

Topock Project Executive Abstract

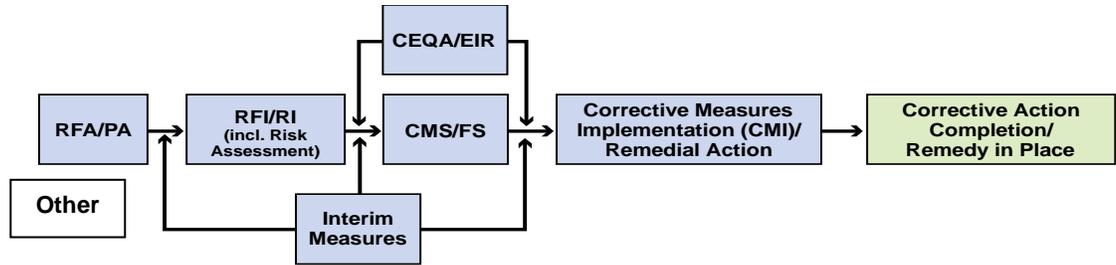
<p>Document Title: <i>Topock Groundwater Remediation Project Pre-Construction Floristic Survey Report – Spring 2017</i> Submitting Agency: DTSC, CDFW Final Document? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Date of Document: October 31, 2017 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) –PG&E</p>
<p>Priority Status: <input type="checkbox"/> HIGH <input type="checkbox"/> MED <input checked="" type="checkbox"/> LOW Is this time critical? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Action Required: <input checked="" type="checkbox"/> Information Only <input type="checkbox"/> Review & Comment Return to: _____ By Date: _____ <input type="checkbox"/> Other / Explain:</p>
<p>Type of Document: <input type="checkbox"/> Draft <input checked="" type="checkbox"/> Report <input type="checkbox"/> Letter <input type="checkbox"/> Memo <input type="checkbox"/> Other / Explain:</p>	<p>What does this information pertain to? <input type="checkbox"/> Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA) <input type="checkbox"/> RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment) <input type="checkbox"/> Corrective Measures Study (CMS)/Feasibility Study (FS) <input type="checkbox"/> Corrective Measures Implementation (CMI)/Remedial Action <input checked="" type="checkbox"/> California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR) <input type="checkbox"/> Interim Measures <input type="checkbox"/> Other / Explain:</p>
<p>What is the consequence of NOT doing this item? What is the consequence of DOING this item? This report complies with the Draft SEIR mitigation measure BIO-2h. If this work was not performed, it would constitute a potential non-compliance with the Draft SEIR mitigation measure.</p>	<p>Is this a Regulatory Requirement? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If no, why is the document needed? The Draft Subsequent Environmental Impact Report (Draft SEIR) proposes a mitigation measure that requires a botanical survey prior to construction during the appropriate blooming period. To accommodate this measure, should the Draft SEIR be certified, PG&E decided to proactively complete the survey during the spring blooming period prior to scheduled construction activities.</p>
<p>Other Justification/s: <input type="checkbox"/> Permit <input type="checkbox"/> Other / Explain:</p>	
<p>Brief Summary of attached document:</p> <p>The Draft Subsequent Environmental Impact Report (Draft SEIR) for the Topock Compressor Station Groundwater Remediation Project (January 2017) proposes mitigation measures to reduce impacts associated with biological resources, including plants and wildlife. Mitigation measures for biological resources include BIO-2h, which addresses ‘Disturbance of Special-Status Plants’ and requires that at least one pre-construction survey be conducted prior to the start of any ground-disturbing activities in areas of suitable habitat. The survey must be conducted in areas where construction is planned and during the blooming period of those species which are either known to occur or likely to occur in the area (i.e., generally March through May but dependent on rainfall patterns). The survey must be conducted by a qualified botanist skilled at identification of the plant species in the region. The qualified botanist must determine where pre-construction surveys are required based on existing habitat conditions.</p> <p>This report satisfies the BIO-2h requirement by documenting the nature and extent of special-status plants within the Project Area and summarizes the relevant information that was gathered in earlier plant surveys that were completed in 2012. The information presented in this memorandum will be used to help guide the final project implementation and to minimize plant impacts within the Project Area.</p> <p>Written by: PG&E</p>	
<p>Recommendations: This report is for your information only.</p>	
<p>How is this information related to the Final Remedy or Regulatory Requirements: This report presents data collected for use for the final remedy implementation. This report was prepared to proactively comply with proposed Draft SEIR mitigation measure BIO-2h.</p>	

Other requirements of this information?

None.

Related Reports and Documents:

Click any boxes in the Regulatory Road Map (below) to be linked to the Documents Library on the DTSC Topock Web Site (www.dtsc-topock.com).



Legend

- RFA/PA – RCRA Facility Assessment/Preliminary Assessment
- RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)
- CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study
- CEQA/EIR – California Environmental Quality Act/Environmental Impact Report

Version 9

FINAL

Topock Groundwater Remediation Project Pre-construction Floristic Survey Report – Spring 2017

Prepared for

Pacific Gas and Electric Company



October 2017

Prepared by



Contents

Section	Page
Acronyms and Abbreviations.....	vii
1 Introduction	1-1
1.1 Project Location	1-1
1.2 Ecological Setting	1-1
1.2.1 Climate and Hydrology	1-2
1.2.2 Geographical Setting.....	1-2
2 Vegetation Communities.....	2-1
2.1 Terrestrial Communities	2-1
2.1.1 Creosote Bush – White Bursage Scrub: <i>Larrea tridentata</i> – <i>Ambrosia dumosa</i> Shrubland Alliance	2-1
2.1.2 Tamarisk Thickets: <i>Tamarix</i> spp. Semi-Natural Shrubland Stands	2-1
2.1.3 Arrow Weed Thickets: <i>Pluchea sericea</i> Shrubland Alliance.....	2-2
2.1.4 Blue Palo Verde – Ironwood Woodland: <i>Parkinsonia florida</i> – <i>Olneya tesota</i> Woodland Alliance.....	2-2
2.1.5 Catclaw Acacia Thorn Scrub: <i>Acacia greggii</i> Shrubland Alliance	2-2
2.1.6 Foothill Palo Verde Desert Scrub: <i>Parkinsonia microphylla</i> Provisional Shrubland Alliance (Note: Foothill Palo Verde = Hillside Palo Verde)	2-2
2.1.7 Quailbush Scrub: <i>Atriplex lentiformis</i> Shrubland Alliance	2-2
2.1.8 Allscale Scrub: <i>Atriplex polycarpa</i> Shrubland Alliance.....	2-3
2.1.9 Mesquite Bosque, Mesquite Thicket: <i>Prosopis glandulosa</i> Woodland Alliance.....	2-3
2.1.10 Screwbean Mesquite Bosque: <i>Prosopis pubescens</i> Woodland Alliance.....	2-3
2.1.11 Upland Mustards: <i>Brassica (nigra)</i> and Other Mustards Semi-Natural Herbaceous Stands	2-3
2.2 Wetland Communities	2-3
2.2.1 Cattail Marshes: <i>Typha (angustifolia, domingensis, latifolia)</i> Herbaceous Alliance.....	2-3
2.2.2 California Bulrush Marsh: <i>Schoenoplectis californicus</i> Herbaceous Alliance	2-4
2.2.3 Common Reed Marshes: <i>Phragmites australis</i> Herbaceous Alliance.....	2-4
3 Methodology.....	3-1
3.1 Special-Status Plants	3-1
3.2 Research and Literature Review	3-1
3.3 Reference Site Visits	3-2
3.4 Survey Area	3-2
3.5 Field Surveys	3-3
4 Results.....	4-1
4.1 Survey Conditions	4-1
4.2 Survey Results	4-1
4.2.1 California Rare Plant Ranked Species	4-1
4.2.2 Culturally Significant Plants	4-2
5 References.....	5-1

Section Page

Tables

1 Summary of Special-Status and Ethnobotanical Plants Identified in the Survey Area 4-5

Figures

- 1 Site Location Map
- 2 Botanical Survey Area
- 3 Special-Status Plants
- 4 CDNPA and Ethnobotanical Trees
- 5 CDNPA Cacti and Shrubs and Ethnobotanical Shrubs
- 6 Selected Ethnobotanical Herbaceous Plants

Appendices

- A Photographs of Special-Status Plants Found in the Project Area
- B Target List of Special-Status Plant Species with Potential to Occur in the Project Area
- C Daily Participant Sign-in Sheets
- D Vascular Plant Species Observed in the Project Area
- E CNDDDB Forms for Special-Status Plants in the Project Area

Acronyms and Abbreviations

ADA	Arizona Department of Agriculture
BLM	U.S. Bureau of Land Management
BNSF	Burlington Northern and Santa Fe
CDNPA	California Desert Native Plants Act
CEQA	California Environmental Quality Act
CDFW	California Department of Fish and Wildlife
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Ranked
DTSC	California Department of Toxic Substances Control
FEIR	Final Environmental Impact Report
HUC	Hydrologic Unit Code
I-40	Interstate 40
msl	mean sea level
NRCS	Natural Resources Conservation Service
PG&E	Pacific Gas and Electric Company
Project Area	Topock Groundwater Remediation Project Area
SEIR	Subsequent Environmental Impact Report
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Introduction

The Pacific Gas and Electric Company (PG&E) is implementing the final groundwater remedy to address chromium in groundwater near the PG&E Topock Compressor Station located in eastern San Bernardino County, 12 miles southeast of the city of Needles, California (Figure 1; figures are presented at the end of this report). The California Department of Toxic Substances Control (DTSC) is the state lead agency overseeing corrective actions at the compressor station. Pursuant to the California Environmental Quality Act (CEQA), DTSC prepared and certified a Final Environmental Impact Report (FEIR) (DTSC, 2011) that evaluated and prescribed mitigation measures to lessen the potential environmental impacts of the final groundwater remedy. Comprehensive botanical surveys were completed in 2013 for the entire FEIR project area and the results of these surveys are presented in the *Topock Groundwater Remediation Project Floristic Survey Report* (Garcia and Associates and CH2M HILL, 2013). As the groundwater remedy project advanced from a concept to its final state (also called the final 100% design), changes to the project were evaluated by DTSC in a Draft Subsequent Environmental Impact Report (Draft SEIR) (DTSC, 2017). As part of the Draft SEIR review process the California Department of Fish and Wildlife (CDFW) commented that pre-construction botanical surveys should be completed for the project work areas associated with the final groundwater remedy.

This report presents the results of the pre-construction surveys conducted in March 2017 to identify any special-status plant species (as defined in Section 3, Methodology) that may be present in the PG&E Topock Groundwater Remediation Project (the project) work (or construction) areas, as defined in the Draft SEIR (DTSC, 2017). The January 2011 FEIR also included specific cultural mitigation measures including a measure that requires PG&E to avoid, protect, and encourage the regeneration of selected ethnobotanically significant plant species. The pre-construction botanical surveys also identified and mapped traditional, culturally significant plants within the work areas. This report presents overall floristic findings of the pre-construction surveys for special-status and traditional culturally significant plants associated with the proposed groundwater remedy work areas.

1.1 Project Location

The Topock Compressor Station is located near the California and Arizona border in eastern San Bernardino County, approximately 12 miles southeast of the city of Needles, California (Figure 1). The town of Topock, Arizona is located approximately one-half mile to the east. Access to the compressor station is from the Park Moabi Road exit from Interstate 40 (I-40). At Moabi Regional Park, the roadway connects to National Trails Highway, which extends eastward and then southward for approximately one mile along the Colorado River to the Topock Compressor Station.

1.2 Ecological Setting

Most of the project is located within the Piute Valley-Sacramento Mountains ecological subsection of the Mojave Desert Ecological Section (Miles and Goudey, 1998). Approximately half of the subsection is characterized by steep mountains, moderately sloping piedmonts, and alluvial fans, while the other half of the subsection is characterized by alluvial plains and a nearly level basin floor (Miles and Goudey, 1998). The project is located within the U.S. Department of Agriculture's (USDA's) Land Resource Region D – Western Range and Irrigated Region (Natural Resources Conservation Service [NRCS], 2006). This is the largest of the Land Resource Regions and includes the semi-desert plateaus, plains, basins, and mountains from southeastern Oregon to the Mexico border throughout eastern California; it extends eastward into southwestern Texas and northward into Wyoming.

Locally, the landscape is characterized by rocky slopes, moderately to deeply-dissected alluvial terraces, gently sloped sand dunes composed of dredge river sands, and the nearly level basin and terraces east of the Topock Marsh. Topography ranges from approximately 455 feet above mean sea level (msl) along the Colorado River to over 800 feet above msl to the south and southwest. The following sections provide additional information on the climate, hydrology, geology, and soils. Descriptions of the vegetation communities are provided in Section 2.

Representative photographs of the different floristic survey segments are provided in Appendix A.

1.2.1 Climate and Hydrology

Regional climate data were obtained from Needles Airport, located approximately 7.5 miles northwest of the Topock Groundwater Remediation Project Area (Project Area). Average temperatures range from a low of 42 degrees Fahrenheit (°F) in December and January to a high of 109°F in July. Average annual precipitation is 4.5 inches with rainfall occurring during summer thunderstorms between July and September and winter rains between January and March. Very little rainfall occurs in May and June.

The majority of the project is located within the Havasu – Mohave Lakes Watershed (Hydrologic Unit Code [HUC] 15030101). Most of the project, including the work areas to the north and west of the compressor station, is located within Bat Cave Wash – Colorado River Sub-watershed, which encompasses approximately 35 square miles in California and Arizona. A few of the project work areas to the south and east of the compressor station are located in the Mohave Wash – Colorado River Sub-watershed which encompasses approximately 56 square miles in California and Arizona. The area along the Oatman-Topock Highway is located within the Sacramento Wash Watershed (HUC 15030103), which has a total drainage area of 1,290 square miles, extending to the north and west of Kingman, Arizona, and to the south in the vicinity of Lake Havasu City, Arizona.

The Colorado River, located approximately 1,300 feet east of the compressor station, is the primary water feature in the Project Area. Within the Project Area, the river is approximately 435 to 740 feet wide with an average depth of 9 feet. Flows in this area are regulated by upstream releases from the Davis Dam, approximately 41 river miles upstream of the Project Area. Water levels often fluctuate 2 to 3 feet daily and by as much as 5 feet seasonally, with the highest flows generally occurring in the summer months. The Topock Marsh is located northeast of the Project Area within the Havasu National Wildlife Refuge. On the California side of the Colorado River, the local surface water drainage flows toward the river from the south and west towards the lower elevations to the north and east. On the Arizona side of the river, surface water drainage gradients flow from east to west with water draining directly into either the Topock Marsh or the Colorado River.

1.2.2 Geographical Setting

The project is located within the Basin and Range geomorphic province which is characterized by parallel fault-block mountains and alluvial valleys. The majority of the project is located on a north-sloping piedmont characterized by deeply dissected terraces with steep canyon walls. These terraces are composed of Tertiary and Quaternary alluvium and surficial deposits consisting of moderately consolidated sandy gravel and silty-clayey gravel. The terraces along the Colorado River are composed of Quaternary and recent floodplain deposits. The older fluvial deposits in this area consist primarily of sand and fine to coarse gravels and cobbles, with fine-grained sand and silt/clay also present in some areas. Younger deposits consist of sandy gravel, gravelly sand, and well-sorted fine sand and silt/clay. Most of the fluvial deposits north of I-40 and the BNSF railroad have been covered with dredged sands. The Chemehuevi Mountains, located south of the compressor station, are composed of Miocene Age sedimentary and volcanic rocks including metadiorite, gneiss, and granites.

Vegetation Communities

There are eleven primary terrestrial plant community types and three major wetland communities that are located in and around the project work areas. Vegetation classification follows the second edition of *A Manual of California Vegetation* (Sawyer et al., 2009). The primary terrestrial plant community types are creosote bush scrub, tamarisk thickets, arrow weed thickets, blue palo verde woodlands, catclaw acacia thorn scrub, foothill palo verde desert scrub, allscale scrub, quailbush scrub, western honey mesquite bosque, screwbean mesquite bosque, and upland mustards. The primary wetland communities include California bulrush marshes, cattail marshes, and common reed marshes. Descriptions of these primary plant communities are provided in the following sections.

2.1 Terrestrial Communities

2.1.1 Creosote Bush – White Bursage Scrub: *Larrea tridentata* – *Ambrosia dumosa* Shrubland Alliance

The most common and widespread plant community is creosote bush – white bursage scrub. This vegetation type is characterized by widely-spaced creosote bush (*Larrea tridentata*) with associated species such as white bursage (*Ambrosia dumosa*), white rhatany (*Krameria bicolor*), brittlebush (*Encelia farinosa*), beavertail cactus (*Opuntia basilaris* var. *basilaris*), silver cholla (*Cylindropuntia echinocarpa*) and allscale or cattle saltbush (*Atriplex polycarpa*). Creosote bush – white bursage scrub occurs throughout the dissected alluvial terraces south of the Colorado River.

2.1.2 Tamarisk Thickets: *Tamarix* spp. Semi-Natural Shrubland Stands

Tamarisk thickets are found primarily on the east side of the Oatman-Topock Highway within Sacramento Wash and along the low sandy terraces adjacent to the Colorado River and the inlet to Pirate’s Cove on the north side of the National Trails Highway. This vegetation type is also found near the terminus of the larger ephemeral washes south of the National Trails Highway. Extensive tamarisk thickets previously existed in three areas: the north side of the Colorado River across from the Moabi Regional Park Campground, within the Havasu National Wildlife Refuge along the west and east sides of the Oatman-Topock Highway, and along the west bank of the Colorado River north and south of the BNSF bridge. Most of the first area along the north side of the Colorado River was burned in the Topock wildfire of April 2016. The tamarisk thicket in the second area on the west side of the Topock-Oatman Highway (but not the east side of the highway) was burned in October 2008 and was subsequently part of a restoration effort by the Havasu National Wildlife Refuge. The third area on the west side of the Colorado River south of the BNSF bridge was burned on July 14, 2015 when it was ignited by a BNSF work crew that was grinding welds on the bridge. Vegetation is characterized by open to dense stands of the non-native and invasive salt cedar (*Tamarix ramosissima*) and/or athel tamarisk (*Tamarix aphylla*). In many locations salt cedar or athel tamarisk occur as monospecific stands; in other areas associated trees and shrubs include western honey mesquite (*Prosopis glandulosa* var. *torreyana*), screwbean mesquite (*Prosopis pubescens*), blue palo verde (*Parkinsonia florida*) and arrow weed (*Pluchea sericea*). Herbaceous vegetation is absent within dense thickets of salt cedar and athel tamarisk, but scattered herbaceous species such as fanleaf crinklemat (*Tiquilia plicata*), Spanish needle (*Palafoxia arida*), and *Cryptantha* spp. are often present in the openings between the trees in some areas.

