Topock Project Executive Abstract

Document Title:

Topock Groundwater Remediation Project Revised Floristic Survey Report (PGE20131230A)

Submitting Agency: DTSC, DOI

Final Document? ☒ Yes ☐ No

Date of Document: December 30, 2013

Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) – PG&E

Priority Status: ☐ HIGH ☐ MED ☒ LOW
Is this time critical? ☐ Yes ☒ No

Type of Document:
☐ Draft ☒ Report ☐ Letter ☐ Memo
☐ Other / Explain:

Action Required:
☒ Information Only ☐ Review & Comment
Return to: _____
By Date:_____
☐ Other / Explain:

What does this information pertain to?
☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)
☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)
☐ Corrective Measures Study (CMS)/Feasibility Study (FS)
Corrective Measures Implementation (CMI)/Remedial Action
X California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR)
☐ Interim Measures
☐ Other / Explain:

Is this a Regulatory Requirement?
☒ Yes
☐ No
If no, why is the document needed?

What is the consequence of NOT doing this item? What is the consequence of DOING this item?
This report presents data collected during surveys made in compliance with the EIR mitigation measures AES-1a, AES-2b, and CUL-1a-5. If this work was not performed, it would constitute a non-compliance with the EIR mitigation measure.

Other Justification/s:
☐ Permit ☐ Other / Explain:

Brief Summary of attached document:

The Final Environmental Impact Report (EIR) for the Topock Compressor Station Groundwater Remediation Project prescribes mitigation measures to reduce impacts associated with the groundwater remedy design and cleanup. In compliance with EIR mitigation measures (AES-1a/AES-2b) and CUL-1a-5), PG&E conducted a comprehensive floristic survey with field efforts in August and November 2011, March 2012, and March 2013. Incidental floristic data was also collected during the February 2012 Wetlands surveys performed under mitigation measure BIO-1. On March 29, 2013, PG&E submitted a report that summarizes the 2011 and 2012 floristic survey results. This report included the 2013 survey results, and detailed maps of Federal and State listed rare plant occurrence, as well as appendices of photographs and GPS data. The data presented with this report have been considered in the groundwater remedy design.

Written by: PG&E

Recommendations:
This report is for your information only.

How is this information related to the Final Remedy or Regulatory Requirements:

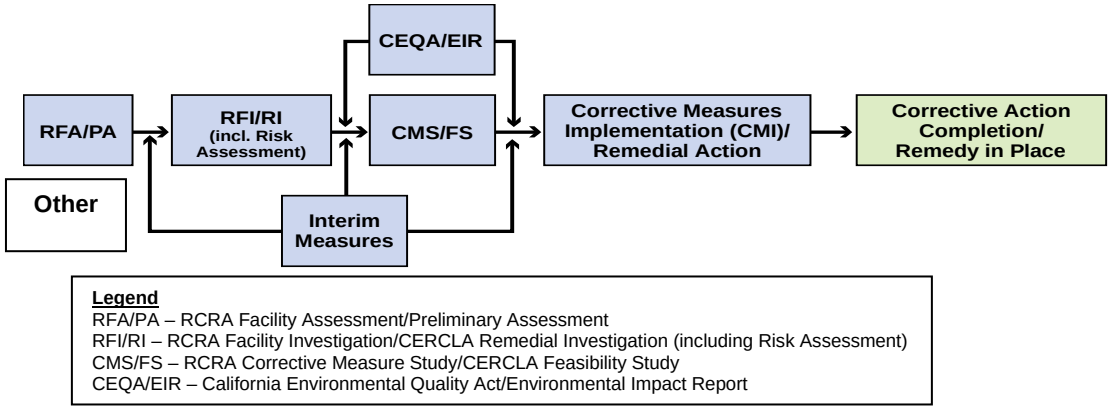
This report presents data collected for use with the remedy design. The comprehensive Floristic Survey collected data for compliance with EIR mitigation measures AES-1a, AES-2b, and CUL-1a-5, with separate reports issued in relation to those mitigation measures. Rare plant results are also reported herein.

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

Pacific Gas and Electric Company®

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Environmental Remediation

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December 30, 2013

Mr. Aaron Yue
Project Manager
California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Subject: *Topock Groundwater Remediation Project Revised Floristic Survey Report* (Document ID: PGE20131230A)

Dear Mr. Yue:

Enclosed is the *Topock Groundwater Remediation Project Revised Floristic Survey Report*. This revised report presents Floristic data that was collected in compliance with the requirements of EIR mitigation measures AES-1a, AES-2b, and CUL-1a-5. This report expanded upon the last report published in March 2013, and includes the 2013 floristic survey results as well as detailed maps of Federal and State listed rare plant occurrence. This information have been used in the groundwater remedy design.

Please contact me at (805) 234-2257 or Virginia Strohl at (559) 263-7417 if you have any questions on the delineation.

Sincerely,

Yvonne Meeks
Topock Project Manager

Enclosure
Topock Groundwater Remediation Project Revised Floristic Survey Report

cc: Karen Baker/DTSC
Pam Innis/DOI
Carrie Marr/FWS

REVISED FINAL

Topock Groundwater Remediation Project Floristic Survey Report

Prepared for

Pacific Gas and Electric Company

December, 2013

Prepared by

Garcia and Associates (GANDA)

and

CH2M HILL

Contents

Appendices

Acronyms and Abbreviations

ADA	Arizona Department of Agriculture
BLM	Bureau of Land Management
BN&SF	Burlington Northern and Santa Fe
CDNPA	California Desert Native Plants Act
CEQA	California Environmental Quality Act
CDFG	California Department of Fish and Game
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Ranked
DTSC	California Department of Toxic Substance Control
EIR	Environmental Impact Report
I-40	Interstate 40
PG&E	Pacific Gas and Electric Company
Project Area	Topock Groundwater Remediation Project Area
TCS	Topock Compressor Station
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SECTION 1

Introduction

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). The California Department of Toxic Substance 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 an environmental impact report (EIR) (DTSC, 2011) that evaluated and prescribed mitigation measures to lessen the potential environmental impacts of the final groundwater remedy.

The purpose of this report is to establish a comprehensive inventory of plant species that occur in the PG&E Topock Groundwater Remediation Project Area (Project Area), and to identify any special-status plant species (as defined in the *Methodology* section below). The Mitigation Measures contained in the January 2011 EIR included specific cultural and aesthetic protection requirements (DTSC, 2011). These Mitigation Measures require PG&E to avoid, protect, and encourage the regeneration of special-status plant species. Vegetation surveys within the EIR Project Area were required to comply with cultural resource measure CUL-1a-5 to identify traditional culturally (ethnobotanically) significant plants, and aesthetics measures AES-1a and AES-2b to identify mature plant specimens intrinsic to key viewsheds. Additionally, biology mitigation measure BIO-1 required that a Section 404 wetland delineation be prepared. In order to collect data for these specific mitigation measures, a comprehensive floristic survey was performed. Results specific to the ethnobotanical and mature plants surveys were reported separately. This report presents overall floristic and rare plant results from the botanical surveys and other field surveys and includes a preliminary avoidance and restoration plan for rare and sensitive species. The location of the Compressor Station is indicated in Figure 1, and the survey segments comprising the Project Area are depicted in Figure 2.

1.1 Project Location

The Topock Compressor Station (TCS) 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 off of Interstate 40 (I-40). At Moabi Regional Park, the roadway connects to National Trails Highway, which extends eastward and then southward for more than a mile along the Colorado River to the Topock Compressor Station.

1.2 Project Area

The approximately 1,057-acre Project Area for the purpose of the botanical surveys includes the 780-acre Project Area covered in the EIR as well as an additional 277 acres, associated with the evaluation for the freshwater well locations along Oatman-Topock Highway in Arizona. Of the 277 acres surveyed for the freshwater well locations, only 75 acres were subsequently added to the EIR Project Area with the Freshwater EIR Addendum. Elevation ranges from approximately 400 to 700 feet above sea level. The survey team divided the Project Area into twelve segments designated A—L (Figure 2). One of these, Segment K, contains the evaporation ponds for the TCS. While the existing evaporation ponds may be used for wastewater from the final remedy this segment was later excluded due to the limited existing vegetation within the fenced areas. Of the remaining 11 segments, eight (A, B, C, D, E, H, I, and L) are located in San Bernardino County, California, and three (F, J, and G) are located in Mohave County, Arizona (Figure 2). Segments of the Project Area within California are primarily on land managed by the Bureau of Land Management (BLM) or the U.S. Fish and Wildlife Service (USFWS); with the exception of portions of segments C and D, which are owned by the Fort Mojave Indian Tribe; and a portion of Segment H,

which is owned by PG&E. On the Arizona side of the Colorado River, Segment F and most of Segment G are part of the USFWS Havasu National Wildlife Refuge, and land in Segment J and a portion of Segment G are on privately owned land.

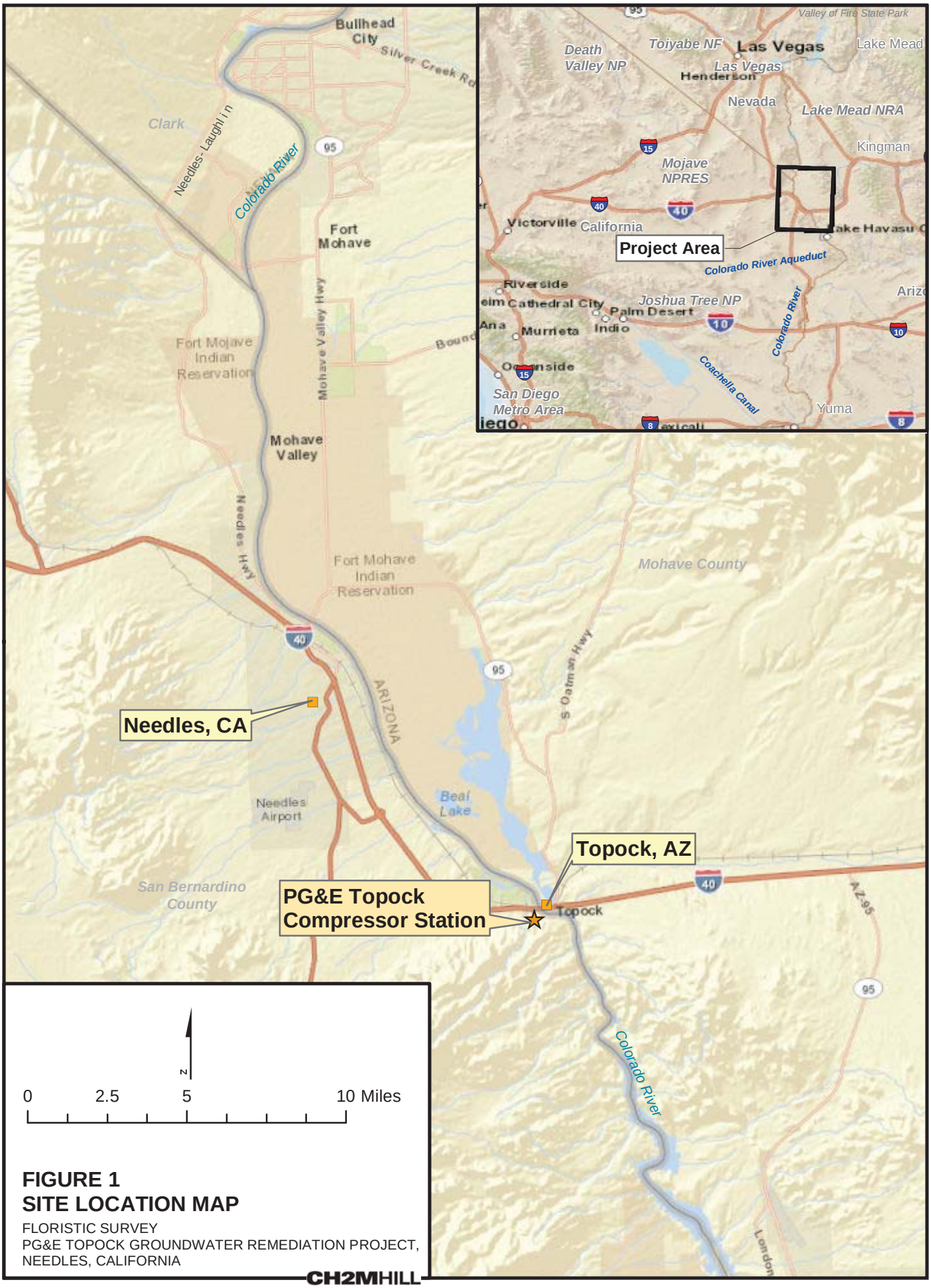

FIGURE 1
SITE LOCATION MAP

FLORISTIC SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

CH2MHILL

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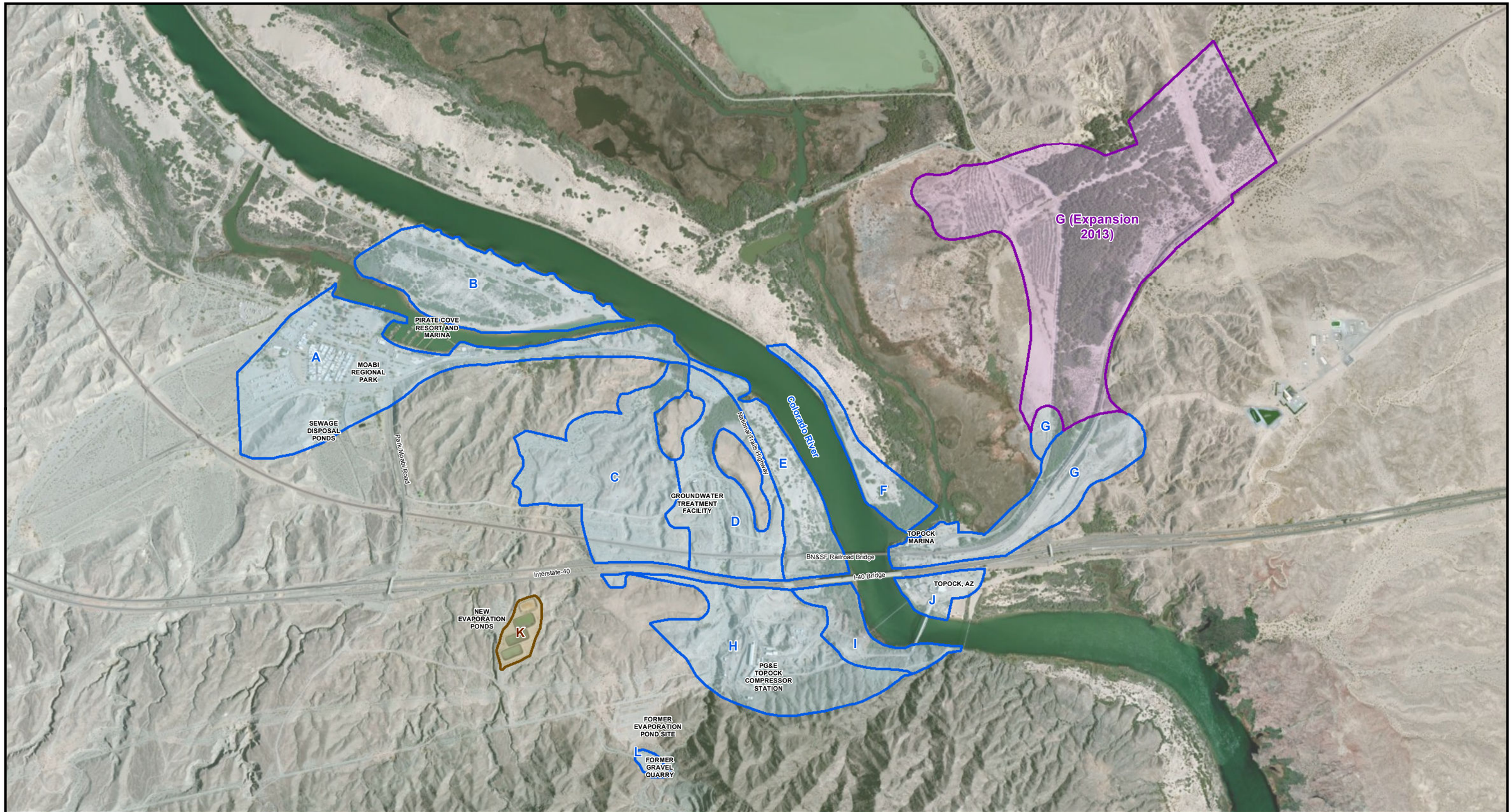

FIGURE 2
PROJECT AREA WITH BOTANICAL SURVEY SEGMENTS

FLORISTIC SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\CMS\BioSurveySegements

SECTION 2

Vegetation Communities of the Project Area

There are ten primary terrestrial plant community types, and three major wetland communities in the Project Area. The primary terrestrial plant community types are creosote bush scrub, tamarisk thickets, arrow weed thickets, blue palo verde woodlands, catclaw acacia thorn scrub, hillside palo verde scrub, allscale scrub, quailbush scrub, western honey mesquite bosque, and screwbean mesquite bosque. 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. A detailed vegetation map with additional community types found in the Project Area is provided in Figure 3.

