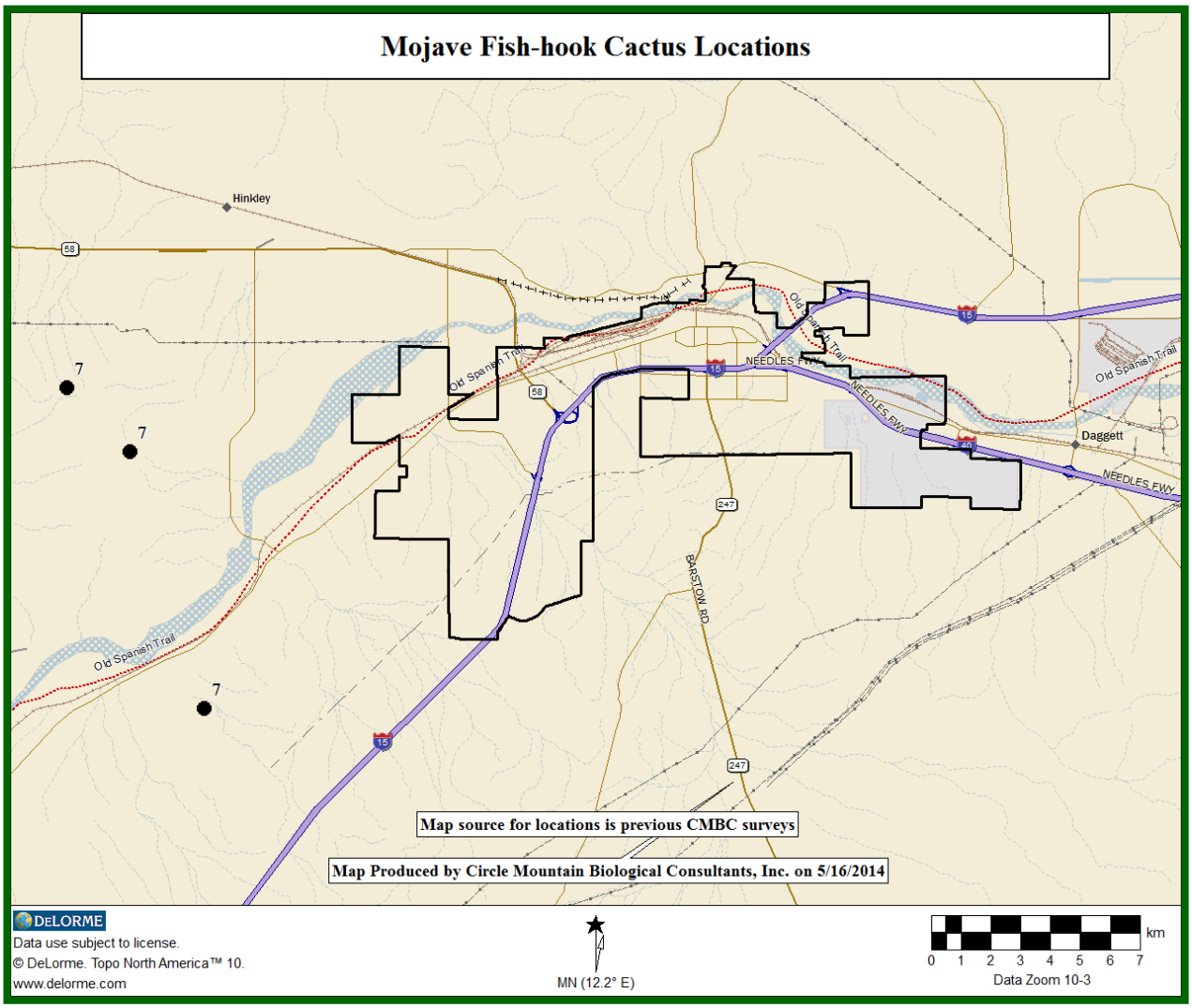

MOJAVE FISH-HOOK CACTUS

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = None; Heritage Rank = G4/S3.2; CNPS (2014) = List 4

General Distribution: Reported as far north as the Owens Valley and as far south as Victorville, it is widely distributed but mostly west of the Mojave River. Most occurrences by Circle Mountain Biological Consultants, Inc. have been to the southwest, typically on rocky slopes, from Iron Mountains south to Helendale.

Natural History: This small (8 to 12") columnar cactus, usually with a single barrel, is a perennial stem succulent that blooms between April and July. It is differentiated from similar columnar cacti [hedgehog cactus (*Echinocereus engelmannii*) and foxtail cactus (*Coryphantha* sp.), for example] by longer, fish-hook-shaped spines that extend beyond the tight clusters of spines. Its elevational range is from approximately 2,100 feet (640 meters) to 7,610 feet (2,320 meters) in Joshua tree woodland and Mojavean desert scrub.

Habitat Requirements: Although sometimes associated with carbonate substrates, it is also found on rocky and cobbly hillsides on noncarbonated soils. On one site in Helendale (CMBC 2003) where dozens of fish-hook cacti were observed, other dominant perennial plant species included creosote bush (*Larrea tridentata*), several saltbush species (*Atriplex confertifolia* and *A. spinifera*), burrobush (*Ambrosia dumosa*), and cheesebush (*Ambrosia salsola*).

Literature Cited:

California Native Plant Society, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 2 May 2014].

Circle Mountain Biological Consultants. 2003. Helendale Hill Mine Project: Focused desert tortoise survey. Unpublished report prepared by Sharon Dougherty on behalf of John Duncan and David Daley. Job #03-020. Wrightwood, CA.

MOJAVE MENODORA

Menodora spinescens var. *mohavensis*

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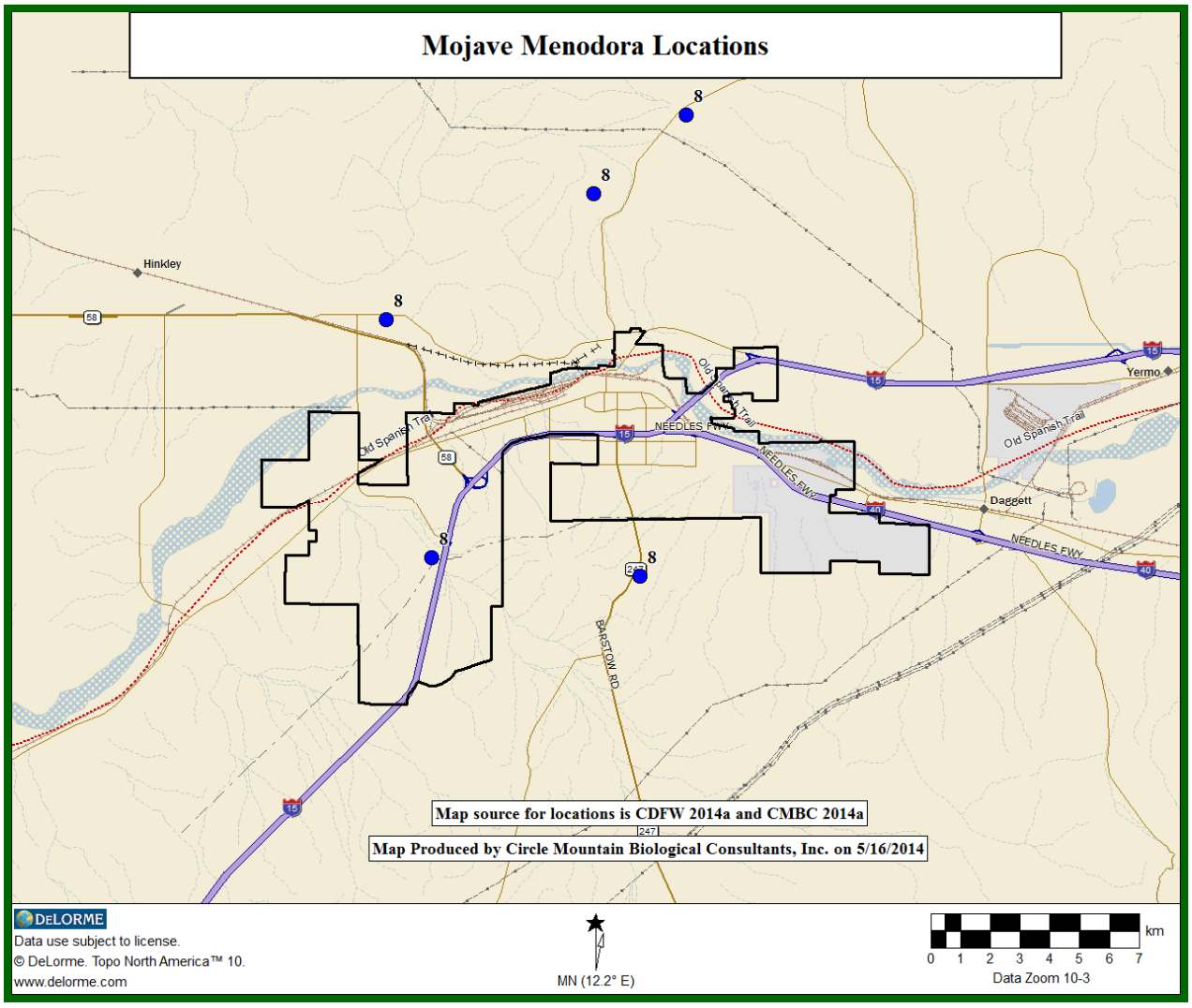

MOJAVE MENODORA

Author: Ed LaRue

Status Designation: USFWS = None; BLM Sensitive; CDFW = None; Heritage Rank = G4T2T3/S2S3; CNPS (2014) = List 1B.2

General Distribution: Known occurrences of this small shrub are reported from a northwest-to-southeast axis from Superior Lakes north of Barstow to Sheephole Mountains east of Twentynine Palms, and particularly through the Ord Mountains north of Lucerne Valley (CNPS 2014). LaRue found six plants growing on a series of low hills of the west side of Interstate 15 in the vicinity of Lenwood in April 2014 (CMBC 2014), which were later confirmed by botanist, James André.

Natural History: Mojave menodora is a small (2 to 3 feet tall), perennial deciduous shrub that blooms in April and Map. CNPS (2014) reports it is usually associated with andesitic gravel, rocky hillsides, and canyons in Mojavean desert scrub, between approximately 2,260 feet (690 meters) and 6,560 feet (2,000 meters) elevation.

Habitat Requirements: On the 314-acre site where LaRue found it in April 2014 (CMBC 2014), the six plants were associated with a small dry wash, at the base of gentle slopes, in creosote bush scrub, where the dominant perennial species were creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), Pima rhatany (*Krameria erecta*), Nevada joint-fir (*Ephedra nevadensis*), California buckwheat (*Eriogonum fasciculatum*), Anderson's box-thorn (*Lycium andersonii*), desert senna (*Senna armata*), and allscale (*Atriplex polycarpa*).

Literature Cited:

California Native Plant Society, Rare Plant Program. 2014. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website http://www.rareplants.cnps.org [accessed 2 May 2014].

Circle Mountain Biological Consultants, Inc. 2014. Reconnaissance surveys and habitat assessments for fifteen sites in the City of Barstow, in support of the Master EIR for the General Plan Update, Barstow, San Bernardino County, California. Unpublished report prepared by Ed LaRue on behalf of the City of Barstow. Job #14-005. Wrightwood, CA.

Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

MOJAVE MONKEYFLOWER

Mimulus mohavensis

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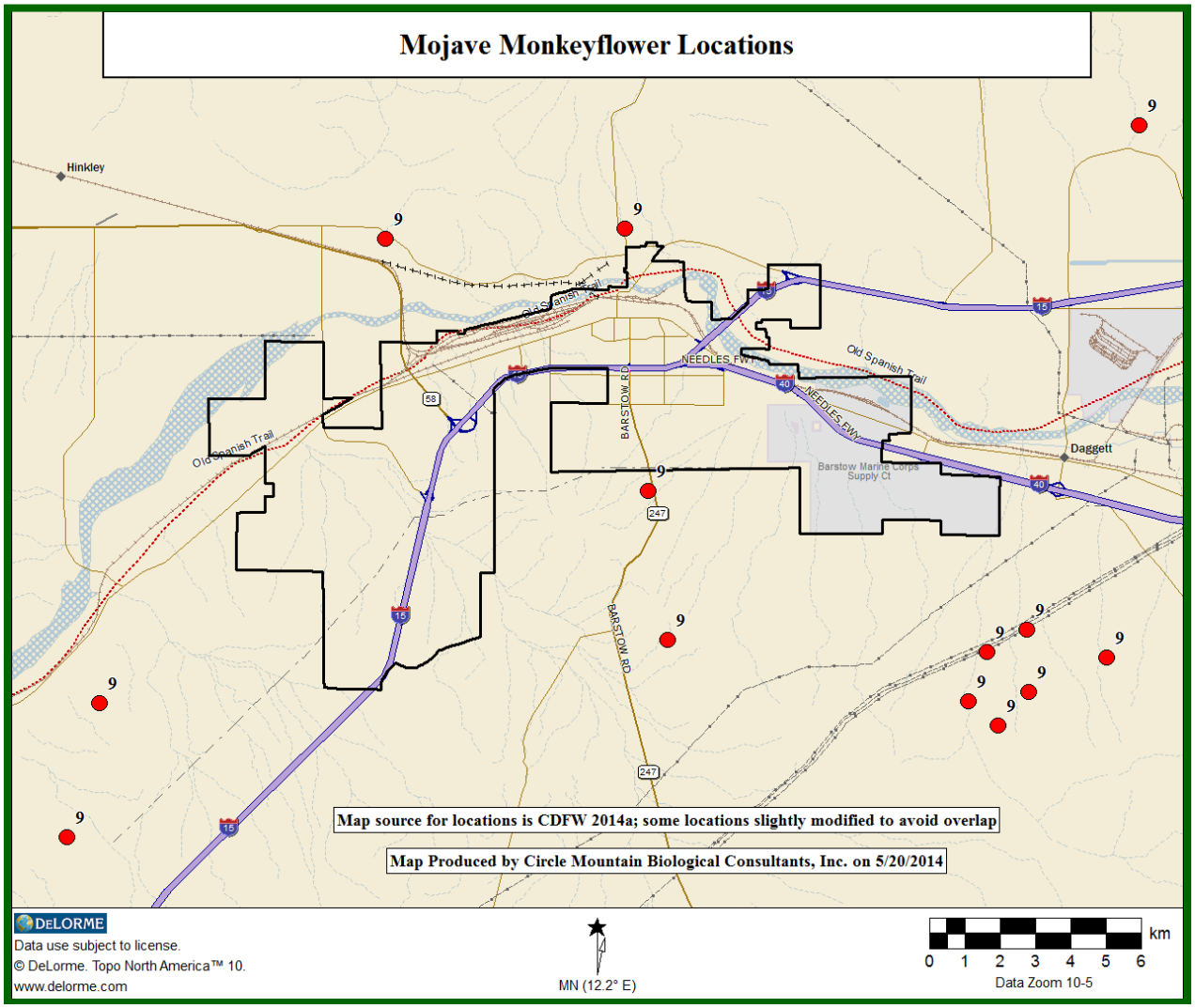

MOJAVE MONKEYFLOWER

Author: Pamela J. MacKay

Status Designation: USFWS = None; CDFW = None; Heritage Rank = G2/S2; CNPS (2014) = List 1B.2

General Distribution: Mojave monkeyflower's highest population densities are in areas just south of Daggett and Barstow; and it has also been found within the Barstow city limits (CDFG, 1997b). An historic record of this species at Calico Ghost Town, ten miles northeast of Barstow (Lemmon, 1884), represents the northernmost reported location, while the easternmost population occurs at Kane Springs in the Newberry Mountains. There are numerous extant small populations east of the Mojave River drainage and west of Interstate 15 between Victorville and Barstow. The Mojave monkeyflower has not been reported from west of the Mojave River.

Natural History: These annual plants have purplish-red stems and leaves, and are covered with minute glandular hairs that are visible when magnified (10X). This species tends to grow erect and branch from the base, reaching a height of 1-6 in. (3-15 cm). The Mojave monkeyflower blooms from April to June (Munz, 1974).

Habitat Requirements: The Mojave monkeyflower is found in Joshua tree woodland and creosote bush scrub communities. Occurrence reports show associations with creosote bush (*Larrea tridentata),* desert senna *(Senna armata),* cheese bush *(Hymenoclea salsola),* rattany *(Krameria* sp.), cholla *(Opuntia* sp.), burro bush *(Ambrosia dumosa),* indigo bush *(Dalea* sp.), cat-claw acacia (*Acacia greggii),* Bigelow's monkeyflower *(Mimulus bigelovii),* desert bells *(Phacelia campanularia),* and desert trumpet *(Eriogonum inflatum).* This species occurs primarily in granitic soils on gravelly banks of desert washes, in sandy openings between creosote bushes and along rocky slopes above washes, areas that are not subject to regular water flows. The elevation range at which this species occurs varies from 2000-3300 ft. (600-1000 m) (CDFG, 1997b; Hickman, 1993). The amount and timing of precipitation are probably important factors affecting population size (Bagley, 1991; CDFG, 1997b).

Literature Cited:

Bagley, M. 1991. Survey results for three rare Mojave Desert plants. Prepared for U.S. Fish and Wildlife Service.

California Department of Fish and Game (CDFG). 1997a. Special Plants List, August Natural Heritage Division, Sacramento, California.

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Lemmon, J.G. 1884. On a new *Mimulus* of a peculiar section of the genus. Bot. Gaz. 9:141-143.

Munz, P.A. 1974. A Flora of Southern California. Univ. of California Press, Berkeley, California.

U.S. Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan, a Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Moreno Valley, CA.

Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

PARISH'S PHACELIA

Phacelia parishii

© 2006 James M. André

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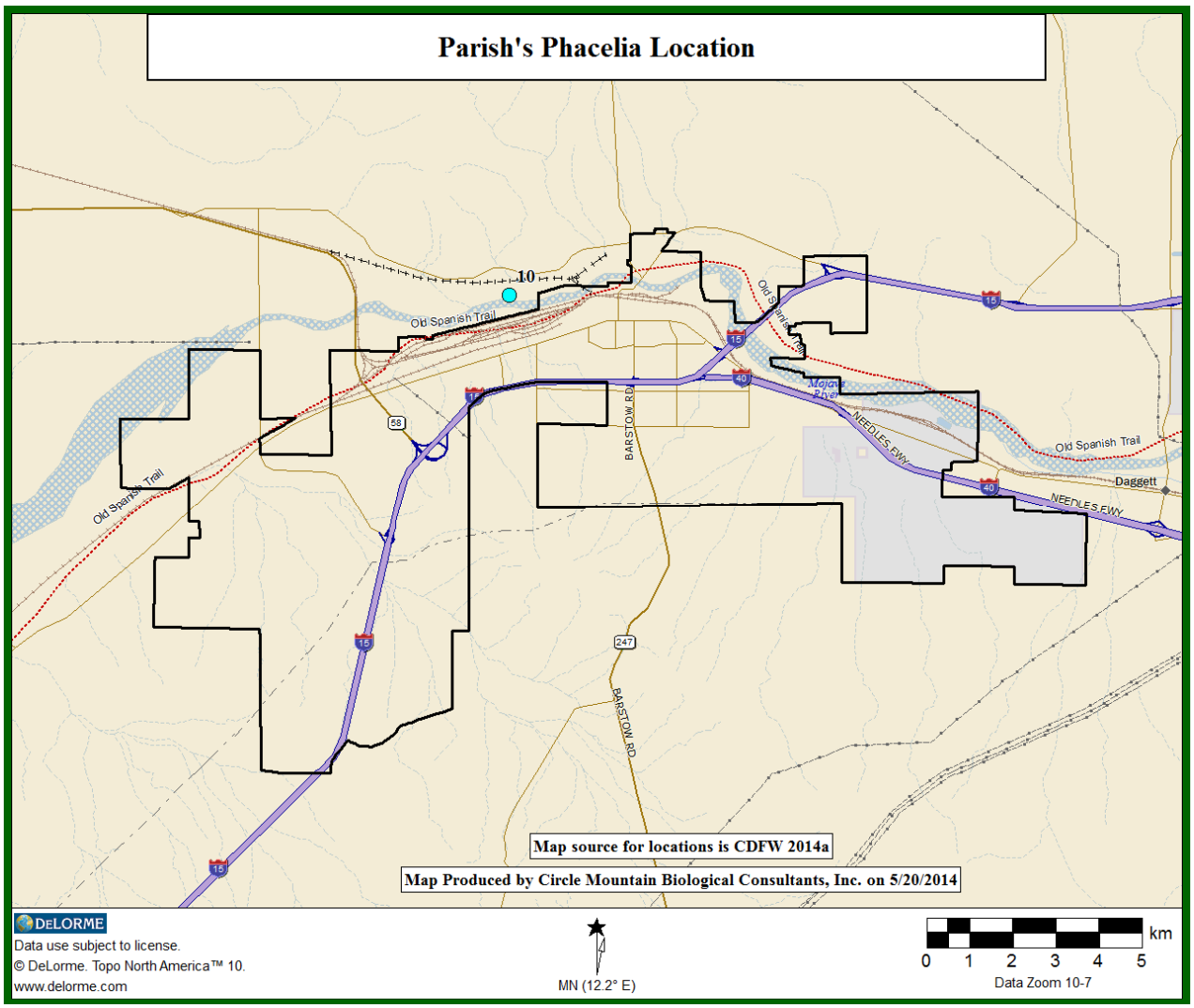

PARISH'S PHACELIA

Author: Scott D. White

Status Designation: USFWS = None; BLM Sensitive; CDFW = None; Heritage Rank = G2G3/S1; CNPS (2014) = List 1B.1

General Distribution: Parish's phacelia has been collected at three sites in San Bernardino County, California (Skinner and Pavlik, 1994), and is more widely distributed to the east and northeast, in Clark, Lincoln, Nye, and White Pine Counties, Nevada, and Mohave County, Arizona (Cronquist et al., 1984; James Morefield, pers. comm.). All Parish's phacelia collections from California have been from alkaline playas or lakebeds below about 900 m (3000 ft.) elevation. Two records are reported as "presumed extinct" (Skinner and Pavlik, 1994), and the only confirmed extant location is southeast of Coyote Dry Lake, near the southern boundary of Fort Irwin.

Natural History: It is an annual with several finely glandular-puberulent stems, 2-6 in. (5-15 cm) long spreading from the base. The flowering season for Parish's phacelia has been reported as April - June (Munz, 1974) and April-July (Howell, 1943; Skinner and Pavlik 1994), but all California collections and observations have been made between 6 April and 11 May.

Habitat Requirements: All known occurrences are on sparsely vegetated alkaline flats, generally in dry, cracked mud flats of seasonal pools filled in years of high rainfall. Most accounts have given little attention to co-occurring plants, but saltbush (*Atriplex*), patata (*Monolepis nuttalliana*), Fremont's phacelia (*P. fremontii*), thick-leaf phacelia (*P. pachyphylla*), and split grass (*Schismus barbatus*) have been mentioned on field reports or herbarium labels. Sanders (*16397* UCR) described its habitat at the Coyote Dry Lake site as "Shallow dried alkaline pools, mostly barren except for annuals."

Literature Cited:

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Howell, J.T. 1943. Studies in *Phacelia* -- a revision of species related to *P. pulchella* and *P. rotundifolia.* Amer. Mid. Nat. 29:1-26.

Munz, P.A. 1974. A flora of southern California. Univ. California Press, Berkeley, California.

Skinner, M.W. and B.M. Pavlik (eds.). 1994. Inventory of Rare and Endangered Vascular plants of California. Special Pub. No. 1 (5th ed.). California Native Plant Society, Sacramento, California.

U.S. Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan, a Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Moreno Valley, CA.

SPINY-HAIR BLAZING STAR

Mentzelia tricuspis

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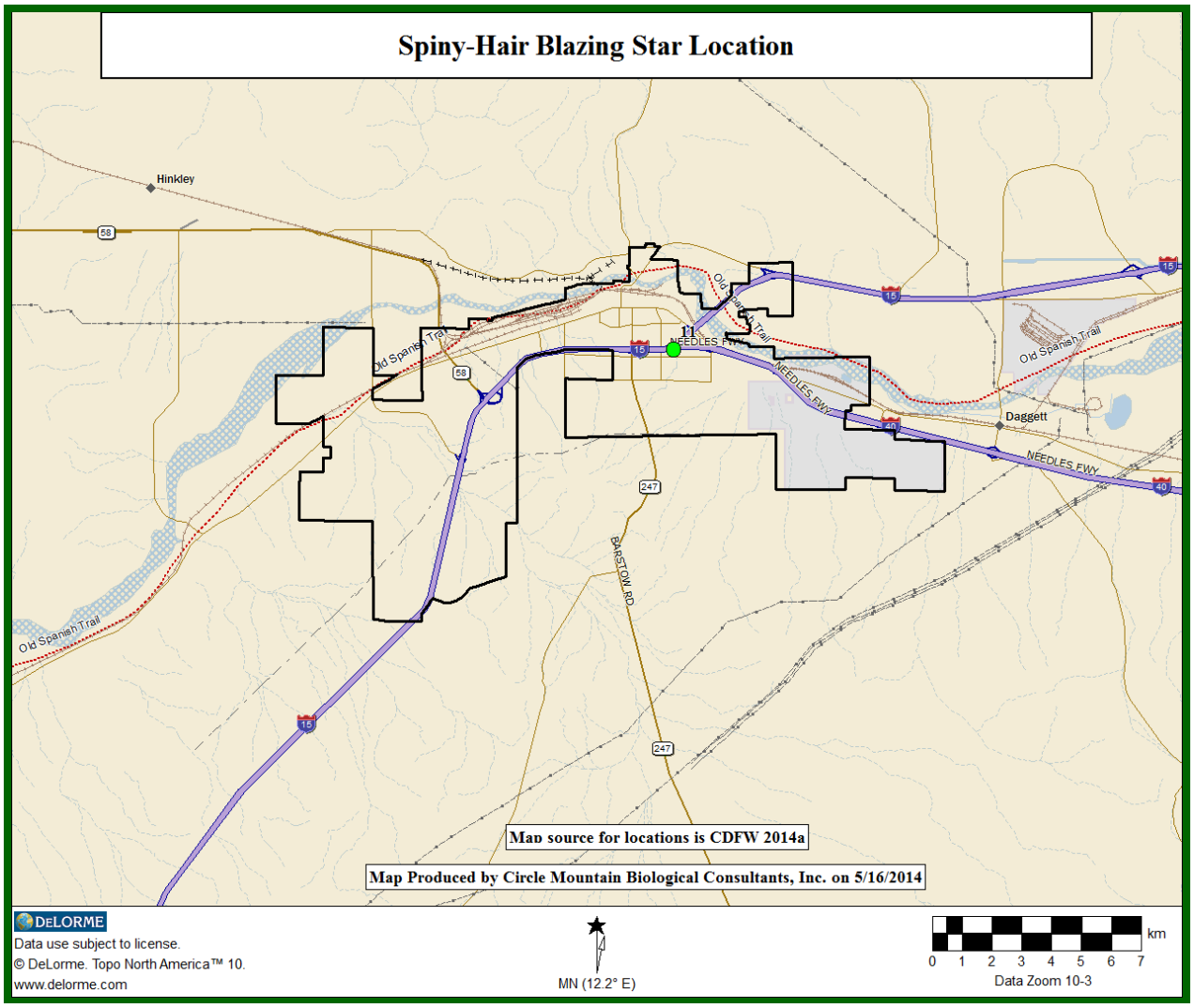

SPINY-HAIR BLAZING STAR

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = None; Heritage Rank = G4/S2; CNPS (2014) = List 2B.1

General Distribution: Except for a record in Barstow, the species is mostly reported from along the Colorado River between Bullhead City to the north and Lake Havasu City to the south (CNPS 2014).

Natural History: A small annual herb in the stick-leaf family (Loasaceae), it blooms from March through May, and is typically found on sandy and gravelly slopes and washes in Mojavean desert scrub. CNPS reports its range between approximately 490 feet (150 meters) and 4,200 feet (1,280 meters) elevation.

Habitat Requirements: The California Department of Fish and Wildlife (2014) record was from 1932, where the plant was reported from disintegrating rock on a small hill near Barstow. No information was found regarding the types of perennial plants typically associated with this plant.

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REPTILES

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AGASSIZ'S DESERT TORTOISE

Gopherus agassizii

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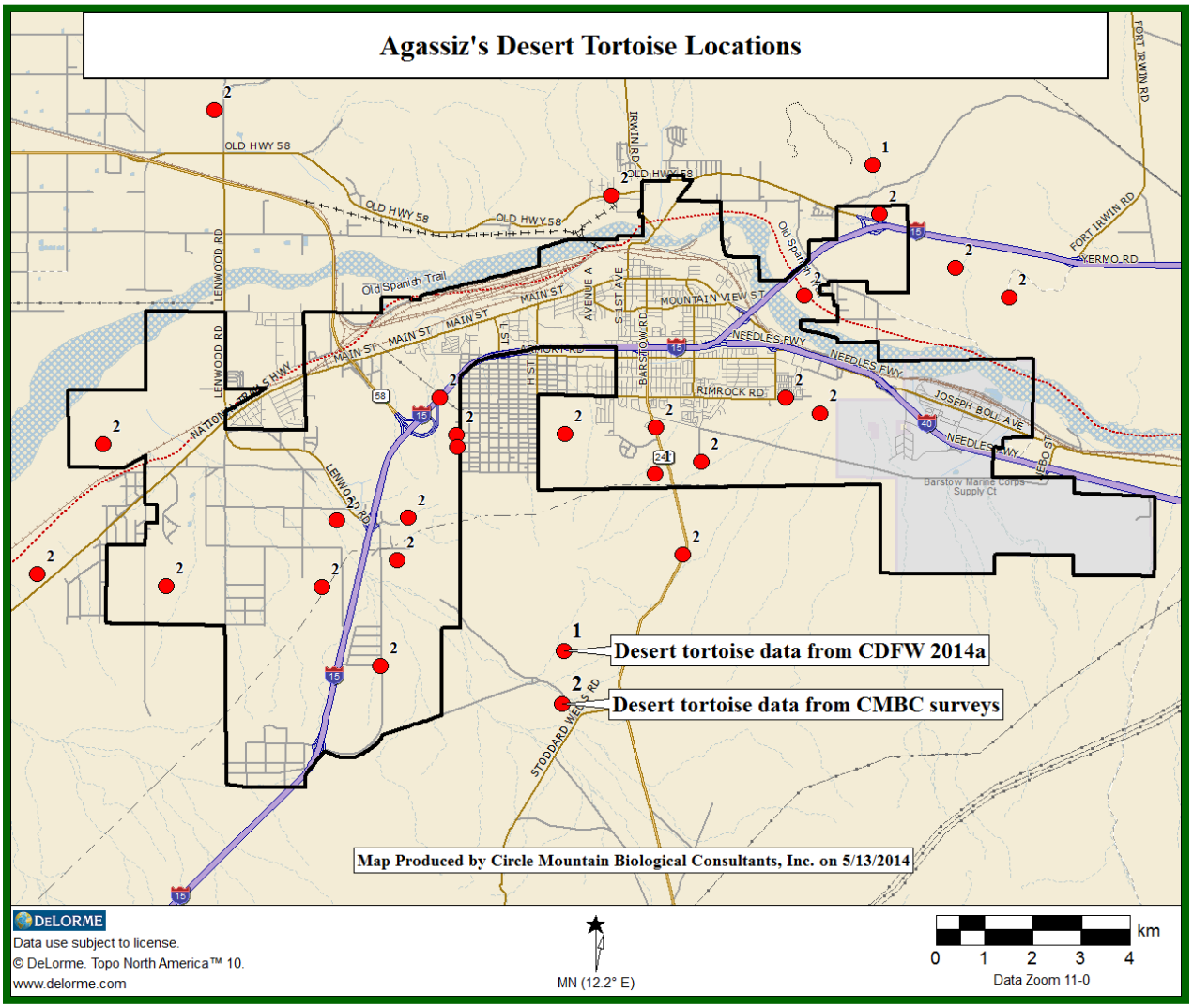

AGASSIZ'S DESERT TORTOISE

Author: Ed LaRue

Status Designation: USFWS = Threatened; CDFW = Threatened

A significant paper was published in June 2011 (Murphy et al. 2011) whereby the "desert tortoise" of the Mojave Desert was split into two species, including *G. agassizii*, referred to as "Agassiz's desert tortoise," and a newly described species, *G. morafkai*, referred to as "Morafka's desert tortoise," which occurs in the Sonoran Desert. According to Murphy et al. (2011), "…this action reduces the distribution of *G. agassizii* to only 30% of its former range. This reduction has important implications for the conservation and protection of *G. agassizii*, which may deserve a higher level of protection." Agassiz's desert tortoise is the threatened species that occurs throughout the Barstow area.

General Distribution: The Agassiz's desert tortoise is found throughout the Mojave Desert of southern California, with the listed population occurring north and west of the Colorado River in Arizona, Nevada, Utah, and California. Although they seem to be extirpated from urbanizing portions of the West Mojave Desert, including Palmdale, Lancaster (Tierra Madre Consultants, Inc. 1991), southern Apple Valley, southern Victorville, central Lucerne Valley, and Hesperia, they are still persisting in some urbanizing areas, the most noteworthy regions being Barstow and Morongo Basin, the latter of which encompasses the areas between Yucca Valley and Twentynine Palms (LaRue, both published and unpublished data). As shown in the figure on the preceding page, tortoises occur throughout the less-developed, southern, northeastern, and western portions of Barstow.

Natural History: Tortoises are mostly found between approximately 500 and 5,000 feet elevation in a variety of native desert plant communities including creosote bush scrub, saltbush scrub, Joshua tree woodland, Mojave mixed-woody scrub, etc., but tend to be absent from blackbush scrub, which occurs at relatively higher elevations. The largest of the California desert reptiles, tortoise are herbivorous, eating a variety of annual plants that are typically available in the spring or fall-winter growing seasons, although they may occasionally eat some perennial plants, including the pads of beavertail cactus (*Opuntia basilaris*).

Tortoises are most active in the spring when they are actively looking for forage following good winter precipitation, in the fall when males actively seek out females, but may be active anytime of the year; in summer when there are monsoonal rainstorms and on mild winter days, particularly if there is precipitation; and juvenile tortoises may be active throughout the year, even in the absence of precipitation. From one to three clutches of eggs may be buried in underground chambers excavated by gravid females between April through June, with hatchlings emerging from late August through October. One female tortoise was documented as laying fertile eggs 16 years after her last exposure to a male tortoise, indicating that female tortoises may store sperm for many years. Once the eggs are laid, the females typically abandon the nest and the hatchlings are on their own to forage when they emerge in the fall.

In support of the West Mojave Plan (U.S. Bureau of Land Management 2005), Dr. Bill Boarman identified 22 threats affecting tortoises. In the immediate Barstow area, these threats would be urbanization throughout, agriculture to the west and north, military maneuvers at Fort Irwin, common raven predation throughout, pet and feral dogs and cats throughout, road-kills on both paved and unpaved roads, collection for pets, vandalism (particularly shooting and intentional crushing), drought, and upper respiratory tract disease, to name a few.

Habitat Requirements: Although tortoises may occupy a variety of native habitats within their preferred elevational range, they appear to be much less tolerant of human development and have disappeared from much of the central, urbanizing portions of Barstow (see the figure on page 23 above). Where they persist, there is usually (though not always) adequate perennial cover by creosote bush, burrow bush, saltbush, and the many other perennials characterizing the area (see species list in Appendix A). They typically create their burrows at the bases of perennial plants but do occasionally excavate burrows in the interstitial spaces between shrubs. They may be less abundant in the vicinity of roads (LaRue 1992) but are still observed crossing even heavily-travelled roads like Highway 58 or even Interstate 15 (LaRue, personal observation in 1997 of a tortoise on the bridge where Outlet Center Drive crosses I-15).