2.1.3 Arrow Weed Thickets: *Pluchea sericea* Shrubland Alliance

Arrow weed thickets are found on the low sandy terraces along the both sides of Colorado River and Park Moabi Slough. Arrow weed is the sole dominant shrub species with individuals widely scattered or aggregated into dense, nearly impenetrable stands. This vegetation type often intermixes with tamarisk thickets and mesquite bosque. Associated species include salt cedar, western honey mesquite, brittlebush, and desert broom (*Baccharis sarothroides*). Scattered herbaceous vegetation in the more open areas includes fanleaf crinklemat, Spanish needle, *Cryptantha* spp., and Mediterranean grass (*Schismus barbatus*).

2.1.4 Blue Palo Verde – Ironwood Woodland: *Parkinsonia florida* – *Olneya tesota* Woodland Alliance

Blue palo verde woodland occurs along the edges and throughout the channel bottoms of the larger ephemeral washes of the dissected alluvial terraces south of the Colorado River. This vegetation type is also present along sections of the Sacramento Wash and in some areas of the Havasu National Wildlife Refuge. Total vegetation cover is generally low, but species diversity is relatively high, especially in the larger washes, as compared to the other vegetation types in the Project Area. Blue palo verde is the dominant tree with scattered individuals of salt cedar, athel tamarisk, and desert smoke tree (*Psorothamnus spinosus*) also present in some areas. Associated shrubs include catclaw acacia (*Senegalia greggii*), Anderson’s desert thorn (*Lycium andersonii*), brittlebush, sweetbush (*Bebbia juncea* var. *aspera*), cheesebush (*Hymenoclea salsola*), climbing milkweed (*Funastrum hirtellum*), desert lavender (*Hyptis emoryi*), white bursage, white rhatany, and creosote bush. Common herbaceous species include small-seeded spurge (*Chamaesyce polycarpa*), small-flowered California poppy (*Eschscholzia minutiflora*), Emory rock daisy (*Perityle emoryi*), Spanish needle, and Arizona lupine (*Lupinus arizonicus*).

2.1.5 Catclaw Acacia Thorn Scrub: *Acacia greggii* Shrubland Alliance

Catclaw acacia thorn scrub is limited to the bottoms of moderate-sized ephemeral washes in the dissected terraces south of the National Trails Highway and in the western portion of Moabi Regional Park. This vegetation type is characterized by widely scattered shrubs dominated by catclaw acacia. Common associated species include Anderson’s desert thorn, brittlebush, sweetbush, cheesebush, desert lavender, white bursage, white rhatany, and creosote bush. Herbaceous species include small-seeded spurge, Arizona lupine, and Spanish needle.

2.1.6 Foothill Palo Verde Desert Scrub: *Parkinsonia microphylla* Provisional Shrubland Alliance (Note: Foothill Palo Verde = Hillside Palo Verde)

Foothill palo verde desert scrub is restricted to a small area east of the compressor station along the slopes of the Chemehuevi Mountains. Vegetation in this area is characterized by scattered foothill palo verde (*Parkinsonia microphylla*). Associated species in this area include creosote bush, pygmy-cedar (*Peucephyllum schottii*), brittlebush, white rhatany, beavertail cactus, buckhorn cholla (*Cylindropuntia acanthocarpa*), California barrel cactus (*Ferocactus cylindraceus* var. *cylindraceus*), and inflated desert trumpet (*Eriogonum inflatum* var. *inflatum*).

2.1.7 Quailbush Scrub: *Atriplex lentiformis* Shrubland Alliance

Quailbush scrub is dominated by big saltbush (*Atriplex lentiformis*) and occurs on low-lying alkaline or saline soils. This community is most common on the Havasu National Wildlife Refuge west of the Oatman-Topock Highway. The only common associate at this site is bush seepweed (*Suaeda moquinii*).

2.1.8 Allscale Scrub: *Atriplex polycarpa* Shrubland Alliance

Allscale scrub is dominated by cattle saltbush (*Atriplex polycarpa*) and is the most common alkaline tolerant shrubland alliance in the Project Area. In the Project Area, the allscale scrub community is generally uncommon and is found in scattered locations along the National Trails Highway in California and on the east side of the BNSF railroad tracks in Arizona.

2.1.9 Mesquite Bosque, Mesquite Thicket: *Prosopis glandulosa* Woodland Alliance

Western honey mesquite bosque is mostly found on the low sandy terraces along the Colorado River where it occurs intermixed with tamarisk thickets, but it also occurs in a few scattered locations south of the National Trails Highway and on the Havasu National Wildlife Refuge on the east side of the Oatman-Topock Highway.

2.1.10 Screwbean Mesquite Bosque: *Prosopis pubescens* Woodland Alliance

Screwbean mesquite bosque is largely restricted to the low terraces along the Colorado River where it is concentrated in three relatively small areas. It is most abundant across from the Topock Marina, along the southwestern shoreline of Havasu National Wildlife Refuge. Approximately 55 screwbean mesquite trees were also planted on the California side of the Colorado River near the BNSF railroad bridge. Some of these planted screwbean mesquite trees were scorched or burned during a wildfire on July 14, 2015 that was accidentally started by a BNSF work crew that was grinding welds on their bridge. Screwbean mesquite was also planted in a portion of the survey area on the west side of the Oatman-Topock Highway within the Havasu National Wildlife Refuge following a 2008 wildfire.

2.1.11 Upland Mustards: *Brassica (nigra)* and Other Mustards Semi-Natural Herbaceous Stands

The portion of the Project Area on the Havasu National Wildlife Refuge along the west side of the Oatman-Topock Highway that burned in 2008 was largely devoid of vegetation during previous botanical surveys. During the March 2017 survey, most of this area was characterized by naturalized/invasive weeds including Sahara mustard (*Brassica tournefortii*), London rocket (*Sisymbrium irio*), and Russian thistle (*Salsola tragus*). In a few locations, dense patches of arrow weed are also present in the 2008 burn area surrounded by mustard and Russian thistle.

2.2 Wetland Communities

Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming three principal wetland communities, as described below.

2.2.1 Cattail Marshes: *Typha (angustifolia, domingensis, latifolia)* Herbaceous Alliance

Cattail marshes are generally found in scattered locations along the edges of the Colorado River and Park Moabi Slough, as well as in the pond located on the south side of the National Trails Highway. In these areas cattail (*Typha* spp.) are dominant with lesser amounts of California bulrush (*Schoenoplectus californicus*) and *Juncus* spp., and marsh pennywort (*Hydrocotyle verticillata*) also present.

2.2.2 California Bulrush Marsh: *Schoenoplectis californicus* Herbaceous Alliance

California bulrush marsh occurs at scattered locations along the edges of the Colorado River and Park Moabi Slough. California bulrush is also the sole dominant species in the portion of the Topock Marsh along the west side of the Oatman-Topock Highway.

2.2.3 Common Reed Marshes: *Phragmites australis* Herbaceous Alliance

The common reed marshes are concentrated and most extensive along the edges of the low terraces next to the Colorado River south of I-40, whereas the bulrush marshes occur just offshore in standing water at scattered locations all along the Colorado River. Common reed (*Phragmites australis*) is typically the sole dominant species in this vegetation type, although localized patches of giant reed (*Arundo donax*) are present in some areas.

Methodology

3.1 Special-Status Plants

The purpose of the pre-construction botanical survey conducted in March 2017 was to identify any special-status plant species that occur within the project work areas, and to ensure that such species are documented and mapped prior to the start of construction activities.

A plant species was considered to be special-status if it met one or more of the following criteria:

- Listed, proposed, or candidate for listing as rare, threatened, or endangered under the federal or state Endangered Species Acts or the California Native Plant Protection Act
- Listed by the U.S. Bureau of Land Management (BLM) Needles Field office or Lake Havasu Field office as a Sensitive Plant
- California Rare Plant Ranked (CRPR) 1 or 2 by the California Native Plant Society (CNPS) in its Online Inventory of Rare and Endangered Plants of California
- CRPR 3 or 4 plants that are considered locally significant (e.g., range extensions or unusual populations)
- Listed by the Arizona Rare Plant Committee

In addition to the above listed plants, traditional culturally significant plants such as desert tobacco (*Nicotiana obtusifolia* var. *obtusifolia*), jimson weed (*Datura wrightii*), and desert lily (*Hesperacalus undulatus*), among others, were also mapped and recorded during the surveys.

3.2 Research and Literature Review

Prior to the initial botanical surveys conducted between 2011 and 2013, research was conducted to identify special-status plant species with a potential to occur in the Project Area. A preliminary list of potentially occurring special-status plants (target list) was derived from several sources. Research on special-status plants in California included quadrangle-based searches of the CNPS Inventory of Rare and Endangered Plants of California and the California Natural Diversity Database (CNDDDB) RareFind3 database to identify potentially occurring special-status plants. The 7.5-minute U.S. Geologic Survey (USGS) quadrangles containing the Project Area (Whale Mountain and Topock Quadrangles) and the 11 surrounding USGS 7.5-minute quadrangles (Needles NW, Needles SW, Needles, Monumental Pass, Snaggle Tooth, Chemehuevi Peak, Castle Rock, Savahia Peak NW, Savahia Peak NE, Havasu Lake, and Lake Havasu City South) were included in both the CNPS and CNDDDB RareFind3 database searches. The CNDDDB Quickviewer online database was also searched to identify potentially occurring plant species such as CRPR List 4 plants that are not recorded on a quadrangle basis in the RareFind3 database. Prior to the March 2017 surveys the CNPS (2017) Inventory of Rare and Endangered Plants of California and the CNDDDB (CDFW, 2017) RareFind5 database were both reviewed to determine if any additional species had been added since the initial database review. In addition, plants that are designated as federally listed or candidate species by the U.S. Fish and Wildlife Service (USFWS) (1996b, 2006, 2017) were also considered.

Information on special-status plants in Arizona included a review of all rare plant species listed for Mohave County in the Arizona Rare Plant Field Guide (Arizona Rare Plant Committee, 2000). The potential for each species was evaluated based on range and habitat information provided as well as reported occurrences in the Southwest Environmental Information Network (SEINet, 2017).

Sensitive species lists for the BLM in California and Arizona (BLM, 2015 and 2017) as well as lists of native plants that area protected under the California Desert Native Plants Act (CDNPA) (1981) and by the Arizona Department of Agriculture (ADA) (2016) were also reviewed and evaluated based on reported occurrences, habitats, and distributional ranges of each species. Additional special-status plants with potential to occur in the Project Area were also included based on observations, collections, and recommendations by Jim Andre, Ph.D. Dr. Andre is a regional botanical expert and the director of the University of California Riverside, Granite Mountains Research Center.

If a species' distribution, habitat, or elevation range precluded its possible occurrence in the Project Area or vicinity, it was not considered further. A species was determined to have potential to occur within the Project Area if its known or expected geographic range includes the Project Area, and suitable habitat was identified in the Project Area during any of the botanical surveys.

The FEIR and Draft SEIR identified nine special-status plant species as potentially occurring in the Project Area. Based on the pre-survey research and literature review, 39 special-status plants have the potential to occur in the Project Area. These species, along with data on flowering period, conservation status, habitat preferences, geographic distribution, and known locations in the vicinity of the survey area, are presented in Appendix B. The list of potential special-status species includes 29 species that have been designated as CRPR 1B or 2B and 10 plants that are CRPR 3 or 4 in the Inventory of Rare and Endangered Plants of California (CNPS, 2017). All special-status plants included in the FEIR and SEIR are also included in Appendix B. The FEIR and SEIR did not include plants that are CRPR 3 or 4 in the Inventory of Rare and Endangered Plants of California.

Several native desert plants are protected by the Arizona Department of Agriculture and the California Desert Native Plants Act. These statutes are designed primarily to regulate commercial harvesting and collection of native desert species for the nursery trade, charcoal production and other landscape purposes. Activities associated with public utilities are exempted from these regulations.

3.3 Reference Site Visits

Prior the March 2017 botanical surveys, known occurrences of small-flowered androstephium (*Androstephium breviflorum*) and mouse-tail suncup (*Chylismia arenaria* var. *arenaria*) that had been previously identified in the FEIR study area during the spring 2012 surveys were revisited. Both species were in flower and readily identifiable.

3.4 Survey Area

The approximately 265-acre survey area included the proposed work areas (i.e., construction footprint for planned activities) associated with the final groundwater remedy. Work areas included such things as well locations, pipeline routes, laydown and staging areas, access routes, and other major paved roads (I-40, Park Moabi Road and National Trails Highway) that are regularly traveled. The paved roads would not involve any project work other than routine travel, and so were not included in the pre-construction surveys. At the time of the survey the Arizona Department of Transportation was constructing a bridge over the Sacramento Wash along the Oatman-Topock Highway. Due to construction activities, the work areas immediately adjacent to the roadway were not included in the March 2017 survey. The extent of the pre-construction survey area is shown in Figure 2. This map depicts the Project Area that includes the planned construction footprint, as well as potential areas where unplanned activities may occur in the future. The map also shows a 100-foot buffer area around parts of the Project Area. Where the Project Area and buffer followed paved roadways, but the only planned activity was vehicle travel along the roadway, these portions were not included in the March 2017 survey. On the other hand, Figure 2 also depicts additional areas outside of the Project Area and 100-foot buffer, such as the areas west of the Oatman-Topock Highway and Topock Marsh in Arizona

and in the northwest portion of Moabi Regional Park in California, that were surveyed in case of unanticipated future project need.

3.5 Field Surveys

Protocol-level floristic surveys that conform to the guidelines of the California Department of Fish and Wildlife (CDFW, 2009), the USFWS (1996a), and the CNPS (2001) were conducted in the 265-acre survey area (Figure 2). The survey was conducted by CH2M HILL botanists Russell Huddleston and Mia Marek and Transcon Environmental, Inc. biologist Brandy McWain between March 7 and 11, 2017. Aaron Yue from the DTSC was present for part of the surveys on March 8, 2017. Monitors from the Fort Mojave Indian Tribe, Colorado River Indian Tribes, and Hualapai Tribe were also present during the March survey. Daily tailboard meeting sign-in sheets are provided in Appendix C).

The objective of the surveys was to generate a comprehensive list of all plant species that occur in the survey area and to census, map, photograph, and record data for any special-status species found. During the surveys, location data were collected for some of the more common and widespread species, such as beavertail cactus and silver cholla, for which detailed location data were not collected for each individual during previous botanical surveys.

Because of the relatively few plant collections known from the Needles and Topock area, it was possible that a special-status plant not known to occur in the Project Area or vicinity (and therefore not on the target list shown in Appendix B) would be detected during the surveys. Therefore; the surveys were floristic and comprehensive in nature, meaning that all plants found were identified. Species that were not immediately recognizable to the surveyors were identified using the Jepson Manual (Baldwin et al., 2012) or the Arizona Flora (Kearney and Peebles, 1973), to the level necessary to determine whether or not they had special-status significance.

The ability of surveyors to detect and identify plants efficiently and accurately in the field was enhanced by a field review of the common plant species in the Project Area prior to beginning the surveys. Surveyors also reviewed reference locations, photographs and information of targeted special-status plants prepared by Dr. Andre, as well as information provided from the Jepson Online Interchange (Jepson Herbarium, 2017) prior to the surveys.

The entire survey area was walked by surveyors. Surveyors walked meandering transects to ensure coverage of the entire survey area, unless vegetation density (e.g., dense tamarisk/mesquite thickets) precluded surveyors from accessing certain areas. In inaccessible, dense tamarisk/mesquite thickets, the lack of sunlight and/or high soil salinity invariably resulted in areas devoid of understory species. A hand-held Trimble GeoXT global positioning system (GPS) with sub-meter accuracy was used to collect data on special-status plant species that were observed.

In addition to the proposed work areas, surveys were expanded in a few locations such as the area around the BLM parking area on the west side of Moabi Regional Park, as well as the area between the Sacramento Wash and the existing USFWS well on the west side of the Oatman-Topock Highway (Figure 2). Although no work is currently planned in these locations, it was considered that they could be used at some time in the future. An additional buffer area up to 100 feet from the work area was also included to the extent feasible during the surveys. Adjacent buffer areas with steep unstable slopes or rock ravines were visually examined but not walked by the surveyors. Any special-status plants observed in the adjacent buffer areas were mapped and recorded with the Trimble GPS unit.

A list of all vascular plant species observed during the March 2017 surveys is included in Appendix D. Nomenclature for scientific names follows the Jepson Online Interchange for California Floristics (Jepson Herbarium, 2017).

Results

4.1 Survey Conditions

Survey conditions in March 2017 were considered ideal due to the above-average winter rainfall for the region. Average rainfall for Needles, California between December and February is approximately 1.7 inches (Western Regional Climate Center, 2017). Between December 2016 and February 2017 rainfall in this area was nearly 3 inches (California Department of Water Resources, 2017). In fact, the blooming conditions for desert plants were so good that reports of the California Desert “super bloom” made national news coverage including CNN (Williams, 2017) and National Public Radio (Del Barko, 2017).