2.1 Terrestrial Communities

2.1.1 Creosote Bush Scrub

The most common and widespread plant community in the Project Area is creosote bush 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*), and silver cholla (*Cylindropuntia echinocarpa*). Creosote bush scrub occurs throughout the dissected alluvial terraces in the Project Area (Appendix C, Plate 5, G-5).

2.1.2 Tamarisk Thicket

Tamarisk thicket is found primarily on the east side of the Oatman-Topock Highway in Segment G and along the low sandy terraces adjacent to the Colorado River and the inlet to Pirate's Cove between Segments A and B (Appendix C, Plate 3, E-1 and E-2, Plate 4, G-2). This vegetation type is also found near the terminus of the larger ephemeral washes in Survey Segments A, C, and D (Appendix C, Plate 3, D-2) south of the National Trails Highway. 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 Thicket

Arrow weed thicket is found on the low sandy terraces along the Colorado River and Park Moabi Slough (Appendix C, Plate 4, F-1). Arrow weed is the sole dominant shrub species with individuals widely scattered or aggregated into dense, nearly impenetrable stands. It is most common in Survey segments A, B, E, and F and often intermixes with tamarisk thickets and mesquite bosque. Associated species include salt cedar, smoke tree (*Psorothamnus spinosus*), 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 Woodland

Blue palo verde woodland occurs along the edges and throughout the channel bottoms of the larger ephemeral washes in the dissected alluvial terraces south of the Colorado River (Appendix C, Plate 3, D-1). This vegetation type is also present in the northern and eastern parts of Segment G on 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 smoke tree 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

In the Project Area catclaw acacia thorn scrub is limited to the bottoms of moderate-sized ephemeral washes in the dissected terraces south of the National Trails Highway. 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 Hillside Palo Verde Scrub

Hillside palo verde scrub is restricted to a small area east of the compressor station along the slopes of the Chemehuevi Mountains (Appendix C, Plate 6, I-3). Vegetation in this area is characterized by scattered hillside 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

Quailbush scrub is dominated by big saltbush (*Atriplex lentiformis*) and occurs on low-lying alkaline or saline soils. This community is most common in Segment G, where it occurs on the Havasu National Wildlife Refuge west of the Oatman-Topock Highway (Appendix C, Plate 4, G-3). The only common associate at this site is bush seepweed (*Suaeda moquinii).* A small area of Quailbush scrub also occurs near the Colorado River in Segment J at the foot of the southernmost natural gas pipeline bridge (Appendix C, Plate 6, J-1).

2.1.8 Allscale Scrub

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, allscale scrub is most common along the National Trails Highway in Segments A, C, D and H. A small area of all scale shrub is also present in Segment J, south of the pipeline bridge and cattle saltbush is the characteristic shrub in a large open area on the east side of the Burlington Northern and Santa Fe (BN&SF)railroad tracks in Segment G.

2.1.9 Western Honey Mesquite Bosque

Western Honey Mesquite bosque is mostly found on the low sandy terraces along the Colorado River in Survey segments A, B, E, and F, where it occurs intermixed with tamarisk thickets (Appendix C, Plate 4, F-2)., but also occurs in a few scattered locations on the Havasu National Wildlife Refuge on the east side of the Oatman-Topock Highway in Survey Segment G.

2.1.10 Screwbean Mesquite Bosque

Screwbean Mesquite bosque is largely restricted to the low terraces along the Colorado River where it is concentrated in three relatively small areas of Segments A, B and E. It is most abundant in Survey Segment B across from the Topock Marina, along the southwestern shoreline of the segment (Appendix C, Plate 4, F-2). It is

also a principal component of the screwbean/tamarisk thicket vegetation that covers the southern portion of Segment B. In Segment E, it is common on the California side of the Colorado River near the BN&SF railroad bridge. In Segment A, it is locally common and near the cattail marshes that are present in the panhandle of Segment A. Screwbean mesquite was also planted in a portion of Survey Segment G on the Havasu National Wildlife Refuge following a 2008 wildfire.

2.2 Wetland Communities

Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming three principal wetland communities, from the mostly submerged broad-leaved cattail (*Typha latifolia*) marshes and California bulrush (*Schoenoplectus californicus*) marshes, to the adjacent but somewhat drier common reed (*Phragmites australis*) marshes. The common reed marshes are concentrated and most extensive along the edges of the low terraces next to the Colorado River in Segment I (Appendix C, Plate 6, I-1), whereas the bulrush marshes occur just offshore in standing water in all segments of the Project Area that include shoreline. California bulrush is also the dominant species in the portion of the Topock Marsh along the west side of the Oatman-Topock Highway in Segment G. It is likely that the common reed species in the Project Area is an invasive, non-indigenous form of *Phragmites australis*.

2008
Burn Area

Refference:

[1] Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California vegetation, 2nd ed. California Native Plant Society, Sacramento, CA.

Aerial Image Source:

Toponex Inc. aerial flyover, conducted August 2011

LEGEND

Project Area

Vegetation Types

- Desert Lilly
- Allscale Scrub (MCV2[1]: Allscale scrub) [1]
- Arrow Weed (MCV2: Arrow weed thickets)[2]
- Athel Tamarisk (MCV2: Tamarisk thickets)[3]
- Blue Paloverde (MCV2: Blue palo verde-Ironwood woodland)[4]
- Blue Paloverde/Catclaw Acacia (MCV2: Blue palo verde-Ironwood woodland)[5]
- Blue Paloverde/Honey Mesquite (MCV2: Blue palo verde woodland)[6]
- Broad-leaved Cattail (MCV2: Cattail marshes)[7]
- California Bullrush (MCV2: California bulrush marsh)[8]
- Catclaw Acacia (MCV2: Catclaw acacia thorn scrub)[9]
- Common Reed (MCV2: Common reed marshes)[10]
- Creosote bush scrub (MCV2:Creosote bush scrub)[11]
- Creosote Bush/Cattle Saltbush (MCV2: Allscale scrub)[12]
- Desert Smoke Tree (MCV2: Blue palo verde-Ironwood woodland)[13]
- Developed/Disturbed[14]
- Giant Reed (MCV2:Giant reed breaks)[15]
- Hillside Paloverde (MCV2: Foothill palo verde desert scrub)[16]
- Honey Mesquite (MCV2: Mesquite bosque)[17]
- Landscaped[18]
- Open Water [19]
- Quailbush Scrub (MCV2: Quailbush scrub)[20]
- Salt Cedar (MCV2: Tamarisk thickets)[21]
- Salt Cedar/Arrow Weed (MCV2: Tamarisk/Arrow weed thickets)[22]
- Salt Cedar/Athel Tamarisk (MCV2: Tamarisk thickets)[23]
- Salt Cedar/Honey Mesquite (MCV2: Tamarisk thickets/Mesquite bosque)[24]
- Salt Cedar/Honey Mesquite/Blue Paloverde (MCV2: Tamarisk thickets/Mesquite bosque/Blue palo verde-Ironwood woodland)[25]
- Salt Cedar/Screwbean Mesquite (MCV2: Tamarisk thickets/ Screwbean mesquite bosque)[26]
- Screwbean Mesquite (MCV2: Screwbean mesquite bosque)[27]
- Wetland [28]

FIGURE 3
VEGETATION COMMUNITIES IN PROJECT AREA

FLORISTIC SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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SECTION 3

Survey Segments in the Project Area

The Project Area was divided into twelve Survey Segments designated A—L (Figure 2). Segment K, which contains the evaporation ponds for the Topock Compressor Station, was later excluded from the survey due to limited existing vegetation within the fenced areas. Following the initial botanical surveys, an additional 277 acres, associated with potential freshwater well locations, were added onto Segment G (Figure 2). The following sections provide a brief description of each of the survey segments in the Project Area. Representative photographs of the Survey Segments are provided in Appendix C.

Segment A: The western portion of Segment A, north of National Trails Highway, includes the developed and landscaped areas of Moabi Regional Park and Pirates Cove Resort and Marina (Appendix C, Plate 1, A-4 and A-5. The developed portion of Moabi Regional Park includes offices, a mobile home park, a recreational vehicle storage lot, parking areas, campgrounds, and a boat launch. Pirate's Cove Resort includes a marina, a store, a restaurant, vacation housing, and paved and unpaved parking lots. The landscaped areas of Moabi Regional Park and Pirate's Cove are planted primarily with Mexican fan palm (*Washingtonia robusta*), but they also include California fan palm (*Washingtonia filifera*), western honey mesquite, Fremont's cottonwood *(Populus fremontii*), eucalyptus (*Eucalyptus* spp.), and other native and exotic landscape plants. Undeveloped areas with natural vegetation are restricted primarily to areas to the south of National Trails Highway with the exception of the sewage disposal ponds on the southwest corner of Park Moabi Road and National Trails Highway (Appendix C, Plate 1, A-3). On the south side of National Trails Highway, there is a broad dry wash that is partially channelized and includes blue palo verde, smoke tree, and creosote bush (Appendix C, Plate 1, A-1). This wash drains into a low-lying area covered with blue palo verde woodland, and tamarisk thickets. The flat-topped hill to the south and west of the wash is covered with desert pavement on top and steep gravely slopes on the sides (Appendix C, Plate 1, A-2). The top and steep side slopes of this hill are characterized by creosote bush and beavertail cactus.

The eastern portion of Segment A resembles a pan handle (Figure 2) and is covered primarily in creosote bush scrub on the rocky hillslopes. On the adjacent flats are small patches of a variety of other vegetation types including wetlands with California bulrush, common reed and giant reed (*Arundo* donax) along the edge of the cove. Away from the water's edge are tamarisk thickets, mixed western honey mesquite/tamarisk thickets, screwbean mesquite thickets, arrow weed thickets, a cattail marsh, and creosote bush and allscale scrub. On the south side of National Trails Highway are hills covered in creosote bush scrub with the low areas characterized by tamarisk thickets or tamarisk/western honey mesquite thickets.

Segment B: This segment is a peninsula that was partially created with dredge sands from the Colorado River and Park Moabi Slough during the late-1940s through the mid-1960s. The central portion of the peninsula is dominated by arrow weed thickets (Appendix C, Plate 1, B-1) and tamarisk thickets with scattered fanleaf crinklemat, and open sandy areas with scattered individuals of western honey mesquite, smoke tree, and creosote bush. The area along the edge of the Colorado River consists of a series of camping areas and restrooms (Appendix C, Plate 2, B-2). Landscape plantings in this area include Fremont's cottonwood, eucalyptus, and athel tamarisk. On the cove side is a small wetland area dominated by California bulrush, broad-leaved cattail, geniculate spike rush (*Eleocharis geniculata*), rough-glume bushy blue stem (*Andropogon glomeratus* ssp. *scabriglumis*) and other wetland plants. The majority of the cove side is characterized by a cleared and maintained public beach (Appendix C, Plate 2, B-3).

Segment C: This segment consists of alluvial terraces dissected by small natural drainage channels that converge on a single broad sandy wash. The wash is characterized by blue palo verde woodland with catclaw acacia scrub, and an area of creosote bush mixed with cattle salt bush (Appendix C, Plate 2, C-1, C-2, C-3). There is also a large

area containing tamarisk thickets near the National Trails Highway. The surrounding rocky hills are mostly flat on the tops with desert pavement (Appendix C Plate 2, C-4). These areas are characterized by creosote bush and white bursage.

Segment D: This segment is similar to Segment C with rocky, dissected alluvial terraces characterized by creosote bush and white bursage that is bisected by a major wash system, (Bat Cave Wash). Most of this wash is characterized by blue palo verde woodland with occasional smoke trees (Appendix C, Plate 3, D-1), but it ends in an extensive tamarisk thicket with some western honey mesquite (Appendix C, Plate 3, D-2) before passing under the road and emptying into the Colorado River (Appendix C, Plate 3, E-3).

Segment E: This segment is mostly a sandy flood plain extending northward from the I-40 Bridge to just beyond the outlet for Bat Cave Wash into the Colorado River. The sandy nature of the flood plain is due to dredge sands deposited during the channelization of the Colorado River during the late-1940s through the mid-1960s. The major vegetation types in this segment are arrow weed and tamarisk thickets (Appendix C, Plate 3, E-1 and E-2). There are also some rocky upland slopes dominated by creosote bush scrub, with scattered individuals of blue palo verde and western honey mesquite extending up to the National Trails Highway along the western edge of the segment. There is also a small area of creosote bush scrub on the northwest side of the Bat Cave Wash outlet to the Colorado River (Appendix C, Plate 3, E-4).

Segment F: This segment is in Arizona, directly across the Colorado River from Segment E. Similar to Segment E, it consists mainly of dredge sands that are dominated by arrow weed thickets (Appendix C, Plate 4, F-1), tamarisk thickets or tamarisk thickets mixed with athel tamarisk or screwbean mesquite. However, unlike Segment E, this entire segment is a low sandy terrace with no rocky hills or creosote bush scrub vegetation. There is a small wetland along the southern edge, across from the Topock Marina (Appendix C, Plate 4, F-2). This wetland is dominated by California bulrush, common reed, and sand-bar willow (*Salix exigua*), with some marsh fleabane (*Pluchea odorata*), geniculate spikerush and other wetland species (Appendix C, Plate 4, F-3).