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MOJAVE FRINGE-TOED LIZARD

Uma Scoparia

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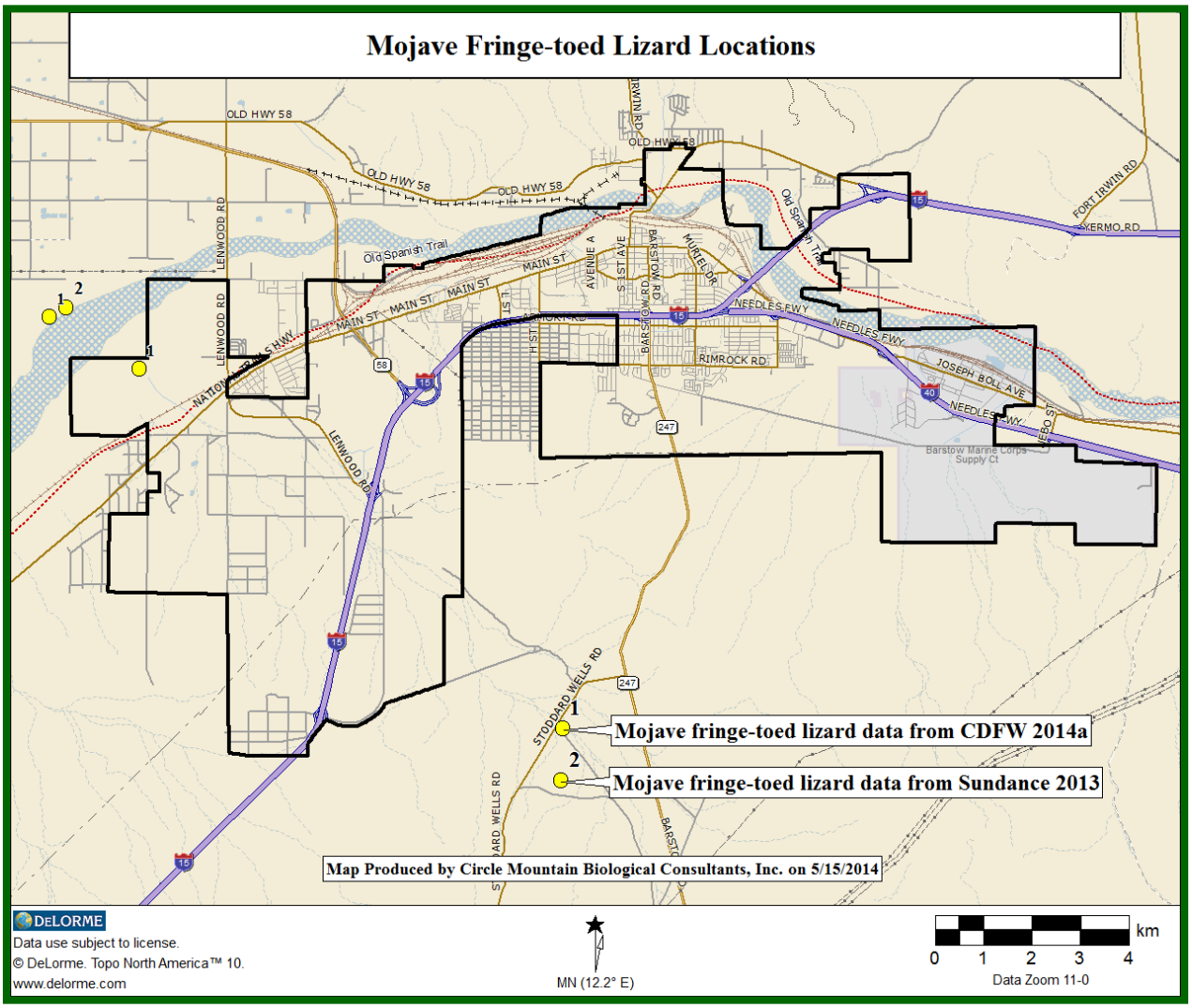

MOJAVE FRINGE-TOED LIZARD

Author: Ed LaRue

Status Designation: USFWS = None; BLM Sensitive; CDFW = Species of Special Concern

General Distribution: Unless otherwise noted, the following information is taken exclusively from Zeiner et al. (1988). This species occurs in desert regions of Inyo, San Bernardino, Los Angeles, and Riverside counties. Only two occurrences of Mojave fringe-toed lizards have been reported to the CNDDB (CDFW 2014a), with a third occurrence, very near the others, reported again in 2013 (Sundance Biology, Inc. 2013).

Natural History: In the early spring and fall, lizards are active mid-day; from May through September, they are active in the mornings and late afternoons, but retreat underground when temperatures are high. They are somewhat less active than other desert fringe-toed lizard species in March and April due to cooler temperatures. Hibernation occurs from November to February, although juveniles may be active throughout the year, including warmer days in the winter.

Mojave fringe-toed lizards usually hide from predators by burrowing in the sand, within several inches of the surface, usually on the lee side of the dunes to prevent being uncovered by winds. They are insectivores feeding on ants, beetles, grasshoppers, sand-dwelling cockroaches, true bugs (family Hemiptera), spiders, ant-lion larvae, and caterpillars, although they also feed on flower buds, stems, leaves, and seeds of plants.

Habitat Requirements: Mojave fringe-toed lizards are restricted to fine, loose, wind-blown deposits in sand dunes, dry lake beds, riverbanks, desert washes, sparse alkali scrub, and desert shrub habitats. Shrubs or annual plants may be necessary for arthropods found in the diet.

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BURROWING OWL

Athene cunicularia

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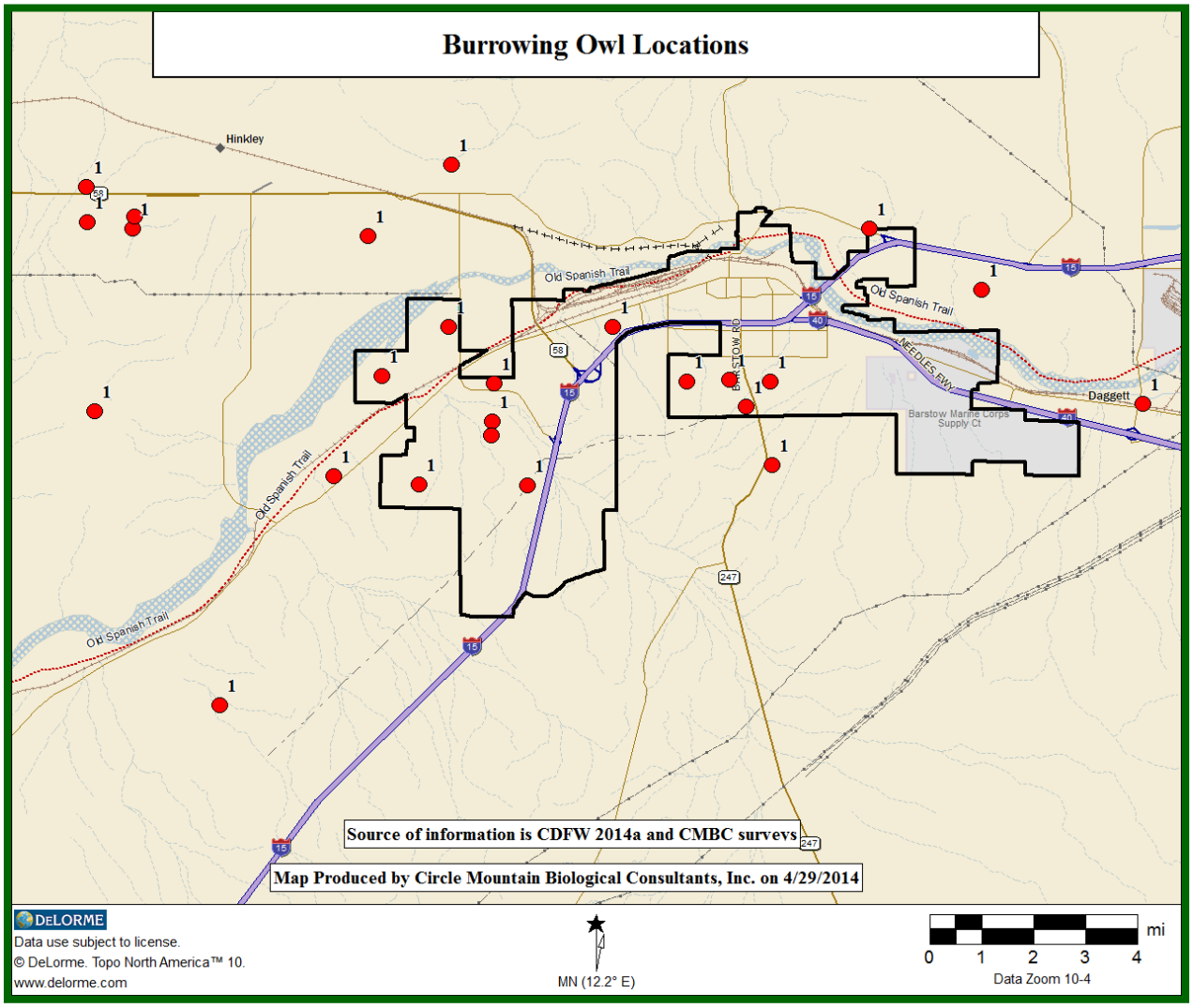

BURROWING OWL

Author: Dudek. 2012. Biological baseline for Desert Renewable Energy Conservation Plan

Status Designation: USFWS = Bird of Conservation Concern; BLM Sensitive; CDFW = Species of Special Concern

General Distribution: In the Barstow area, burrowing owls may be found in creosote bush scrub, saltbush scrub, fallow agricultural lands, and in habitats disturbed by human activities. Unlike some animal species that are intolerant of human urbanization, burrowing owls may be found in degraded habitats immediately adjacent to developed areas, in vacant lots. Several habitat characteristics may explain the species' distribution within the Barstow area: vegetation density, availability of suitable prey, availability of burrows or suitable soil, and disturbance (primarily from humans) (Bureau of Land Management 2005). California supports year-round resident burrowing owls and over-wintering migrants (Gervais et al. 2008). Many owls remain resident throughout the year in their breeding locales (especially in central and Southern California) while some apparently migrate or disperse in the fall (Haug et al. 1993; Coulombe 1971; Barclay 2007).

Natural History: Burrowing owls are opportunistic predators that will consume arthropods, small mammals, birds, amphibians, and reptiles (Haug et al. 1993; Karalus and Eckert 1987), [where they] typically forage in habitats characterized by low-growing, sparse vegetation (Haug et al. 1993). Insects are often taken during the day, especially during the summer, while small mammals are taken at night. Nesting in California generally runs from February through August, with peak activity from mid-April to mid-July (Zeiner et al. 1990; Thomsen 1971; Gervais et al. 2008). Nesting sites always have available perching sites, such as fences, utility poles, or raised rodent mounds (Johnsgard 1988). Burrowing owls are primarily monogamous and typically breed once per year.

Habitat Requirements: Burrowing owls occupy grasslands, deserts, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, (California Natural Diversity Data Base 2009), and urban vacant lots, as well as the margins of airports, golf courses, residential developments, and roads (CVMSCHP 2007; Gervais et al. 2008). In California, burrowing owls most commonly live in burrows created by ground squirrels (*Spermophilis* spp.) (Gervais et al. 2008). Burrowing owls exhibit high site-fidelity and reuse burrows year after year, although dispersal distances may be considerable and variable depending on location and the age of the owls.

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

COOPER'S HAWK

Accipiter cooperii

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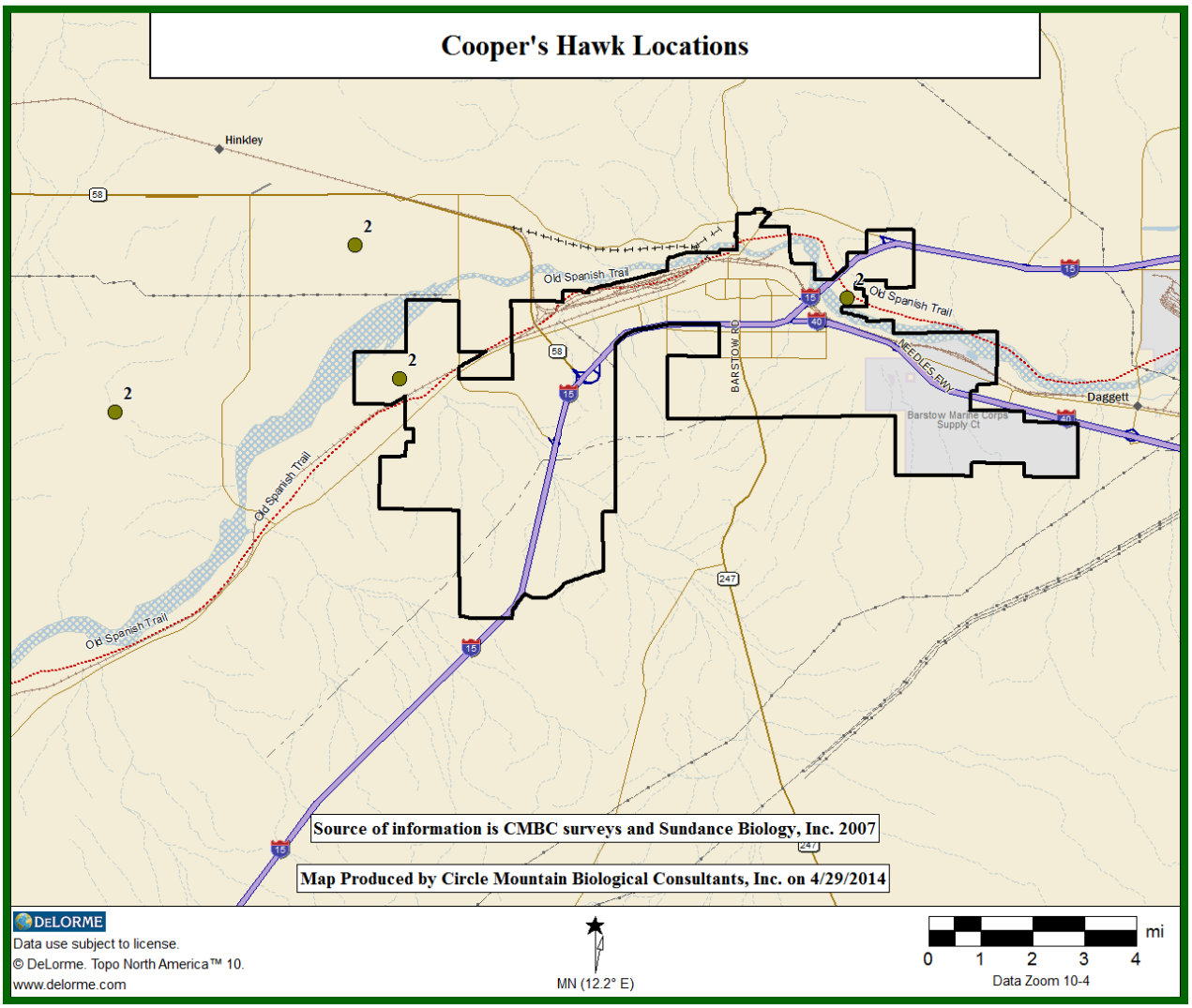

COOPER'S HAWK

Authors: Paul Grindrod and Brian James Walton

Status Designation: USFWS = None; CDFW = Watch List

General Distribution: Cooper's hawk is primarily a winter visitor or migrant in the Barstow area, an uncommon permanent resident in southern California, with a small breeding population restricted to open montane forests, river and creekside bottomlands, and desert oases (Garrett and Dunn, 1981; Rosenberg et al., 1991). Cooper's Hawks consistently appear in Breeding Bird Survey records within the West Mojave, and are known to nest at Morongo Valley (Breeding Bird Census records), at Mojave Narrows Regional Park in Victorville (S.J. Myers, pers. comm.), and Ed LaRue observed a pair nesting in a tall pine at Edwards Air Force Base in 2010. Since many Cooper's hawks are simply moving through the Barstow area in winter, they may be observed briefly at any location

Natural History: This species is adapted to woodlands, with relatively short, rounded wings and a long, somewhat rounded tail that allow a high degree of maneuverability in thick cover. Adults of both sexes are heavily barred in rufous on a white background on the breast, belly, and flanks, but the undertail coverts are clear white (Wheeler and Clark, 1995). The Cooper's Hawk has relatively narrow wings and a longer tail than the smaller Sharp-shinned Hawk, with the tail roughly one and one-half times the breadth of the wings. The wings are held with straighter edges than on the Sharp-shinned Hawk, making the Cooper's Hawk head more pronounced ahead of the leading edge of the wings when in flight.

Although it takes more birds than any other prey type, (70-80% of the diet), the Cooper's Hawk takes more mammals than the Sharp-shinned Hawk, (estimated at 12-17% of the diet; Meng, 1951; Jones, 1979). Avian prey observed by Walton at 77 territories in southern California in the 1970s included towhees, titmice, meadowlarks, blackbirds, jays, crows, doves, English sparrows, white-crowned sparrows, song sparrows, killdeer, green heron, juncos, phoebes, hermit thrushes, California quail, kestrels, screen owls, Virginia rails, magpies, flickers, woodpeckers, grosbeaks, orioles, wrens, and swallows).

Habitat Requirements: The Cooper's Hawk nests in deciduous, conifer, and mixed woodlands. In southern California it generally favors extensive riparian bottomlands (Garrett and Dunn, 1981). During migration, Cooper's Hawks use a mixture of habitat types with vegetative cover, often hunting on the edges of wooded areas (Palmer, 1988). Being less dependent on birds as a principal prey item than the Sharp-shinned Hawk, Cooper's Hawks are less directly associated with riparian habitats in winter.