As previously mentioned, construction work along the Oatman-Topock Highway precluded surveys of the work areas immediately along the roadway. In addition to the roadwork, several of the proposed staging and laydown areas for the Topock remediation project located along the Oatman-Topock Highway were being used as construction staging areas at the time of the survey, and so surveys were limited at these locations. Recent disturbance included some portions of the survey area that were burned in the April 2016 Topock wildfire which burned over 2,200 acres along both sides of the Colorado River, as well as a smaller area that was burned in July 2015 along the west side of the Colorado River near the I-40 and BNSF bridges. Fire-related disturbance was most apparent on the Havasu National Wildlife Refuge area across the river from the Moabi Regional Park campground. In this area, what were once dense stands of salt cedar were characterized by open salt encrusted soils that were largely devoid of any kind of vegetation other than occasional salt-cedar re-sprouts. The smaller burn area showed signs of active sprouting from burned tamarisk stumps and arrow weed clumps.

4.2 Survey Results

No federal or state listed endangered, threatened, or rare plants and no BLM sensitive species were found during the March 2017 pre-construction surveys. A total of four species, including three with California Rare Plant Ranks of 2B and one of CRPR 4, were identified during the pre-construction surveys (see Table 1 at the end of this section). The number of estimated plants in Table 1 was reported for three different polygon areas: 1) the Project Area that includes planned and potential construction activities; 2) a 100-foot buffer around the Project Area; and 3) other Draft SEIR project areas not included in Items 1 and 2. Photographs of the special-status plants found in the survey area are provided in Appendix A. Three of these (mouse-tail suncup, spiny-hair blazing star (*Mentzelia tricuspis*), and hillside palo verde) were found in California and one species, small-flowered androstephium, was found only in Arizona. A total of 14 plants protected as traditional culturally significant were identified in the survey area (Table 1). Additional information on these plants is provided in the following subsections.

4.2.1 California Rare Plant Ranked Species

California Rare Plant Ranks are used to define and categorize degrees of concern regarding rarity in the California Flora. Plants that have been ranked as 2B are considered to be rare, threatened, or endangered in California, but more common elsewhere (outside of the state). Plants assigned this ranking meet the definitions of a threatened or endangered species under sections 2062 and 2067 of the California Endangered Species Act and are eligible for listing. As such, potential impacts to these species require consideration and analysis under CEQA.

Plants that have been ranked as 4 included species that have a limited distribution or have infrequent occurrences over a broad region in California. Plants assigned this rank are generally not eligible for listing under the California Endangered Species Act, but are uncommon enough that their status warrants monitoring. In general plants in this category are not required to be evaluated under CEQA; however, many are locally significant or represent populations that are at the periphery of the species' range.

In addition to California Rare Plant Ranks, plants are also assigned a Threat Rank to designate the degree to which the species is threatened. A threat rank of .1 indicates the species is seriously threatened, a rank of .2 indicates a moderate threat level, and a rank of .3 indicates that a species is not very threatened in California.

Four CRPR plants were identified in the survey area (Table 1). Two species, mouse-tail suncup (CRPR 2B.2) and hillside palo verde (CRPR 4.3), had been observed in California during the previous 2012 and 2013 botanical surveys of the FEIR project area. Previously, spiny-hair blazing star (CRPR 2B.1) had only been found in Arizona, but during the March 2017 surveys several hundred of these plants were identified in California. Small-flowered androstephium (CRPR 2.2) had been previously been found only in Arizona and no populations were found in California during the March 2017 Surveys. A single gravel milkvetch (*Astragalus sabulonum*) (CPRP 2B.2) was found in 2013 adjacent to the Sacramento Wash, on the east side of the Oatman-Topock Highway, but none were found in this area during the March 2017 survey. Appendix E contains CNDDDB forms from the 2017 floristic surveys.

Mouse-tail suncup was found on a vertical conglomerate rock wall along Bat Cave Wash on the north side of the BNSF railroad tracks (Figure 3). Several of the plants that had been previously identified at this location, as well as the single plant that had previously been observed on a granitic rock face at the south end of the wash, had died, likely due to natural causes, but a number of small seedlings were observed at the northernmost occurrence. Two other mouse-tail suncup locations were observed along Bat Cave Wash to the south of I-40 and along the rock walls near the southern end of the Project Area. These plants represent a significant range extension for the species as they are over 90 miles northeast of previously recorded populations in California.

Spiny-hair blazing star had been previously found only in Arizona. A total of five plants had been identified in 2013 on the rocky slopes just west of the BNSF railroad tracks (outside of the work area). During the March 2017 survey, approximately 550 plants were identified in California, mostly growing on steep rocky slopes north of the BNSF railroad tracks between the Topock Compressor Station and Park Moabi Road, and an additional 15 plants were found growing along the edges of one of the evaporation ponds (Figure 3). Subsequent to the surveys, an additional approximately 360 plants were found outside of the survey area south of the BNSF tracks by Curt Russell (PG&E) and Brandy McWain (Blue Rock Services, Inc.) (also shown on Figure 3).

Hillside palo verde occurs on the rocky north-facing slopes of the Chemehuevi Mountains east of the Topock Compressor Station. Adding individuals that occur outside of the Project Area on adjacent lands, the total number of individuals in this population is approximately 150 trees. Four hillside palo verde were observed within the immediate Project Area footprint, within an additional 33 trees observed within the adjacent 100-foot buffer area (Figure 4).

One small-flowered androstephium was observed in the work area on sandy soils west of the Oatman-Topock Highway (Figure 3). While listed as a rare species in California, these plants have no special-status ranking in Arizona.

4.2.2 Culturally Significant Plants

Culturally significant plants identified in the survey area included four trees, four shrubs, and six herbaceous species (designated as Ethnobotanical status in Table 1).

Blue Palo Verde (*Parkinsonia florida*)

Blue palo verde is common and widespread throughout the Project Area, where it frequently occurs within the large desert washes and on low terraces. This species is the most abundant native tree in the Project Area. A total of 201 individuals were identified within the Project Area footprint; there are also 406 trees within the adjacent 100-foot buffer area and 32 trees within the remaining Survey Area (Figure 4).

Hillside Palo Verde (*Parkinsonia microphylla*)

In the Project Area hillside palo verde is restricted to the pre-tertiary metamorphic/igneous bedrock along the slopes of the Chemehuevi Mountains. A total of 4 individuals were identified within the Project Area footprint and there are 33 individuals within the adjacent 100-foot buffer area (Figure 4).

Screwbean Mesquite (*Prosopis pubescens*)

Screwbean mesquite occurs on the low terraces along the Colorado River. This tree was also planted as part of the native vegetation restoration activities on the Havasu National Wildlife Refuge west of Oatman-Topock Highway following the 2008 wildfire, as well as north of the I-40 bridge as part of restoration associated with installation of groundwater monitoring wells. A total of 38 individuals were identified within the Project Area footprint, as well as 23 trees within the adjacent 100-foot buffer area and 7 trees within the remaining Survey Area (Figure 4).

Western Honey Mesquite (*Prosopis glandulosa* var. *torreyana*)

Western honey mesquite is most commonly found intermixed with salt cedar on the low terraces and levees adjacent to the Colorado River. A total of 46 individuals were identified within the Project Area footprint, in addition to 144 trees within the adjacent 100-foot buffer area and 25 trees within the remaining Survey Area (Figure 4).

Cattle Saltbush (*Atriplex polycarpa*)

Cattle saltbush is locally abundant in a few areas and scattered plants also occur throughout the Project Area. This species is most common in scattered locations along the National Trails Highway and in the upper reaches of a large wash system in the dissected alluvial terraces south of the Colorado River. In Arizona, scattered individuals are also present on the Havasu National Wildlife Refuge and on the east and west sides of the BNSF railroad tracks (Figure 5). Three cattle saltbush were mapped within the Project Area footprint and 19 plants were mapped within the adjacent 100-foot buffer area (Figure 5).

Big Saltbush (*Atriplex lentiformis*)

Big saltbush is generally uncommon in the Project Area and is most abundant in localized, dense patches along the sides of the Oatman-Topock Highway on the sandy, alkaline soils east of the Topock Marsh on the Havasu National Wildlife Refuge. No big saltbush were mapped within the construction footprint, while nine plants were mapped within the adjacent 100-foot buffer area (Figure 5).

Arrow Weed (*Pluchea serecia*)

Arrow weed is common and widespread on the low, sandy terraces along both sides of the Colorado River and along Park Moabi Slough. In these areas, arrow weed is often the sole dominant shrub species forming dense, nearly impenetrable stands, but it also occurs as widely scattered individuals intermixed with brittlebush and buttonbush in some areas. Arrow weed is often intermixed with tamarisk thickets, western honey mesquite, and screwbean mesquite in some areas. This species seems to do well in disturbed areas as dense, healthy stands were observed in areas that burned in the 2008, 2015, and 2016 wildfires on the Havasu National Wildlife Refuge lands, as well as other recently disturbed locations within the survey area. Mapped arrow weed units are estimated to cover about 7.1 acres of the Project Area footprint (4.8 percent of total 149.3 acres), about 16.4 acres of the 100-foot buffer

around the Project Area footprint (3.9 percent of total 419.2 acres), and about 24.2 acres of the remaining Survey Area (24.9 percent of total 96.9 acres).

Anderson’s Desert Thorn (*Lycium andersonii*)

Anderson’s desert thorn mostly occurs along the channel bottoms of the larger ephemeral washes of the dissected alluvial terraces south of the Colorado River. Twelve Anderson’s desert thorn were mapped within the Project Area footprint and 22 plants were mapped within the adjacent 100-foot buffer area (Figure 5).

Desert Tobacco (*Nicotiana obtusifolia* var. *obtusifolia*)

Desert tobacco is uncommon and only a few scattered individuals were observed in the vicinity of the Sacramento Wash in Arizona. Seven desert tobacco plants were mapped within the Project Area footprint; 12 plants were mapped within the adjacent 100-foot buffer area; and a single plant was mapped in the remaining Survey Area (Figure 6).

Desert Lily (*Hesperocallis undulata*)

Desert lily occurs on the rocky dissected terraces north of the Topock Compressor Station and along the west side of the BNSF railroad tracks on the Havasu National Wildlife Refuge. Twenty-two desert lily plants were mapped within the Project Area footprint, while 35 plants were mapped within the adjacent 100-foot buffer area (Figure 6).

Golden Suncup (*Camissonia brevipes* ssp. *brevipes*)

Golden suncup is relatively common and widespread throughout the area, often intermixed with other similar-looking species such as heart-leaf suncup (*Camissonia cardiofolia*). This species was particularly common on the rocky dissected terraces between the compressor station and Moabi Regional Park. This species is also common on the east side of the BNSF railroad tracks in Arizona. Mapped golden suncup units are estimated to cover about 24.2 acres of the Project Area footprint (16.2 percent of total 149.3 acres), about 111.2 acres of the 100-foot buffer around the Project Area footprint (26.5 percent of total 419.2 acres), and about 1.2 acres of the remaining Survey Area (1.3 percent of total 96.9 acres) (Figure 6).

Jimson Weed (*Datura wrightii*)

Jimson weed is uncommon in the Project Area and was only observed in Arizona on the Havasu National Wildlife Refuge near the Sacramento Wash. Two jimson weed plants were mapped within the Project Area footprint, while 14 plants were mapped within the adjacent 100-foot buffer area (Figure 6).

Common Reed (*Phragmites australis*)

Common reed occurs in locally dense patches along the Colorado River, with the largest area located just south of the I-40 bridge on the west side of the river. No common reed was mapped within the Project Area footprint, but five common reed plants were mapped within the 100-foot buffer area adjacent to the Project Area footprint, while four plants were mapped in the remaining Survey Area. Mapped common reed units are estimated to cover about 0.00006 acre of the Project Area footprint (0.00004 percent of total 149.3 acres); about 0.32 acre of the 100-foot buffer around the Project Area footprint (0.075 percent of total 419.2 acres); and about 0.083 acre of the remaining Survey Area (0.09 percent of total 96.9 acres) (Figure 6).

Broadleaf Cattail (*Typha latifolia*)

Broadleaf cattail is somewhat uncommon in the Project Area where it typically occurs in small patches along the Colorado River and in two wetland areas at the north end of a broad wash along the National Trails Highway. Only three cattail plants were mapped within the 100-foot buffer adjacent to the Survey

Area footprint. Mapped broadleaf cattail units were only seen within the 100-foot buffer around the Project Area footprint where they cover about 0.043 acre (0.01 percent of total 419.2 acres) (Figure 6).

Table 1. Summary of Special-Status and Ethnobotanical Plants Identified in the Survey Area

Common Name	Scientific Name	Status	Estimated Number in the Project Area Footprint	Estimated Number in 100-ft Buffer Area	Estimated Additional Number in Survey Area
Trees					
Blue palo verde	<i>Parkinsonia florida</i>	Ethnobotanical	305	406	32
Hillside palo verde	<i>Parkinsonia microphylla</i>	CRPR 4.3 Ethnobotanical	4	33	113
Screwbean mesquite	<i>Prosopis pubescens</i>	Ethnobotanical	38	23	7
Western honey mesquite	<i>Prosopis glandulosa</i>	Ethnobotanical	46	144	25
Shrubs					
Cattle saltbush	<i>Atriplex polycarpa</i>	Ethnobotanical	3	19	0
Big saltbush	<i>Atriplex lentiformis</i>	Ethnobotanical	0	9	0
Arrow weed ¹	<i>Pluchea sericea</i>	Ethnobotanical	7.1	16.4	24.2
Anderson's desert thorn	<i>Lycium andersonii</i>	Ethnobotanical	12	22	0
Herbs					
Desert lily	<i>Hesperocallis undulata</i>	Ethnobotanical	22	35	0
Desert tobacco	<i>Nicotiana obtusifolia</i>	Ethnobotanical	7	10	4
Mouse-tail suncup ²	<i>Chylismia arenaria</i>	CRPR 2.2	0	3	8
Small-flowered androstephium ³	<i>Androstephium breviflorum</i>	CRPR 2.2	4	1	0
Spiny-hair blazing star	<i>Mentzelia tricuspis</i>	CRPR 2.1	15	250	650
Golden suncup ¹	<i>Chylismia breviflora</i>	Ethnobotanical	24.2	111.2	1.2
Jimson weed	<i>Datura wrightii</i>	Ethnobotanical	2	14	0
Common reed ¹	<i>Phragmites australis</i>	Ethnobotanical ⁴	0.32	0.00006	0.083
Broadleaf cattail ¹	<i>Typha latifolia</i>	Ethnobotanical ⁴	0	0.043	0

Notes:

¹ Individual plants are too numerous to count so values reported refer to estimated area of mapped polygons in acres.

² Species found in California within the limits of the Survey Area.

³ Species found only in Arizona within the limits of the Survey Area.

CRPR = California Rare Plant Ranks (CNPS, 2017)

References

- Arizona Department of Agriculture (ADA). 2016. Protected native plants by category. Accessed at: <https://agriculture.az.gov/plants/native-plants>.
- Arizona Rare Plant Committee. 2000. *Arizona rare plant field guide: A collaboration of agencies and organizations*. Washington, DC: U.S. Government Printing Office. Accessed at: <http://www.aznps.com/rareplants.php>.
- Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California, second edition*. University of California Press, Berkeley.
- Calflora. 2017. Information on California plants for education, research and conservation, based on data contributed by dozens of public and private institutions and individuals, including the Consortium of Calif. Herbaria. Berkeley, California. Accessed at: <http://www.calflora.org/>.
- California Department of Fish and Wildlife (CDFW). 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Sacramento, CA. Accessed at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=107494&inline>
<http://www.dfg.ca.gov/bdb/pdfs/guideplt.pdf>.
- California Department of Fish and Wildlife (CDFW). 2017a. California Natural Diversity Database RareFind5 electronic database. Sacramento, California. August.
- California Department of Fish and Wildlife (CDFW). 2017b. Special vascular plants, bryophytes and lichens list. Accessed at: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf>.
- California Department of Toxic Substances Control (DTSC). 2011. *Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project*, Volume 1. January 18.
- California Department of Toxic Substances Control (DTSC). 2017. *Subsequent Draft Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project*. January 12.
- California Department of Water Resources. 2017. *California Data Exchange Center*. 2017 Water Year Monthly Precipitation. Accessed at: http://cdec.water.ca.gov/snow_rain.html.
- California Desert Native Plants Act (CDNPA). 1981. Accessed at: <https://www.wildlife.ca.gov/Conservation/Plants/CA-Desert-Plant-Act>.
- California Native Plant Society (CNPS). 2001. *Botanical survey guidelines of the California Native Plant Society*. 9 December 1983 (Revised 2 June 2001).
- California Native Plant Society (CNPS). 2017. Inventory of Rare and Endangered Plants of California (online edition). Accessed at: <http://www.cnps.org/cnps/rareplants/inventory/>.
- Consortium of California Herbaria. 2017. Data provided by the participants of the Consortium of California Herbaria. Accessed at: <http://ucjeps.berkeley.edu/consortium/>.
- Del Barko, Mandalit. 2017. *California Deserts In 'Super Bloom' Thanks To A Wet Winter*. National Public Radio, Morning Edition. March 17, 2017. Accessed at: <http://www.npr.org/2017/03/17/520496783/california-deserts-in-super-bloom-thanks-to-a-wet-winter>.
- Garcia and Associates (GANDA) and CH2M HILL. 2013. *Revised Final Topock Groundwater Remediation Project Floristic Survey Report*. December.