Segment G: This Survey segment is in Arizona and is bisected by the BN&SF railroad tracks and the Topock-Oatman Highway. The Topock Marina with a mobile home park and associated parking areas is located north of the BN&SF railroad tracks at the western end of this segment. A small portion of the Topock marsh, dominated by California bulrush, is present in this segment on the northwest side of the Oatman-Topock Highway (Appendix C, Plate 4, G-1). Between the highway and the railroad tracks is a strip of tamarisk/western honey mesquite/blue palo verde thicket that grades into a denser stand of salt cedar and athel tamarisk as one progresses northeastward (Appendix C, Plate 4, G-2). Further along the highway there is a sandy alkaline/saline area dominated by big saltbush with scattered shrubs of bush seepweed (Appendix C, Plate 4, G-3). The areas of Segment G on the east side of the railroad tracks consists of rocky hillslopes dominated by creosote bush scrub (Appendix C, Plate 5, G-5) and an open sandy area with numerous annuals and scattered cattle saltbush (Appendix C, Plate 5, G-4).

An additional 277 acres were added to this Survey segment that included potential freshwater well locations. The additional area extends approximately one mile to the north along both sides of the Oatman-Topock Highway (Figure 2). The area on the west side of the highway was previously dense salt cedar and athel tamarisk that was burned during a wildfire in October of 2008. In early 2011, the USFWS initiated restoration activities in the burn area that included the removal of logs and woody debris, irrigation to leach salts form the soils and planting of native vegetation. At the time of the survey, 22 acres of the 240-acre burn area have been planted with native vegetation (Appendix C, Plate 5, G-6). Native species planted in this area include screwbean mesquite, blue paloverde, desert broom, four wing saltbush (*Atriplex canescens*), needle grama (Bouteloua aristidoides), alkali sacaton (Sporobolus airoides), James' galleta (Pleuraphis jamesii) and desert globe mallow (*Sphaeralcea ambigua*). The remaining areas are barren with the exception of the occasional seedlings of athel tamarisk and Russian thistle (*Salsola tragus*). Some of these areas have been covered with wood chips and scattered logs and woody debris piles are also present in a few locations (Appendix C, Plate 5, G-7). The additional area on the east

side of the highway is characterized by dense athel tamarisk with some creosote bush scrub along the northern side of the BN&SF railroad tracks and a small area of blue paloverde woodland at the northern end of the dense tamarisk scrub (Appendix C, Plate 5, G-8). A large section in the northeast corner of the added survey area has been cleared for a natural gas pipeline right-of-way (Appendix C, Plate 5, G-9).

Segment H: This segment is botanically diverse because it encompasses two areas of different geologic history that influence soils and vegetation. The northern two-thirds of the segment consist of alluvial terraces primarily of tertiary origin, whereas the southern one-third consists of pre-tertiary metamorphic/igneous rock that forms the northernmost extension of the Chemehuevi Mountains. The Topock Compressor Station, its auxiliary structures and landscaping, are built on the alluvial terraces (Appendix C, Plate 6, H-1). The rocky hillslopes and dissected alluvial terraces are characterized by creosote bush scrub. Segment H also includes part of Bat Cave Wash, a major dry wash system that starts in Segment L and finishes in Segment E (Appendix C, Plate 6, H-2). The rocky north-facing slopes of the Chemehuevi Mountains are characterized by a number of plant species that are largely restricted to this substrate including hillside palo verde, and Pima rhatany (*Krameria erecta*), California barrel cactus and buckhorn cholla.

Segment I: Segment I runs along the Colorado River from the I-40 bridge in the north to the southernmost gas transmission line bridge in the south. This segment is similar to Segment H because it includes both the pre-tertiary rock of the Chemehuevi Mountains and the more recent tertiary alluvial terraces common in the more northerly survey segments (e.g., Segments A, C, D, G and E). Unlike Segment H, however, it includes a distinctive reddish Miocene conglomerate bedrock that is exposed below the Route 66 sign, as well as wetlands along the edge of the Colorado River on recent (Quaternary) alluvial deposits (Appendix C, Plate 7, I-1 and I-2). The Miocene conglomerate in this area includes the only known location for rock nettle (*Eucnide urens*) in the Project Area. The northern areas of this segment are characterized by scattered blue palo verde on the hillslopes east of the National Trails Highway and a large common reed wetland area adjacent to the Colorado River (Appendix C, Plate 7, I-3). The southeastern area is characterized by hillside palo verde along the slopes of the Chemehuevi Mountains with narrow strips of common reed and California bulrush along the edges of the river.

Segment J: This segment is a small area in Arizona that includes a developed and landscaped parcel with private residences set back on the hills overlooking the Colorado River. The slopes above the river are variously terraced and landscaped, yet there are a few patches of native vegetation that remain near the river's edge. These patches include common reed marsh, arrow weed thickets, quailbush, and tamarisk thickets, as well as California bulrush and cattail marshes scrub (Appendix C, Plate 7, J-1). There is also landscaping with Mexican fan palms and a variety of other cultivated plants on the river's edge (Appendix C, Plate 7, J-2). Segment J also contains a small area of partially degraded slopes at the east end of the segment south of I-40. These slopes are characterized by sparse creosote bush scrub and blue palo verde.

Segment L. This segment is located next to a rock quarry site in a small valley that is approximately 0.3 miles southwest of the compressor station (Figure 2). This segment is flat with a gently sloping (to the northeast) dry wash that is a continuation of the Bat Cave Wash drainage system. The wash is characterized by scattered blue palo verde and catclaw acacia, whereas the surrounding rocky areas are creosote bush scrub. The eastern portion of Segment L is covered by rocks from the gravel quarry and is devoid of vegetation (Appendix C, Plate 7, L-1).

SECTION 4

Methodology

4.1 Special-Status Plants

Pursuant to Mitigation Measure CUL-1a-5 (DTSC, 2011),

> *"Should any indigenous plants of traditional cultural significance and listed in Appendix PLA of this FEIR be identified within the project area, PG&E shall avoid, protect, and encourage the natural regeneration of the identified plants when developing the remediation design, final restoration plan, and IM-3 decommission plan…."*

The purpose of the floristic survey was to comply with Mitigation Measure CUL-1a-5, obtain a comprehensive inventory of plant species that occur in the Project Area, and to ensure that sensitive plants (i.e., special-status and culturally significant plant species as described below) were detected, mapped and recorded.

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 BLM Needles Field office or Lake Havasu Field office as a Sensitive Plant
- California Rare Plant Ranked (CRPR) 1, 2, 3, or 4 by the California Native Plant Society (CNPS) in its Online Inventory of Rare and Endangered Plants of California
- Listed by the Arizona Rare Plant Committee
- Listed by Arizona Department of Agriculture (ADA)
- Listed under the California Desert Native Plants Act (CDNPA)

4.2 Research and Literature Review

Prior to the surveys, 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 (2011) Inventory of Rare and Endangered Plants of California and the CNDDB (2011a) RareFind3 database were conducted to identify potentially occurring special-status plants. The 7.5-minute United States Geological 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 CNDDB RareFind 3 database searches. The CNDDB Quickviewer online database (CNDDB 2011b) 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. Information regarding federally listed threatened and endangered species that may occur in San Bernardino County was also reviewed (USFWS 2011).

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, 2001). 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, 2011).

Sensitive species lists for the BLM Needles and Lake Havasu field offices (BLM 2011a and 2011b) as well as lists of native plants that are protected under the CDNPA (1981) and by the ADA (2012) 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 also included observations, collections and recommendations from a regional botanical expert and the director of the University of California Riverside, Granite Mountains Research Center, Jim Andre, Ph.D.

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 included the Project Area and suitable habitat was identified in the Project Area during the August 2011 botanical survey.

Based on the pre-survey research and literature review, 54 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 A. The list of 54 potential special-status species includes 36 species that have been designated a CRPR in the Inventory of Rare and Endangered Plants of California (CNPS, 2011) and 22 plants that are protected under the CNDPA and/or the ADA.

4.3 Survey Timing

Rainfall in the eastern Mojave Desert exhibits a bimodal pattern, with most rainfall occurring in the winter and a significant proportion of annual rainfall occurring in the late-summer. To ensure the proper timing for both fall and spring surveys, Dr. Andre was contracted to review survey planning and timing and to review the target plant list (Appendix A). Dr. Andre also joined the field survey team for a pre-survey reconnaissance and orientation towards locally occurring special-status plants. Based on late summer and early fall rainfall in 2011, it was decided to conduct a fall survey at the beginning of November. The spring survey 2012 was planned for mid-March based on preliminary observations made during a wetland delineation conducted by CH2MHILL ecologist and botanist Russell Huddleston and Garcia and Associates senior botanist Kim Steiner in mid-February, and consultation with Dr. Andre. Generally, the most productive timing for a spring survey in this area is mid- to late- March (Jim Andre, pers. comm.), and 2012 and 2013 fit this pattern. In some cases later than normal rains (e.g., February or March) can stimulate later than normal flowering and warrant a late spring survey. However in 2012, rainfall occurred too late to warrant an additional later spring survey (Jim Andre, pers. comm.).

4.4 Reference Site Visits

Before the spring 2012 Floristic survey began, searches of nearby reference populations were made for spiny-haired blazing star (*Mentzelia tricuspis*), small-flowered androstephium (*Androstephium breviflorum*), and Hall's tetracoccus (*Tetracoccus hallii*) based on locality information from the Consortium of California Herbaria (2012) and on location information from Dr. Andre. These plants represented the special-status species that were considered most likely to occur in the Project Area. The surveyors Kim Steiner and Russell Huddleston, together with Dr. Andre, searched unsuccessfully for plants of both spiny-haired blazing star and small-flowered androstephium at locations known by Dr. Andre near Laughlin, Nevada and Golden Shores, Arizona respectively. A visit to an additional site to find shrubs of Hall's tetracoccus northwest of Needles, California was successful. Information prepared by Dr. Andre including photographs and descriptions of special-status species considered likely to occur in the project area as well as information from the Jepson Online Interchange for California Floristics (2011) were also reviewed prior to the surveys.

Prior to the March 2103 surveys populations of mousetail suncup (*Chylismia arenaria* var. *arenaria*) and spiny-hair blazing star (*Mentzelia tricuspis*) that were identified in the EIR study area during the spring 2012 surveys were revisited. Both species were in flower and readily identifiable.

4.5 Field Surveys

Protocol-level floristic surveys that conform to the guidelines of the California Department of Fish and Wildlife (CDFW, 2009), the USFWS (2000), and the CNPS (2001) were conducted in the 780-acre EIR Project Area during the fall (October 31–Nov 8, 2011) and spring (March 12–20, 2012). The fall survey was conducted in late October/early November 2011, because late summer rainfall in amounts sufficient to trigger germination and flowering of late-blooming species had been observed in the area (Jim Andre, pers. comm.). This late-season 2011 survey was targeted to areas within the Project Area that exhibited germination and flowering. These areas were decided on after an initial field reconnaissance, and in consultation with Dr. Andre. Floristic surveys of the 277 acres added to Survey Segment G were completed on March 11–15, 2013. The March 2013 surveys also included some areas of the 780-acre EIR Project Area to specifically to identify additional herbaceous species that may be present given the more favorable rainfall conditions relative to the spring 2012 survey. These additional surveys focused on the undeveloped areas south of the Colorado River in Survey Segments A, C, D, H and I.

The main goal for the surveys was to generate a comprehensive list of all plant species that occur in the Project Area and to census, map, photograph, and record habitat data for any special-status species found in the Project Area. Some of these species (e.g., beavertail cactus and silver cholla) were common and widespread across the Project Area, and in these cases specific locality information was not collected for each individual.

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 – Appendix A) would be detected during the surveys. Therefore, the floristic surveys were 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 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 photographs and information of targeted special-status plants prepared by Dr. Andre as well as information provided from the Jepson Online Interchange (2011) prior to the surveys.

Trimble GeoXT and GeoXH global positioning system (GPS) units with sub-meter accuracy were used to collect data on special-status plant species. The GPS units were equipped with data files for navigation and with data dictionaries for data collection. For the fall 2011 and spring 2012 surveys of the 780-acre EIR project area transect lines, spaced 50 feet apart, were programmed into the GPS units and walked by surveyors. Surveyors walked meandering routes along each transect to ensure coverage of the entire Project Area, unless vegetation density (i.e., dense tamarisk/mesquite thickets) or steep unstable slopes precluded surveyors from accessing certain areas. To ensure that inaccessible areas were surveyed to the extent feasible, surveyors identified species by making observations from the margins of such areas or from nearby vantage points above and below these areas. In inaccessible dense tamarisk/mesquite thickets the lack of sunlight and/or high soil salinity invariably resulted in areas devoid of understory species.

Transect-based surveys were impractical for the additional 277 acres added to Segment G due to the extremely dense tamarisk that characterizes the west side of the Oatman-Topock Highway and the extensive barren areas in the previously burned area on the east side of the highway. Surveys on the east side of the

road were completed by walking through all accessible pathways and openings in the dense tamarisk and walking meandering transects in the more open areas outside of the dense tamarisk thickets. Surveys of the barren areas on the west side of the highway were completed by walking widely spaced meandering transects with more focused surveys in the few areas, such as within the channel of the Sacramento Wash, where vegetation was present.

A list of all plant species observed was compiled for the Project Area during the surveys (Appendix B). Nomenclature for scientific names follows the Jepson Manual (Baldwin et al. 2012).

SECTION 5

Results

5.1 Survey Summaries

Information on the vegetation and flora of the project area was recorded during multiple site surveys that included vegetation mapping, botanical surveys and wetland delineations. Because these surveys were completed at different times throughout the year, they collectively provide a more complete assessment of the flora of the project area. The results and findings of each of these surveys is briefly summarized in the following sections. A comprehensive list of all vascular plants identified in the Project Area is provided in Appendix B.

Mature plant and vegetation mapping – EIR Project Area (Aug 18-26, 2011). A preliminary checklist of 84 species was compiled by Kim Steiner and CH2M HILL ecologist Morgan King while mapping mature plants and vegetation communities. Due to the seasonal timing of these surveys most of the plants recorded were shrubs or trees and many of these were leafless, or in a vegetative condition. The relatively few perennial herbs encountered, such as catchfly gentian (*Eustoma exaltatum*), were mainly in wetland areas. A few late summer/fall annuals such as spiderling (*Boerhavia coccinea*), California kallstroemia (*Kallstroemia californica*), and chinch-weed (*Pectis papposa* var*. papposa*) were present and just starting to flower, but the few spring-flowering annuals such as chia (*Salvia columbariae)* and rigid spineflower (*Chorizanthe rigida*) were present only as dried skeletons.

Fall plant survey – EIR Project Area (Oct 31-Nov 8, 2011). The fall plant survey was conducted by Kim Steiner and Russell Huddleston. An additional 44 plant species, not detected during the August survey, were recorded during this survey. These included a variety of fall annuals including six-weeks three awn (*Aristida adscensionis*)*,* needle gamma (*Bouteloua aristidoides*)*,* and six weeks gamma (*Bouteloua barbata* ssp*. barbata*) as well as members of the four 'o clock family including sand verbena (*Abronia villosa*), trailing windmills (*Allionia incarnata* var*. incarnata*), and Wright's spiderling (*Boerhavia wrightii*). Some of these species can flower at almost any time, given adequate rainfall, but others flower only in fall and after late summer germination.