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FERRUGINOUS HAWK

Buteo regalis

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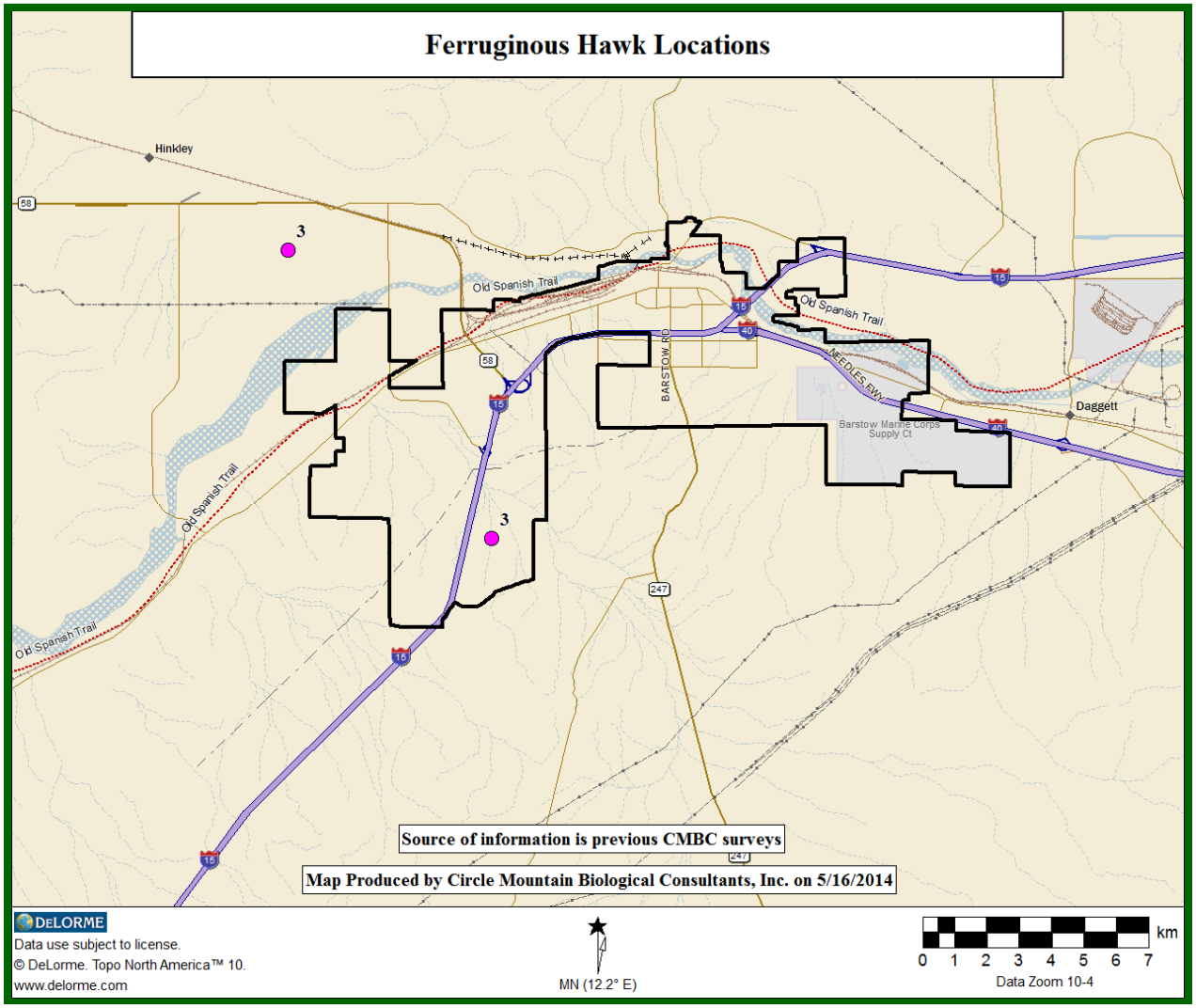

FERRUGINOUS HAWK

Author: Paul Grindrod

Status Designation: USFWS = Bird of Conservation Concern; CDFW = Watch List

General Distribution: With only a few recorded nests ever in California, all in the northeast part of the state, there are no breeding records for the Ferruginous Hawk in the Barstow area; it occurs as a winter visitor or migrant. It is fairly common in grasslands and agricultural regions in southern California from mid-September to early April (Garrett and Dunn, 1981). Sight records for southern California include Antelope Valley, Harper Dry Lake, Helendale, and Victorville.

Natural History: The largest member of the genus Buteo in North America, the Ferruginous Hawk is a large, soaring bird of wide-open country. With the long, broad wings and relatively short tail characteristic of the genus, it is distinctive, nonetheless, for its size, bulk, and wing shape. Light morph adults are much like juveniles underneath except for dark red leggings sometimes barred with dark brown or black. The dark legs make a distinct "V" against the otherwise light body when the bird is seen in overhead flight.

Ferruginous Hawks are largely perch hunters, although they will also spend more time foraging on the ground than any other large raptor, course low over the ground to flush prey, and hover hunt from heights up to 300 ft. (91.5 m; Wakely, 1974; Bechard and Schmutz, 1995). In studies range-wide, mammals including thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), white-tailed jackrabbit (*Lepus townsendii*), northern pocket gopher (*Thomomys talpoides*), prairie dogs (*Cynomys* spp.), kangaroo rats (*Dipodomys* spp.), and cottontails (*Sylvilagus* spp.) make up roughly 70-85% of the diet (up to 99% of the biomass). Birds comprise 5-13% of the diet (< 5% of the biomass), and amphibians, reptiles, and insects add the remaining proportion (Olendorff, 1993; Bechard and Schmutz, 1995).

Habitat Requirements: Winter and migratory habitat requirements largely overlap with breeding habitat, but without the need for trees or other elevated nest placements, although trees may be used to roost if they are available (Steenhof, 1984; King, et al., 1988).

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GOLDEN EAGLE

Aquila chrysaetos

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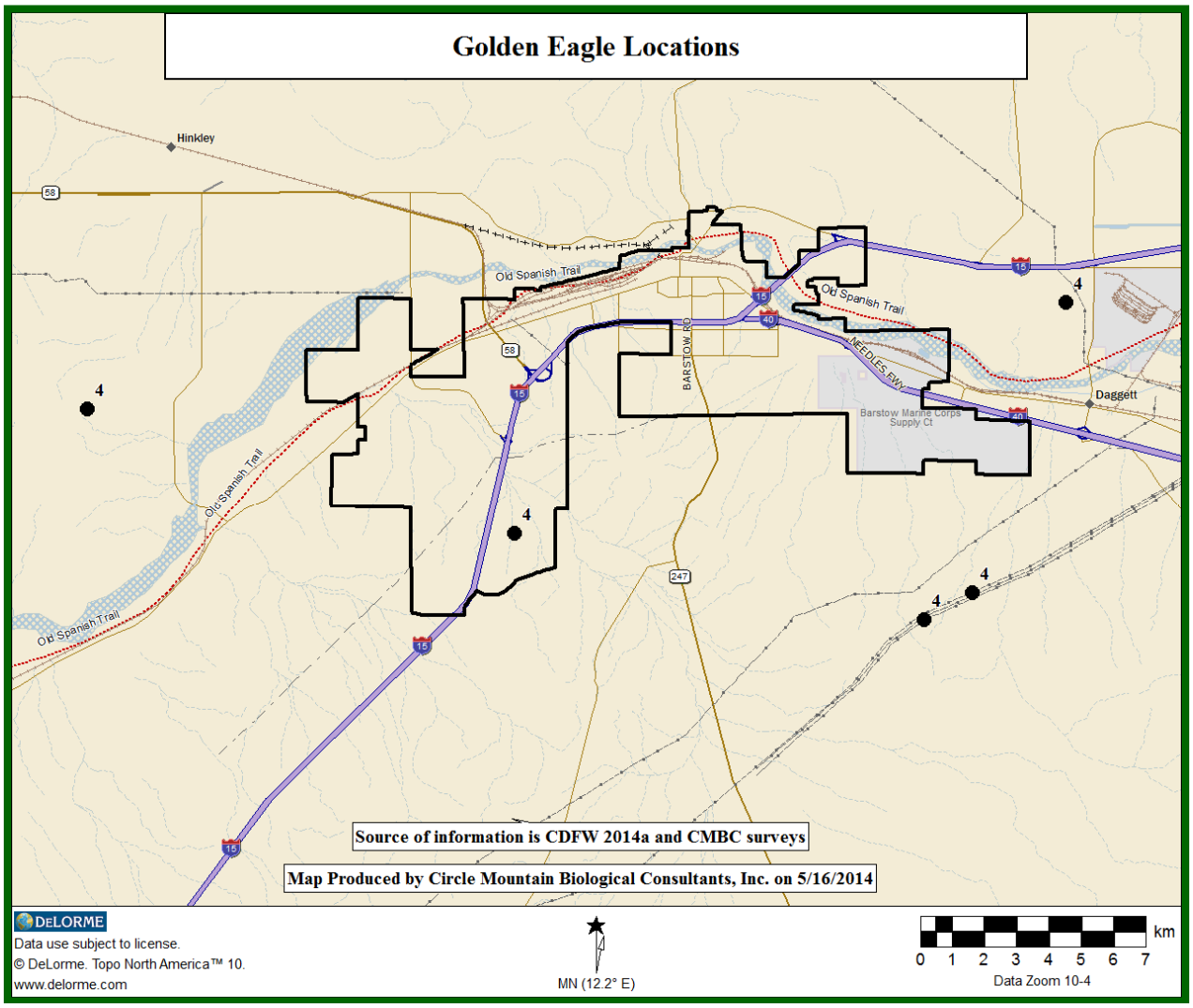
Gerald and Buff Corsi
© 2002 California Academy of Sciences



GOLDEN EAGLE

Author: Dudek. 2012. Biological baseline for Desert Renewable Energy Conservation Plan

Status Designation: USFWS = Bird of Conservation Concern;; CDFW = Fully Protected, Watch List

General Distribution: Within California, the golden eagle is a year-round resident generally inhabiting mountainous and hilly terrain throughout the open areas of the state. The golden eagle is an uncommon permanent resident and migrant throughout the West Mojave, ranging from sea level up to 3,500 meters (11,480 feet) (Grinnell and Miller 1944). There are concentration areas for eagle records in the region between Victorville and Barstow east of Interstate 15, including the Newberry Mountains, which the Bureau of Land Management has designated as a "Key Raptor Area."

Natural History: Golden eagles typically forage in open habitats including grasslands and shrublands. They feed mainly on leporids (hares and rabbits) and sciurids (ground squirrels), but they also take birds, fish, and reptiles, mostly on or near the ground, and they frequently feed on carrion (Kochert et al. 2002). Their diet is most varied in nonbreeding season. Hunting typically involves soaring 30 to 90 meters (98–295 feet) above ground in search of prey, or making low, quartering flights, often 7–8 meters (23–26 feet) above ground. Golden eagles occasionally search from a perch and fly directly to prey (Polite and Pratt 1990) and they sometimes pirate food from other predators. Hunting in mated pairs is also documented (Kochert et al. 2002).

Golden eagles generally breed after attaining adult plumage, usually acquired in their fifth summer (Kochert et al. 2002). Mated pairs use the same nest each year, alternate nests in successive years, or nest only every other year (Terres 1991). Pairs rarely re-nest when the first clutch is destroyed (Watson 1997) and there are no records of pairs producing more than one brood per year. Golden eagles prefer to locate their nests on cliffs or trees near forest edges or in small stands near open fields (Bruce et al. 1982; Hunt et al. 1998).

Habitat Requirements: Golden eagles use nearly all terrestrial habitats of the western states, occurring primarily in mountainous canyon land, rimrock terrain of open desert and grassland areas (Kochert et al. 2002). Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990). Deeply cut canyons rising to open mountain slopes and crags are ideal habitat (Kochert et al. 2002).

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

LE CONTE'S THRASHER

Toxostoma lecontei

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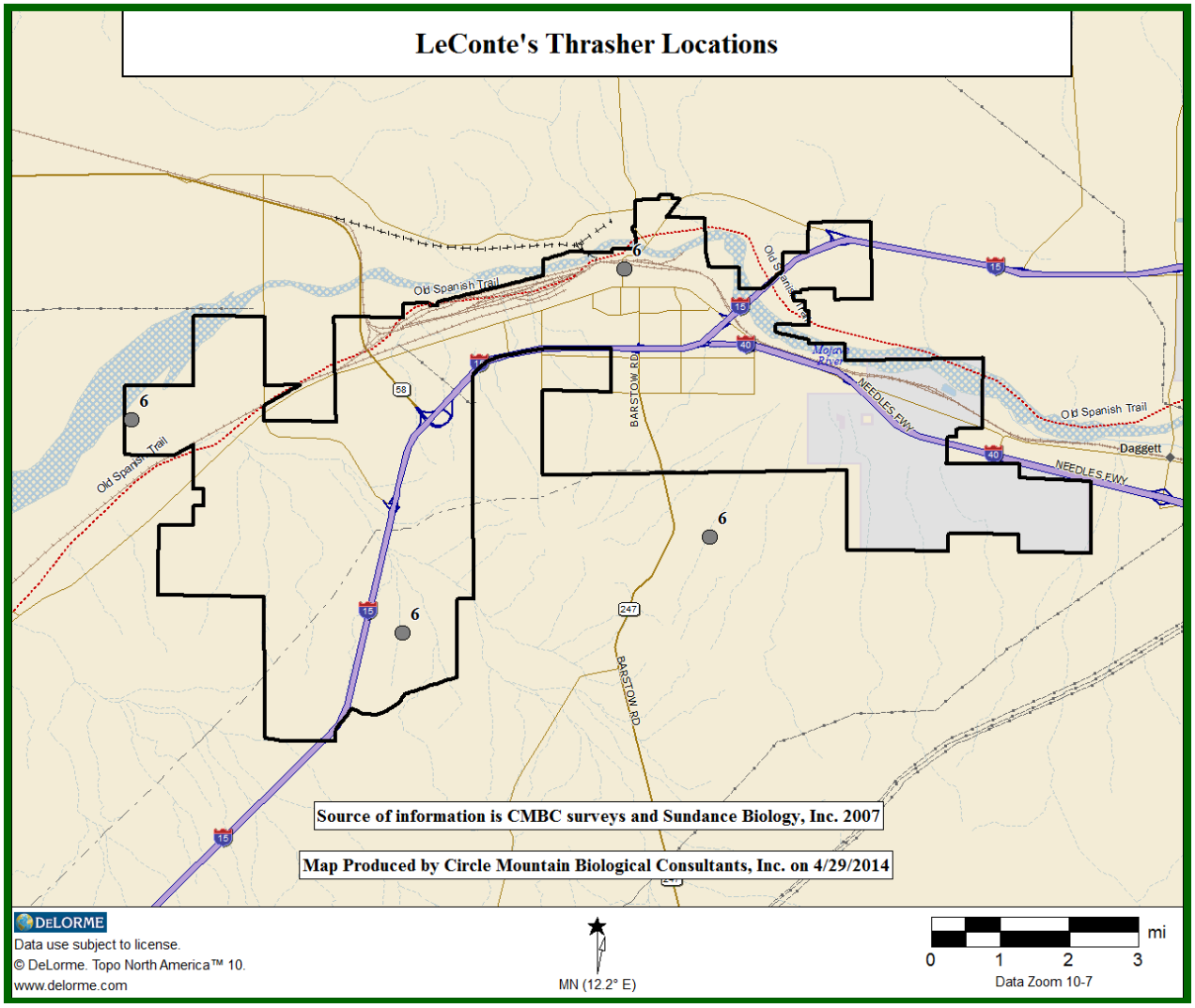

LE CONTE'S THRASHER

Author: Brian G. Prescott

Status Designation: USFWS = Bird of Conservation Concern; CDFW = Species of Special Concern

General Distribution: California contains a major portion of the range of the Le Conte's Thrasher, and the West Mojave holds a large percentage of the California range. They are found in desert scrub throughout the West Mojave. They occur in the Antelope Valley north to eastern Kern County, including California City, Ridgecrest and the Naval Air Weapons Station at China Lake. They also occur north into the Owens and Panamint valleys. In the southern portion of the West Mojave, Le Conte's Thrashers occur widely throughout Joshua Tree National Park, and west along the northern base of the San Bernardino and San Gabriel mountains.

Natural History: The Le Conte's Thrasher is pale gray-brown on the upperparts and pale buff on the underparts. The long tail is dark brown to blackish, and contrasts with the pale body. The undertail coverts are buffy. The wings are short and rounded, typical of sedentary, terrestrial birds. The Le Conte's Thrasher is probably the most terrestrial of the desert thrashers, and its behavior is suggestive of a miniature roadrunner (Bent, 1948). Le Conte's Thrashers forage for much of their food by digging and probing in the soil. Other items are gleaned from vegetation or pursued on the ground. Their diet consists of arthropods, small lizards, small snakes, and seeds and fruits (Sheppard, 1996).

The Le Conte's Thrasher is monogamous, and both sexes share in building the nest and caring for the young. The nest typically is placed in a cactus, thorny shrub, or small tree, chosen to offer protection from predators and sun (Sheppard, 1996). The nest is a bulky mass of twigs and sticks and is lined with plant down, leaves, flowers, and sometimes human-made materials (Sheppard, 1996). It is typically placed about 2-4 ft (0.6-1.2 m) above ground but can be as high as 8 ft. (2.4 m) in a small tree, such as a smoke tree (*Psorothamnus spinosus*). A pair usually nests in the same area year after year and over a period of several years. The Le Conte's Thrasher usually does not occur in areas of monotypic creosote bush scrub, as it provides little cover or nesting sites. Creosote bush (*Larrea tridentata*) does not provide the structure needed for nest placement (B.G. Prescott, pers. obs.; S.J. Myers, pers. comm.). Egg dates span nearly half the year, from 22 January to 24 June (Bent, 1948). The clutch size is from 2-5, and is commonly 3-4.