- Jepson Herbarium, The. 2017. The Jepson Online Interchange for California Floristics. The University of California, Berkeley. Accessed at: <http://ucjeps.berkeley.edu/interchange/>.
- Kearney, Thomas H. and Robert H. Peebles. 1973. *Arizona Flora*. University of California Press, Berkeley.
- Miles, Scott R. and Charles B. Goudey. 1998. *Ecological Subregions of California, Section and Subsection Descriptions*. United States Department of Agriculture (USDA) Forest Service R5-EM-TP-005-NET (Internet publication). May.
- Natural Resources Conservation Service [NRCS]. 2006. *Land Resources Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin*. United States Department of Agriculture (USDA) Handbook 296.
- Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A manual of California vegetation, 2nd ed.* California Native Plant Society, Sacramento, CA.
- SEINet. 2017. Accessed at: <http://swbiodiversity.org/seinet/>
- U.S. Bureau of Land Management (BLM). 2015. BLM Special Status Plants, California. Accessed at: <https://www.blm.gov/sites/blm.gov/files/programs-natural-resources-native-plants-california-special-status-plants-detailed-list.pdf> . May 28.
- U.S. Bureau of Land Management (BLM). 2017. BLM Sensitive Species List, Arizona. Accessed at: <https://www.blm.gov/policy/az-im-2017-009/>. February.
- U.S. Fish and Wildlife Service (USFWS) 1996a. *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants*. USFWS, September 23. Accessed at: https://www.fws.gov/sacramento/es/survey-protocols-guidelines/es_survey.htm
- U.S. Fish and Wildlife Service (USFWS). 1996b. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species; Notice of Review; Proposed Rule. Federal Register 61(40): 7596-7613.
- U.S. Fish and Wildlife Service (USFWS). 2006. List of federal candidates for listing. Accessed at: <https://www.fws.gov/endangered/>.
- U.S. Fish and Wildlife Service (USFWS). 2017. List of federally listed threatened & endangered species which may occur in San Bernardino County, CA. USFWS, Carlsbad Fish and Wildlife Office, Carlsbad, CA. Accessed at: <https://www.fws.gov/endangered/>.
- Western Regional Climate Center. 2017. 2008 Western U.S. Location Climate Data (LCD) for Needles, CA. Accessed at https://wrcc.dri.edu/Climate/west_lcd_2008.php/.
- Williams, David. 2017. *California desert's wildflower 'super bloom' delights nature lovers*. CNN March 9, 2017. Accessed at: <http://www.cnn.com/2017/03/09/travel/california-super-bloom-trnd/>.

Personal Communication

- Andre, J. 2012. Director of the University of California Riverside, Granite Mountains Research Center, Personal communications with Kim Steiner (GANDA).

Figures

Path: \\brookside\GIS_SHARE\ENBG00_Proj\PG&E\Topock\MapFiles\2017\Topock_SpringPlantSurvey_2017\FinalReport\Figures\Figure1_SiteLocation.mxd Date Saved: 8/3/2017 9:54:12 AM

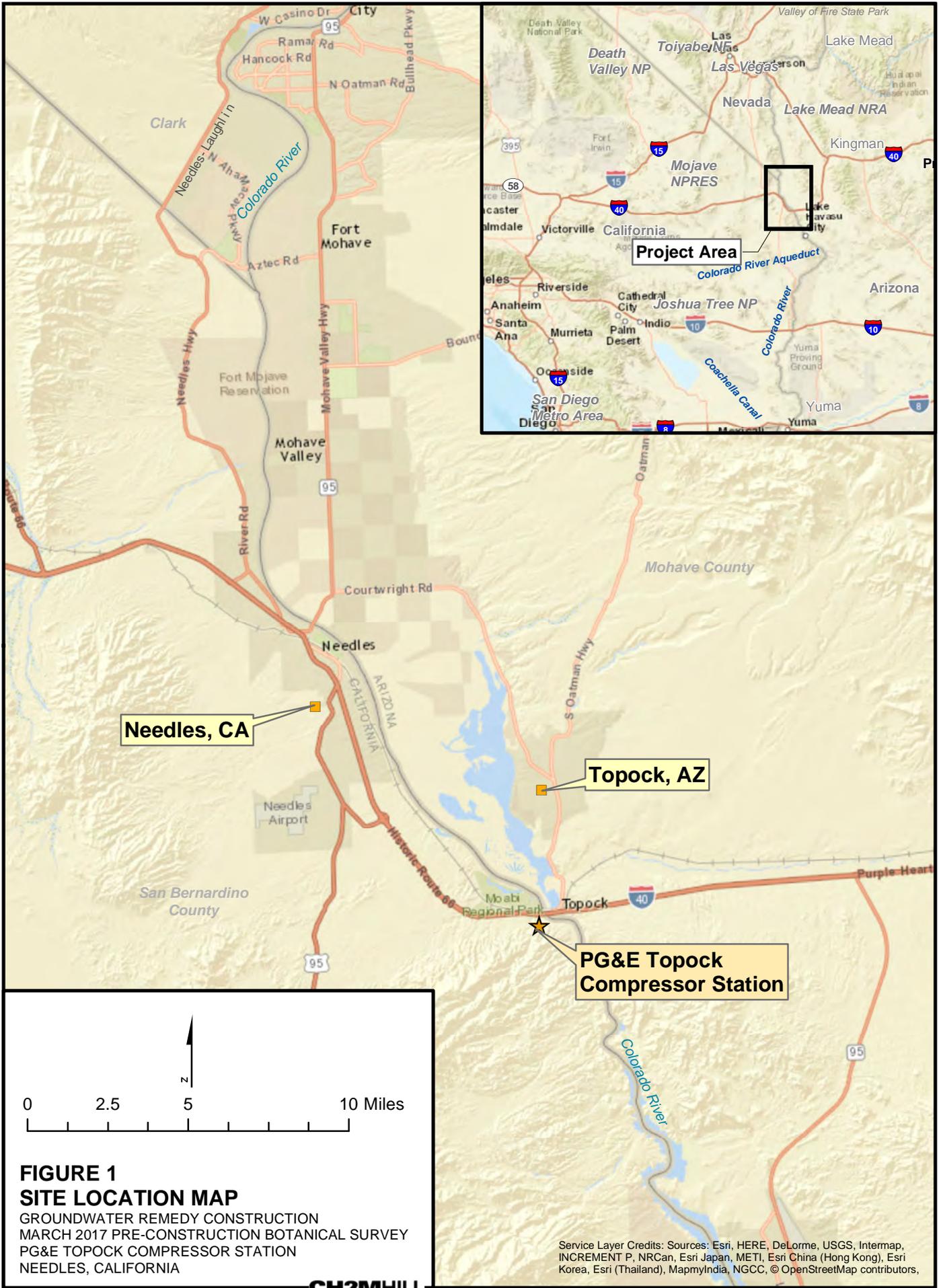
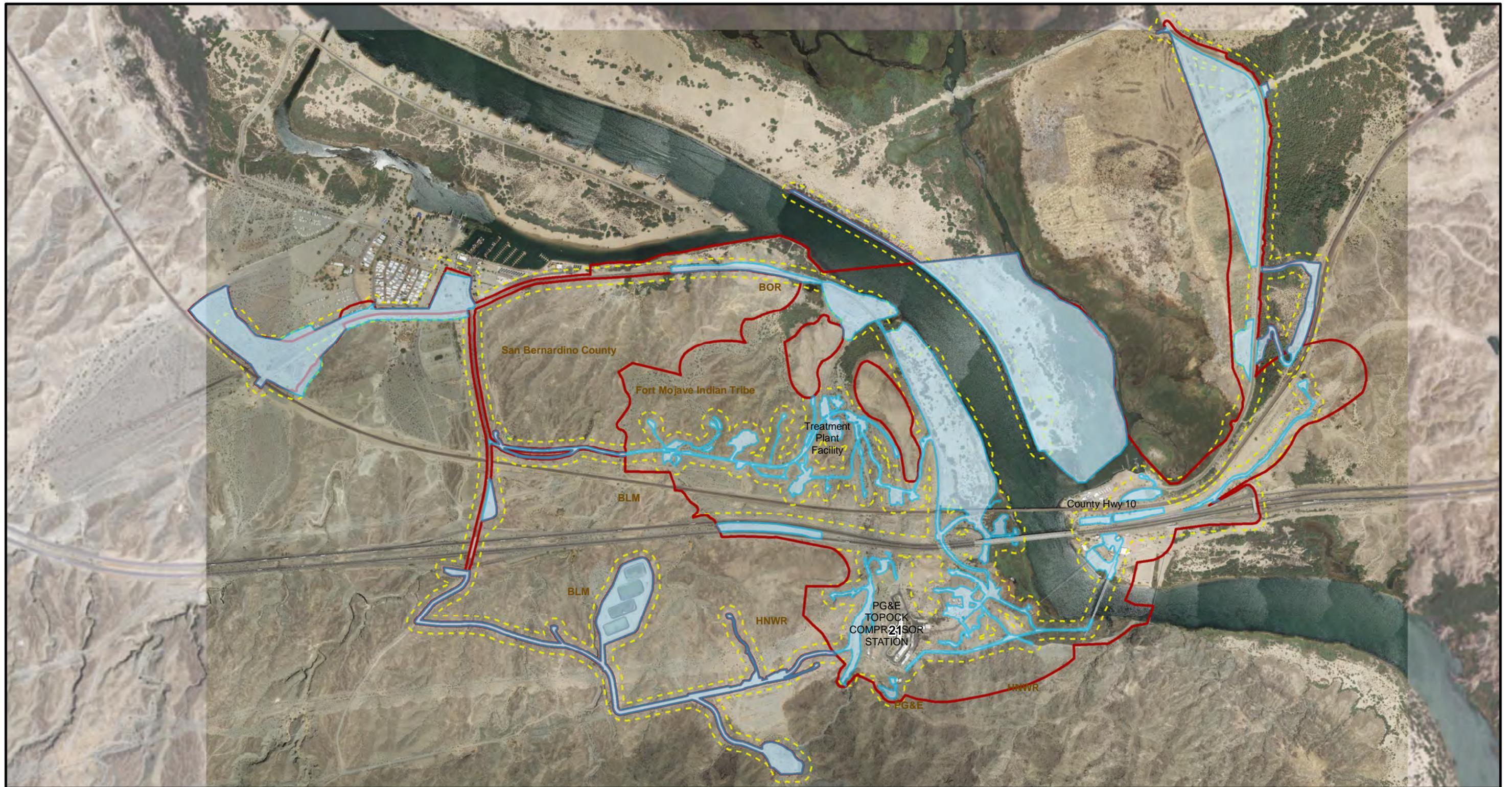


FIGURE 1
SITE LOCATION MAP
 GROUNDWATER REMEDY CONSTRUCTION
 MARCH 2017 PRE-CONSTRUCTION BOTANICAL SURVEY
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors,



LEGEND

- 2017 Survey Area
- Draft SEIR Boundary
- 100-foot Buffer Area around proposed work areas that was surveyed as feasible during the Spring 2017 plant survey

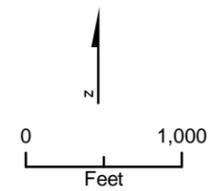
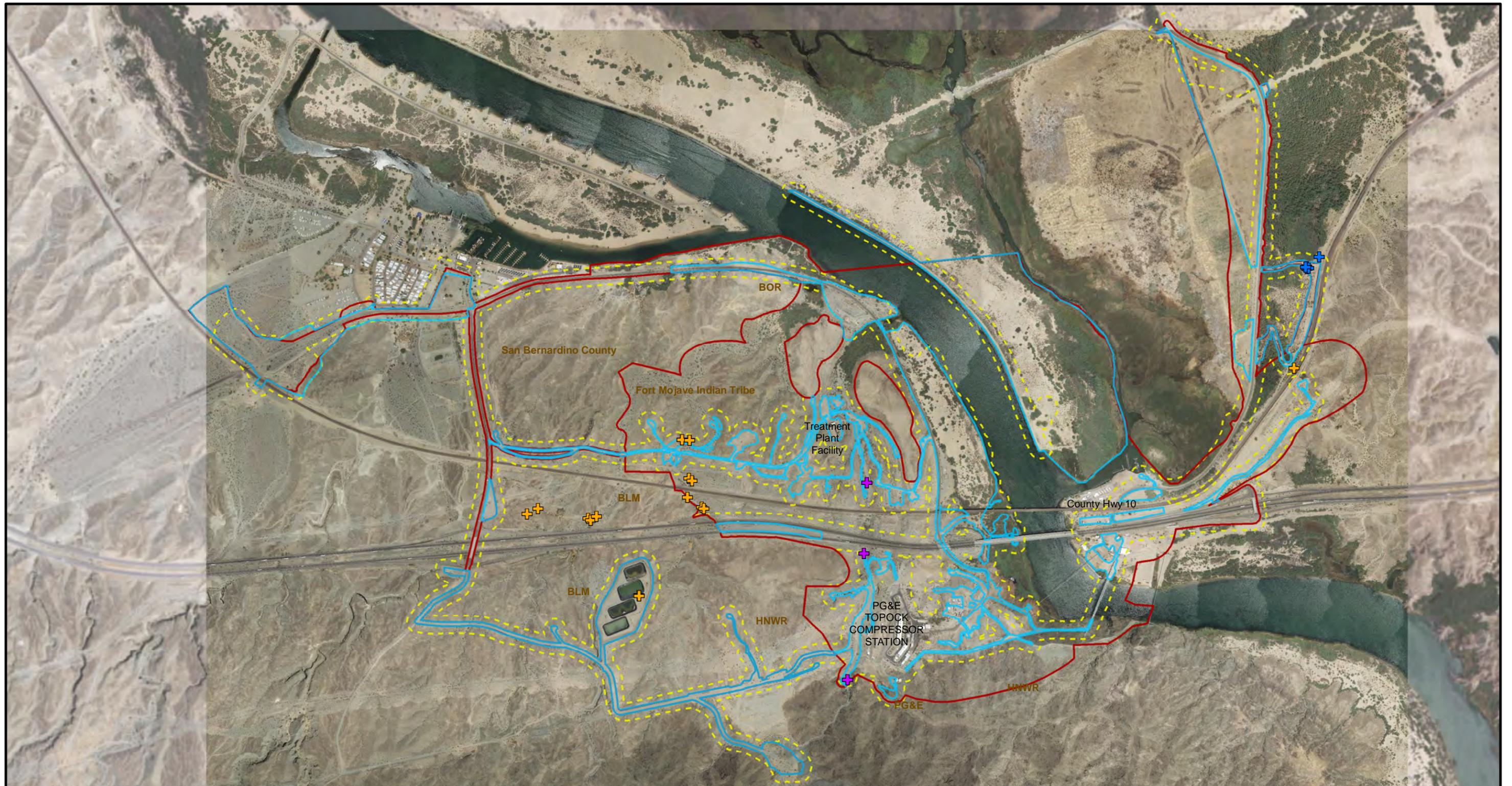


FIGURE 2
BOTANICAL SURVEY AREA
 GROUNDWATER REMEDY CONSTRUCTION/
 REMEDIAL ACTION WORK PLAN
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA



LEGEND

- Herb**
- + Mouse-tail suncup
 - + Small-flowered androstephium
 - + Spiny-hair blazing star
- 2017 Survey Area
 - Draft SEIR Boundary
- 100-foot Buffer Area around proposed work areas that was surveyed as feasible during the Spring 2017 plant survey

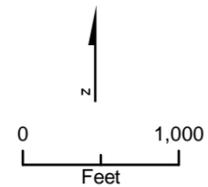
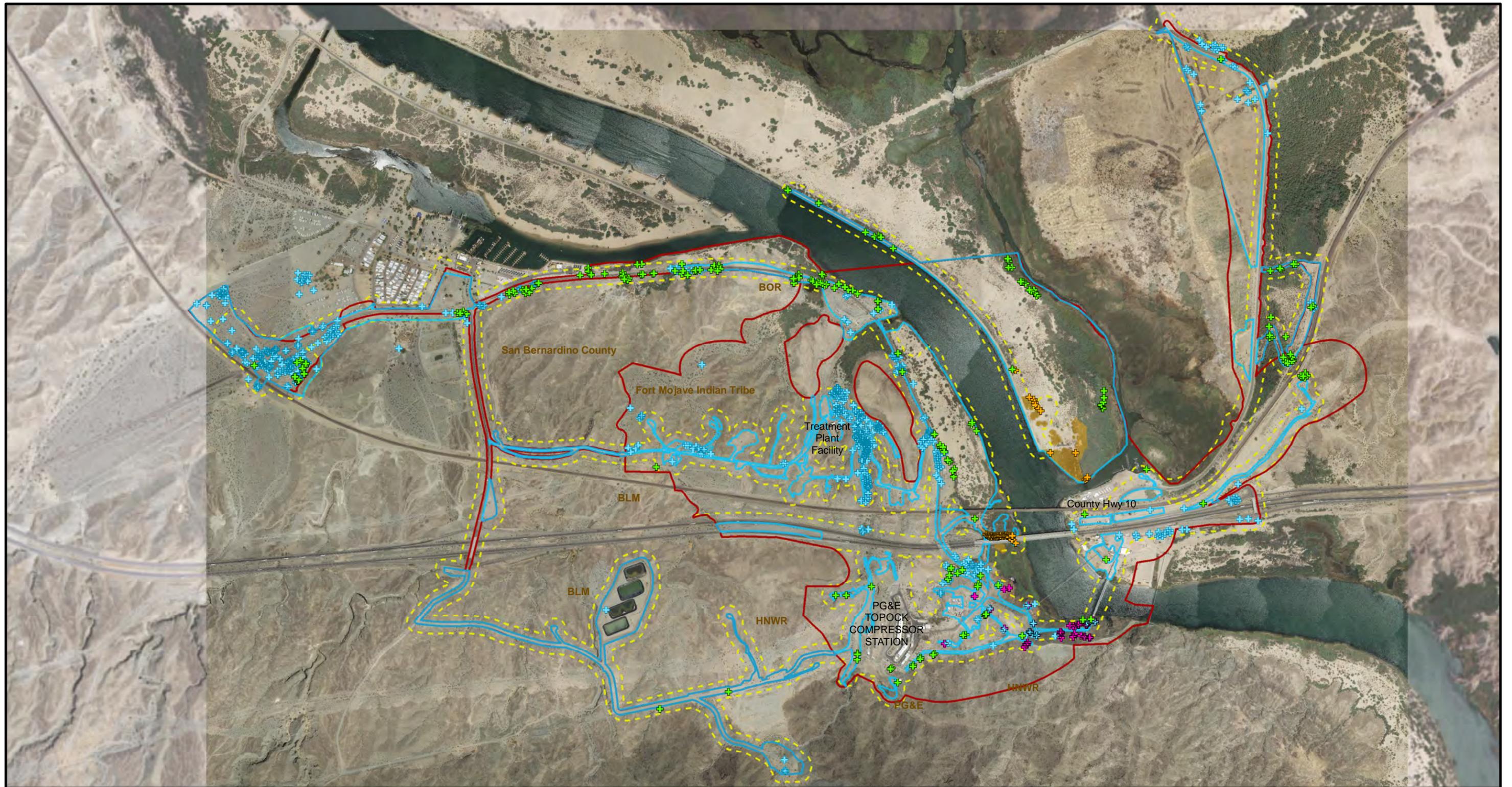