Wetland delineation – EIR Project Area (Feb 13-17, 2012). During a wetland delineation of the EIR Project Area by Russell Huddleston and Kim Steiner, notes on spring-flowering annual species were begun. Many of the spring annuals were already in flower including *Cryptantha* spp*.,* desert sunflower (*Geraea canescens*)*,* combseed (*Pectocarya* spp.)*, Phacelia* spp*.,* and suncups (*Chylismia* and *Eremothera* spp.)*,* whereas some were just beginning to flower *e.g., Chaenactis* spp*.,* white tackstem (*Calycoseris wrightii*), and gravel-ghost (*Atrichoseris platyphylla*). Other plant species *e.g.,* pedicillate phacelia (*Phacelia pedicillata*), bristly calico (*Langloisia setosissima* ssp. *setosissima*), and mousetail suncup had not yet started flowering*.* Many of the trees, shrubs, and herbaceous perennials were not yet in flower, but most of these had already been identified during previous surveys. Notable new additions to the species list included desert lily (*Hesperocallis undulata*) in Segment G, and rock nettle in Segment I. The existence and location of the hybrid between brittle and button brittlebush (*Encelia frutescens*) on the flood plain in Segment E was also confirmed. In total, 32 species were added to the checklist, 27 of which were annual species that had not previously been detected during the earlier surveys. Many of these were in early stages of flowering, but others were approaching their flowering peak.

Spring plant survey – EIR Project Area (March 12-20, 2012). This survey was conducted by Kim Steiner and Russell Huddleston. No significant rainfall occurred in the project area between the wetland delineation and the beginning of the spring survey. Although occurring only about 3-4 weeks after the wetland survey, the Project Area looked considerably drier and some species detected during the early survey were no longer flowering *e.g*., Bigelow's monkey flower (*Mimulus bigelovii*) and wedge-leaved draba (*Draba cuneifolia*) or were less abundant. Other species that had not been in flower earlier (*e.g*., mousetail suncup) were in full flower during this survey. This survey added an additional 33 species to the checklist for the Project Area.

Wetland delineation and vegetation mapping – Additional 183 acres for Freshwater Evaluation added to Survey Segment G (July 16-17, 2012). This survey was conducted by Russell Huddleston and CH2M HILL biologist Melissa Fowler. Most of the spring annuals were dry and gone at the time of the survey. This added area includes a portion of burned area on the west side of the Oatman–Topock Highway where the USFWS has initiated native vegetation restoration. Additional plants species noted during this survey included native species that were planted as part of this restoration project including four-wing saltbush and alkali sacaton. Other additional species observed in this area included jimson weed (*Datura wrightii*), nettle-leaved goosefoot (*Chenopodium murale*), alkali heliotrope (*Heliotropium curassavicum*) and verrucose sea purslane (*Sesuvium verrucosum*).

Wetland delineation – Additional 94 acres for Freshwater Evaluation added to Survey Segment G for proposed new well site A (December 12 and 13, 2012). This survey primarily focused on mapping the limits of the Sacramento Wash and a rapid reconnaissance of the survey area to identify any other potential wetland and water resources. No new plant species were identified during this survey.

Spring plant survey – 277 acres for Freshwater Evaluation for Survey Segment G and focused surveys within the EIR Project Area (March 11-15, 2013) This survey was conducted by Russell Huddleston and Michelle Balk. Rainfall recorded at the Needles Airport between January 1 and February 28 of 2013 was 1.51 inches as compared to 0.79 inch for the same time period in 2012 (University of California, Integrated Pest Management 2013). Many spring annuals were abundant and in flower at the time of the survey and in general conditions appeared more favorable for herbaceous plants than the spring survey of 2012. A total of 36 new plant species were added to the species list including gravel milkvetch (*Astragalus sabulonum*) a CRPR 2.2 species. During the focused surveys of the EIR Project Area several herbaceous plants that were present, but in low numbers in the spring of 2012, including the species such as golden suncup (*Chylismia brevipes*) were widespread and abundant while other plants such as chia (*Salvia columbarie*) remained uncommon.

5.1.1 The Flora of Topock

The final plant list for the Project Area included 235 species in 47 families and 165 genera (Appendix B). Four of the species included on the list (oleander, California fan palm, and eucalyptus, and Mexican palo verde) are cultivated landscape plants associated with Park Moabi, Pirates Cove Resort and the compressor station. The greatest numbers of species were found in Segments G, A, H, D, and C with 142, 114, 112, 105 and 104 species respectively, whereas the segment with the fewest species was Segment J with only 39. Special-status plants in the Project Area

No federal or state listed endangered, threatened, or rare plants and no BLM sensitive species were found in the Project Area. A total of five species including four with California Rare Plant Ranks of 2B and one CRPR 4 were identified in the project area (Table 1). Photographs of the CRPR plants found in the survey area are provided in Appendix D. Two of these (mousetail suncup and hillside palo verde) were found in California and three (spiny-haired blazing star, small flowered androstephian, and gravel milkvetch) were found only in Arizona. A total of 15 plants that are protected under the California Desert Native Plants Act and/or by the Arizona Department of Agriculture were identified in the Project Area (Table 1). Photographs of CDNPA and ADA listed plants are provided in Appendix E.

5.1.2 Federal or State Listed Plants

No federal or state listed endangered, threatened, or rare plants or candidates for listing were found in the Project Area.

5.1.2.1 Federally Sensitive Plants of the Bureau of Land Management

The BLM has designated a category of special-status plants termed “sensitive”. Such plants are not federally endangered, threatened or proposed, but are designated by the BLM State Director for special management

consideration. In California this category includes all plants that are Federal Candidates for listing, all plants that are listed as Endangered, Threatened, or Rare by the State of California, and all plants that are ranked as 1B in the Inventory of Rare and Endangered Plants of California (CNPS, 2011), unless the State Director has determined that a particular taxon should be excluded from sensitive status. Based on the literature and database reviews only four BLM sensitive species were considered to have the potential to occur in the Project Area: Harwood's woolly star (*Eriastrum harwoodii*), Kofa Mountain barberry (*Berberis harrisoniana*), white-margined penstemmon (*Penstemmon albomarginatus*) and Howe's hedgehog cactus (*Eichenocereus engelmannii* var. *howei*). None of these species were found to occur in the Project Area.

5.1.2.2 California Rare Plant Ranked Species

California Rare Plant Ranks are used to define and categorizes 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 and as such require consideration 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 and therefore it is highly recommended that they be included for consideration.

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

Five CRPR plants were identified in the Project Area (Table 1). Two species, mousetail suncup (CPRP 2.2) and hillside palo verde (CRPR 4.3) were discovered in the California and the other three species, spiny-haired blazing star (CRPR 2.1), small-flowered androstephium (CRPR 2.2) and gravel milkvetch (CRPR2.2) were found only in Arizona (Figure 4).

Mousetail suncup was found in Survey Segments C, D and H. The largest population (with approximately 9 individuals) is located on a vertical conglomerate rock wall above Bat Cave Wash in Survey Segment D. Single individuals also occur on a conglomerate rocks above the wash in Segment H and on a granitic rock face at the end of the wash just east of the Project Area. It also occurs on a steep rocky slope next to the BN&SF railroad tracks in Segment C (Figure 4). These populations represent a significant range extension for the species as they are over 90 miles northeast of previously recorded populations in California (Jepson Online Interchange, 2012). Hillside palo verde was found in Survey Segments H, and I on the rocky north-facing slopes of the Chemehuevi Mountains (Figure 4). If one adds those individuals that occur outside of the Project Area on adjacent lands, the number of individuals in this population is approximately 150 trees. CNDDB occurrence record forms for these two species are provided in Appendix F.

The other three species were all found in Survey Segment G in Arizona. A few individuals of spiny-haired blazing were identified on the rocky slopes just west of the BN&SF railroad tracks. Approximately 70 individuals of small-flowered androstephium were observed in sandy soils on the west side of the BN&SF railroad tracks and a single gravel milkvetch plant was found adjacent to the Sacramento Wash on the east side of the Oatman-Topock Highway (Figure 4). While listed as rare species in California these plants have no special-status ranking in Arizona. However, these plants may be locally significant as they are likely near the western extent of their natural range and were therefore considered special-status for the purpose of this report.

5.1.2.3 Plant Species Protected under the California Desert Native Plants Act (CDNPA)

The CDNPA is included in Division 23 of the California Food and Agriculture Code. In general the CDNPA prohibits the harvest, transport and sale of certain desert plants without a valid permit from the county in which the collecting will occur. This regulation also prohibits the destruction, excavation, damage and removal of certain plants without a valid permit. Under Section 80117 activities such as land clearing for surveys, building sites, roads or other right –of –ways by the landowner or his or her agent are not prohibited as long as the native plants are not transported from the land or offered for sale, and the county is given 10 days notice prior to any such activity. The Act also states under Section 80117 "*This division does not apply to a public agency or to a publicly or privately owned public utility when acting in the performance of its obligation to provide service to the public.*"

Fifteen plant species (not including cultivated individuals of *Washingtonia filifera* in Park Moabi) found in the Project Area are protected by the California Desert Native Plants Act (Table 1). Trees and shrubs protected under the CDNPA include blue paloverde, hillside palo verde, catclaw acacia, desert smoketree, screwbean mesquite, western honey mesquite and desert holly saltbush (*Atriplex hymenelytra*). All seven cacti identified in the project area including beavertail cactus, buckhorn cholla, California barrel cactus, corkseed mammillaria, ocotillo, teddy bear cholla (*Opuntia bigelovii*) and silver cholla, are protected under the CNDPA. Photographs of these species can be found in Appendix E, Plates 1-4 and the locations of listed CNDPA trees in the project area are shown in Figure 5, and Cacti, shrubs and herbs are shown in Figure 6.

5.1.2.4 Plants with Special-Status in Arizona

The Arizona Rare Plant Guide includes over 125 species of plants that are considered rare in Arizona, including 26 species that occur in Mohave County (Arizona Rare Plant Committee, 2001). All but one of the rare plants listed for Mojave County are found in the northern and eastern parts of the county and were not considered likely to occur. The only Arizona rare plant that was considered to possibly occur in the Project Area is white-margined beardtongue, which was not found during multiple site surveys of the Project Area.

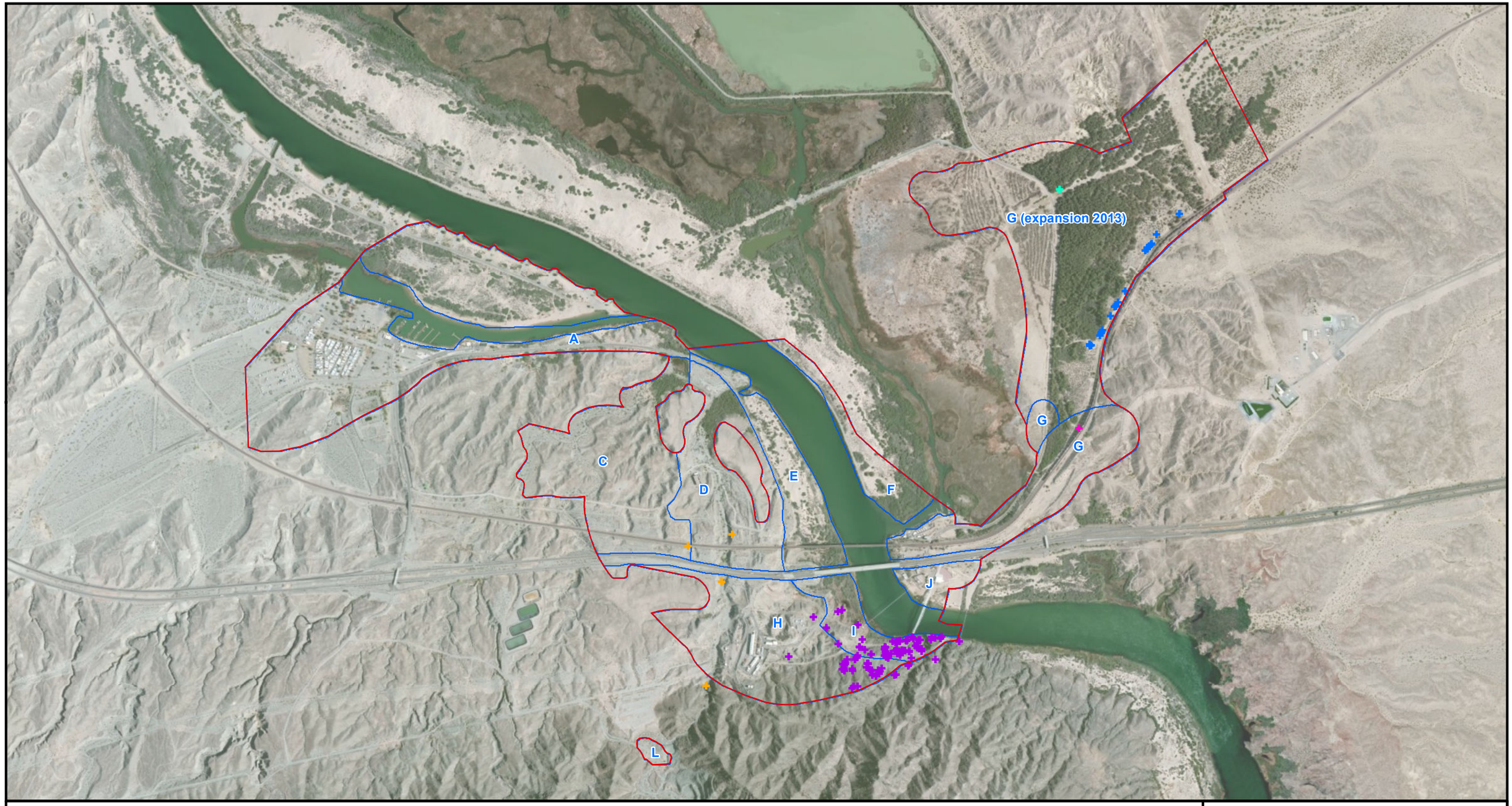
The Arizona Department of Agriculture regulates the salvage, harvesting, transport and sale of native plants under Section 3-901 through 3-916 of the Revised Statutes as well as Article 11 of the ADA Administrative Code. Salvage, clearing and removal of protected native plants located on private lands are exempted from regulation provided the plants are not transported from the land and offered for sale. On private lands the salvage and moving protected plants from one location on the property to another area on the same property does not require a permit as long as the plants are not offered for sale, but salvage and relocation of protected plants on public lands requires a non-commercial permit from the ADA. Additionally the ADA must be notified in advance prior to the destruction, salvage and/or transporting of any protected plants.

No highly safeguarded protected native plants (ADA list A) were identified in the Project Area. A total of 8 Salvage Restricted (ADA category B) and Salvage Assessed Protected Plants), were found in the Project Area (Table 1). Plants in Category B include beavertail (*Opuntia basilaris* var. *basilaris*), silver cholla (*Cylindropuntia echinocarpa*) and desert lily (*Hesperocallis undulata*). Category C plants found in the Project Area include blue palo verde, western honey mesquite, screwbean mesquite, and smoke tree. Salvage Restricted (ADA List B) and Salvage Assessed (ADA List C) plants require a permit prior to removal or damage to the plant. Utility rights-of-ways, facilities and structures used by public service corporations and normal and routine maintenance activities that may cause incidental or unavoidable destruction of native plants are exempted from the statutes.