Habitat Requirements: The Le Conte's Thrasher inhabits desert flats, washes and alluvial fans with sandy and/or alkaline soil and scattered shrubs (Grinnell and Miller, 1944). The thrashers are rarely found on rocky soil, hillsides, in riparian vegetation or on agricultural lands. They are not found in urban or dense residential areas but may be found near scattered rural residences that abut suitable habitat. The plant species used for nesting varies with availability. Where it occurs, silver cholla (*Opuntia echinocarpa*) is the preferred nesting plant. In the Antelope Valley, at Harper Lake, and in portions of the Victor/Lucerne valleys, the only suitable plant for

nesting is allscale (*Atriplex polycarpa*). Other species of saltbush found in the Le Conte's Thrashers range, such as shadscale (*A. confertifolia*), quailbush (*A. lentiformis*), desert holly (*A. hymenolytra*) and fourwinged saltbush (*A. canescens*) may be occasionally used for nesting. Other plants used are pencil cholla (*Opuntia ramosissima*), smoke tree, blue palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*), honey mesquite (*Prosopis glaudulosa var. torreyana*), and Mojave yucca (*Yucca schidigera*) (B.G. Prescott, pers. obs.).

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

LOGGERHEAD SHRIKE

Lanius ludovicianus

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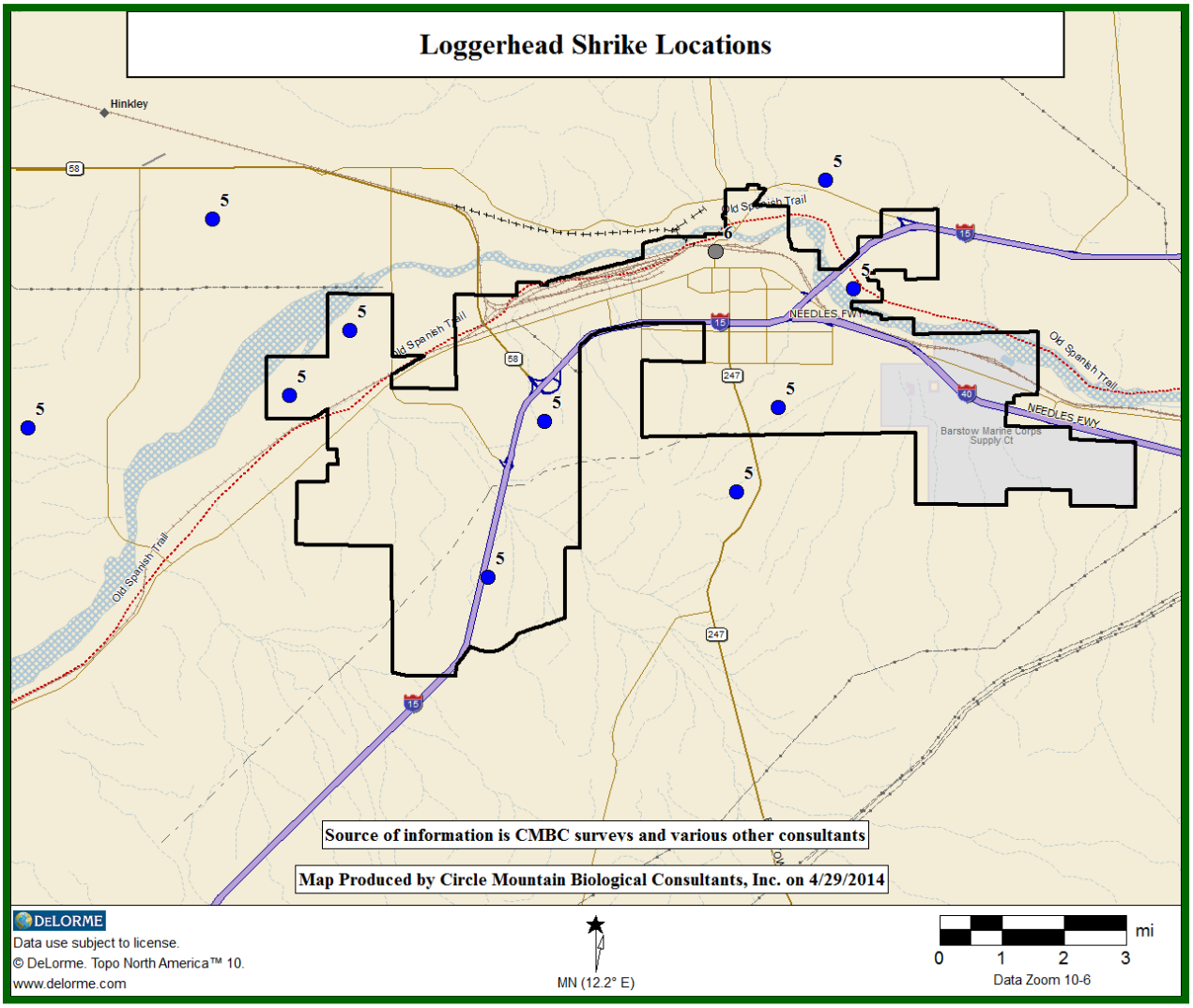

LOGGERHEAD SHRIKE

Author: Kurt F. Campbell

Status Designation: USFWS = Bird of Conservation Concern; CDFW = Species of Special Concern

General Distribution: This shrike is one of the most widely distributed vertebrates in the West Mojave, although it is not truly common anywhere in the deserts. As the records compiled for this report suggest, the species is to be expected virtually anywhere in the West Mojave except the centers of the largest and most barren dry lake beds. Distribution in the area may be limited primarily by the presence of adequate nesting sites and foraging posts, and the degree and nature of local habitat degradation or augmentation by man. In some areas, adequately dense nesting substrate may be a limiting factor, as the species is well-known to use artificial plantings at ranchyards and roadsides.

Natural History: Egg-laying extends from early February through June, with a peak in April (Kiff and Irwin, 1987; Yosef, 1996). Nests are generally well-hidden in taller shrubs or low in trees, and often at a break in the landscape, such as at the base of slopes or edge of a woodland or clump of trees (Bent, 1950; Yosef, 1996; pers. obs.). Mean nest height in several studies (see Yosef, 1996) ranged from 31-91 in. (0.8-2.3 m) above ground and probably reflects in part the local availability of plants of adequate density. Loggerhead Shrikes are opportunistic and generalist in diet, with prey items including primarily arthropods, and as available, a variety of small to medium-sized vertebrates (Miller, 1931; Yosef, 1992; Chapman and Castro, 1972; Reid and Fulbright, 1981; Scott and Morrison, 1995; Yosef, 1996). The majority of the diet in all or nearly all areas is invertebrates, but individual prey can also potentially exceed the shrike in mass (Balda, 1965).

Habitat Requirements: Grinnell and Miller (1944) state of this species that, “chief requisites are open terrain with well spaced lookout posts, at least two feet high, from which moving animals -- insects or small vertebrates -- may be seen below on the bare ground or in short or sparse grass. Densely timbered areas and chaparral are avoided.” Garrett and Dunn (1981) add that, “Loggerhead Shrikes are very widespread in open and semi-open habitats throughout the lowlands of the region. Often only very limited taller vegetation is required. There is some expansion into open agricultural areas in winter.” The same habitat types are occupied all year.

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

NORTHERN HARRIER

Circus cyaneus

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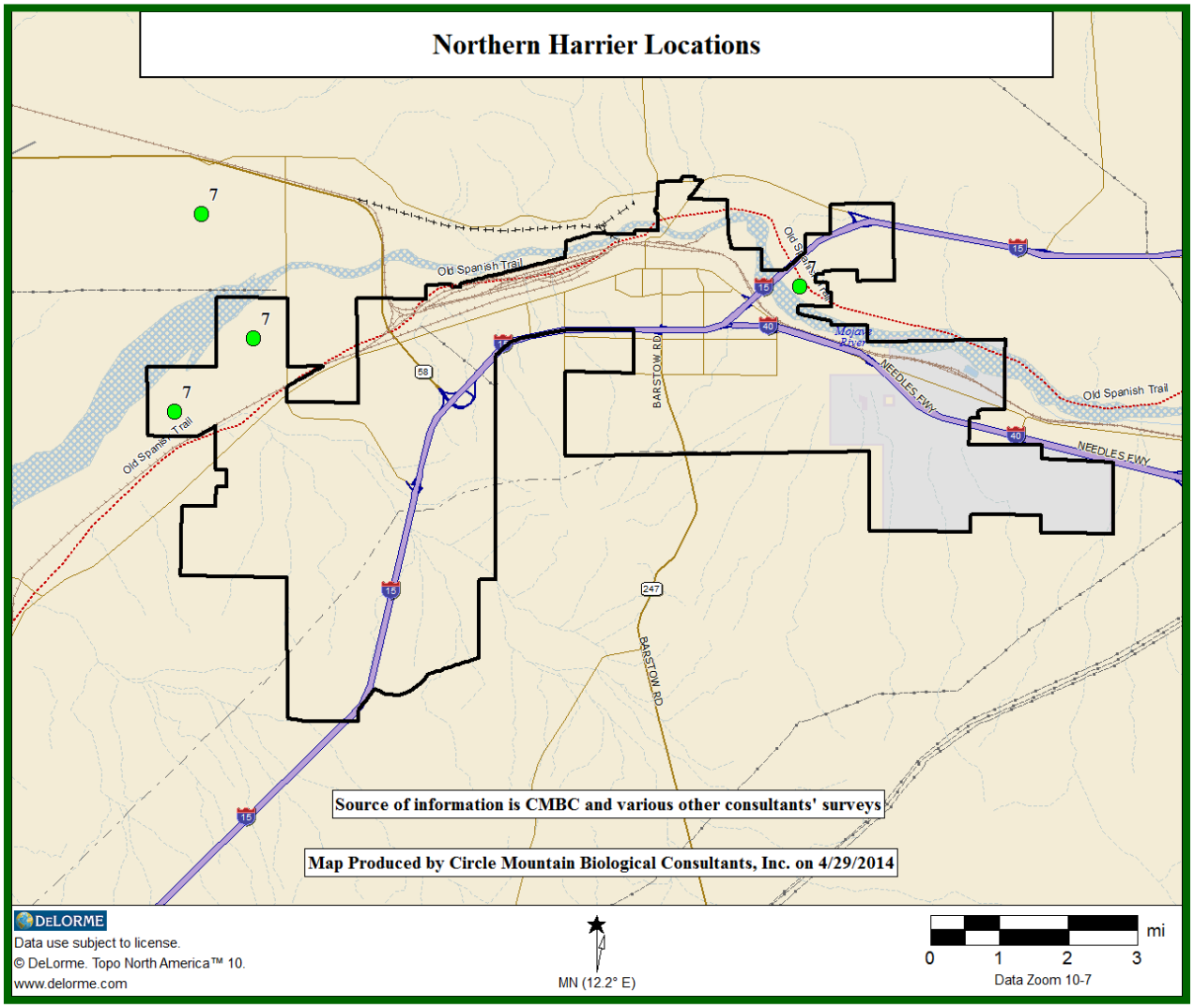

NORTHERN HARRIER

Author: Kimball L. Garrett and Kathy C. Molina

Status Designation: USFWS = None; CDFW = Species of Special Concern

General Distribution: Regular breeding is limited in the West Mojave to Piute Ponds on the Edwards Air Force Base and Harper Dry Lake. Northern Harriers occur commonly throughout the year and nest regularly at Harper Dry Lake (ENSR, 1989); the breeding population there is estimated at two to four pairs. This species may also nest in other marshy wetlands in the West Mojave, at least after wet winters. In winter this species is recorded annually in Lancaster, is common in winter at China Lake NWC, is fairly common through the winter in the Mojave Narrows/Victorville/Hesperia area (S.J. Myers, unpubl. data), with recent records for this area falling between 19 September and 17 February, and are regularly recorded on the Mojave River Valley Christmas Bird Count (*American Birds/National Audubon Society Field Notes*). Fall migration through the region is mainly in September and October. There is no clear period of spring migration through the WMPA, but wintering birds largely depart by mid-April.

Natural History: Northern Harriers are moderately large raptors with rather long, narrow wings, a long tail, and a striking white band on the upper tail coverts. Females are considerably larger and heavier than males, with the mass averaging 513 g in the breeding season, vs. 336 g for breeding males (MacWhirter and Bildstein, 1996). Adult males are primarily pale gray on the head, breast and upperparts, and white below; in flight they show black wingtips and white uppertail coverts. Females are brown on the head, breast and upperparts and buffy below with dark streaks; they also show white uppertail coverts. Immatures generally resemble adult females but are a deeper, ruddier brown in coloration.

Harriers have a distinctive slow, buoyant flight, with the wings raised in a slight dihedral; when foraging they often fly within a few feet of the ground. The diet is usually dominated by rodents. Northern Harriers are ground nesters, with the nest placed in dense, low ground cover in marshes or uplands; nests may sometimes be placed in croplands (MacWhirter and Bildstein, 1996).

Habitat Requirements: Northern Harriers breed in open wetlands, wet, lightly grazed pastures, fallow fields, dry uplands, prairies, agricultural lands, and cold desert shrub-steppe (MacWhirter and Bildstein, 1996); in western North America they are found more often in dry upland habitats than in the rest of the continent (MacWhirter and Bildstein, 1996). Migrants and wintering birds are somewhat broader in their range of occupied habitats, using both wetland habitats and a variety of upland habitats with low vegetation. Wintering birds in the desert regions occur mainly in agricultural areas (Garrett and Dunn, 1981), especially those dominated by alfalfa fields; they also occupy extensive marshes such as at Piute Ponds and Harper Dry Lake. Migrants in the deserts are widespread in open habitats, including marshes, grasslands, pastures, agricultural fields, saltbush scrub, and even creosote scrub.

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U.S. Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan, a Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Moreno Valley, CA.

OSPREY

Pandion haliaetus

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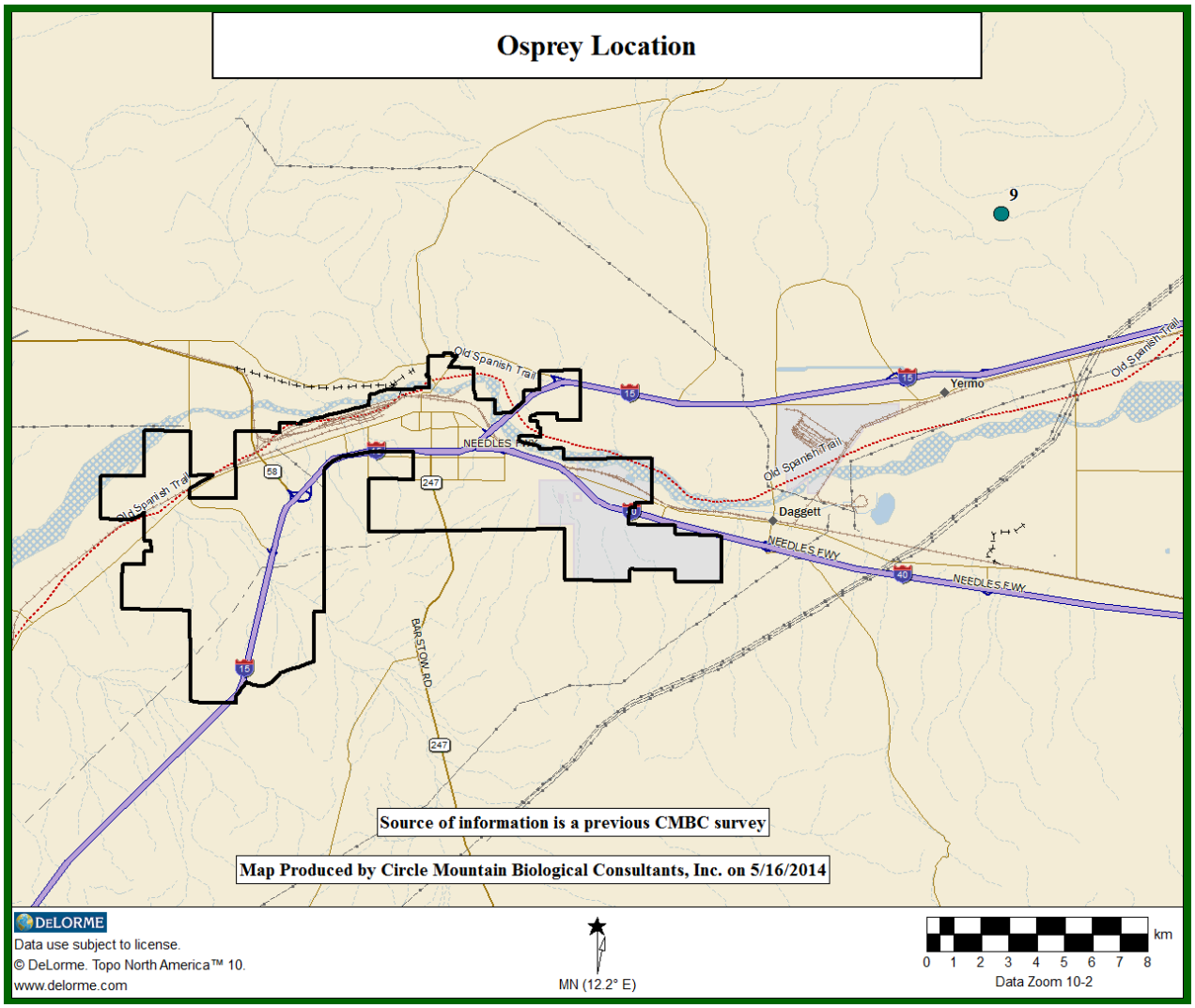

OSPREY

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = Watch List

General Distribution: Unless otherwise noted, the following information is taken from Zeiner et al. (1990). Ospreys arrive on nesting grounds in northern California in mid-March to early April, migrating south along the coast and western slope of Sierra Nevada in October as they head south to Central and South America. They are apparently a rare migrant to the Mojave Desert, but have been seen by the author in the community of Joshua Tree to the east, Edwards Air Force Base to the west, Silver Lakes at Helendale to the south, and one was observed in 2011 north near Yermo (CMBC 2011).