FIGURE 3
SPECIAL-STATUS PLANTS
 GROUNDWATER REMEDY CONSTRUCTION/
 REMEDIAL ACTION WORK PLAN
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA

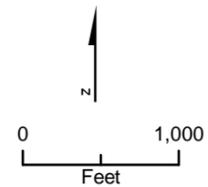


LEGEND

Trees (Common Name)

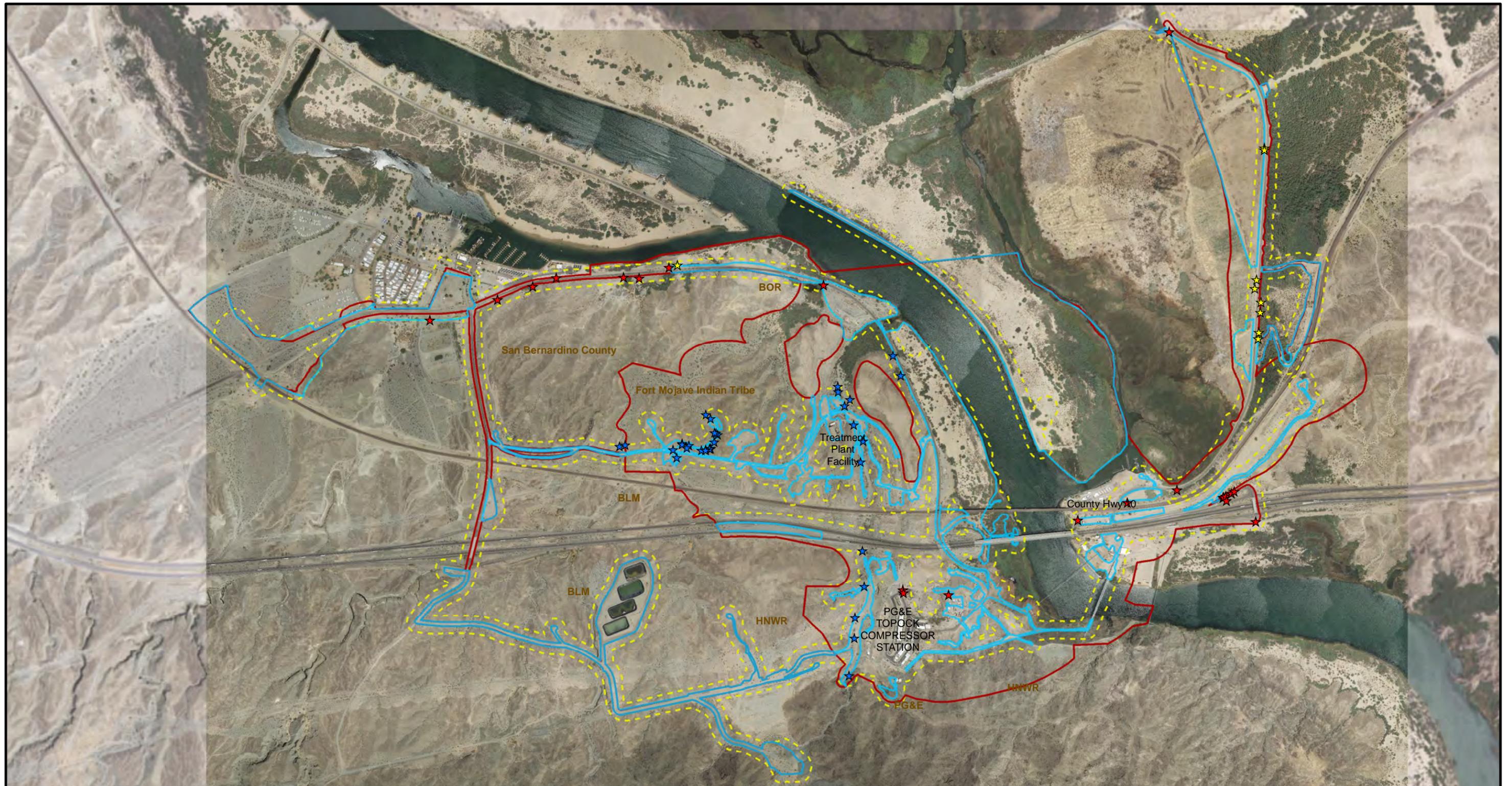
- + Blue Palo Verde
- + Hillside Palo Verde
- + Screwbean Mesquite
- + Western Honey Mesquite

- 2017 Survey Area
- Draft SEIR Boundary
- 100-foot Buffer Area around proposed work areas that was surveyed as feasible during the Spring 2017 plant survey



**FIGURE 4
ETHNOBOTANICAL TREES**

GROUNDWATER REMEDY CONSTRUCTION
MARCH 2017 PRE-CONSTRUCTION BOTANICAL SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA



LEGEND

- | | |
|--|---|
| Shrub |  2017 Survey Area |
|  Andersons desert thorn |  Draft SEIR Boundary |
|  Big saltbush |  100-foot Buffer Area around proposed work areas that was surveyed as feasible during the Spring 2017 plant survey |
|  Cattle saltbush | |

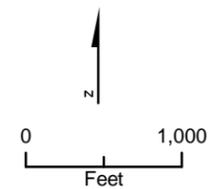
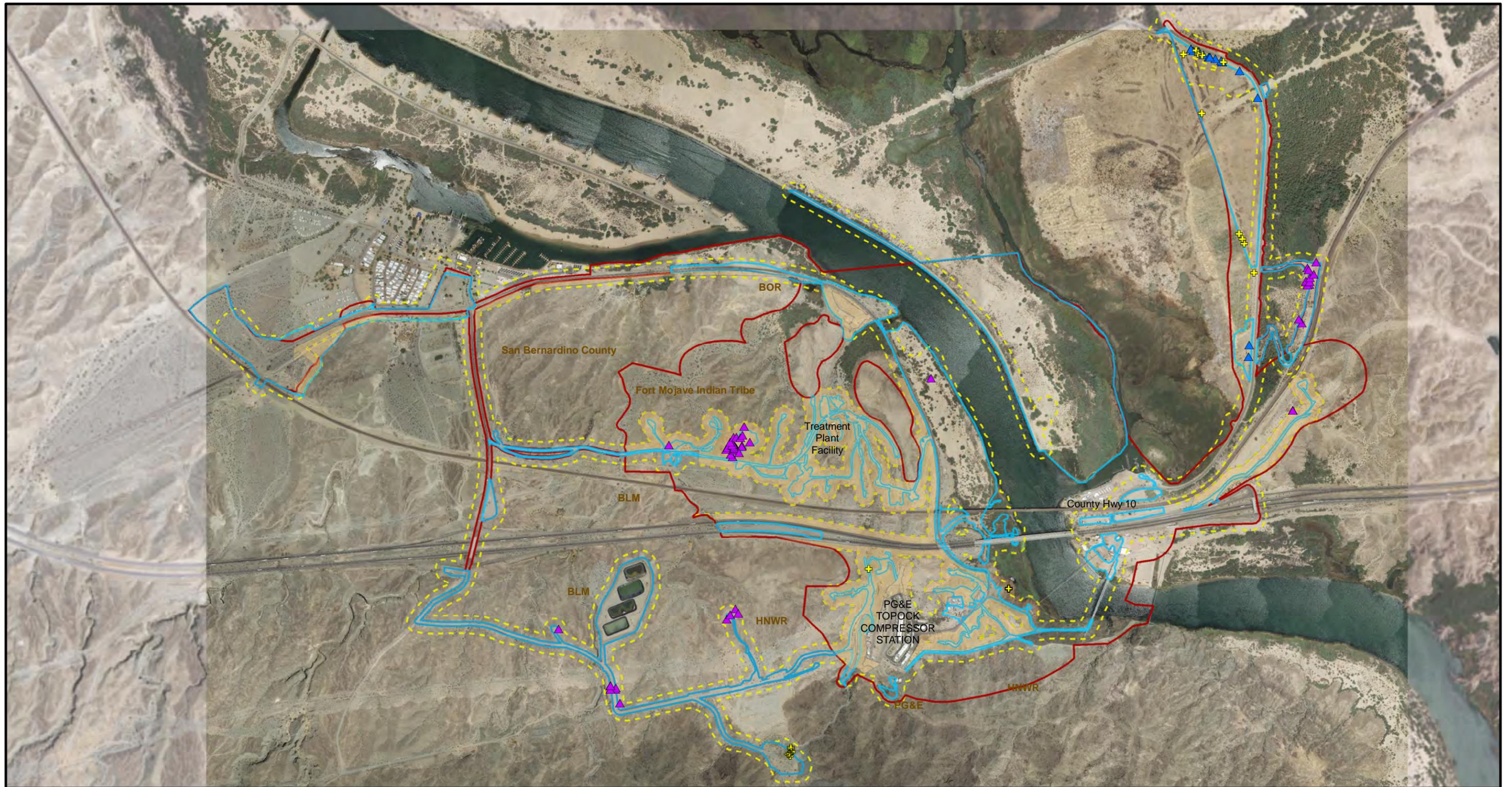


FIGURE 5
ETHNOBOTANICAL SHRUBS
 GROUNDWATER REMEDY CONSTRUCTION/
 REMEDIAL ACTION WORK PLAN
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA



LEGEND

- | | |
|----------------------|---|
| Plants | 2017 Survey Area |
| Desert tobacco | Draft SEIR Boundary |
| Desert lily | 100-foot Buffer Area around proposed work areas that was surveyed as feasible during the Spring 2017 plant survey |
| Jimson weed | |
| Broad-leaved cattail | |
| Common reed | |
| Golden suncup | |

Note:
 1. Common and/or widespread species such as cattle saltbush, big saltbush, golden suncup and common reed are not shown on this map.

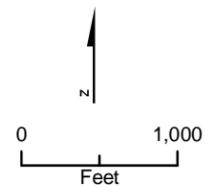


FIGURE 6
SELECTED ETHNOBOTANICAL HERBACEOUS PLANTS
 GROUNDWATER REMEDY CONSTRUCTION/
 REMEDIAL ACTION WORK PLAN
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA

Appendix A
Photographs of Special-Status Plants
Found in the Project Area

Photographs of Special-status Plants Found in the Project Area

Photographs in this Appendix were taken from the *Revised Final Topock Groundwater Remediation Project Floristic Survey Report* (GANDA and CH2M HILL, 2013).

Plate 1. Mouse-tail suncup (*Chylismia arenaria* var. *arenaria*); California Rare Plant Rating (CRPR) = 2.2: (1) Habitat on hard-packed vertical walls of conglomerate above Bat Cave Wash in Survey Section D. (2) Close-up of habitat with four plants visible. (3) Close-up of flower (front view). (4) Close-up of flower (side view) showing elongated hypanthium with white arrow.



Plate 2. Hillside palo verde (*Parkinsonia microphylla*), CRPR 2.2. (1) Habit (i.e., the characteristic form in which a given species of plant grows) of hillside palo verde on rocky hillside in segment H. (2) Branches of hillside palo verde showing numerous small leaves. (3) Close-up of flower.



Plate 3. Gravel milkvetch (*Astragalus sabulonum*), CRPR 2.2. Habit of plant growing along the edge of the Sacramento Wash in the northern part of Segment G (added survey area).



Plate 4. Spiny-hair blazing star (*Mentzelia tricuspis*) CRPR 2.1; (1) Plant growing on rocky slope on the north side of the access road to the Interim Measure 3 facilities. (2) Inflorescence of *Mentzelia tricuspis* with arrow pointing to a floral bract. (3) Arrow pointing to corresponding bract in white-bract mentzelia (*Mentzelia involucreta*).



Plate 5. Small-flowered androstephium (*Androstephium breviflorum*) CRPR 2.2; (1) Habit of plant in sandy soil on the west side of BNSF railroad tracks in added survey area in Survey Segment G (in Arizona)
(2) Close-up of flowers.



Appendix B
Target List of Special-status Plant
Species with the Potential to Occur in
the Project Area

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
TREES					
Foothill palo verde	<i>Parkinsonia microphylla</i>	4.3	Apr–May	Creosote bush scrub; rocky or gravelly areas	Present. This woody shrub or small tree is locally common in the Project Area on the slopes of the Chemehuevi Mountains east of the compressor station.
SHRUBS AND CACTI					
Crucifixion thorn	<i>Castela emoryi</i>	2B.3	Apr–July	Mojavean or Sonoran Desert scrub; gravelly soils, sometimes in alkali playas or washes.	Possible. Suitable habitat is present, for this shrub; the nearest known occurrence is near Chemehuevi Wash, approximately 19 miles southeast of Topock. This species was not found during multiple surveys of the Project Area.
Graham’s fishhook cactus	<i>Mammillaria grahamii</i> var. <i>grahamii</i>	2B.2	Apr–Jun	Creosote bush scrub; gravelly alluvial fans and rocky slopes.	Possible. Suitable habitat is present for this small succulent shrub; the nearest reported occurrence is from the Whipple Mountains, approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Hall’s tetracoccus	<i>Tetracoccus hallii</i>	4.3	Jan–May	Creosote bush scrub; rocky slopes and washes.	Possible. Suitable habitat is present for this woody shrub; the nearest reported occurrence is 14 miles southwest of Project Area. This species was not found during multiple surveys of the Project Area.
Howe’s hedgehog cactus	<i>Echinocereus engelmannii</i> var. <i>howei</i>	S/1B.1	May–Jun	Creosote bush scrub; hills and flats on well-drained rocky ledges and steep gravelly slopes.	Possible. Suitable habitat for this stem succulent cactus is present; the nearest reported occurrences is 35 miles northwest of the Project Area on rocky ledges. This species was not found during multiple surveys of the Project Area.
Kofa Mountain barberry	<i>Berberis harrisoniana</i>	S/1B.2	Jan–Mar	Mojavean desert scrub, usually north-facing talus slopes, sometimes volcanic.	Possible. Suitable habitat is present and this species is known to occur near Colorado River in the Whipple Mountains, approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Narrow-leaved dalea	<i>Psorothamnus fremontii</i> var. <i>attenuatus</i>	2B.3	Mar–May	Desert scrub; granitic or volcanic rocky slopes and canyons.	Possible. Suitable habitat is present for this shrub; nearest reported occurrences is from the Whipple Mountains approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
Torrey's box-thorn	<i>Lycium torreyi</i>	4.2	Jan–Nov	Sandy, rocky, washes, streambanks, desert valleys in Mojavean and Sonoran Desert scrub.	Possible. Suitable habitat is present for this shrub; the nearest reported occurrences are from the Whipple Mountains approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Utah funastrum	<i>Funastrum utahense</i>	4.2	Apr–Jun, Sep	Mojavean desert scrub; dry, sandy or gravelly areas	Possible. Suitable habitat is present for this shrub and it has been reported 12 miles northwest of the Project Area. This species was not found during multiple surveys of the Project Area.
HERBACEOUS PLANTS					
Abram's spurge	<i>Chamaesyce abramsiana</i>	2B.2	Aug–Nov	Creosote bush scrub; open or vegetated sandy flats.	Possible. Annual herb known sporadically from Imperial to eastern Riverside and San Bernardino Counties. Suitable habitat is present; the nearest known occurrences are 35 miles west of the Project Area. This species was not found during multiple surveys of the Project Area.
Arizona pholistoma	<i>Pholistoma auritum</i> var. <i>arizonicum</i>	2B.3	Feb–Apr	Creosote bush scrub; rocky canyons, north-facing slopes.	Possible. Suitable habitat is present for this annual herb; reported to occur in the Dead Mountains approximately 15 miles northwest of Project Area. This species was not found during multiple surveys of the Project Area.
Bare-stem larkspur	<i>Delphinium scaposum</i>	2B.3	Mar–May	Creosote bush scrub; rocky granitic slopes and canyons.	Possible. Suitable habitat is present for this perennial herb. The nearest reported occurrence is from the Whipple Mountains approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Bitter hymenoxys	<i>Hymenoxys odorata</i>	2B.2	Apr–Jun, Sep–Oct	Seasonally moist silty soils, sandy flats near the Colorado River.	Possible. Suitable habitat for this annual herb is present; nearest document occurrence in California is approximately 40 miles south of the Project Area along the flood plain of Colorado River. This species was not found during multiple surveys of the Project Area.
Borrego milkvetch	<i>Astragalus lentiginosus</i> var. <i>borreganus</i>	4.3	Feb–May, Sep	Creosote bush scrub; widely scattered in sand dunes, or semi-stabilized sandy areas in valleys.	Possible. Suitable habitat is present for this annual herb, nearest reported occurrence is along the Colorado River approximately 45 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
Chocolate Mountains tiqulia	<i>Tiquilia canescens</i> var. <i>pulchella</i>	3.2	Feb–May	Slopes, ridges, or washes in Sonoran Desert scrub.	Possible. Suitable habitat is present for this perennial herb; the nearest reported occurrence is from the Chemehuevi Mountains between Bat Cave Wash and Trampas Wash, approximately 3 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Cooper’s rush	<i>Juncus cooperi</i>	4.3	Apr–May	Alkali sink scrub; meadows and seeps; often alkaline or saline.	Possible. Some suitable habitat for this perennial herb; nearest reported occurrence is from the Chemehuevi Mountains 10 miles southwest of the Project Area. This species was not found during multiple surveys of the Project Area.
Cove’s cassia	<i>Senna coves</i>	2B.2	Mar–Jun, Sep	Creosote bush scrub; washes, alluvial slopes, and sandy disturbed areas.	Possible. Suitable habitat is present for this perennial herb; the nearest reported occurrences are from the Whipple Mountains approximately 25 miles south of the Project Area, and the Piute Range approximately 30 miles to the west. This species was not found during multiple surveys of the Project Area.
Darlington’s blazing star	<i>Mentzelia puberula</i>	2B.2	April–May, Sept–Oct	Rocky slopes and canyons; sandy washes.	Possible. Suitable habitat is present for this perennial herb; the nearest reported occurrences is approximately 10 miles southeast of the Project Area in the Needles area, Arizona. This species was not found during multiple surveys of the Project Area.
Desert germander	<i>Teucrium glandulosum</i>	2B.3	Mar–May	Desert scrub; dry rocky slopes.	Possible. Suitable habitat is present for this stoloniferous herb; the nearest reported occurrences is from Whipple Mountains approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Desert portulaca	<i>Portulaca halimoides</i>	4.2	Aug–Oct	Desert scrub; sandy washes, alluvial fans and flats. Emerges after summer rains.	Possible. Suitable habitat for this annual herb is present; the nearest reported occurrence is from the Piute Valley approximately 10 miles northwest of Needles; this species was not found during multiple surveys of the Project Area.