TABLE 1
Summary of Special-Status Plants Identified in the Project Area

Common Name	Scientific Name	Status	Estimated Number in the Project Area
Trees			
Blue palo verde	*Parkinsonia florida*	CDNPA / ADA – List C	700 +
Catclaw acacia	*Senegalia greggii*	CDNPA	250 +
Desert smoke tree	*Psorothamnus spinosus*	CDNPA / ADA – List C	50
Hillside palo verde	*Parkinsonia microphylla*	CRPR 4.3 / CDNPA / ADA – List C	100 -150
Screwbean mesquite	*Prosopis pubescens*	CDNPA / ADA – List C	150 +
Western honey mesquite	*Prosopis glandulosa* var. *torreyana*	CDNPA / ADA – List C	200
Shrubs			
Desert holly saltbush	*Atriplex hymenelytra*	CDNPA / ADA – List B	3
Cacti			
Beavertail prickly pear	*Opuntia basilaris* ssp. *basilaris*	CDNPA / ADA – List B	>500
Buckhorn cholla	*Cylindropuntia acanthocarpa* var. *coloradensis*	CDNPA / ADA – List B	30
California Barrel Cactus	*Ferocactus cylindraceus* var. *cylindraceus*	CDNPA / ADA – List B	65
Corkseed mammillaria	*Mammillaria tetrancistra*	CDNPA / ADA – List B	50
Ocotillo	*Fouquieria splendens*	CDNPA / ADA – List B	8
Teddy bear cholla	*Cylindropuntia bigelovii*	CDNPA / ADA – List B	2
Silver cholla	*Cylindropuntia echinocarpa*	CDNPA / ADA – List B	200
Herbs			
Desert lily	*Hesperocallis undulata*	ADA – List B	250
Mousetail suncup	*Chylismia arenaria*	CRPR 2.2	12
Small-flowered androstephium*	*Androstephium breviflorum*	CRPR 2.2	70 +
Spiny-hair blazing star*	*Mentzelia tricuspis*	CRPR 2.1	5
Gravel milkvetch*	*Astragalus sabulonum*	CRPR 2.2	1

*Species found only in Arizona within the limits of the project area.



LEGEND

- Project Area
- Survey Segments

Plant Species

Common Name:	Scientific Name:
Hillside Palo Verde	*Parkinsonia microphylla*
Small-flowered androstephium	*Androstephium breviflorum*
Mousetail suncup	*Chylismia arenaria*
Spiny-haired blazing-star	*Mentzelia tricuspis*
Gravel milkvetch	*Astragalus sabulonum*

N

0 1,000 2,000 4,000 Feet

FIGURE 4
CALIFORNIA RARE PLANT RANKED PLANTS IN THE PROJECT AREA

FLORISTIC SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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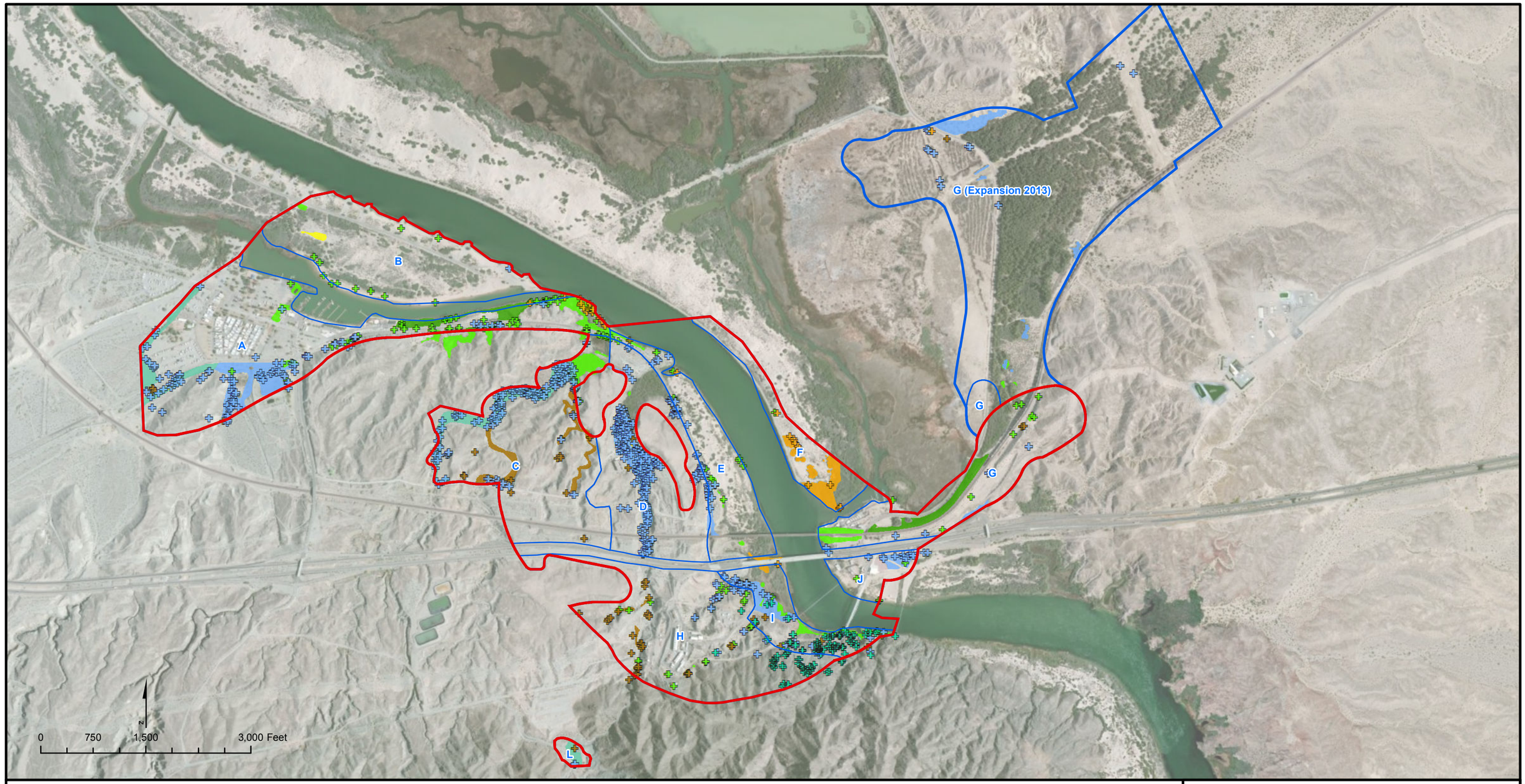

LEGEND

- Project Area
- Survey Segments

Trees

Common Name	Scientific Name
Blue palo verde	*Parkinsonia florida*
Blue palo verde/Catclaw acacia	
Blue palo verde/ Western honey mesquite	
Catclaw acacia	*Senegalia greggii*
Desert smoke tree	*Psorothamnus spinosus*
Screwbean mesquite	*Prosopis pubescens*
Western honey mesquite	*Prosopis glandulosa var. torreyana*

Common Name	Scientific Name
Hillside Palo Verde	*Parkinsonia microphylla*
Blue palo verde	*Parkinsonia florida*
Catclaw acacia	*Senegalia greggii*
Desert smoke tree	*Psorothamnus spinosus*
Screwbean mesquite	*Prosopis pubescens*
Western honey mesquite	*Prosopis glandulosa var. torreyana*

FIGURE 5
TREES PROTECTED BY THE CDNPA AND THE ADA
FLORISTIC SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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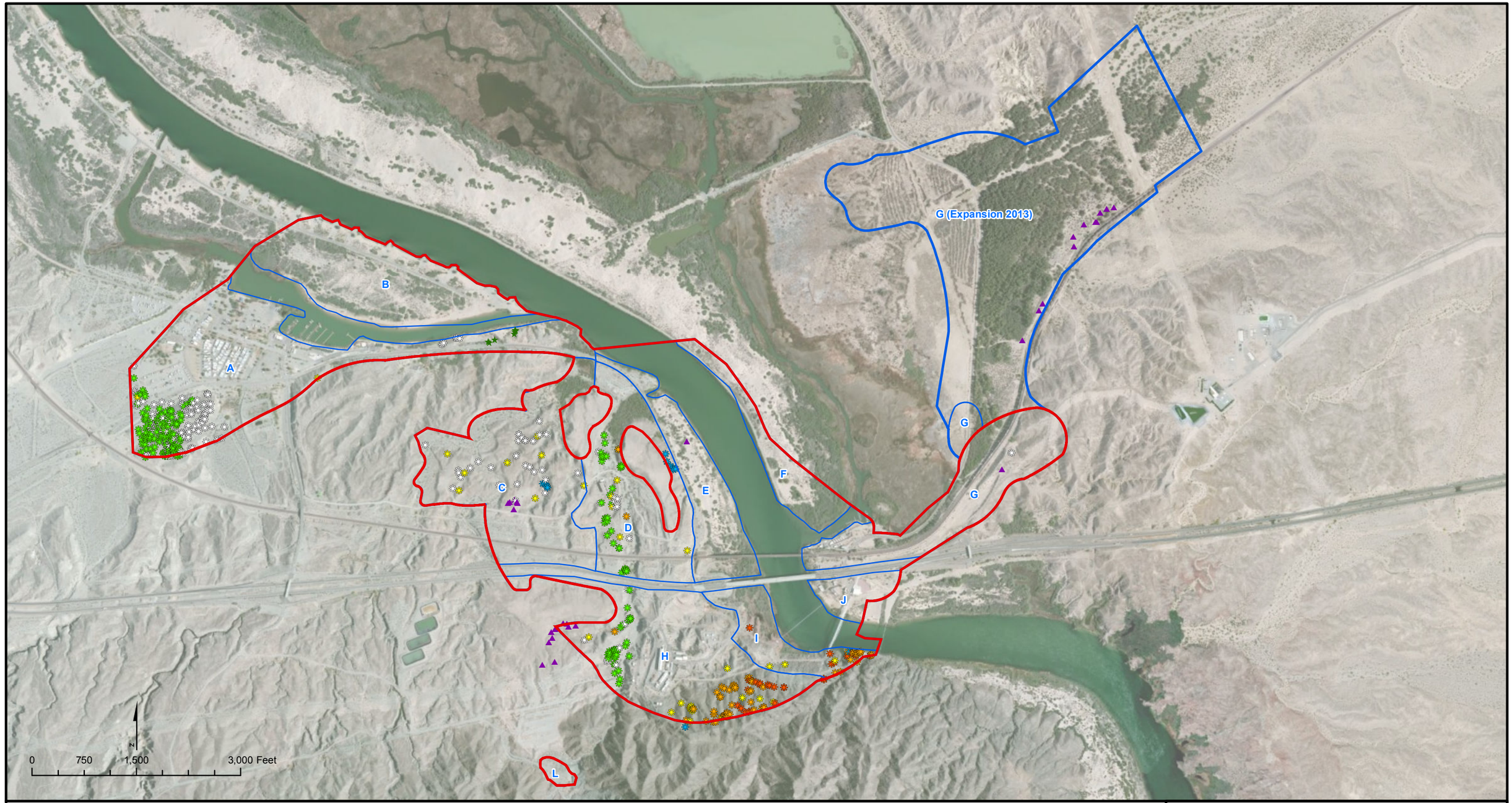

LEGEND

- Project Area
- Survey Segements

Cacti

Common Name	Scientific Name
Beavertail cactus	*Opuntia basilaris* ssp. *basilaris*
Buckhorn cholla	*Cylindropuntia acanthocarpa* var. *coloradensis*
California Barrel Cactus	*Ferocactus cylindraceus* var. *cylindraceus*
Corkseed mammillaria	*Mammillaria tetrancistra*
Ocotillo	*Fouquieria splendens*
Silver cholla	*Cylindropuntia echinocarpa*

Common Name	Scientific Name
Holly-leaved Saltbush	*Atriplex hymenelytra*
Desert lilly	*Hesperocallis udulata*

NOTES:
1. Beavertail cactus was mapped extensively only in the southwest corner of segment A. It is also common in Survey Segments C, D, E, G,H, I and L
2. Silver cholla was not extensively mapped in all areas. It occurs in Survey Segments A, C, D, E, G and H

FIGURE 6
CACTI, SHRUBS AND HERBS PROTECTED UNDER THE CDNPA AND ADA

FLORISTIC SURVEY REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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5.2 Probability of Missed Occurrences due to Below-average Rainfall

The 2011-2012 rainfall year (July through March), measured in the Project Area at IM-3 near Bat Cave Wash, was below average (2.75 inches versus 4.5 inches), and this lack of precipitation affected the germination and growth of annuals and herbaceous perennials in the Project Area. There were only thirteen annuals listed with potential to occur in the Project Area and most of these species were absent (Appendix A). In a year of average or better rainfall, one or more of these species may occur in the Project Area.

Additional floristic surveys were completed in the spring of 2013 focusing on areas where any missed herbaceous plant species were most likely to be present within the Project Area. The purpose of these surveys were to obtain a better estimate on the size of and distribution of annual and herbaceous perennials plant populations in the Project Area during a more favorable rainfall year.

5.3 Special-status Plants versus Culturally Significant Plants

Special-status plants are protected under Federal or State statutes and may be rare, endangered or threatened/ or they may fall under other categories (CNPS, 2011). Many of the plants in the Project Area are protected by the CDNPA in order to discourage harvesting on both publicly and privately owned lands. There are also plant species that are also protected in Arizona by the Arizona Department of Agriculture (ADA, 2012). Plants on the Appendix PLA list of the EIR (DTSC, 2011) that occur in the Project Area (Table 1) are also protected by virtue of their cultural significance to Native American tribes, whether or not they have protection under any federal or state legislation.