Natural History: Ospreys prey mostly on fish, although they also take a few mammals, birds, reptiles, amphibians, and invertebrates. They swoop from flight, hover, or perch to catch fish near the surface of the water. They breed in March to September, producing clutches of one to four eggs, and often nest in colonies.

Habitat Requirements: Ospreys are associated strictly with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats, where they use large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. They require open, clear water for foraging, using rivers, lakes, reservoirs, bays, estuaries, and surf zones.

Literature Cited:

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PRAIRIE FALCON

Falco mexicanus

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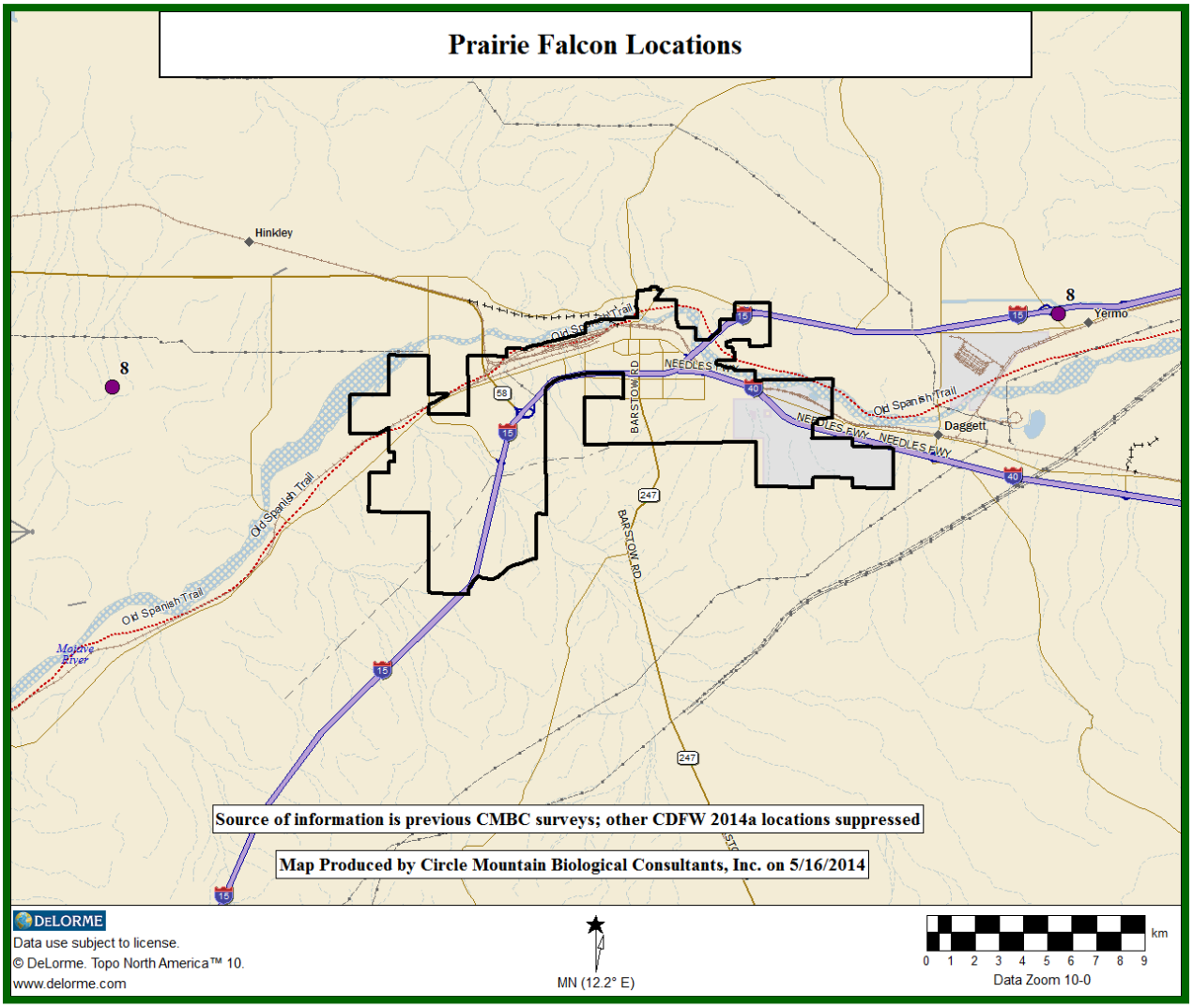

PRAIRIE FALCON

Author: Ed LaRue

Status Designation: USFWS = Bird of Conservation Concern; CDFW = Watch List

General Distribution: Prairie falcon is a year round resident of the Barstow area, reported from several locations to the California Natural Diversity Data Base (CDFW 2014), although locations are not revealed to protect (particularly nesting) birds. The species is found in annual grasslands, some agricultural fields, and desert scrub (Zeiner et al. 1990).

Natural History: Prairie falcons eat mostly small mammals, some birds, and reptiles, catching prey both in the air and on the ground. Usually nests in a scrape on a sheltered ledge of a cliff overlooking large, open areas. Will nest in old raven and stick nests on cliffs, bluffs, or rock outcrops. Southeast-facing nest site may be preferred, although height and orientation are secondary to the nature and character of the ledge. Prairie falcons breed from mid-February through mid-September, with peak activity from April to early August.

Habitat Requirements: Nesting and foraging characteristics are given above. Specifically, within the Barstow city limits, prairie falcons are not likely to nest. However, they have been observed in some relatively urbanized areas, where they depredate small to medium-sized birds, including mourning doves and rock doves (city pigeons) (LaRue, personal observation).

Literature Cited:

California Department of Fish and Wildlife (CDFW). 2014. Electronic database of rare plant and animal species reported to The State Resources Agency, Natural Heritage Division, California Natural Diversity Data Base. Sacramento, CA.

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

SWAINSON'S HAWK

Buteo swainsoni

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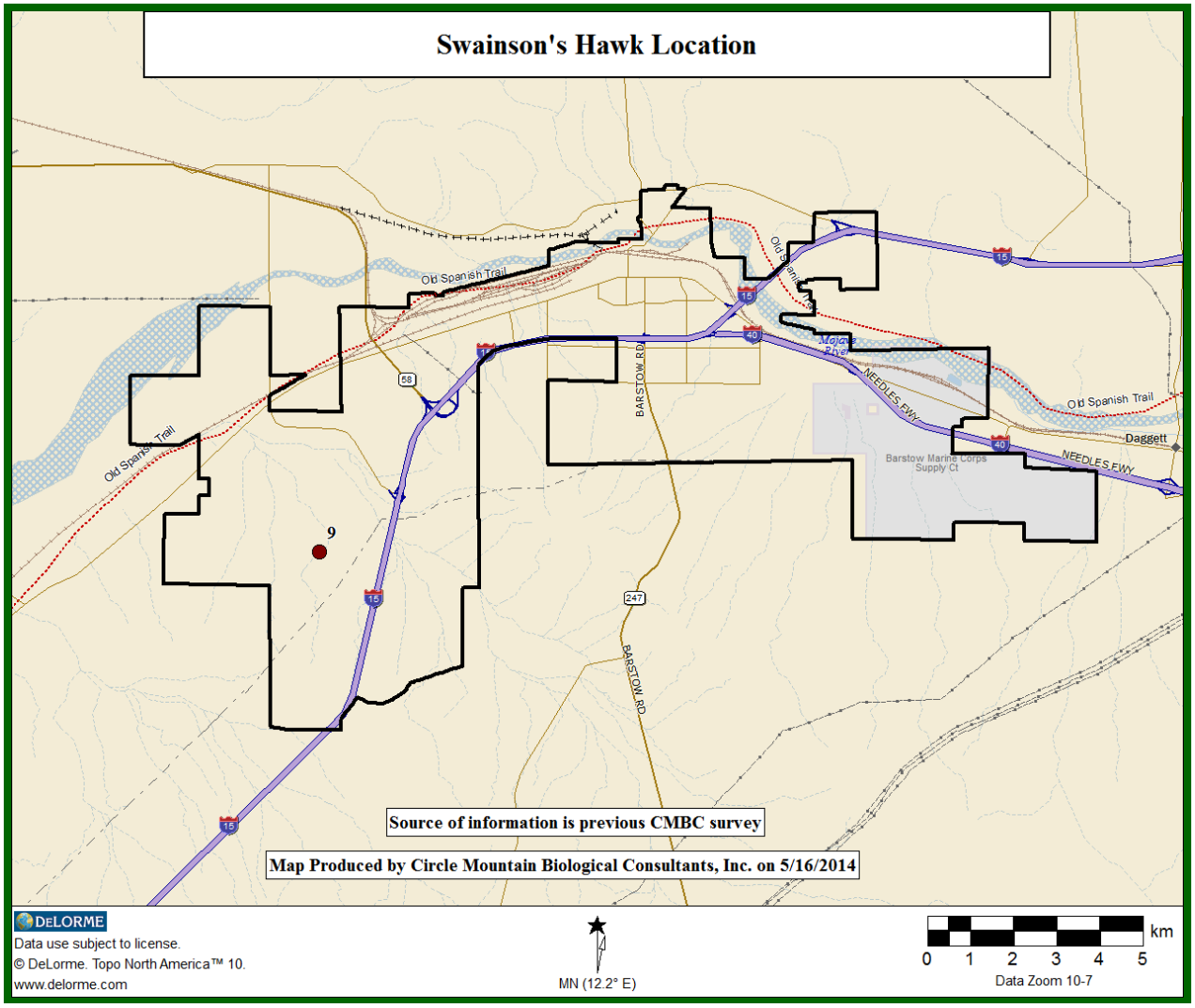

SWAINSON'S HAWK

Author: A. Sidney England

Status Designation: USFWS = Bird of Conservation Concern; CDFW = Threatened

General Distribution: All documented nesting attempts by Swainson's Hawks in the West Mojave are in the Antelope, Victor, and Apple valleys from near Palmdale and Lancaster to Adelanto and Victorville. Within this range, they nest in extremely low densities and apparently not in all years in desert scrub vegetation with an overstory of Joshua Trees (*Yucca brevifolia*) and in Fremont Cottonwoods (*Populus fremontii*) along stream courses or planted as windbreaks. Flocks of migrating Swainson's Hawks may be found in the West Mojave during either the spring or fall (Garrett and Dunn, 1981; Small, 1994).

Natural History: The plumage coloration of Swainson's Hawks is polymorphic and is called light, dark, or rufous based on coloration of the under parts (Palmer, 1988). Color variation is almost continuous from lightest to darkest morphs making these categories convenient but somewhat arbitrary (Palmer, 1988). Most birds are light to intermediate in color. In flight, these individuals are easily distinguished from other buteos in the Mojave Desert by an underwing pattern of dark flight feathers contrasting with paler wing-linings. In flight, the overall appearance of a Swainson's Hawk, whatever color morph, is slimmer with a thinner body and narrower wings compared to other North American buteos. Also, when soaring, they hold their wings in a dihedral reminiscent of a Turkey Vulture (*Cathartes aura*).

Unlike any other buteos in the western United States (e.g., Red-tailed Hawk, Red-shouldered Hawk), Swainson's Hawks migrate long distances, are highly gregarious, and are largely insectivorous. Their annual round-trip migration between North America and Argentina covers approximately 12,500 mi (20,000 km; England et al., 1997). Birds typically return to nest sites in early March to April (later in more northern areas), immediately form pairs, and begin the nesting cycle.

Habitat Requirements: Breeding Swainson's Hawks have three general habitat requirements: (1) suitable foraging habitat with adequate prey, (2) nest sites, and (3) and isolation from disturbances that may disrupt breeding activities. No quantitative information has been published on the habitat requirements of Swainson's Hawks in the Mojave Desert. In the West Mojave, nesting opportunities are found in Joshua tree woodland, riparian woodland, and ornamental plantings. The primary nest trees are Joshua trees and Fremont cottonwoods, but other large trees could also be used, especially where planted in narrow bands such as agricultural windbreaks (e.g., cottonwoods).

Literature Cited:

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VAUX'S SWIFT
Chaetura vauxi


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Seattle Times


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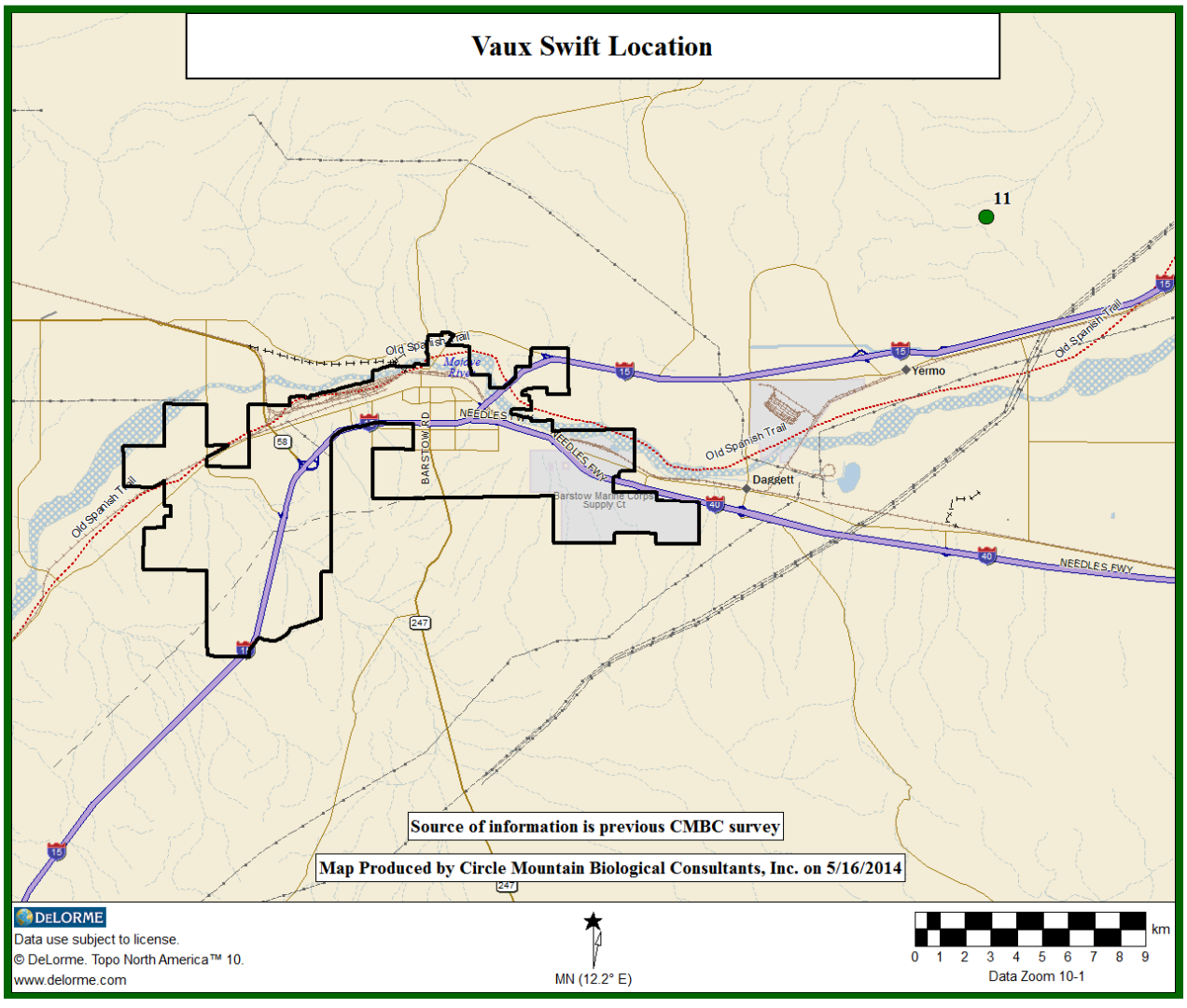

VAUX'S SWIFT

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = Species of Special Concern

General Distribution: Unless otherwise noted, the information given herein is taken exclusively from Zeiner et al. (1990). Vaux's (pronounced "voxes") swift is a summer resident of northern California, breeding fairly commonly in the Coast Ranges, Sierra Nevada, and possibly in the Cascade Range. They are a fairly common migrant throughout the Mojave Desert in April and May and again in August and September, as they migrate to northern California in the spring and back to Mexico and Central America in the fall. A small flock of birds was observed in 2010 north of Barstow, near the community of Yermo (CMBC 2010), although they may be observed anywhere in Barstow in the spring and fall during migration.

Natural History: This bird feeds exclusively on flying insects taken in long, continuous foraging flights, feeding high over most terrains and habitats, and also at lower levels in forest openings, above burns, and especially above rivers. They breed from early March to mid-August, with solitary nesting being typical.

Habitat Requirements: Vaux's swift roosts in hollow trees and snags, and occasionally in chimneys and buildings; often in large flocks. They nest in redwoods, Douglas fir, and occasionally other coniferous forests, and do not nest in the Barstow area.