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
Desert unicorn-plant	<i>Proboscidea althaeifolia</i>	4.3	May–Oct	Creosote bush scrub; sandy soil.	Possible. Suitable habitat is present for this annual species; the nearest reported occurrence is from the Chemehuevi Wash approximately 19 miles southeast of the Project Area. This species was not found during multiple surveys of the Project Area.
Glandular ditaxis	<i>Ditaxis claryana</i>	2B.2	Oct–Mar	Mojavean and Sonoran Desert scrub; dry washes and rocky hillsides, sandy soils.	Possible. Suitable habitat is present for this annual herb and this species has been collected in the vicinity of the Topock Compressor Station near the Colorado River. This species was not found during multiple surveys of the Project Area.
Gravel milk-vetch	<i>Astragalus sabulonum</i>	2B.2	Feb–June	Desert dunes, Mojave Desert scrub and Sonoran Desert scrub; usually sandy, sometimes gravelly soils; flats, washes, and roadsides	Present. One plant was observed along the side of the Topock-Oatman Highway at the Sacramento Wash.
Harwood’s woolystar	<i>Eriastrum harwoodii</i>	S/1B.2	Apr–May	Known only from sandy areas (dunes and wind-blown ramps) of the eastern San Bernardino and Riverside Counties.	Unlikely. Habitat for this annual herb in the Project Area is limited to dredged sands and the nearest reported occurrence is approximately 40 miles southwest of the Project Area. This species was not found during multiple surveys of the Project Area.
Lobed ground-cherry	<i>Physalis lobata</i>	2B.3	Apr–Jun	Mojavean desert scrub; seasonally moist depressions, dry lake margins and washes, active following summer rains.	Possible. Suitable habitat is present for this perennial herb; nearest reported occurrences is approximately 13 miles northwest of Needles in the Piute Valley. This species was not found during multiple surveys of the Project Area.
Mouse-tail suncup	<i>Chylismia arenaria</i>	2B.2	Jan–May	Mojavean desert scrub; rocky slopes and canyon walls, may also be found in washes.	Present. Several plants found growing on steep rocky conglomerates along Bat Cave wash north of the BNSF railroad tracks and a few plants along the BNSF railroad tracks in west of Bat Cave Wash.
Narrow-leaved yerba santa	<i>Eriodictyon angustifolium</i>	2.3	May-Aug	Pinyon-Juniper woodland	Unlikely. No suitable habitat present, nearest occurrence is based on an 1884 herbarium collection from “Needles”

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
Playa milkvetch	<i>Astragalus allochrous</i> var. <i>playanus</i>	2B.2	March– May	Creosote bush scrub; sandy saline flats.	Unlikely. Suitable habitat is present for this annual herb, but the only reported occurrence in California is near Goffs, 30 miles west of the Project Area. The nearest reported occurrence in Arizona is near Buckeye, over 140 miles southeast of the Project Area. This species was not found during multiple surveys of the Project Area.
Pointed dodder	<i>Cuscuta californica</i> var. <i>apiculata</i>	3	Feb–Aug	Mojavean desert scrub; sandy soils.	Possible. Suitable habitat is present; nearest reported occurrence is near Parker Dam road, 38 miles southwest of Project Area. This species was not found during multiple surveys of the Project Area.
Reveal's buckwheat	<i>Eriogonum contiguum</i>	2B.3	May–Jul, Sept–Oct	Creosote bush scrub; sandy, clay or gypsum soils.	Possible. Suitable habitat is present for this annual herb; the nearest reported occurrence is approximately 12 miles north of Needles. This species was not found during multiple surveys of the Project Area.
Ribbed cryptantha	<i>Cryptantha costata</i> (<i>Johnstonella costata</i>)	4.3	Feb–May	Mojavean and Sonoran Desert scrub; sandy soil, dunes.	Possible. This small annual herb normally occurs in desert sand dunes. But has been reported along the Colorado River just north of Topock. It has also been collected 30 miles northwest of the Project Area. This species was not found during multiple surveys of the Project Area.
Slender cottonheads	<i>Nemacaulis denudata</i> var. <i>gracilis</i>	2B.2	Mar–May	Creosote bush scrub; sandy soils on stabilized dunes and sand ramps.	Possible. Suitable habitat is present for this Annual herb; the nearest reported occurrence is along the Colorado River in Arizona, approximately 15 miles south of Project Area. This species was not found during multiple surveys of the Project Area.
Small-flowered androstephium	<i>Androstephium breviflorum</i>	2B.2	Mar–Apr	Mojavean desert scrub; widely scattered in stabilized to semi-stabilized sandy areas in valleys.	Present. Several of these perennials (bulb) were found in Arizona on the east side of the Oatman-Topock Highway, west of the BNSF railroad tracks. No plants were found in California during multiple surveys of the Project Area.
Spearleaf	<i>Matelea parvifolia</i>	2B.3	Mar–May	Mojavean desert scrub; dry rocky areas, especially granitic rock.	Possible. Suitable habitat is present for this perennial herb; the nearest reported occurrence is 15 miles west of the Project Area in the South Sacramento Mountains. This species was not found during multiple surveys of the Project Area.

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
Spiny-hair blazing star	<i>Mentzelia tricuspidis</i>	2B.1	Apr–Jun, Sept–Oct	Mojavean desert scrub; sandy or gravelly slopes and washes.	Present. This annual species was found in the rocky slopes just west of the BNSF railroad tracks south of the Sacramento Wash in Arizona and on the Dissected terraces south of the National Trails Highway in California.
Three-awned gramma	<i>Bouteloua trifida</i>	2B.3	Apr–Nov	Creosote bush scrub; Rocky slopes, usually on limestone.	Possible. Suitable habitat is present for this Perennial herb; the nearest reported occurrence is from the Whipple Mountains approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Wand-like fleabane daisy	<i>Erigeron oxyphyllus</i>	2B.3	Apr–Jun	Desert scrub, rocky slopes and canyons.	Possible. Suitable habitat is present for this perennial herb; the nearest reported occurrence is from the Whipple Mountains approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
White-margined beardtongue	<i>Penstemon albomarginatus</i>	S/1B.1	Mar–May	Desert suns and sandy area in Mojave Desert scrub	Unlikely. Limited habitat present for this perennial herb, consisting mostly of dredged sands. This species has a highly disjunctive distribution in San Bernardino County, California and Mojave County, Arizona. There are no reported occurrences in the vicinity of the Project Area and this species was not found during multiple surveys.
Winged cryptantha	<i>Cryptantha holoptera</i>	4.3	Mar–Apr	Mojavean desert scrub; sandy to rocky soils.	Possible. Suitable habitat is present for this annual species; the nearest reported occurrence is 33 miles southwest of Project Area. This species was not found during multiple surveys of the Project Area.

Table B-1. Target List of Special-status Plant Species with the Potential to Occur in the Project Area

Common Name	Scientific Name	Status ¹ BLM/CRPR	Flowering Period	Habitat	Potential to Occur ²
-------------	-----------------	---------------------------------	---------------------	---------	---------------------------------

Notes

¹ Conservation status abbreviations:

U.S. Bureau of Land Management (BLM) designations:

S – Sensitive.

California Rare Plant Ranks (CRPR) (formerly CNPS Lists)

- 1B Plants rare, threatened or endangered in California and elsewhere.
- 2B Plants rare, threatened or endangered in California, more common elsewhere.
- 3 Plants for which more information is needed – a review list.
- 4 Plants of limited distribution – a watch list.

California Rare Plant Subcategories

- .1 Seriously threatened in California.
- .2 Fairly threatened in California.
- .3 Not very threatened in California.

² Potential to occur definitions:

- Present: Species observed on the site.
- Possible: Species not observed on the site, however conditions suitable for occurrence.
- Unlikely: Species not observed on the site, conditions marginal for occurrence.

Sources:

California Native Plant Society, 2017; California Natural Diversity Database (CDFW, 2017); Consortium of California Herbaria, 2017; Jepson Online Interchange, 2017; Calflora, 2017; U.S. Bureau of Land Management (BLM, 2015 and 2017),

Appendix C
Daily Participant Sign-in Sheets

MARCH 8 2017 - PLANT SURVEY
PGE TOPOGR PRE-CONSTRUCTION

RUSSELL HUDDLESTON / CH2M

Mia Marek / CH2M

Delbert Holmes / FMIT

Ron Escobar / CIT

Winston Escobar / CIT

CARRIE CALSAN CAUNON ~~OR~~ HAWAIIAN TRIBE

NICK ZEYOUMA / CRIT

Barry Sharp / CRIT

Aaron Yue / DTSC

CURT RUSSEN / PGE

PGE TOPOCU - PRECONSTRUCTION PLANT SURVEY
MARCH 9, 2017

RUSSELL HUDDGESTON / CH2M

Mia Mark / CH2M

MIK ZEYOUMA / CRIT

Barry Sharp / CRIT

Delbert Holmes / FMIT

Winston Escobar cit

CARRIE CALISAY CAMPEN

PG&E TOPOCK - PLANT SURVEYS

MARCH 10, 2017

RUSSELL HUDDGESTON / CIT2M

Mia MAHUK / CH2M

Delbert Holmes / FMIT

Winston ESCOBAR CIT

Ron ESCOBAR CIT

Brandy McWain Transcon

TOPOGIC PLANT SURVEY

MARCH 11, 2017

RUSSELL HUNDESTON / CH2M
Delbert Holmes / FMIT
Brandy McWain / TRANSCOM
Winston Escobar / CIT
CARRIE CANNON / ADOL

Note: met with Kerrie Anne Lyod from ASU at 1:00 on this date as well

Appendix D
Vascular Plant Species Observed in the
Project Area

Table D-1. Vascular Plants Observed at Topock During the March 2017 Pre-Construction Surveys

Scientific Names ¹	Common Names	Status ¹
ANGIOSPERMS-DICOTS		
AMARANTHACEAE	amaranth family	
<i>Amaranthus fimbriatus</i>	fringed amaranth	Native
<i>Tidestromia suffruticosa</i> var. <i>oblongifolia</i>	honeysweet	Native
APOCYNACEAE	milkweed family	
<i>Asclepias albicans</i>	white-stemmed milkweed	Native
<i>Asclepias subulata</i>	rush milkweed	Native
<i>Funastrum hirtellum</i>	climbing-milkweed	Native
<i>Nerium oleander</i>	oleander	Naturalized
ASTERACEAE	sunflower family	
<i>Ambrosia dumosa</i>	white bursage	Native
<i>Ambrosia salsola</i>	cheesebush	Native
<i>Atrichoseris platyphylla</i>	gravel-ghost	Native
<i>Baccharis salicifolia</i>	mulefat	Native
<i>Baccharis sarothroides</i>	broom baccharis	Native
<i>Bebbia juncea</i> var. <i>aspera</i>	sweetbush	Native
<i>Calycoseris wrightii</i>	white tackstem	Native
<i>Chaenactis carphoclinia</i>	pebble pincushion	Native
<i>Chaenactis fremontii</i>	Fremont pincushion	Native
<i>Chaenactis stevioides</i>	stevia pincushion	Native
<i>Encelia farinosa</i>	brittlebush	Native
<i>Encelia farinosa</i> x <i>frutescens</i>	brittlebush hybrid	Native
<i>Encelia frutescens</i>	button brittlebush	Native
<i>Eriophyllum lanosum</i>	white woolly eriophyllum	Native
<i>Geraea canescens</i>	desert sunflower	Native
<i>Logfia depressa</i>	dwarf cottonrose	Native
<i>Malacothrix glabrata</i>	smooth desert dandelion	Native
<i>Monoptilon bellioides</i>	desert star	Native
<i>Palafoxia arida</i>	Spanish needle	Native
<i>Perityle emoryi</i>	Emory's rock daisy	Native
<i>Peucephyllum schottii</i>	pygmy-cedar	Native
<i>Pluchea odorata</i>	marsh fleabane	Native
<i>Pluchea sericea</i>	arrow weed	Native
<i>Porophyllum gracile</i>	slender poreleaf	Native
<i>Rafinesquia neomexicana</i>	New Mexico desert chicory	Native
<i>Senecio mohavensis</i>	Mojave groundsel	Native
<i>Stephanomeria pauciflora</i>	skeletonweed	Native
BORAGINACEAE	borage family	
<i>Amsinckia menziesii</i>	common fiddleneck	Native
<i>Amsinckia tessellata</i>	devil's lettuce	Native
<i>Cryptantha angustifolia</i>	narrow-leaved cryptantha	Native

Table D-1. Vascular Plants Observed at Topock During the March 2017 Pre-Construction Surveys

Scientific Names ¹	Common Names	Status ¹
<i>Cryptantha barbiger</i> var. <i>barbiger</i>	bearded cryptantha	Native
<i>Cryptantha maritima</i>	Guadalupe cryptantha	Native
<i>Cryptantha micrantha</i>	red-root cryptantha	Native
<i>Cryptantha nevadensis</i> var. <i>rigida</i>	rigid cryptantha	Native
<i>Cryptantha pterocarya</i>	winged-nut cryptantha	Native
<i>Heliotropium curassavicum</i>	alkali heliotrope	Native
<i>Pectocarya heterocarpa</i>	chuckwalla combseed	Native
<i>Pectocarya platycarpa</i>	broadfruited combseed	Native
<i>Pectocarya recurvata</i>	curvednut combseed	Native
<i>Phacelia crenulata</i>	notch-leaved phacelia	Native
<i>Phacelia distans</i>	distant phacelia	Native
<i>Phacelia ivesiana</i>	Ives' phacelia	Native
<i>Plagiobothrys jonesii</i>	Mojave popcorn flower	Native
<i>Tiquilia plicata</i>	fanleaf crinklemat	Native
BRASSICACEAE	mustard family	
<i>Brassica tournefortii</i>	Sahara mustard	Naturalized (<i>Cal-IPC Inventory rating: High</i>) ²
<i>Descurainia pinnata</i>	pinnate tansy mustard	Native
<i>Draba californica</i>	California draba	Native
<i>Caulanthus lasiophyllus</i>	California mustard	Native
<i>Lepidium lasiocarpum</i>	pepperweed	Native
<i>Physaria tenella</i>	Moapa bladderpod	Native
<i>Raphanus raphanistrum</i>	jointed charlock	Naturalized
<i>Sisymbrium altissimum</i>	tumble mustard	Naturalized
<i>Sisymbrium orientale</i>	oriental hedge-mustard	Naturalized
<i>Thysanocarpus curvipes</i>	fringe pod	Native
CACTACEAE	cactus family	
<i>Cylindropuntia acanthocarpa</i>	buckhorn cholla	Native (<i>CDNPA Protection</i>) ³
<i>Cylindropuntia bigelovii</i>	teddy-bear cholla	Native (<i>CDNPA Protection</i>) ³
<i>Cylindropuntia echinocarpa</i>	silver cholla	Native (<i>CDNPA Protection</i>) ³
<i>Echinocereus engelmannii</i>	hedgehog cactus	Native
<i>Ferocactus cylindraceus</i>	California barrel cactus	Native (<i>CDNPA Protection</i>) ³
<i>Mammillaria tetrancistra</i>	corkseed mammillaria	Native (<i>CDNPA Protection</i>) ³
<i>Opuntia basilaris</i>	beavertail (<i>CDNPA Protection</i>)	Native (<i>CDNPA Protection</i>) ³
CARYOPHYLLACEAE	carnation family	
<i>Achyronychia cooperi</i>	onyx flower	Native
CHENOPODIACEAE	goosefoot family	
<i>Atriplex canescens</i>	four-wing saltbush	Native
<i>Atriplex hymenelytra</i>	desert holly	Native (<i>CDNPA Protection</i>) ³
<i>Atriplex lentiformis</i>	big saltbush	Native
<i>Atriplex polycarpa</i>	cattle saltbush	Native

Table D-1. Vascular Plants Observed at Topock During the March 2017 Pre-Construction Surveys