SECTION 6

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Personal Communication

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

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

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
TREES					
Blue palo verde	*Parkinsonia florida*	--/--/CDNPA/C	Apr–May	Creosote bush scrub; washes and floodplains.	**Present.** This tree is the most abundant native tree in the Project Area.
California fan palm	*Washingtonia filifera*	--/--/CDNPA/B	Feb–Jun	Creosote bush scrub; Moist places, seeps, springs, streamsides.	**Present.** This tree does not appear to be native to the Project Area; however, it is planted in the landscaped areas.
Catclaw acacia	*Senegalia greggii*	--/--/CDNPA/--	Apr–Jun	Creosote bush scrub; Pinyon-juniper woodland, uncommon on dry slopes, chaparral, washes, flats, disturbed areas.	**Present.** This shrub to small tree is common in the Project Area, particularly in the upper reaches and tributaries of the larger ephemeral washes.
Desert ironwood	*Olneya tesota*	--/--/CDNPA/C	Apr–May	Creosote bush scrub; desert washes.	**Possible.** Suitable habitat occurs in the Project Area; however, this species is not known to occur further north than the Whipple mountains approximately 30 miles south of the Project Area. Not found during the multiple surveys.
Desert smoke tree	*Psorothamnus spinosus*	--/--/CDNPA/C	Mar–May	Creosote bush scrub; desert washes.	**Present.** This shrub to small tree is locally common in several parts of the Project Area, but is generally uncommon overall.
Hillside palo verde	*Parkinsonia microphylla*	--/4.3/CDNPA/C	Apr–May	Creosote bush scrub; rocky or gravelly areas	**Present.** This woody shrub or small tree is locally common in the project area in Segments H and I on the slopes of the Chemehuevi Mountains.
Screwbean mesquite	*Prosopis pubescens*	--/--/CDNPA/C	Apr–Sep	Creosote bush scrub; creek, river bottoms, sandy or gravelly washes, ravines.	**Present.** This medium to large tree is common under the Interstate 40 and BNSF railroad bridges that cross the Colorado River, and on the Arizona side of the river opposite the Topock Marina. Also planted on the Havasu National Wildlife Refuge.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Velvet mesquite	*Prosopis velutina*	--/--/CDNPA/C	Apr–Jun	Mojavean desert scrub; sandy, rocky soils in canyons, washes; only naturalized in CA, not native.	**Possible.** Suitable habitat present; a single occurrence of this tree is known from the Topock Marsh. This species was not found during multiple surveys of the Project Area.
Western honey mesquite	*Prosopis glandulosa* var. *torreyana*	--/--/CDNPA/C	Apr–Aug	Creosote bush scrub and alkali sink scrub; grasslands, alkali flats, washes, sandy alluvial flats, mesas.	**Present.** This medium to large tree is common in some parts of the Project Area especially on the low sandy terraces along the Colorado River.
SHRUBS					
Beavertail cactus	*Opuntia basilaris* ssp. *basilaris*	--/--/CDNPA/B	Mar–Jun	Mojavean desert scrub to pinyon-juniper woodland.	**Present.** This succulent shrub is very common and widely scattered throughout much of the Project Area.
Buckhorn cholla	*Cylindropuntia acanthocarpa* var. *coloradensis*	--/--/CDNPA/B	May–Jun	Creosote bush scrub and Joshua tree woodland; gravelly or rocky places.	**Present.** This succulent shrub is uncommon in the project area and generally limited to the slopes of the Chemehuevi Mountains in Segments H and I.
California Barrel Cactus	*Ferocactus cylindraceus* var. *cylindraceus*	--/--/CDNPA/B	Apr–May	Creosote bush scrub and Joshua tree woodland; gravelly or rocky places.	**Present.** This succulent shrub is locally scattered on the slopes of the Chemehuevi Mountains in Segments H and I.
Corkseed mammillaria	*Mammillaria tetrancistra*	--/--/CDNPA/B	Apr	Creosote bush scrub; sandy hills.	**Present.** This small succulent shrub is uncommon on rocky slopes of the dissected terraces south of the Colorado River.
Crucifixion thorn	*Castela emoryi*	--/2B.3/CDNPA/B	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.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Graham's fishhook cactus	*Mammillaria grahamii* var. *grahamii*	--/2B.2/CDNPA/B	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 Mtns. approximately 25 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Hall's tetracoccus	*Tetracoccus hallii*	--/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	*Echinocereus engelmannii* var. *howei*	S/1B.1/CDNPA/B	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.
Desert holly saltbush	*Atriplex hymenelytra*	--/--/CDNPA/B	Jan–Apr	Desert slopes, washes, scrub; below 4800 feet	**Present.** This small woody shrub occurs in Segment A north of the National Trails Highway.
Kofa Mountain barberry	*Berberis harrisoniana*	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 Whipple Mtns. This species was not found during multiple surveys of the Project Area.
Mojave yucca	*Yucca schidigera*	--/--/CDNPA/B	Apr–May	Creosote bush scrub.	**Possible.** Suitable habitat is present for this succulent shrub and this species is known to occur near the Project Area. The nearest reported occurrence is approximately 10 miles south of Needles. This species was not found during multiple surveys of the Project Area.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Narrow-leaved dalea	*Psorothamnus fremontii* var. *attenuatus*	--/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 Mtns. approximately 30 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Ocotillo	*Fouquieria splendens*	--/--/CDNPA/B	Mar–Jul	Creosote bush scrub; dry, generally rocky soils.	**Present.** This large shrub occurs in Segment C, D, and I. Limited distribution and only a few plants are present in the Project Area.
Pencil cholla	*Cylindropuntia ramosissima*	--/--/CDNPA/--	Apr–Aug	Creosote bush scrub and other Mojavean desert scrub.	**Possible.** Suitable habitat is present; small individuals of silver cholla can be mistaken for this species, but the absence of larger shrubs indicates that they are juvenile silver cholla. This species was not found during multiple surveys of the Project Area.
Silver cholla	*Cylindropuntia echinocarpa*	--/--/CDNPA/B	May–Jun	Mojavean desert scrub.	**Present.** This succulent shrub is common and widespread on the dissected terraces and on rocky slopes south of the National Trails Highway in the Project Area.
Utah funastrum	*Funastrum utahense*	--/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.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
HERBACEOUS PLANTS					
Abram's spurge	*Chamaesyce abramsiana*	--/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	*Pholistoma auritum* var. *arizonicum*	--/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 Mtns. approximately 15 miles northwest of Project Area. This species was not found during multiple surveys of the Project Area.
Bare-stem larkspur	*Delphinium scaposum*	--/2B.3/--/--	Mar–May	Creosote bush scrub; rocky granitic slopes and canyons.	**Possible.** Suitable habitat is preset for this perennial herb. The nearest reported occurrence is from the Whipple Mtns. approximately 30 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.
Bitter hymenoxys	*Hymenoxys odorata*	--/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	*Astragalus lentiginosus* var. *borreganus*	--/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.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Cooper's rush	*Juncus cooperi*	--/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	*Senna covesii*	--/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 Mtns. approximately 30 miles to the 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	*Mentzelia puberula*	--/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	*Teucrium glandulosum*	--/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 Mtns. approximately 30 miles south of the Project Area. This species was not found during multiple surveys of the Project Area.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
White-margined beardtongue	*Penstemon albomarginatus*	S/1B.1/--/B	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 disjunct distribution in San Bernardino County, California and Mohave County, Arizona. There are no reported occurrences in the vicinity of the Project Area and this species was not found during multiple surveys.
Desert lily	*Hesperocallis undulata*	--/--/--/B	Mar–May	Desert shrublands; sandy flats and washes.	**Present.** This bulbous perennial, was found in Segments C, H and G, with multiple occurrences noted just outside the Project Area including several plants in the Topock Maze Locus A.
Desert portulaca	*Portulaca halimoides*	--/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 but 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.
Desert unicorn-plant	*Proboscidea althaeifolia*	--/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	*Ditaxis claryana*	--/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.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Harwood's woolystar	*Eriastrum harwoodii*	S/1B.2/--/--	Apr–May	Know 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	*Physalis lobata*	--/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.
Playa milkvetch	*Astragalus allochrous* var. *playanus*	--/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	*Cuscuta californica* var. *apiculata*	--/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	*Eriogonum contiguum*	--/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 along the Needles Hwy approximately 12 miles north of Needles. This species was not found during multiple surveys of the Project Area.

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Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Ribbed cryptantha	*Cryptantha costata*	--/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.
Mousetail suncup	*Chylismia arenaria*	--/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 in Segments D and H and along the BNSF railroad tracks in Segment C.
Slender cottonheads	*Nemacaulis denudata* var. *gracilis*	--/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	*Androstephium breviflorum*	--/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 Segment G on the east side of the Oatman-Topock Highway, north of the BNSF railroad tracks.
Spearleaf	*Matelea parvifolia*	--/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 S. Sacramento Mtns. This species was not found during multiple surveys of the Project Area.
Spiny-hair blazing star	*Mentzelia tricuspis*	--/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 in Segment G.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

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Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Three-awned gramma	*Bouteloua trifida*	--/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 Mtns. approximately 30 miles to the south of the Project Area. This species was not found during multiple surveys of the Project Area.
Wand-like fleabane daisy	*Erigeron oxyphyllus*	--/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 Mtns. approximately 30 miles to the south of the Project Area. This species was not found during multiple surveys of the Project Area.
Winged cryptantha	*Cryptantha holoptera*	--/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.

Notes

[1] **Conservation status abbreviations:**

BLM designations:

S – Sensitive.

California Rare Plant Ranks (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.

APPENDIX A

Target list of special-status plant species with the potential to occur in the Project Area

See below Table for sources, conservation status abbreviations, and occurrence potential definitions.

Common Name	Scientific Name	Status[1] BLM/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]

Department of Food and Agriculture designations:

CDNPA Plants that are protected by the California Desert Native Plants Act

Arizona Department of Agriculture designations:

B – Salvage Restricted Protected Native Plants

C – Salvage Assessed Protected Native Plants

D. Harvest Restricted Protected Native Plants

[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 2011; California Natural Diversity Database 2011; Consortium of California Herbaria 2011; Jepson Online Interchange 2011; Calflora 2012.

Appendix B
Vascular Plant Species Observed In the Project Area

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
GYMNOSPERMS		
EPHEDRACEAE	**ephedra family**	
Ephedra nevadensis	joint fir	H, I
ANGIOSPERMS-DICOTS		
AIZOACEAE	**ice plant family**	
Trianthema portulacastrum	horse-purslane	G
AMARANTHACEAE	**amaranth family**	
Amaranthus fimbriatus	fringed amaranth	A, C, I
Tidestromia oblongifolia	honeysweet	A, B, C, D, E, F, G, H, I, J
APIACEAE	**carrot family**	
Bowlesia incana	hoary bowlesia	G
Hydrocotyle verticillata	marsh pennywort	A, B, E, F
APOCYNACEAE	**milkweed family**	
Asclepias albicans	white-stemmed milkweed	C, H, L
Asclepias subulata	rush milkweed	C, D, H, L
Funastrum hirtellum	climbing-milkweed	A, C, D, E, G, H, I
*Nerium oleander**	oleander	A, B, H
ASTERACEAE	**sunflower family**	
Adenophyllum porophylloides	San Felipe dyssodia	A, C, H, I
Ambrosia dumosa	white bursage	A, C, D, E, F, G, H, I, J, L
Ambrosia salsola	cheesebush	A, B, C, D, E, F, G, H, I, J, L
Atrichoseris platyphylla	gravel-ghost	A, C, D, F, G, H, I, L
Baccharis sarothroides	broom bacharis	A, B, E, F, I
Bebbia juncea var. *aspera*	sweetbush	A, C, D, E, G, H, I, J, L
Calycoseris wrightii	white tackstem	A, C, D, E, G, H, I, L
Chaenactis carphoclinia	pebble pincushion	A, C, D, E, G, H, I, J, L
Chaenactis fremontii	Freemont pincushion	G
Chaenactis stevioides	stevia pincushion	G, J
Cirsium sp.	thistle	G
Encelia farinosa	brittlebush	A, B, C, D, E, F, G, H, J, L
Encelia farinosa x frutescens	brittlebush hybrid	E

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Scientific name	Common name	Survey Segments
Encelia frutescens	button brittlebush	E, G
Eriophyllum lanosum	white woolly eriophyllum	C, G, L
Eriophyllum wallacei	Wallace's woolly daisy	G
Geraea canescens	desert sunflower	A, C, D, E, G, H, I, J
Lactuca serriola	prickly lettuce	A
Logfia depressa	dwarf cottonrose	G
Malacothrix glabrata	smooth desert dandelion	A, C, D, G, H, L
Monoptilon bellioides	desert star	A, C, H, L
Palafoxia arida	Spanish needle	A, B, C, D, E, F, G, H, I, J
Pectis papposa var. *papposa*	chinch-weed	A, C, D, E, G, H
Perityle emoryi	Emory rock daisy	A, C, D, E, H, I, L
Peucephyllum schottii	pygmy-cedar	D, H, I
Pluchea odorata	marsh fleabane	A, B, F, G, I
Pluchea sericea	arrowweed	B, C, D, E, F, G, H, I, J
Porophyllum gracile	slender poreleaf	C, D, H, I
Pseudognaphalium luteoalbum	cudweed	I
Pulicaria paludosa	Spanish false-fleabane	B
Rafinesquia neomexicana	New Mexico desert chicory	C, G
Senecio mohavensis	Mojave groundsel	D, H, I
Sonchus asper	prickly sow-thistle	A, I
Sonchus oleraceus	common sow-thistle	C, H
Stephanomeria pauciflora	skeletonweed	A, B, C, D, E, F, G, H, I, J
Stylocline micropoides	woolly-head nest straw	C, D, G, H
Trichoptilium incisum	yellowdome	D
Xanthisma spinulosum var. *gooddingii*	goldenweed	H, I
Xanthium strumarium	common cocklebur	B
BORAGINACEAE	**borage family**	
Amsinckia menziesii	common fiddleneck	G
Amsinckia tessellata	devil's lettuce	A, C, D, E, G, H, J, L
Cryptantha angustifolia	narrow-leaved cryptantha	A, C, D, E, F, G, H, J, L
Cryptantha barbigera var. *barbigera*	bearded cryptantha	C, D, E, F, G, H, I, J, L

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Scientific name	Common name	Survey Segments
Cryptantha inaequata	Panamint cryptantha	D
Cryptantha maritima	Guadalupe cryptantha	A, C, D, E, F, G, H, I, J, L
Cryptantha micrantha	red-root cryptantha	A, B, E, F, G
Cryptantha nevadensis var. *rigida*	rigid cryptantha	C, D, G, H
Cryptantha pterocarya	winged-nut cryptantha	A, C, D, E, G, H, I, L
Cryptantha racemosa	shrubby cryptantha	H
Heliotropium curassavicum	alkali heliotrope	A, B, I
Nama demissum var. *demissum*	purple mat	G
Pectocarya heterocarpa	chuckwalla combseed	B, C, E, F, G
Pectocarya platycarpa	broadfruited combseed	C, D, E, F, G, H, I, L
Pectocarya recurvata	curvednut combseed	A, C, D, G, H, I
Phacelia crenulata ssp. *ambigua*	notch-leaved phacelia	A, C, D, E, F, G, H, I, J, L
Phacelia distans	distant phacelia	C, D, G
Phacelia ivesiana	Ives' phacelia	D, G
Phacelia pedicillata	pedicellate phacelia	D, L
Plagiobothrys jonesii	Mojave popcorn flower	C, H
Tiquilia plicata	fanleaf crinklemat	A, B, E, F, G, H, J
BRASSICACEAE	**mustard family**	
Brassica tournefortii	Saharan mustard	A, B, C, D, E, F, G, H, I, J, L
Descurainia pinnata	pinnate tansy mustard	A, G
Dithyrea californica	California spectacle pod	D
Draba cuneifolia	wedge-leaved draba	C, D, H
Guillenia lasiophylla	California mustard	C, D
Lepidium lasiocarpum	pepperweed	C, D, E, G, H, I, L
Physaria tenella	Moapa bladderpod	G
Raphanus raphanistrum	jointed charlock	G
Sisymbrium altissimum	tumble mustard	G
Sisymbrium orientale	Oriental hedge-mustard	A, B, E, F, G
Thysanocarpus curvipes	fringepod	G
CACTACEAE	**cactus family**	
Cylindropuntia acanthocarpa	buckhorn cholla	C, D, H, I