Literature Cited:

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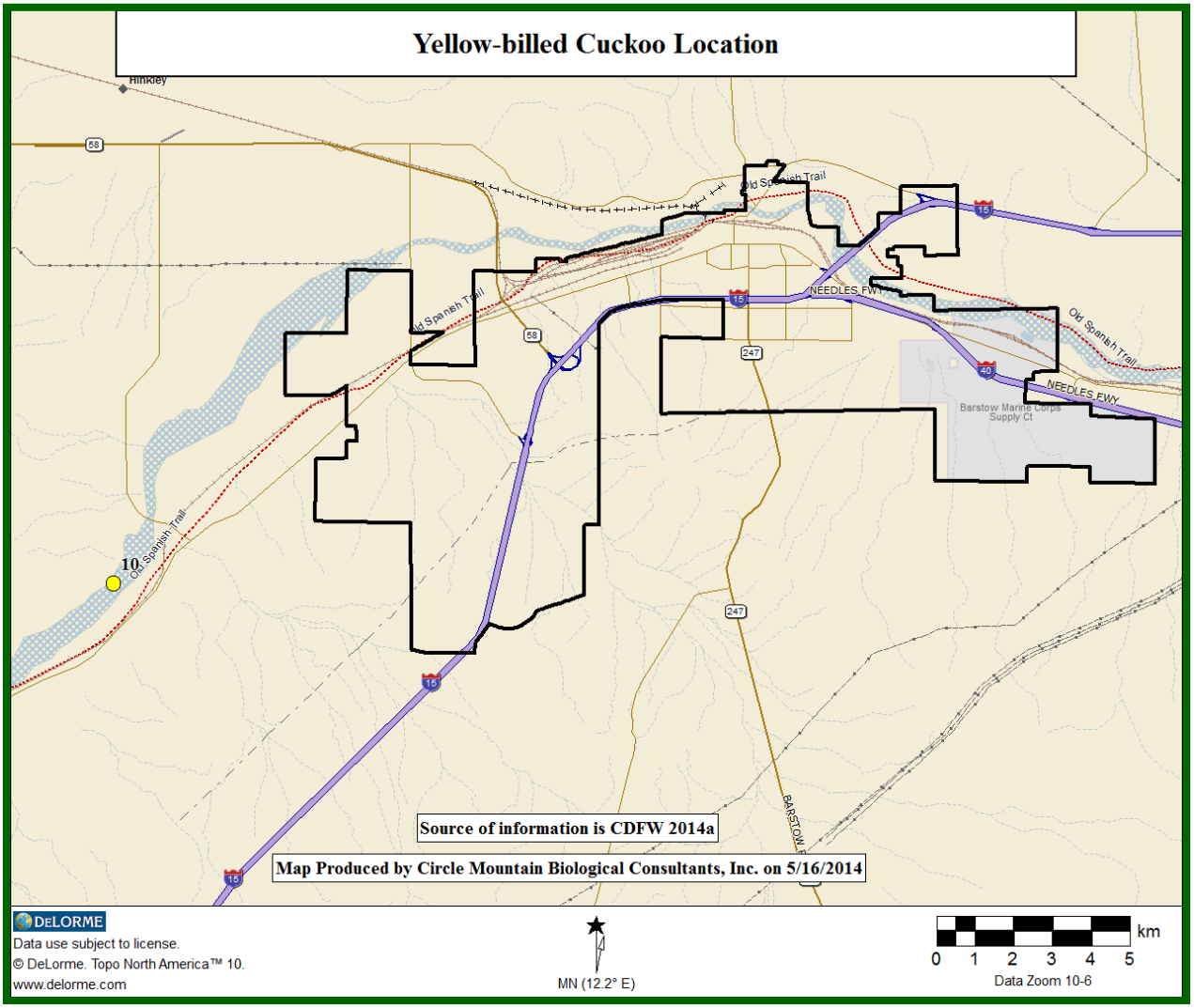
Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

YELLOW-BILLED CUCKOO

Coccyzus americanus

Source of Image: Wikipedia May 2014



YELLOW-BILLED CUCKOO

Author: Stephen A. Laymon

Status Designation: USFWS = Bird of Conservation Concern; CDFW = Endangered

General Distribution: There are no confirmed nesting areas within the West Mojave. Cuckoos have been observed during the breeding season at several locations along the Mojave River between Victorville and Barstow. Most of these sightings have been of unmated males (Gaines and Laymon, 1984; Laymon and Halterman, 1989). They probably breed at Mojave Narrows near Victorville, but nests or fledged young have not been located (Stephen Myers pers. comm.). Yellow-billed Cuckoos could occur in migration at any desert oasis with willows and cottonwoods, although there are very few records for migrant Yellow-billed Cuckoos within the West Mojave (Garrett and Dunn, 1981; Gaines and Laymon, 1984; Laymon and Halterman, 1989).

Natural History: Yellow-billed Cuckoos are elegant streamlined birds with rich brown upper parts and creamy white under parts. The primaries and outer tail feathers have a rufous tinge. The under tail is black with prominent white spots, typical of many members of the cuckoo family. Yellow-billed Cuckoos have a yellow to orange lower mandible contrasting with a black upper mandible.

During spring migration, Yellow-billed Cuckoos generally arrive in California during June, though there are a few early records for May (Gaines and Laymon, 1984). Nesting generally begins shortly after their arrival, though in some years, presumably those with low food availability, nesting is delayed for up to a month after arrival (S.A. Laymon pers. obsv.). Incubation begins with the first egg laid leading to asynchronous hatching. Of 90 nests at the South Fork Kern River, most were initiated in July (67.8%), while fewer were initiated in June (31.1%) and only one was initiated in August (1.1%) (S.A. Laymon unpublished data). Fall migration begins in early August and most cuckoos have departed California by mid-September (Gaines and Laymon, 1984). By mid-August, vocalizations have become less frequent and softer and, hence, the species is harder to detect (S.A. Laymon pers. obs.).

Habitat Requirements: Yellow-billed Cuckoos have one of the most restrictive suite of macro-habitat requirements of any bird species. Not only are they restricted to a single habitat type, but the size and configuration of the habitat is also extremely important. During the breeding season in California, they are confined to cottonwood-willow riparian habitat. Cuckoos have large home ranges, often exceeding 50 acres (20 hectares), and sometimes approaching 100 acres (40 ha), in extent (Laymon and Halterman, 1985).

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MAMMALS

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AMERICAN BADGER

Taxidea taxus

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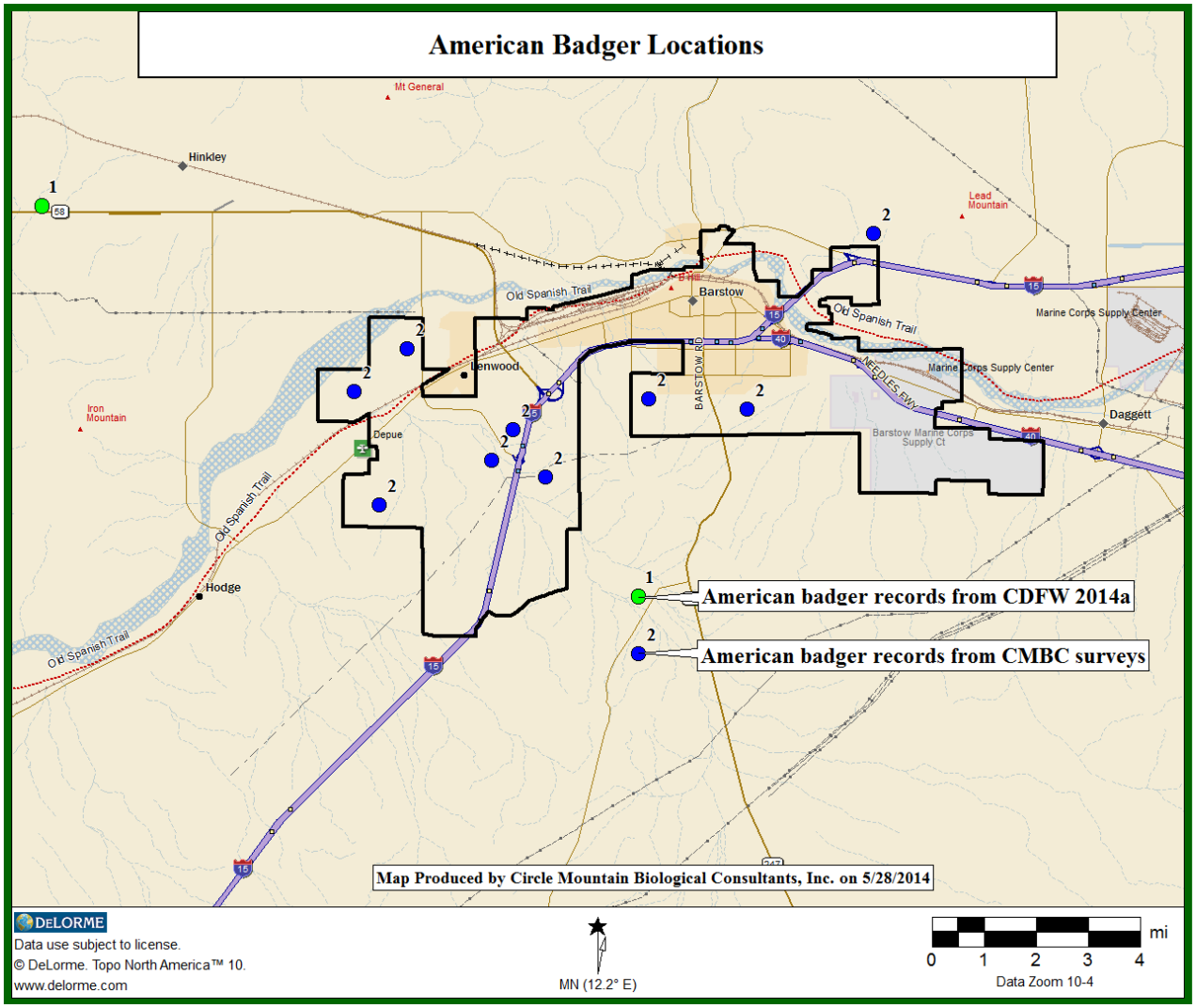

AMERICAN BADGER

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = Species of Special Concern

General Distribution: Unless otherwise noted, all of the following information is taken from Zeiner et al. (1990). American badgers are an uncommon, permanent resident of drier open areas of shrub, forest, and herbaceous habitats, with friable soils, in all but the very northwestern corner of the state. In the Barstow area, their diagnostic digs have been observed throughout undeveloped areas and they are absent from more urbanized areas (LaRue, unpublished data).

Natural History: Badgers are carnivorous, eating burrowing rodents, rats, mice, chipmunks, and especially ground squirrels and pocket gophers, which are common in the Barstow area. They may also eat some reptiles, insects, earthworms, eggs, birds, and carrion. Young are born mostly in March and April in burrows dug in relatively dry, often sandy, soil, usually in areas with sparse overstory cover, and may live to be 11-15 years old.

Habitat Requirements: Badgers dig burrows in friable soils for cover, frequently using old burrows, although some have been observed to dig a new den each night, especially in summer. A study in Idaho (Messick and Hornocker 1991, in Zeiner et al. 1990) found that home ranges of seven females averaged 400 acres while home ranges of three males were estimated at 600 acres.

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KIT FOX

Vulpes macrotis

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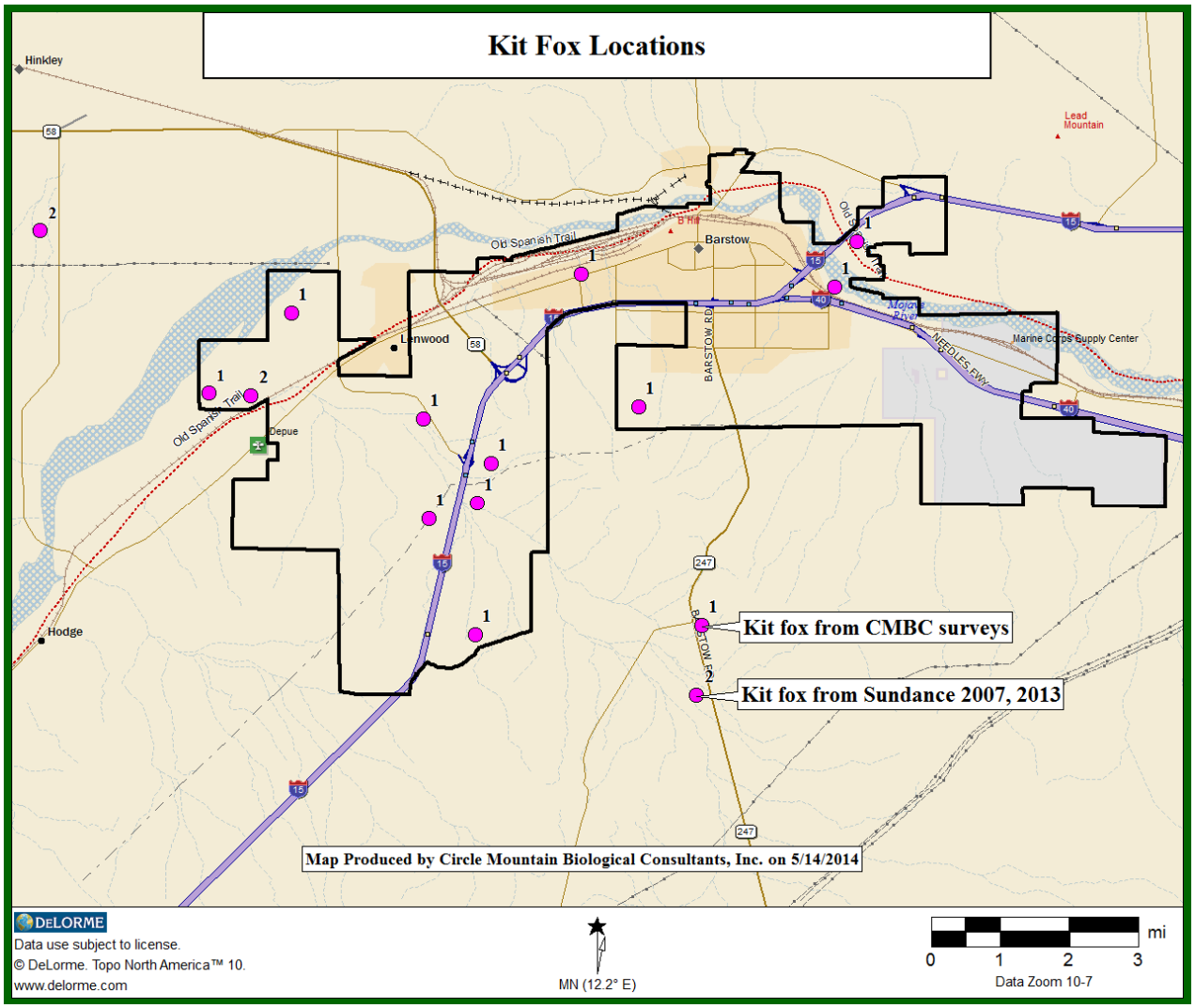

KIT FOX

Author: Ed LaRue

Status Designation: USFWS = None; CDFW = Fully Protected (as a fur-bearing mammal)

General Distribution: Unless otherwise noted, all of the following information is taken from Zeiner et al. (1990). Kit fox is an uncommon to rare, permanent resident of arid regions of the southern half of the state, where they live in vegetation dominated by scattered brush, shrubs, and scrub. In the Barstow area, diagnostic dens and scat of kit fox have been observed throughout undeveloped areas, and sign were even observed just north of Main Street on Site 6 of the April 2014 reconnaissance survey (CMBC 2014), likely due to the rows of tamarisk trees along the railroad line that provide sufficient cover for this otherwise developed area.

Natural History: Kit foxes are primarily carnivorous, feeding on black-tailed hares, desert cottontails, kangaroo rats, ground squirrels, insects, reptiles, and some birds, bird's eggs, and vegetation. They are mostly monogamous, producing pups from February through April, with pups being weaned in about four to five months. Young may reproduce in their second year, and one adult was reported to have been seven years of age at last capture.

Habitat Requirements: Their primary cover is provided by dens excavated in open, level areas with loose-textured soils. Open, level areas with loose-textured soils supporting scattered, shrubby vegetation with little human disturbance represent suitable habitats for kit foxes, although some agricultural areas may support the species. Nocturnal activity and regular use of dens are important adaptations for thermal regulation and water conservation.

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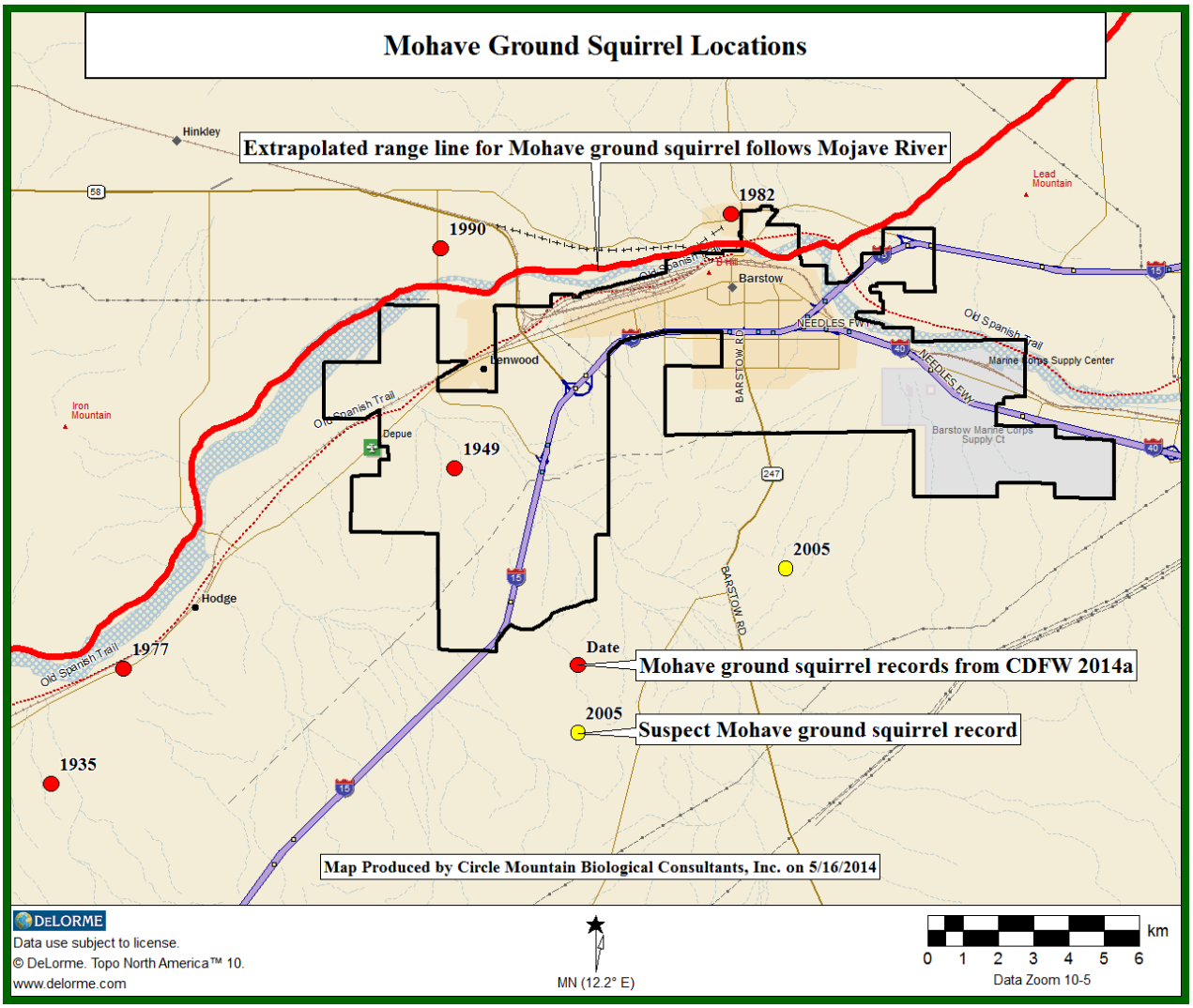
Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

MOHAVE GROUND SQUIRREL

Xerospermophilus mohavensis

© Moose Peterson

© Phil Leitner



MOHAVE GROUND SQUIRREL

Author: David Laabs

Status Designation: USFWS = None; CDFW = Threatened

General Distribution: The Mohave ground squirrel occupies portions of Inyo, Kern, Los Angeles and San Bernardino counties in the western Mojave Desert. The species ranges from near Palmdale on the southwest to Lucerne Valley on the southeast, Olancha on the northwest and the Avawatz Mountains on the northeast (Gustafson, 1993). The species occupies canyons in the eastern foothills of the Sierra Nevada up to 5600 ft. (1706 m). The Mojave River roughly marks the southeastern extent of its range, although the species historically occupied an area east of the Mojave River as far as Lucerne Valley. The southern edge of the distribution of the species is limited by the abrupt rise of the San Bernardino and San Gabriel Mountains.