Scientific Names ¹	Common Names	Status ¹
<i>Chenopodium album</i>	white goosefoot	Naturalized
<i>Salsola tragus</i>	Russian thistle	Naturalized (<i>Cal-IPC Inventory rating: Limited</i>) ²
<i>Suaeda nigra</i>	bush seepweed	Native
CUCURBITACEAE	gourd family	
<i>Cucurbita palmata</i>	coyote gourd	Native
CUSCUTACEAE	dodder family	
<i>Cuscuta</i> sp.	dodder	Native
EUPHORBIACEAE	spurge family	
<i>Euphorbia micromera</i>	desert spurge	Native
<i>Euphorbia polycarpa</i>	small-seeded spurge	Native
<i>Euphorbia setiloba</i>	Yuma spurge	Native
<i>Ditaxis neomexicana</i>	common ditaxis	Native
FABACEAE	legume family	
<i>Acmispon strigosus</i>	strigose bird's foot trefoil	Native
<i>Dalea mollis</i>	hairy indigo-pea	Native
<i>Dalea mollissima</i>	downy dalea	Native
<i>Lupinus arizonicus</i>	Arizona lupine	Native
<i>Marina parryi</i>	Parry's marina	Native
<i>Parkinsonia florida</i>	blue palo verde	Native (<i>CDNPA Protection</i>) ³
<i>Parkinsonia microphylla</i>	hillside palo verde	Native (<i>CDNPA Protection / CA Rare Plant Ranking 4.3</i>) ^{3,4}
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	honey mesquite	Native (<i>CDNPA Protection</i>) ³
<i>Prosopis pubescens</i>	screwbean mesquite	Native (<i>CDNPA Protection</i>) ³
<i>Psoralea arguta</i>	desert smoke tree	Native (<i>CDNPA Protection</i>) ³
<i>Senegalia greggii</i>	catclaw acacia	Native (<i>CDNPA Protection</i>) ³
FOUQUIERIACEAE	ocotillo family	
<i>Fouquieria splendens</i> ssp. <i>splendens</i>	ocotillo (<i>CDNPA Protection</i>)	Native (<i>CDNPA Protection</i>) ³
GERANIACEAE	geranium family	
<i>Erodium cicutarium</i>	red-stemmed filaree	Naturalized (<i>Cal-IPC Inventory rating: Limited</i>) ²
KRAMERIACEAE	rhatany family	
<i>Krameria bicolor</i>	white rhatany	Native
<i>Krameria erecta</i>	Pima rhatany	Native
LAMIACEAE	mint family	
<i>Condea emoryi</i>	desert-lavender	Native
LOASACEAE		
<i>Mentzelia albicaulis</i>	white-stemmed blazing star	Native
<i>Mentzelia involucrata</i>	white-bract mentzelia	Native
<i>Mentzelia tricuspidata</i>	spiny-hair blazing star	Native (<i>CNPS Rare Plant Rank 2B.1</i>) ⁴

Table D-1. Vascular Plants Observed at Topock During the March 2017 Pre-Construction Surveys

Scientific Names ¹	Common Names	Status ¹
MALVACEAE	mallow family	
<i>Malva parviflora</i>	small-flowered cheeseweed	Naturalized
<i>Sphaeralcea ambigua</i> var. <i>ambigua</i>	apricot mallow	Native
NYCTAGINACEAE	four-o'clock family	
<i>Abronia villosa</i>	sand verbena	Native
<i>Allionia incarnata</i> var. <i>incarnata</i>	trailing windmills	Native
<i>Boerhavia wrightii</i>	Wright's spiderling	Native
<i>Mirabilis laevis</i>	retorse desert four-o'clock	Native
ONAGRACEAE	evening primrose family	
<i>Chylismia arenaria</i>	mouse-tail suncup	Native (CNPS Rare Plant Rank 2B.2) ⁴
<i>Chylismia brevipes</i>	golden suncup	Native
<i>Chylismia cardiophylla</i> var. <i>cardiophylla</i>	heartleaf sun-cup	Native
<i>Chylismia claviformis</i>	brown-eyed evening primrose	Native
<i>Eremothera boothii</i>	Booth's shredding suncup	Native
<i>Eremothera refracta</i>	narrow-leaf suncup	Native
<i>Oenothera deltooides</i> ssp. <i>deltooides</i>	bird-cage evening primrose	Native
<i>Oenothera premieres</i> ssp. <i>bufonis</i>	desert evening primrose	Native
PAPAVERACEAE	poppy family	
<i>Eschscholzia californica</i>	California poppy	Native
<i>Eschscholzia glyptosperma</i>	desert golden poppy	Native
<i>Eschscholzia minutiflora</i>	small-flowered California poppy	Native
PLANTAGINACEAE	plantain family	
<i>Antirrhinum filipes</i>	twining snapdragon	Native
<i>Mohavea confertiflora</i>	Mojave ghost-flower	Native
<i>Plantago ovata</i>	ovate plantain	Native
POLEMONIACEAE	phlox family	
<i>Gilia scopulorum</i>	rock gilia	Native
POLYGONACEAE	buckwheat family	
<i>Chorizanthe brevicornu</i> var. <i>brevicornu</i>	brittle spineflower	Native
<i>Chorizanthe rigida</i>	rigid spineflower	Native
<i>Eriogonum deflexum</i> var. <i>deflexum</i>	flat-crown buckwheat	Native
<i>Eriogonum inflatum</i>	inflated desert trumpet	Native
<i>Eriogonum thomasii</i>	Thomas's wild buckwheat	Native
<i>Eriogonum trichopes</i>	little desert buckwheat	Native
<i>Polygonum argyrocoleon</i>	silver-sheathed knotweed	Naturalized
RESEDACEAE	mignonette family	
<i>Oligomeris linifolia</i>	linear-leaved oligomeris	Native
SOLANACEAE	nightshade family	
<i>Datura wrightii</i>	jimson weed	Native
<i>Lycium andersonii</i>	Anderson's desert-thorn	Native
<i>Nicotiana obtusifolia</i>	desert tobacco	Native

Table D-1. Vascular Plants Observed at Topock During the March 2017 Pre-Construction Surveys

Scientific Names ¹	Common Names	Status ¹
<i>Physalis crassifolia</i>	thick-leaf ground cherry	Native
TAMARICACEAE	tamarisk family	
<i>Tamarix ramosissima</i>	salt cedar	Naturalized (<i>Cal-IPC Inventory rating: High</i>) ²
<i>Tamarix aphylla</i>	athel tamarisk	Naturalized (<i>Cal-IPC Inventory rating: Limited</i>) ²
URTICACEAE	nettle family	
<i>Parietaria hespera</i> var. <i>hespera</i>	western pellitory	Native
ZYGOPHYLLACEAE	caltrop family	
<i>Larrea tridentata</i>	creosote bush	Native
MONOCOTS		
AGAVACEAE	century-plant family	
<i>Hesperocallis undulata</i>	desert lily	Native
ARECACEAE	palm family	
<i>Washingtonia filifera</i>	California fan palm	Native (<i>CDNPA Protection</i>) ³
CYPERACEAE	sedge family	
<i>Schoenoplectus californicus</i>	California bulrush	Native
POACEAE	grass family	
<i>Aristida adscensionis</i>	six-weeks three awn	Native
<i>Arundo donax</i>	giant reed	Naturalized (<i>Cal-IPC Inventory rating: High</i>) ²
<i>Bouteloua aristidoides</i>	needle gamma	Native
<i>Bromus catharticus</i>	rescue brome	Naturalized
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome	Naturalized
<i>Cynodon dactylon</i>	Bermuda grass	Naturalized (<i>Cal-IPC Inventory rating: Moderate</i>) ²
<i>Dasyochloa pulchella</i>	fluff grass	Native
<i>Festuca myuros</i>	rat-tail fescue	Naturalized
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	hare barley	Naturalized
<i>Pennisetum setaceum</i>	feathertop	Naturalized (<i>Cal-IPC Inventory rating: Moderate</i>) ²
<i>Phragmites australis</i>	common reed	Native ⁵
<i>Hilaria jamesii</i>	James' galleta	Native
<i>Hilaria rigida</i>	big galleta	Native
<i>Schismus arabicus</i>	Arabian schismus	Naturalized (<i>Cal-IPC Inventory rating: Limited</i>) ²
<i>Schismus barbatus</i>	Mediterranean grass	Naturalized (<i>Cal-IPC Inventory rating: Limited</i>) ²
THEMIDACEAE	brodiaea family	
<i>Androstephium breviflorum</i>	small-flowered androstephium	Native (<i>CNPS Rare Plant Rank 2B.2</i>) ⁴
TYPHACEAE	cattail family	
<i>Typha</i> spp.	cattail	Native/Naturalized ⁶

Table D-1. Vascular Plants Observed at Topock During the March 2017 Pre-Construction Surveys

Scientific Names ¹	Common Names	Status ¹
-------------------------------	--------------	---------------------

Notes:

¹Taxonomic nomenclature and status are based on the March 2017 Jepson Online Interchange for California Floristics. Accessed at: <http://ucjeps.berkeley.edu/interchange/> (March 14 and 15, 2017).

²California Invasive Plant Council (CAL-IPC) Invasive Plant Inventory. Accessed at: <http://cal-ipc.org/ip/inventory/index.php> (March 15, 2017)

CAL-IPC Ratings

High – Species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – Species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – Species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

³California Desert Native Plant Act (CDNPA) – Protects California desert native plants from unlawful harvesting on both public and privately owned lands.

⁴California Native Plant Society (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California. Accessed at: <http://www.rareplants.cnps.org/> (March 15, 2017).

CNPS Rare Plant Ranks

2B.1 – Plants rare, threatened, or PA) – Protects California desert native plants from unlawful harvesting on both public and privately-owned lands.

2B.2 – Plants rare, threatened, or endangered in California, but more common elsewhere, considered to be moderately threatened in California.

4.3 – Plants of limited distribution - a watch list, not very threatened in California

⁵ Generally considered native, but global genetic issues make it uncertain which strains may be non-native in California and unclear whether it was historically present in this area.

⁶ Both *Typha angustifolia* (narrow-leaved cattail), a naturalized species and *Typha domingensis* (southern cattail) a native species have been recorded from the site, but no catkins were present at the time of the surveys so the species could not be conclusively determined.

Appendix E
CNDDDB Forms for Special-Status Plants
in the Project Area

CNDDDB Forms for Special-Status Plants in the Project Area

(1) Mouse-tail suncup (*Chylismia arenaria*)

<p style="text-align: center;">Mail to: California Natural Diversity Database Department of Fish and Game 1807 13th Street, Suite 202 Sacramento, CA 95811 Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov</p>	<p style="text-align: center; font-size: small;">For Office Use Only</p> <p>Source Code _____ Quad Code _____</p> <p>Elm Code _____ Occ. No. _____</p> <p>EO Index No. _____ Map Index No. _____</p>
<p>Date of Field Work (mm/dd/yyyy): <u>03/12/2012</u></p>	
<input type="button" value="Reset"/>	<input type="button" value="Send Form"/>
<h3>California Native Species Field Survey Form</h3>	
<p>Scientific Name: <i>Chylismia arenaria</i></p> <p>Common Name: <u>mousetail suncup</u></p>	
<p>Species Found? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No if not, why?</p> <p>Total No. Individuals <u>11</u> Subsequent Visit? <input type="checkbox"/> yes <input type="checkbox"/> no</p> <p>Is this an existing NDDB occurrence? <input type="checkbox"/> yes, Occ. # _____ <input type="checkbox"/> no <input type="checkbox"/> unk.</p> <p>Collection? If yes: _____</p> <p style="font-size: x-small;">Number _____ Museum / Herbarium _____</p>	<p>Reporter: <u>Kim Steiner</u></p> <p>Address: <u>1791 Inverness Dr.</u> <u>Petaluma, CA 94954</u></p> <p>E-mail Address: <u>ksteiner15@gmail.com</u></p> <p>Phone: <u>(415) 342-9362</u></p>
<p>Plant Information</p> <p>Phenology: <u>2</u> % vegetative <u>7</u> % flowering <u>2</u> % fruiting</p>	<p>Animal Information</p> <p># adults <input type="checkbox"/> # juveniles <input type="checkbox"/> # larvae <input type="checkbox"/> # egg masses <input type="checkbox"/> # unknown <input type="checkbox"/></p> <p>wintering <input type="checkbox"/> breeding <input type="checkbox"/> nesting <input type="checkbox"/> rookery <input type="checkbox"/> burrow site <input type="checkbox"/> other <input type="checkbox"/></p>
<p>Location Description (please attach map AND/OR fill out your choice of coordinates, below)</p> <p>Steep vertical walls of Bat Cave Wash below the Topock Compressor Station. Main population of 9 individuals at UTM 13844718.71m N 729477.77mE and elevation 124 m. Two other individuals at 13844506.53mN 729421.76 mE (elev. 122 m) and 50 feet north of 13844664.794mN 729</p> <p>County: <u>San Bernardino</u> Landowner / Mgr.: <u>PG&E</u></p> <p>Quad Name: <u>NA</u> Elevation: <u>122-136 m</u></p> <p>T _____ R _____ Sec _____, _____ ¼ of _____ ¼, Meridian: <input type="checkbox"/> H <input type="checkbox"/> M <input type="checkbox"/> S <input type="checkbox"/> W</p> <p>Source of Coordinates (GPS, topo. map & type): <u>GPS</u></p> <p>T _____ R _____ Sec _____, _____ ¼ of _____ ¼, Meridian: <input type="checkbox"/> H <input type="checkbox"/> M <input type="checkbox"/> S <input type="checkbox"/> W</p> <p>GPS Make & Model: <u>Trimble GeoXT</u></p> <p>DATUM: NAD27 <input type="checkbox"/> NAD83 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/></p> <p>Horizontal Accuracy: <u>14 feet</u> meters/feet</p> <p>Coordinate System: UTM Zone 10 <input type="checkbox"/> UTM Zone 11 <input checked="" type="checkbox"/> OR Geographic (Latitude & Longitude) <input type="checkbox"/></p> <p>Coordinates: _____</p>	
<p>Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope:</p> <p>Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):</p> <p>Edge of dry wash on vertical conglomerate cliff faces, blue palo verde woodland with Parkinsonia florida, Bebbia juncea, Hyptis emeryii, creosote bushes.</p> <p>Please fill out separate form for other rare taxa seen at this site.</p>	
<p>Site Information Overall site/occurrence quality/viability (site + population): <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</p> <p>Immediate AND surrounding land use: No immediate land use surrounding population, injection wells for ground water re-mediation nearby.</p> <p>Visible disturbances: No obvious disturbances</p> <p>Threats: Possible erosion of main population site if heavy rain falls. No obvious threat from re-mediation activities.</p> <p>Comments: _____</p>	
<p>Determination: (check one or more, and fill in blanks)</p> <p><input type="checkbox"/> Keyed (cite reference): <u>Jussieu 2</u></p> <p><input type="checkbox"/> Compared with specimen housed at: _____</p> <p><input type="checkbox"/> Compared with photo / drawing in: <u>CalFlora</u></p> <p><input checked="" type="checkbox"/> By another person (name): <u>Jim Asker</u></p> <p><input type="checkbox"/> Other: _____</p>	<p>Photographs: (check one or more)</p> <p>Plant / animal <input type="checkbox"/> Slide <input type="checkbox"/> Print <input type="checkbox"/> Digital <input checked="" type="checkbox"/></p> <p>Habitat <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Diagnostic feature <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>May we obtain duplicates at our expense? yes <input checked="" type="checkbox"/> no <input type="checkbox"/></p> <p style="font-size: x-small; text-align: right;">DFG-CNDDB Form 4/06/08</p>

(2) Hillside palo verde (*Parkinsonia microphylla*)

<p style="text-align: center;">Mail to: California Natural Diversity Database Department of Fish and Game 1807 13th Street, Suite 202 Sacramento, CA 95811 Fax: (916) 324-0475 email: CNDDDB@dfg.ca.gov</p>	<p style="text-align: center; font-weight: bold;">For Office Use Only</p> <p>Source Code _____ Quad Code _____ Elm Code _____ Occ. No. _____ EO Index No. _____ Map Index No. _____</p>												
<p>Date of Field Work (mm/dd/yyyy): <u>11/05/2011</u></p>													
<p><input type="button" value="Reset"/> California Native Species Field Survey Form <input type="button" value="Send Form"/></p>													
<p>Scientific Name: <i>Parkinsonia microphylla</i></p>													
<p>Common Name: hillside palo verde</p>													
<p>Species Found? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No # not, why? _____</p> <p>Total No. Individuals <u>150</u> Subsequent Visit? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no</p> <p>Is this an existing NDDDB occurrence? <input checked="" type="checkbox"/> no <input type="checkbox"/> unk.</p> <p>Collection? If yes: _____ Number _____ Museum / Herbarium _____</p>	<p>Reporter: <u>Kim E. Steiner</u></p> <p>Address: <u>1791 Inverness Dr., Petaluma, CA 94954</u></p> <p>E-mail Address: <u>ksteiner@garciaandassociates.com</u></p> <p>Phone: <u>(415) 342-9362</u></p>												
<p>Plant Information</p> <p>Phenology: <u>99</u>% vegetative <u>0</u>% flowering <u>1</u>% fruiting</p>	<p>Animal Information</p> <p># adults <input type="checkbox"/> # juveniles <input type="checkbox"/> # larvae <input type="checkbox"/> # egg masses <input type="checkbox"/> # unknown <input type="checkbox"/></p> <p>wintering <input type="checkbox"/> breeding <input type="checkbox"/> nesting <input type="checkbox"/> rookery <input type="checkbox"/> burrow site <input type="checkbox"/> other <input type="checkbox"/></p>												
<p>Location Description (please attach map AND/OR fill out your choice of coordinates, below)</p>													
<p>County: <u>San Bernardino</u> Landowner / Mgr.: <u>Havasu National Wildlife Refuge</u></p> <p>Quad Name: _____ Elevation: <u>175</u> m</p> <p>T. _____ R. _____ Sec. _____, _____ ¼ of _____ ¼, Meridian: <input type="checkbox"/> H <input type="checkbox"/> M <input checked="" type="checkbox"/> S <input type="checkbox"/> W</p> <p>Source of Coordinates (GPS, topo. map & type): <u>GPS</u></p> <p>T. _____ R. _____ Sec. _____, _____ ¼ of _____ ¼, Meridian: <input type="checkbox"/> H <input type="checkbox"/> M <input checked="" type="checkbox"/> S <input type="checkbox"/> W</p> <p>GPS Make & Model: <u>Garmin GeoXT</u></p> <p>DATUM: NAD27 <input type="checkbox"/> NAD83 <input checked="" type="checkbox"/> WGS84 <input type="checkbox"/> Horizontal Accuracy <u>17</u> feet _____ meters/feet</p> <p>Coordinate System: UTM Zone 10 <input type="checkbox"/> UTM Zone 11 <input checked="" type="checkbox"/> OR Geographic (Latitude & Longitude) <input type="checkbox"/></p> <p>Coordinates: _____</p>													
<p>Habitat Description (plants & animals) plant communities, dominants, associates, substrates/soils, aspects/slope: Animal Behavior (Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna): <u>Parkinsonia microphylla</u> shrubland on rocky NE-facing slope above the western banks of the Colorado River with <u>Encelia farinosa</u>, <u>Bebbia juncea</u> var. <u>aspera</u> and <u>Larrea tridentata</u>. Northern edge of the Chemehevi Mountains in California.</p> <p>Please fill out separate form for other rare taxa seen at this site.</p>													
<p>Site Information Overall site/occurrence quality/viability (site + population): <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</p> <p>Immediate AND surrounding land use: <u>Most of population is within the Havasu National Wildlife Refuge just above Colorado River.</u></p> <p>Visible disturbances: <u>gravel roads through population, disturbance from buried gas pipelines</u></p> <p>Threats: <u>No obvious threats</u></p> <p>Comments: <u>Sympatric with Parkinsonia florida on edge of population. Several individuals appear to be hybrids</u></p>													
<p>Determination: (check one or more, and fill in blanks)</p> <p><input type="checkbox"/> Keyed (cite reference): _____</p> <p><input type="checkbox"/> Compared with specimen housed at: _____</p> <p><input type="checkbox"/> Compared with photo / drawing in: <u>Jensen Online Interchange</u></p> <p><input checked="" type="checkbox"/> By another person (name): <u>James Andrie</u></p> <p><input type="checkbox"/> Other: _____</p>	<p>Photographs: (check one or more)</p> <table border="0"> <tr> <td>Plant / animal</td> <td>Slide <input type="checkbox"/></td> <td>Print <input type="checkbox"/></td> <td>Digital <input checked="" type="checkbox"/></td> </tr> <tr> <td>Habitat</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Diagnostic feature</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table> <p>May we obtain duplicates at our expense? yes <input checked="" type="checkbox"/> no <input type="checkbox"/></p>	Plant / animal	Slide <input type="checkbox"/>	Print <input type="checkbox"/>	Digital <input checked="" type="checkbox"/>	Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Diagnostic feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plant / animal	Slide <input type="checkbox"/>	Print <input type="checkbox"/>	Digital <input checked="" type="checkbox"/>										
Habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
Diagnostic feature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										