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Scientific name	Common name	Survey Segments
Cylindropuntia bigelovii	teddy-bear cholla	H
Cylindropuntia echinocarpa	silver cholla	A, C, D, E, G, H
Ferocactus cylindraceus var. *cylindraceus*	California barrel cactus	C, D, H, I
Opuntia basilaris var. *basilaris*	beavertail	A, C, D, E, G, H, I, L
Mammillaria tetrancistra	corkseed mammillaria	A, C, D, E, H
CAMPANULACEAE	**bellflower family**	
Nemacladus ramosissimus	smallflower threadplant	D, G, H, L
CARYOPHYLLACEAE	**carnation family**	
Achyronychia cooperi	onyx flower	B, E, F, G
CHENOPODIACEAE	**goosefoot family**	
Atriplex elegans var. *elegans*	wheelscale	A
Atriplex fruticulosa	ball saltbush	A
Atriplex hymenelytra	desert holly	A
Atriplex canescens	four-wing saltbush	G
Atriplex lentiformis	big saltbush	A, G, I, J
Atriplex polycarpa	cattle saltbush	A, B, C, D, G, H, I, J
Chenopodium album	white goosefoot	A, E, L
Dysphania ambrosioides	Mexican-tea goosefoot	A, G, L
Salsola tragus	Russian thistle	A, B, C, E, F, G, J
Suaeda moquinii	bush seepweed	A, G
CUCURBITACEAE	**gourd family**	
Cucurbita palmata	coyote gourd	G
EUPHORBIACEAE	**spurge family**	
Chamaesyce micromera	desert spurge	A, B, C, D, E, H, I
Chamaesyce polycarpa	small-seeded spurge	A, B, C, D, E, F, G, H, I, J, L
Chamaesyce setiloba	Yuma spurge	A, C, D, H, I, L
Croton californicus	California croton	G
Ditaxis neomexicana	common ditaxis	A, H, L
Stillingia paucidentata	Mojave toothleaf	G, I

APPENDIX B
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Scientific name	Common name	Survey Segments
FABACEAE	**legume family**	
Acmispon maritimus var. *maritimus*	coastal bird's foot trefoil	D, H
Acmispon strigosus	strigose bird's foot trefoil	D, G, H, I, L
Astragalus nuttallianus var. *imperfectus*	turkeypeas	G
Astragalus sabulonum	gravel milkvetch	G
Dalea mollis	hairy indigo-pea	A, C, D, E, G, H, I, L
Dalea mollissima	downy dalea	D, F, G, I
Lupinus arizonicus	Arizona lupine	A, C, D, E, G, H, J, L
Marina parryi	Parry's marina	A, G
Parkinsonia aculeata	Mexican palo verde	A
Parkinsonia florida	blue palo verde	A, C, D, E, G, H, I, J, L
Parkinsonia microphylla	hillside palo verde	H, I
Prosopis glandulosa var. *torreyana*	honey mesquite	A, C, E, G, H, I, J
Prosopis pubescens	screwbean mesquite	A, E, F, G
Psorothamnus spinosus	smoke tree	A, B, C, D, G, J
Senegalia greggii	catclaw acacia	A, B, C, D, G, H, I
FOUQUIERIACEAE	**ocotillo family**	
Fouquieria splendens ssp. *splendens*	ocotillo	C, D, H, I
GENTIANACEAE	**gentian family**	
Eustoma exaltatum	catchfly gentian	B, F
GERANIACEAE	**geranium family**	
Erodium cicutarium	red-stemmed filaree	A, C, D, E, F, G, H, L
Erodium texanum	Texas filaree	C, G, I
KRAMERIACEAE	**rhatany family**	
Krameria bicolor	white rhatany	A, C, D, G, H, I, L
Krameria erecta	Pima rhatany	H, I
LAMIACEAE	**mint family**	
Hyptis emoryi	desert lavender	A, C, D, H, I, L
Salazaria mexicana	bladder sage	C
Salvia columbariae	chia	A, D, G, H, L

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Scientific name	Common name	Survey Segments
LOASACEAE		
Eucnide urens	rock nettle	I
Mentzelia albicaulis	white-stemmed blazing star	D, E, G, H, L
Mentzelia involucrata	white-bracted mentzelia	A, C, D
Mentzelia tricuspis	spiny-haired blazing star	G
MALVACEAE	**mallow family**	
Eremalche exilis	white mallow	G
Eremalche rotundifolia	desert fivespot	G
Hibiscus denudatus	paleface hibiscus	I
Malva parviflora	small-flowered cheeseweed	A, G
Sphaeralcea ambigua var. *ambigua*	apricot mallow	C, G, H, L
Sphaeralcea emoryi	Emory's globe mallow	G
MYRTACEAE	**myrtle family**	
*Eucalyptus sp.**	eucalyptus	A, B
NYCTAGINACEAE	**four-o-clock family**	
Abronia villosa var. *villosa*	sand verbena	E, F, G, H, J
Allionia incarnata var. *incarnata*	trailing windmills	A, C, D, G, H, I, L
Boerhavia coccinea	spiderling	A, B, D, E
Boerhavia wrightii	Wright's spiderling	A, C, D, G, H, I, J, L
Mirabilis laevis var. *retrorsa*	retrorse desert four-o'clock	A, C, D, H, I, L
ONAGRACEAE	**evening primrose family**	
Chylismia arenaria var. *arenaria*	mousetail suncup	C, D
Chylismia brevipes ssp. *brevipes*	golden suncup	A, C, D, E, G, H
Chylismia claviformis	brown-eyed evening primrose	C, D, G, H
Chylismia multijuga	multi-paired suncup	F, G
Eremothera boothii ssp. *condensata*	Booth's shreading suncup	C, G, H
Eremothera refracta	narrow-leaf suncup	C, D, G
Eulobus californicus	California suncup	G
Oenothera deltoides ssp. *deltoides*	bird-cage evening primrose	G
Oenothera primiveris ssp. bufonis	desert evening primrose	G

APPENDIX B
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Scientific name	Common name	Survey Segments
OROBANCHACEAE	**broomrape family**	
Orobanche cooperi	Cooper's broomrape	H
PAPAVERACEAE	**poppy family**	
Eschscholzia californica	California poppy	G
Eschscholzia glyptosperma	desert golden poppy	A, D, G
Eschscholzia minutiflora	small-flowered California poppy	A, C, D, E, I, L
PHRYMACEAE	**lopseed family**	
Mimulus bigelovii	Bigelow's monkeyflower	D, H
PLANTAGINACEAE	**plantain family**	
Antirrhinum filipes	twining snapdragon	D, G
Mohavea confertiflora	Mojave ghost-flower	C, D, H, I
Plantago ovata	ovate plantain	A, B, C, D, E, F, G, H, I, L
POLEMONIACEAE	**phlox family**	
Eriastrum diffusum	miniature woollystar	G
Gilia scopulorum	rock gilia	D, F, I
Langloisia setosissima ssp. *setosissima*	bristly calico	D
Linanthus jonesii	Jones' linanthus	D, G
Loeseliastrum schottii	Schott's calico	G
POLYGONACEAE	**buckwheat family**	
Chorizanthe corrugata	wrinkled spineflower	A, C, E, H, I,
Chorizanthe brevicornu var. *brevicornu*	brittle spineflower	A, C, D, E, G, H, I, L
Chorizanthe rigida	rigid spineflower	A, C, D, E, G, H, I, L
Eriogonum deflexum var. *deflexum*	flat-crown buckwheat	A, B, F, G, H, I
Eriogonum inflatum var. *inflatum*	inflated desert trumpet	A, C, D, E, H, I, L
Eriogonum thomasii	Thomas's wild buckwheat	C, D, G, H, I, L
Eriogonum trichopes	little desert buckwheat	A, C, D, G, H, I, L
Polygonum argyrocoleon	silver-sheathed knotweed	H
Pterostegia drymarioides	woodland threadstem	D, H
RESEDACEAE	**mignonette family**	
Oligomeris linifolia	linear-leaved oligomeris	A, B

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Scientific name	Common name	Survey Segments
RUBIACEAE	**coffee family**	
Galium angustifolia	narrow-leaved bedstraw	I
SALICACEAE	**willow family**	
Salix exigua	sand-bar willow	B, E, F, G, I
Salix gooddingii	Goodding's willow	B
Populus fremontii	Fremont's cottonwood	A, B
SOLANACEAE	**nightshade family**	
Datura wrightii	Jimson weed	G
Lycium andersonii	Anderson's desert-thorn	C, D, H, I
Lycium cooperi	peach thorn	G
Nicotiana obtusifolia	desert tobacco	C, G, H, I, L
Physalis crassifolia	thick-leaf ground cherry	A, C, H, L
TAMARICACEAE	**tamarisk family**	
Tamarix ramosissima	salt cedar	A, B, C, D, E, F, G, H, I, J
Tamarix aphylla	athel tamarisk	A, B, D, F, G, L
URTICACEAE	**nettle family**	
Parietaria hespera var. *hespera*	western pellitory	D, I
VERBENACEAE	**verbena family**	
Phyla nodiflora	turkey-tangle frog-fruit	F
VISCACEAE	**mistletoe family**	
Phoradendron californicum	desert mistletoe	A, B, C, E, F, G, J
ZYGOPHYLLACEAE	**caltrop family**	
Fagonia laevis	smooth-stemmed fagonia	I
Kallstroemia californica	California kallstroemia	A, D, G
Larrea tridentata	creosote bush	A, C, D , E, G, H, L
Tribulus terrestris	puncture vine	A, C, D, G, H, J
MONOCOTS		
AGAVACEAE	**century-plant family**	
Hesperocallis undulata	desert lily	C, E, G, H
ARECACEAE	**palm family**	
*Washingtonia filifera**	California fan palm	A

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Scientific name	Common name	Survey Segments
Washingtonia robusta	Mexican fan palm	A, B, E, H, J
CYPERACEAE	**sedge family**	
Cyperus eragrostis	tall flat sedge	A
Eleocharis geniculata	geniculate spikerush	A, B, E, F
Schoenoplectus californicus	California bulrush	A, B, E, F, G, I, J
JUNCACEAE	**rush family**	
Juncus xiphioides	iris-leaved rush	B
Juncus sp.	rush	B, F
POACEAE	**grass family**	
Andropogon glomeratus ssp. *scabriglumis*	rough-glume bushy blue stem	A, B, G
Aristida adscensionis	six-weeks three awn	A, C, D, E, G, H, I, J, L
Aristida purpurea var. *wrightii*	purple three-awn	C, E, I
Arundo donax	giant reed	A, E, F, I, J
Avena fatua	wild oat	G
Bouteloua aristidoides	needle grama	A, C, D, E, G, H, I, L
Bouteloua barbata ssp. *barbata*	six weeks grama	A, C, D, G, H, I, L
Bromus arizonicus	Arizona brome	A, C, D, G, H, I
Bromus catharticus	rescue brome	C, D, H
Bromus madritensis ssp. *rubens*	red brome	A, C, D, E, G, H, I, L
Cynodon dactylon	Bermuda grass	A, B, D, E, G, H, I, J
Distichlis spicata	saltgrass	A, E, H
Erioneuron pulchellum	fluff grass	H, I
Festuca myuros	rat-tail fescue	C, D, E, G
Festuca octoflora	six weeks fescue	C, D
Hordeum murinum ssp. *glaucum*	glaucus barley	A, B, C, E, G, H, I, J
Hordeum murinum ssp. *leporinum*	hare barley	G
Muhlenbergia microsperma	small seeded muhlenbergia	F
Paspalum dilatatum	dallis grass	A, B, F, I
Pennisetum setaceum	feathertop	A, B, E, I
Phalaris minor	lesser canary grass	A, C, H
Phragmites australis	common reed	A, B, E, F, G, I, J

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
Pleuraphis jamesii	James' galleta	G
Pleuraphis rigida	big galeta	A, G, H
Schismus barbatus	Mediterranean grass	A, C, D, G, H, I, J, L
Setaria gracilis	knotroot bristlegrass	B
Sporobolus airoides	alkali sacaton	G
Triticum aestivum	wheat	G
THEMIDACEAE	**brodiaea family**	
Androstephium breviflorum	small-flowered androstephium	G
TYPHACEAE	**cattail family**	
Typha latifolia	broad-leaved cattail	A, C, E, G, I, J
Typha domingensis	southern cattail	A

*cultivated

Appendix C
Photographs from Survey Segments of the Project Area

APPENDIX C

Photographs from Survey Segments of the Project Area

Plate 1. Segments A and B. (A- 1) Dry wash south of Park Moabi and the National Trails Highway with rocky hillside on south side; facing west. A-2) Rocky hills on the south side of National Trails Highway looking west with creosote bush scrub and big galeta grass in small valley between slopes. (A-3) Sewage disposal ponds southwest of the intersection of Park Moabi Road and National Trails Highway. (A-4) Landscaped and developed camping areas in Park Moabi. (A-5) Pirate's Cove Resort development. (B-1) Arrow weed thickets in central portion of peninsula; tamarisk thicket in background.

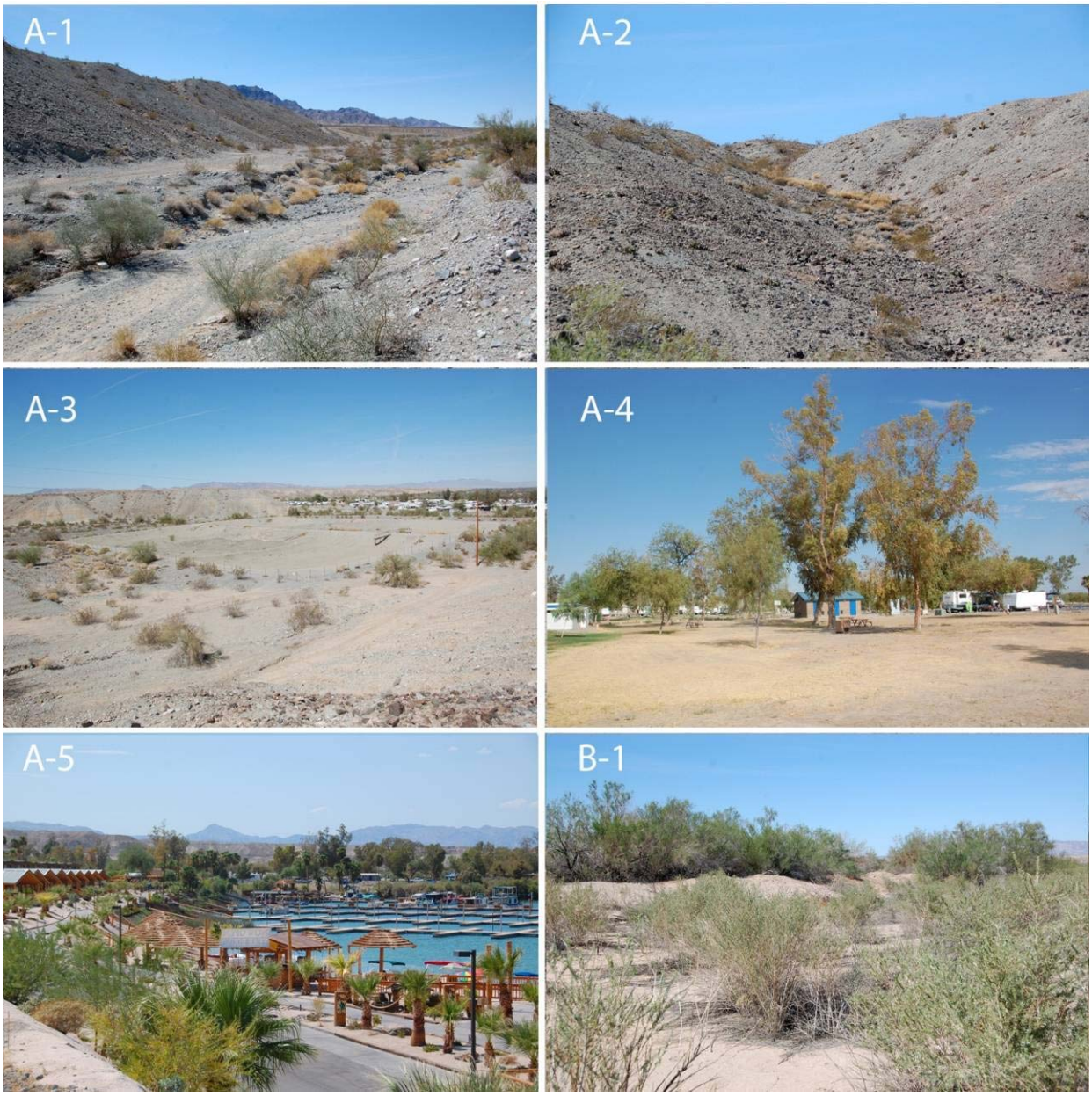


Plate 2. Segments B and C. (B-2) Park Moabi camping area on peninsula adjacent to Colorado River. (B-3) Maintained public beach opposite Pirate's Cove Resort with western honey mesquite and salt cedar in background. (C-1) Broad wash at north end of Segment C with cattle saltbush and creosote bush. (C-2) Rocky slopes above wash with scattered creosote bush. (C-3) Broad wash at south end of Segment C with blue palo verde woodland and creosote bush scrub. C-4) Desert pavement on hills above washes with creosote bush scrub.