Natural History: The Mohave ground squirrel is a medium-sized ground squirrel that measures 8.3-9.1 in. (210-230 mm) in total length, 2.2-2.8 in. (57-72 mm) in tail length, and 1.3-1.5 in. (32-38 mm) in hind foot length (Hall, 1981). There is little difference in size between the sexes. Dorsal coloration is uniformly light gray or brown, often with a wash of cinnamon or pink, while ventral coloration is creamy. The ears are small and the eyelids are white. *S. mohavensis* can be distinguished from [round-tailed ground squirrel] *S. tereticaudus* by a shorter, flatter tail with a white ventral surface and brown rather than white cheeks. It is significantly larger than *S. tereticaudus* in most cranial measurements (Best, 1995). [Both species have recently been reported from the Barstow area; LaRue noting information provided by Phil Leitner].

Mohave ground squirrels feed on a variety of foods, but primarily on the leaves and seeds of forbs and shrubs. If herbaceous annuals become available, Mohave ground squirrels forage on their leaves, flowers, seeds and/or pollen. Invertebrates are consumed regularly, but make up a relatively small proportion of the diet. Shrub species that were consumed most often at the Coso study area were winterfat (*Krascheninnikovia lanata*), spiny hopsage (*Grayia spinosa*) and saltbush (*Atriplex* sp.; Leitner and Leitner, 1998). However, it is not known of the results of this study can be extrapolated to the more southerly portions of the range of the species.
The timing of emergence appears to vary geographically, and individuals in the southern portion of the range may emerge as early as mid-January (Recht, unpublished data). Males typically emerge up to two weeks prior to females (Best, 1995). Once a sufficient amount of fat has been accumulated, individuals enter a period of aestivation and hibernation (Bartholomew and Hudson, 1961). Aestivation generally begins anytime between July and September, but during drought conditions, may begin as early as April or May (Leitner, et al., 1995).

Individuals may maintain several home burrows that are used at night, as well as accessory burrows that are used for temperature control and predator avoidance. Beginning in June, juveniles begin making exploratory movements away from the natal burrow, and some individuals eventually disperse (Brylski, et al., 1994). Recent radio-telemetry data suggest that females are more likely than males to remain in the vicinity of their natal burrows (Harris et al., 1997). During this study, the majority of radio-collared juvenile males moved greater than 0.6 mi. (1 km), up to a maximum of 3.9 mi. (6.2 km; Harris, et al., 1997). These distances are far greater than had been previously recorded.

Habitat Requirements: The Mohave ground squirrel occupies all major desert scrub habitats in the western Mojave Desert. It has observed in habitats described by Holland (1986) as Mojave Creosote Scrub, dominated by creosote bush (*Larrea tridentata*) and burrobush (*Ambrosia dumosa*), Desert Saltbush Scrub, dominated by various species of saltbush (*Atriplex*), Desert Sink Scrub, which is similar in composition to saltbush scrub, but is sparser and grows on poorly drained soils with high alkalinity, Desert Greasewood Scrub, with very sparse vegetation generally located on valley bottoms and dry lake beds, Shadscale Scrub, which is dominated by *Atriplex confertifolia* and/or *A. spinescens*, and Joshua tree woodland, which includes Joshua trees (*Yucca brevifolia*) widely scattered over a variety of shrub species (Gutafson, 1993). These habitat types are distributed throughout the range of the Mohave ground squirrel.

The Mohave ground squirrel inhabits flat to moderate terrain and is not generally found in steep contours. However, juveniles can apparently traverse steep terrain during dispersal (Leinter, pers. comm.). The species has been found most frequently in sandy, alluvial soils, but is also found in gravelly, and occasionally rocky soils (Wessman, 1977; Zembal and Gall, 1980; Best, 1995). It is not known to occupy areas of desert pavement (Aardahl and Rousch, 1985).

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Main Information Source: U.S. Bureau of Land Management. 2005. West Mojave Plan. Moreno Valley, CA.

TOWNSEND'S BIG-EARED BAT

Corynorhinus townsendii

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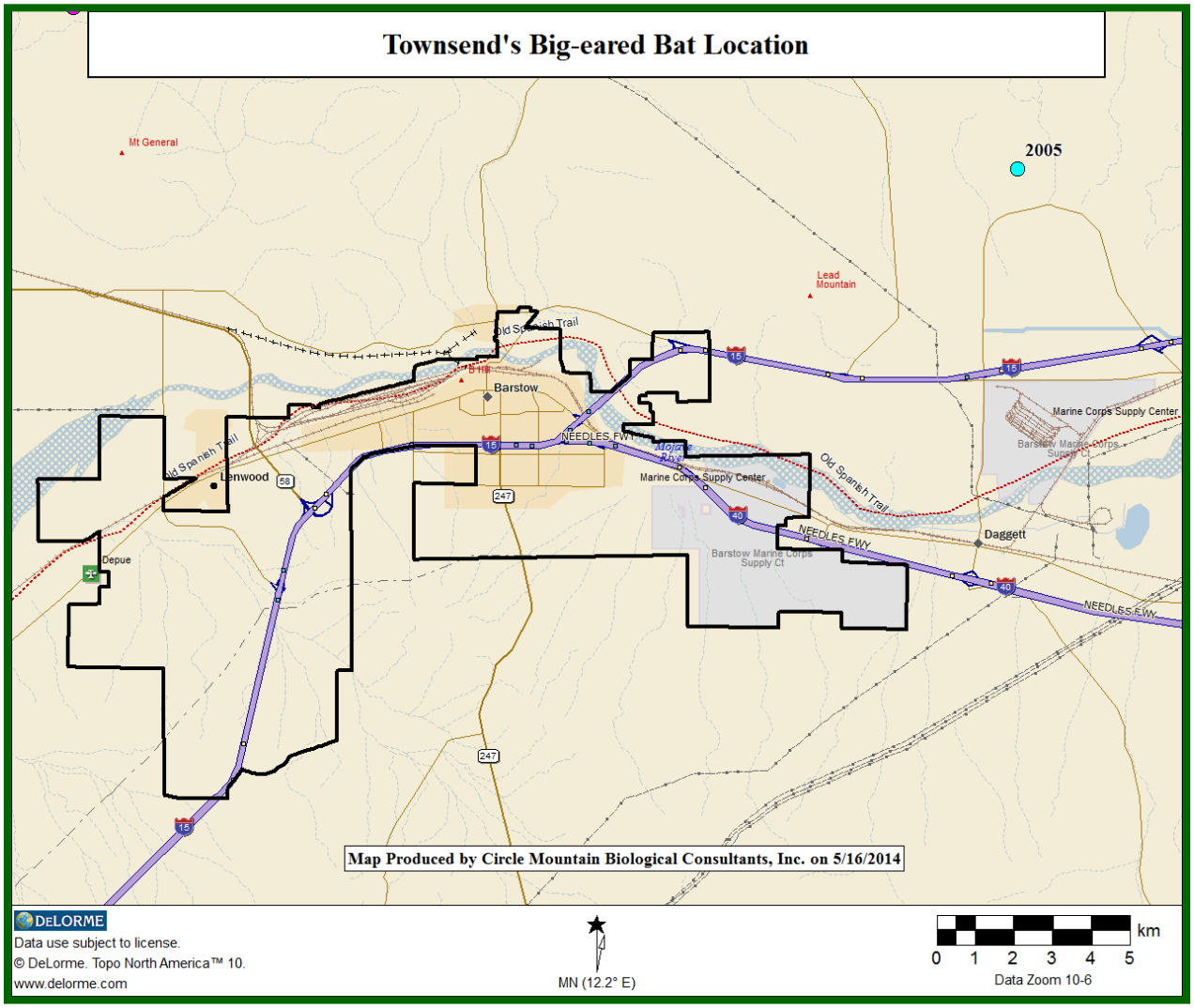

TOWNSEND'S BIG-EARED BAT

Author: Patricia Brown

Status Designation: USFWS = None; BLM Sensitive; CDFW = Candidate for Threatened

General Distribution: Townsend's big-eared bats are found throughout the West Mojave in the vicinity of mines and caves. Small numbers of bats have been found in mines at Joshua Tree National Park and in the lava tubes of Pisgah Crater (P. Brown pers. obs.).

Natural History: Townsend's big-eared bat is a medium-sized bat with buff brown fur distinguished by the combination of a two-pronged, horseshoe-shaped lumps on the rostrum, and large, rabbit-like ears (Barbour and Davis 1969, Kunz and Martin 1982). Although the large ears are obvious in alert bats, they are tightly curled like a ram's horn when animals are in torpor or hibernation (Brylski et al. 2002).

Big-eared bats form maternity colonies in the spring varying in size from a dozen to several hundred animals. In desert areas, colonies begin to form in mid-March (P. Brown pers. obs.). The single pups are born between May and July and weigh an average of 2.4 g at birth. Young bats are capable of flight at 2.5 to 3 weeks of age and are fully weaned at 6 weeks. Nursery colonies start to disperse in August about the time the young are weaned (Pearson et al 1952, Tipton 1983).

Townsend's big-eared bats mate in the hibernaculum between October and February (Brylski et al. 2002). The females store sperm in the uterine lining until ovulation and fertilization in the spring. Band recoveries have documented longevity of 21 years, 2 months (Perkins 1995). This sedentary species does not undertake long migrations (Barbour and Davis 1969, Humphrey and Kunz 1976, Pearson et al. 1952). Banding studies (Pearson et al.1952, P. Brown pers. obs.) have shown seasonal movements of 20 miles.

Brylski et al. (2002) summarized that this species in other areas as a lepidopteran [butterfly and moth family] specialist, feeding primarily (>90% of the diet) on medium sized (6-12 mm) moths (Dalton et al. 1986, Ross 1967, Sample and Whitmore 1993, Whitaker et al. 1977, 1981).

Habitat Requirements: The determining factor in their distribution … tends to be the availability of cave-like roosting habitat, as summarized by Pierson in Brylski et al.1998. Population concentrations occur in areas with substantial surface exposures of cavity forming rock (e.g., limestone, sandstone, gypsum or volcanic) and in old mining districts (Genter 1986, Graham 1966, Humphrey and Kunz 1976, Kunz and Martin 1982, Perkins et al. 1994, Pierson and Rainey 1996). Sometimes the [roosting] areas used are within the same mine or cave, but they may also move between sites during the warm season. Interior dimensions are also important, with the majority of the roosts examined in California at least 100 feet long and the ceiling 4 feet high (Pierson et al. 1991). Maternity clusters are always situated on open surfaces, often in raises in the ceiling just inside the roost entrance where warm outside air is trapped (E. Pierson pers. comm., P. Brown pers. obs.). Occasionally bats are found in buildings (Dalquest 1947, E. Pierson pers. obs.).

The proximity of good foraging habitat appears to be a determining factor in roost selection. In a recent survey in the Panamint Mountains, mines with suitable temperatures were occupied by maternity colonies only if they were within 2 miles of a canyon with water (P. Brown, pers. obs.). Recent radio-tracking and light-tagging studies have found that Townsend's big-eared bats foraged in a variety of habitats in California. In the West Mojave, the majority of roosts for this species are in mines. A recent mist-netting and radio-telemetry study at Camp Cady, demonstrated that the Townsend's big-eared bat foraged in the Mojave River riparian corridor and roosted in mud caves of a badlands formation. Lava tubes in the Pisgah Crater flow have also been shown to shelter small numbers of this species (P. Brown pers. obs.).

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CNPS status designations are described in California Native Plant Society (2014) and reiterated below.

California Rare Plant Ranks (formerly known as CNPS Lists)

California Rare Plant Rank 1A (formerly List 1A): Plants Presumed Extinct in California
The plants with a California Rare Plant Rank of 1A are presumed extinct because they have not been seen or collected in the wild in California for many years. This rank includes plants that are both presumed extinct as well as those plants which are presumed extirpated in California. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range. Plants are ranked 1A in an effort to highlight their plight and encourage field work to relocate extant populations.

All of the plants constituting California Rare Plant Rank 1A meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, it is mandatory that they be fully considered during preparation of environmental documents relating to the California Environmental Quality Act (CEQA).

List 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
The plants of List 1B are rare throughout their range with the majority of them endemic to California. Most of the plants of List 1B have declined significantly over the last century. List 1B plants constitute the majority of the plants in CNPS' Inventory with more than 1,000 plants assigned to this category of rarity.

All of the plants constituting List 1B meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. *It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA* [Emphasis added].

List 2: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Except for being common beyond the boundaries of California, the plants of List 2 would have appeared on List 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the Endangered Species Act. Until 1979, a similar policy was followed in California. However, after the passage of the Native Plant Protection Act, plants were considered for protection without regard to their distribution outside the state.

With List 2, we recognize the importance of protecting the geographic range of widespread species. In this way we protect the diversity of our own state's flora and help maintain evolutionary process and genetic diversity within species. All of the plants constituting List 2 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.

List 3: Plants About Which We Need More Information - A Review List
The plants that comprise List 3 are united by one common theme - we lack the necessary information to assign them to one of the other lists or to reject them. Nearly all of the plants remaining on List 3 are taxonomically problematic. For each List 3 plant we have provided the known information and then indicated in the "Notes" section of the Inventory record where assistance is needed. Data regarding distribution, endangerment, ecology, and taxonomic validity will be gratefully received by e-mailing the Rare Plant Botanist at njensen@cnps.org or (916) 324-3816.

Some of the plants constituting List 3 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. We strongly recommend that List 3 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.

List 4: Plants of Limited Distribution - A Watch List
The plants in this category are of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears relatively low at this time. While we cannot call these plants "rare" from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Should the degree of endangerment or rarity of a List 4 plant change, we will transfer it to a more appropriate list.

Very few of the plants constituting List 4 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and we strongly recommend that List 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA. This may be particularly appropriate for the type locality of a List 4 plant, for populations at the periphery of a species' range or in areas where the taxon is especially uncommon or has sustained heavy losses, or for populations exhibiting unusual morphology or occurring on unusual substrates.

Threat Ranks
The CNPS Threat Rank is an extension added onto the CNPS List and designates the level of endangerment by a 1 to 3 ranking, with 1 being the most endangered and 3 being the least endangered. A Threat Rank is present for all List 1B's, List 2's and the majority of List 3's and List 4's. List 4's may contain a Threat Rank of 0.2 or 0.3; however an instance in which a Threat Rank of 0.1 is assigned to a List 4 plant has not yet been encountered. List 4 plants generally have large enough populations to not have significant threats to their continued existence in California; however, certain conditions still exist to make the plant a species of concern and hence be placed on a CNPS List. In addition, all List 1A (presumed extinct in California), and some List 3 (need more information) and List 4 (limited distribution) plants, which lack threat information, do not have a Threat Rank extension.

0.1-Seriously threatened in California (high degree/immediacy of threat)
0.2-Fairly threatened in California (moderate degree/immediacy of threat)
0.3-Not very threatened in California (low degree/immediacy of threats or no current threats known)

Common examples follow:

List 1B.1 plants are rare, threatened, or endangered in California and elsewhere; and, specifically, seriously threatened in California (high degree/immediacy of threat).

List 1B.2 plants are rare, threatened, or endangered in California and elsewhere; and, specifically, fairly threatened in California (moderate degree/immediacy of threat).

List 1B.3 plants are rare, threatened, or endangered in California and elsewhere; but not very threatened in California (low degree/immediacy of threats or no threats known).

List 2.2 plants are rare, threatened, or endangered in California but more common elsewhere; and, specifically, fairly threatened in California (moderate degree/immediacy of threat).

List 2.3 plants are rare, threatened, or endangered in California but more common elsewhere; but not very threatened in California (low degree/immediacy of threats or no threats known).

List 3.2 plants are those which require more information, but are still considered fairly threatened in California (moderate degree/immediacy of threat).

List 4.2 plants are of limited distribution - A watch list; and, specifically, fairly threatened in California (moderate degree/immediacy of threat).

List 4.3 plants are of limited distribution - A watch list; but not very threatened in California (low degree/immediacy of threats or no threats known).