DFG-CNDDB1147 Rev. 4/06/08

(3) Spiny-hair blazing star (*Mentzelia tricuspis*)

CNDDDB Online Field Survey Form Report



California Natural Diversity Database
 Department of Fish and Wildlife
 1416 9th Street, Suite 1266
 Sacramento, CA 95814
 Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/



Source code HUD17F0004

Quad code 3411465

Occ. no. _____

EO index no. _____

Map index no. _____

This data has been reported to the CNDDDB, but may not have been evaluated by the CNDDDB staff

Scientific name: *Mentzelia tricuspis*

Common name: spiny-hair blazing star

Date of field work (mm-dd-yyyy): 03-15-2017

Comment about field work date(s): _____

OBSERVER INFORMATION

Observer: Russell T. Huddleston

Affiliation: CH2M HILL

Address: 155 Grand Ave Oakland, CA 94612

Email: russell.huddleston@ch2m.com

Phone: (916) 296-6792

Other observers: Curt Russell and Brandy McWain

DETERMINATION

Keyed in: _____

Compared w/ specimen at: Observed plants in flower at references site just north of this observation

Compared w/ image in: _____

By another person: _____

Other: _____

Identification explanation: _____

Identification confidence: Confident

Species found: Yes If not found, why not? _____

Level of survey effort: Focused survey for Mentzelia tricuspis

Total number of individuals: ~450

Collection? No Collection number: _____

Museum/Herbarium: _____

PLANT INFORMATION

Phenology:	<u>0 %</u>	<u>100 %</u>	<u>0 %</u>
	vegetative	flowering	fruiting

SITE INFORMATION

Habitat description: Creosote bush scrub - plants found on rocky slopes above washes

Slope: _____ Land owner/manager: BLM

Aspect: _____

Site condition + population viability: Good

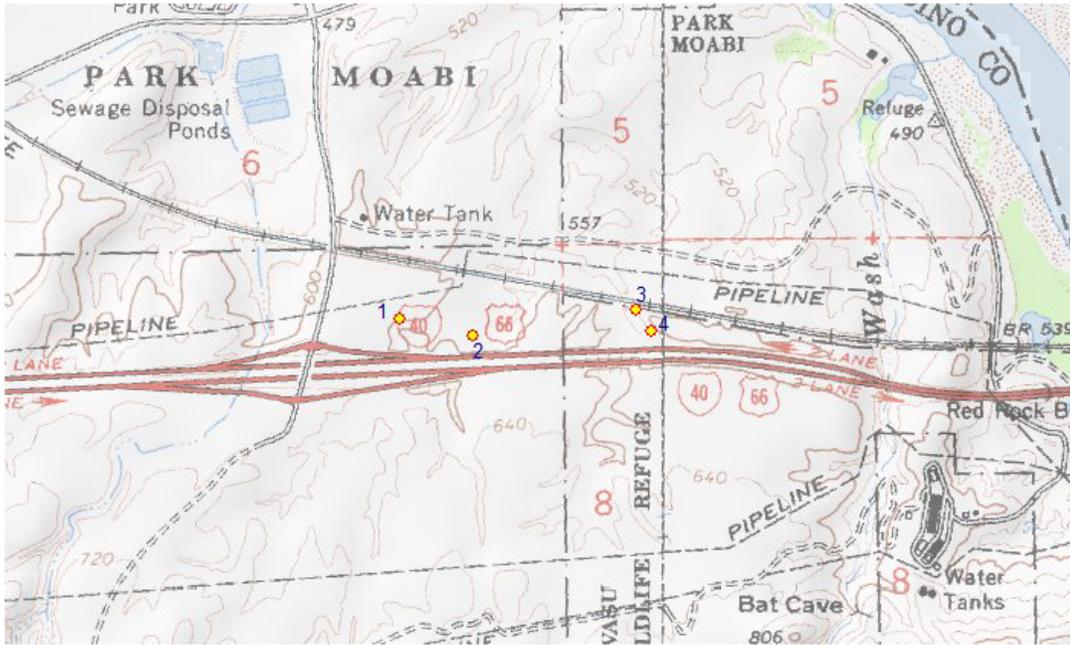
Immediate & surrounding land use: Open space, BNSF Railroad tracks and Interstate 40

Visible disturbances: None

Threats: Threats generally low, possibel some OHV use of washes and trails in this area.

General comments:

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
1	San Bernardino	Whale Mtn.	602	34.71881	-114.50821	728180	3844688	11
	Public Land Survey	Feature Comment						
	S T07N R.24E 7	METR ~250 Plants						
2	San Bernardino	Whale Mtn.	594	34.71841	-114.50614	728371	3844649	11
	Public Land Survey	Feature Comment						
	S T07N R.24E 7	METR ~100 Plants						
3	San Bernardino	Whale Mtn.	563	34.71903	-114.50157	728787	3844728	11
	Public Land Survey	Feature Comment						
	S T07N R.24E 8	METR ~30 Plants						
4	San Bernardino	Whale Mtn.	574	34.71852	-114.50111	728831	3844673	11
	Public Land Survey	Feature Comment						
	S T07N R.24E 8	METR ~75 Plants						

The mapped feature is accurate within: 20 m

Source of mapped feature: [Google Earth Map and Garmin Points](#)

Mapping notes:

Location/directions comments: Plants found on the North side of Interstate 40 south of the BNSF Railroad Tracks between 0.1 and 0.5 miles east of Park Moabi Road

Attachment(s):

CNDDDB Online Field Survey Form Report



California Natural Diversity Database
 Department of Fish and Wildlife
 1416 9th Street, Suite 1266
 Sacramento, CA 95814
 Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodeta/cnddb/



Source code	<u>HUD17F0003</u>
Quad code	<u>3411465</u>
Occ. no.	_____
EO index no.	_____
Map index no.	_____

This data has been reported to the CNDDDB, but may not have been evaluated by the CNDDDB staff

Scientific name: *Mentzelia tricuspis*

Common name: spiny-hair blazing star

Date of field work (mm-dd-yyyy): 03-09-2017

Comment about field work date(s): _____

OBSERVER INFORMATION

Observer: Russell T. Huddleston

Affiliation: _____

Address: 155 Grand Ave Suite 800, Oakland, CA 94612

Email: russell.huddleston@ch2m.com

Phone: (916) 296-6792

Other observers: _____

DETERMINATION

Keyed in: Jepson Desert Manual

Compared w/ specimen at: _____

Compared w/ image in: Cal Photos

By another person: _____

Other: _____

Identification explanation: _____

Identification confidence: Very confident

Species found: Yes If not found, why not? _____

Level of survey effort: Protocol Level Botanical Survey

Total number of individuals: 15

Collection? No

Collection number: _____

Museum/Herbarium: _____

PLANT INFORMATION

Phenology:	<u>70 %</u>	<u>30 %</u>	<u>0 %</u>
	vegetative	flowering	fruiting

SITE INFORMATION

Habitat description: Surrounding plant community consists of creosote bush scrub

Slope: 0-30

Land owner/manager: PG&E

Aspect: South

Site condition + population viability: Fair

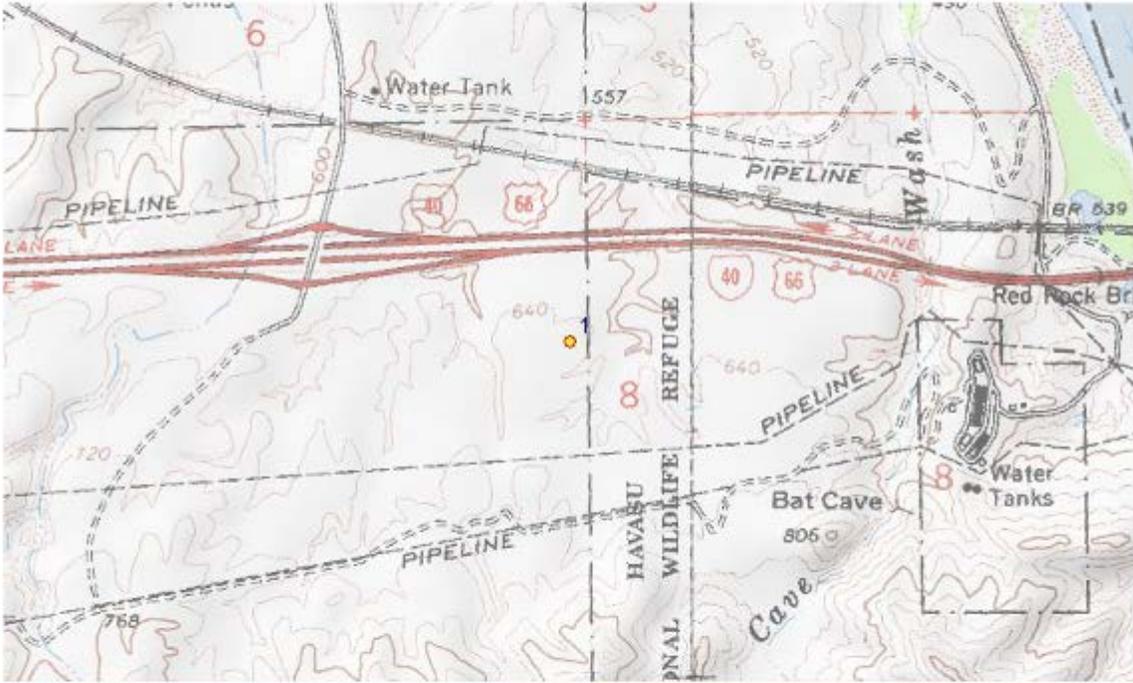
Immediate & surrounding land use: Plants growing on gravel berm of evaporation pond within fenced area. Surrounding land use consists of open lands with scattered unpaved roads.

Visible disturbances: None

Threats: Plants are located on the top and sides of a gravel berm around an evaporation pond; routine inspection and maintenance activities occur in this area.

General comments: PG&E staff are aware of the population and will take measures to avoid and minimize impacts to the extent possible.

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	San Bernardino	Whale Mtn.	646	34.71567	-114.50402	728573	3844349	11
1	Public Land Survey	Feature Comment						
	S T07N R.24E 7	Mentri - 15 Plants						

The mapped feature is accurate within: 5 m

Source of mapped feature: Trimble Geo-XT GPS

Mapping notes: Plants growing on gravel berm surrounding evaporation pond.

Location/directions comments: Ponds are located south of I-40 approximately 0.3 miles east of Park Moabi Road. Evaporation ponds are suron PG&E property and are surrounded by a chain link fence with a locked gate.

Attachment(s): Mentri_Evap_Ponds.jpg, Map Location on Google Earth

CNDDDB Online Field Survey Form Report



California Natural Diversity Database
 Department of Fish and Wildlife
 1416 9th Street, Suite 1266
 Sacramento, CA 95814
 Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/bioqecodata/cnddb/



Source code	HUD17F0005
Quad code	3411485
Occ. no.	_____
EO index no.	_____
Map index no.	_____

This data has been reported to the CNDDDB, but may not have been evaluated by the CNDDDB staff

Scientific name: [Mentzelia tricuspis](#)

Common name: [spiny-hair blazing star](#)

Date of field work (mm-dd-yyyy): [03-09-2017](#)

Comment about field work date(s): _____

OBSERVER INFORMATION

Observer: [Russell T. Huddleston](#)
 Affiliation: [CH2M HILL](#)
 Address: [155 Grand Ave Oakland CA 94612](#)
 Email: russell.huddleston@ch2m.com
 Phone: [\(916\) 296-6792](#)
 Other observers: _____

DETERMINATION

Keyed in: [Jepson Desert Manual](#)
 Compared w/ specimen at: _____
 Compared w/ image in: _____
 By another person: _____
 Other: _____
 Identification explanation: _____
 Identification confidence: [Very confident](#)

Species found: [Yes](#) If not found, why not? _____

Level of survey effort: [Botanical Survey](#)

Total number of individuals: [450+](#)

Collection? [Yes](#) Collection number: [Russell Huddleston](#)
 Museum/Herbarium: [U.C Davis](#)

PLANT INFORMATION

Phenology:	50 %	50 %	0 %
	vegetative	flowering	fruiting

SITE INFORMATION

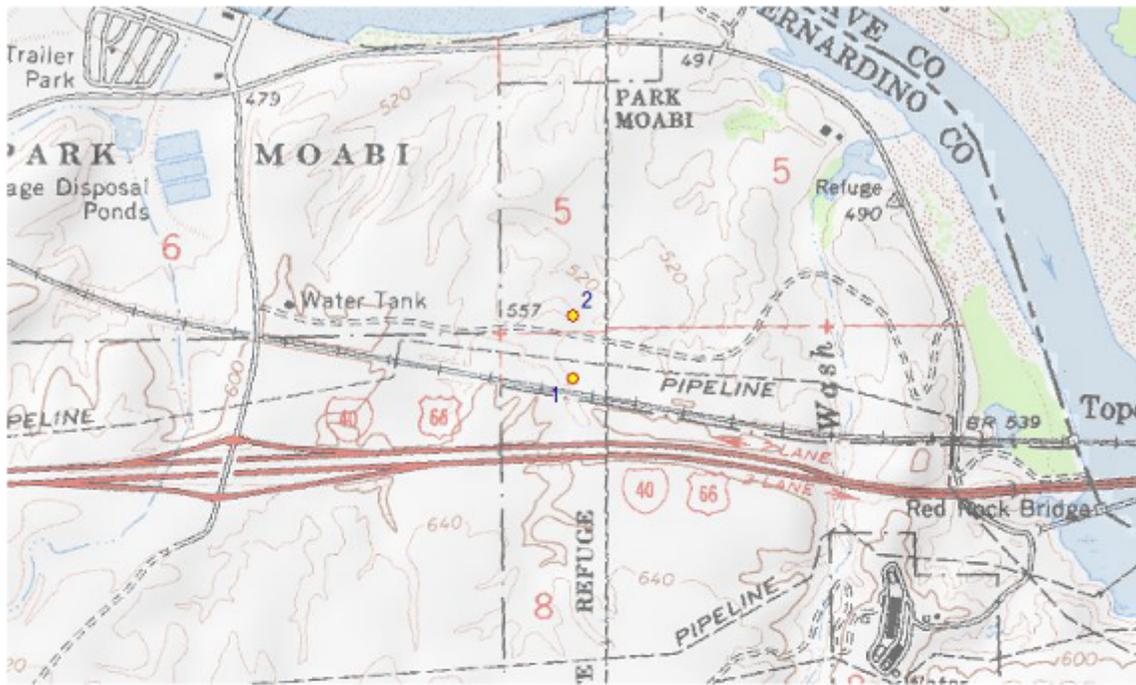
Habitat description: [Creosote Bush scrub, rocky slopes above washes; associated species include Phacelia crenulata, Geraea canescens and Chylismia brevipes](#)
 Slope: [30% to 70%](#) Land owner/manager: [BLM](#)
 Aspect: [South and West](#)
 Site condition + population viability: [Good](#)
 Immediate & surrounding land use: [Mostly open space, BNSF Railroad tracks and Interstate 40 to the south.](#)

Visible disturbances: None

Threats: Possible some OHV use of washes

General comments:

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	San Bernardino	Whale Mtn.	565	34.71954	-114.50169	728775	3844784	11
1	Public Land Survey	Feature Comment						
	S T07N R.24E 8	METR ~150 Plants						
ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	San Bernardino	Whale Mtn.	559	34.72090	-114.50169	728771	3844935	11
2	Public Land Survey	Feature Comment						
	S T07N R.24E 5	METR ~450 Plants						

The mapped feature is accurate within: 5 m

Source of mapped feature: Trimble GPS

Mapping notes:

Location/directions comments: Approximately 0.2 mile north of Interstate 40, on the north side of the BNSF Railroad tracks and 0.6 miles east of Park Moabi Road

Attachment(s):