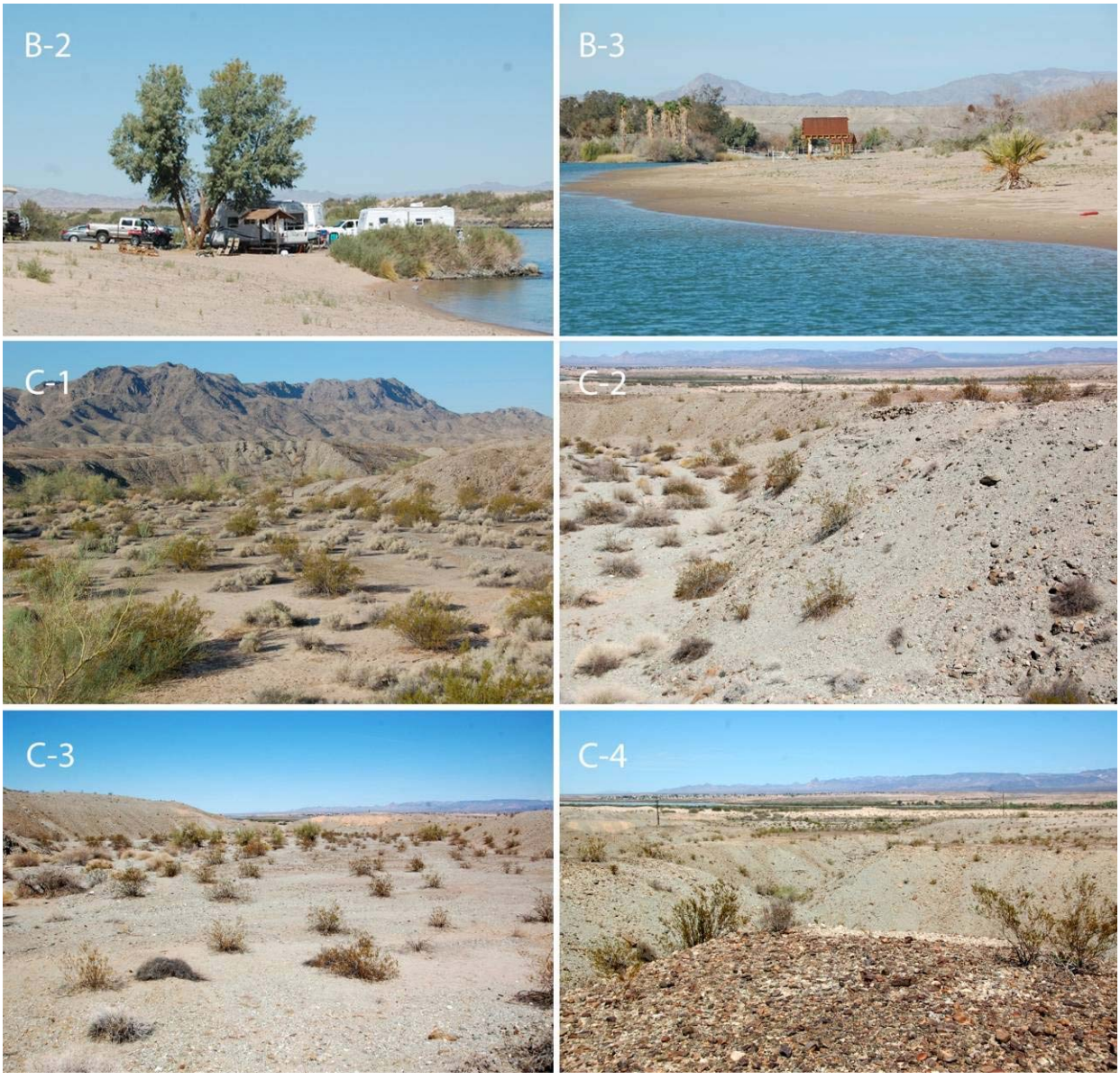


Plate 3. Segments D and E. (D-1) Bat Cave Wash with blue palo verde woodland. (D-2). Tamarisk thicket mixed with western honey mesquite at north end of Bat Cave Wash south of National Trails Highway. (E-1) Colorado River and low terrace of dredged sands with tamarisk and arrow weed thickets. (E-2) Close-up of tamarisk thickets on dredged sands. (E-3) National Trails Highway bridge and wetland where Bat Cave Wash enters the Colorado River. (E-4) Rocky terrace in Segment E with creosote bush scrub.

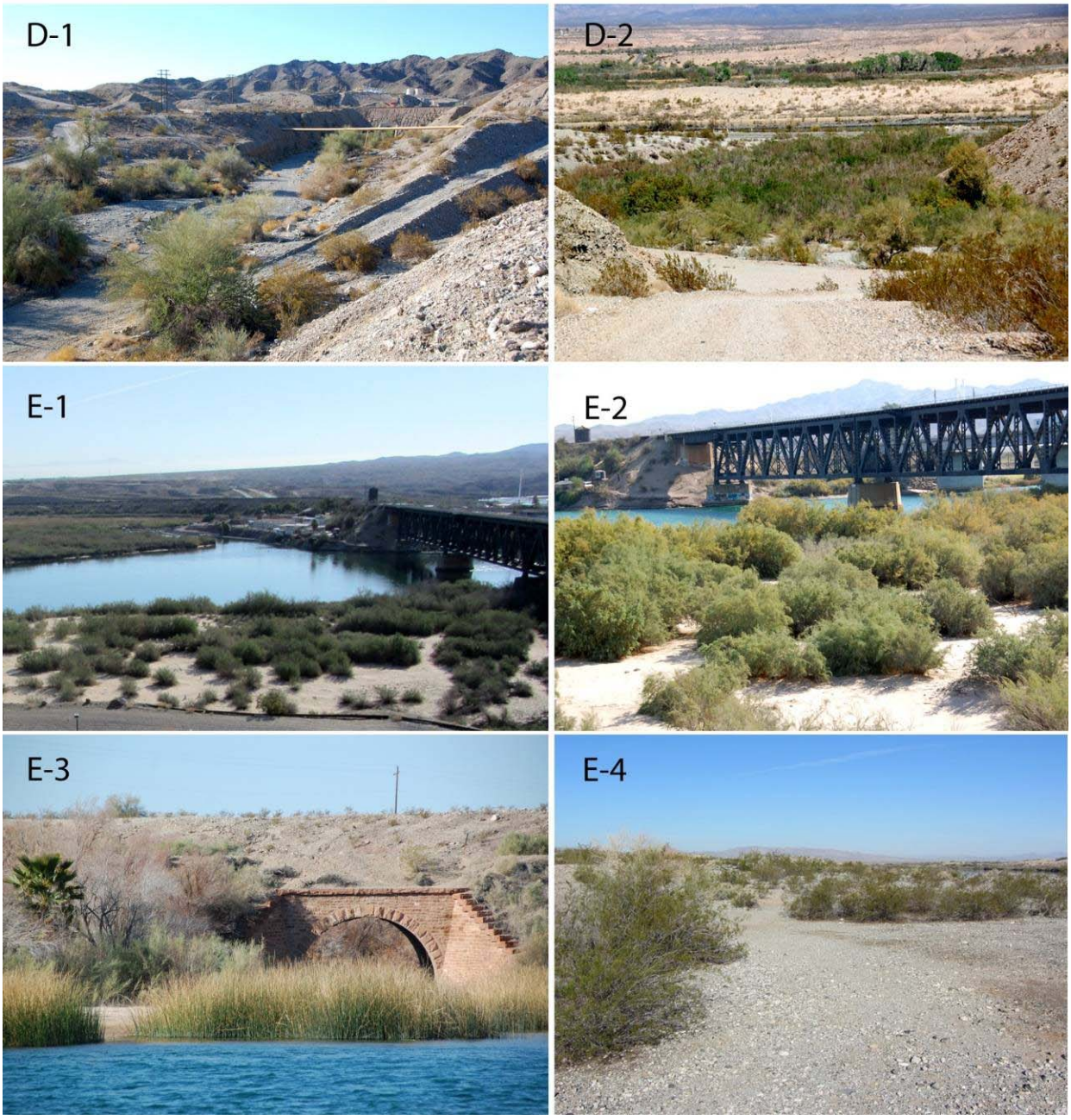


Plate 4. Segments F and G. (F-1) Arrow weed thicket on dredge sands looking north. (F-2) Western honey mesquite, screwbean mesquite and tamarisk thickets at southern end of Segment F with small wetland in the southeast corner of photo. (F-3) Close-up of wetland with common reed and sand-bar willow on drier land and California bulrush standing in water. (G-1) Edge of Topock Marsh on the west side of the Oatman-Topock Highway; big saltbush and salt cedar on higher ground to the left and California bulrush in lower ground to the right. (G-2) Dense tamarisk thicket between BN&SF railroad tracks and the Oatman-Topock Highway. (G-3) Big saltbush on alkaline soils north of the Topock Marsh, west of the Oatman-Topock Highway.

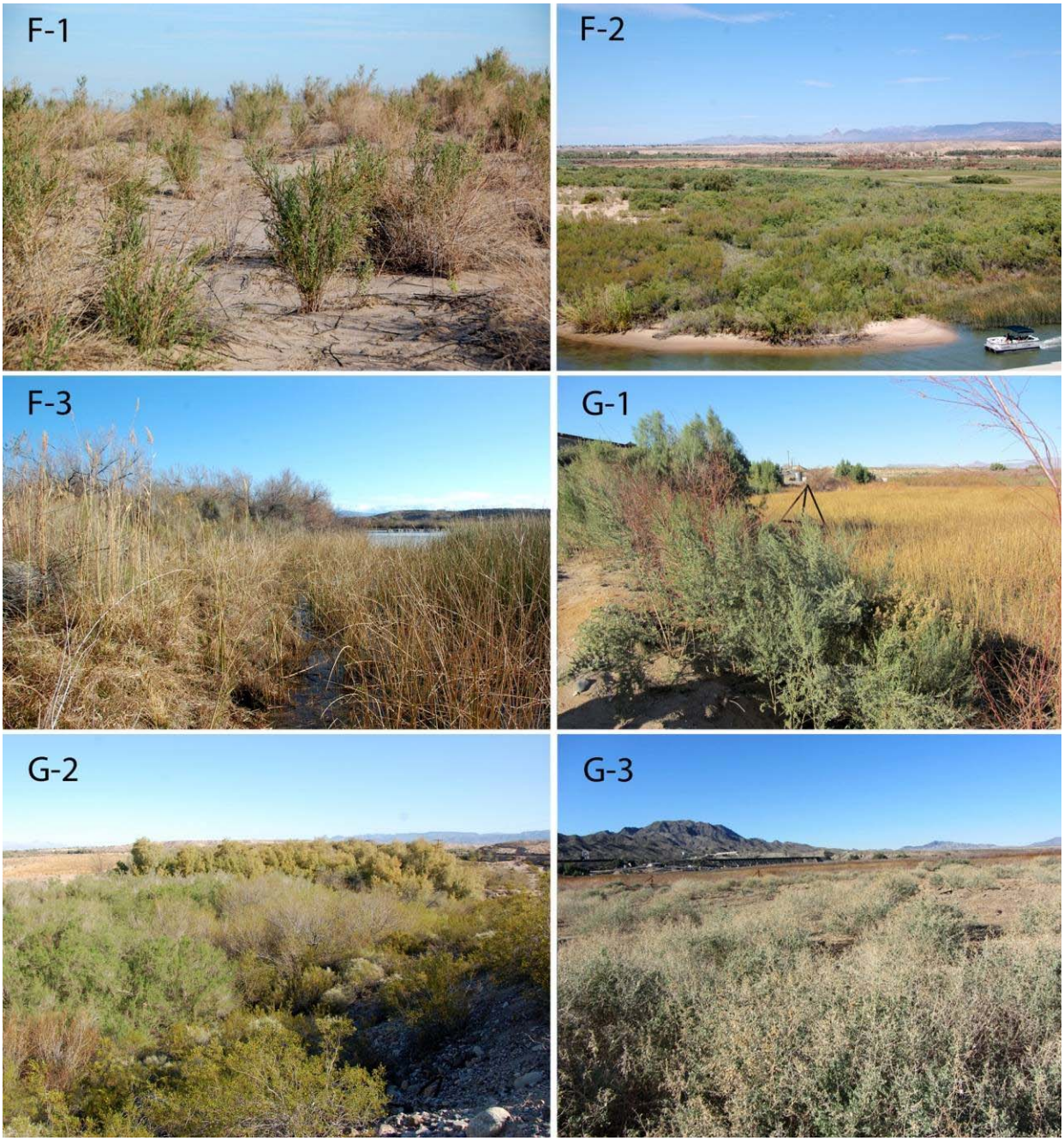


Plate 5. Segment G. (G-4) Sandy area with spring annuals including multi-paired suncup, stevia pincushion, brittle spineflower, *Cryptantha* spp., Spanish needles, and desert sunflower. (G-5) Upland rocky area dominated by creosote bush scrub. (G-6) Native vegetation planting (screwbean mesquite) in burn area on the Havasu National Wildlife Refuge. (G-7) Barren area on west side of Oatman-Topock Highway in 2008 burn area on the Havasu National Wildlife Refuge. (G-8) Dense athel tamarisk thicket and southern edge of blue palo verde woodland in the northern part of the segment, east of the Oatman-Topock Highway. (G-9) Cleared pipeline right-of-way in northeast part of the segment.

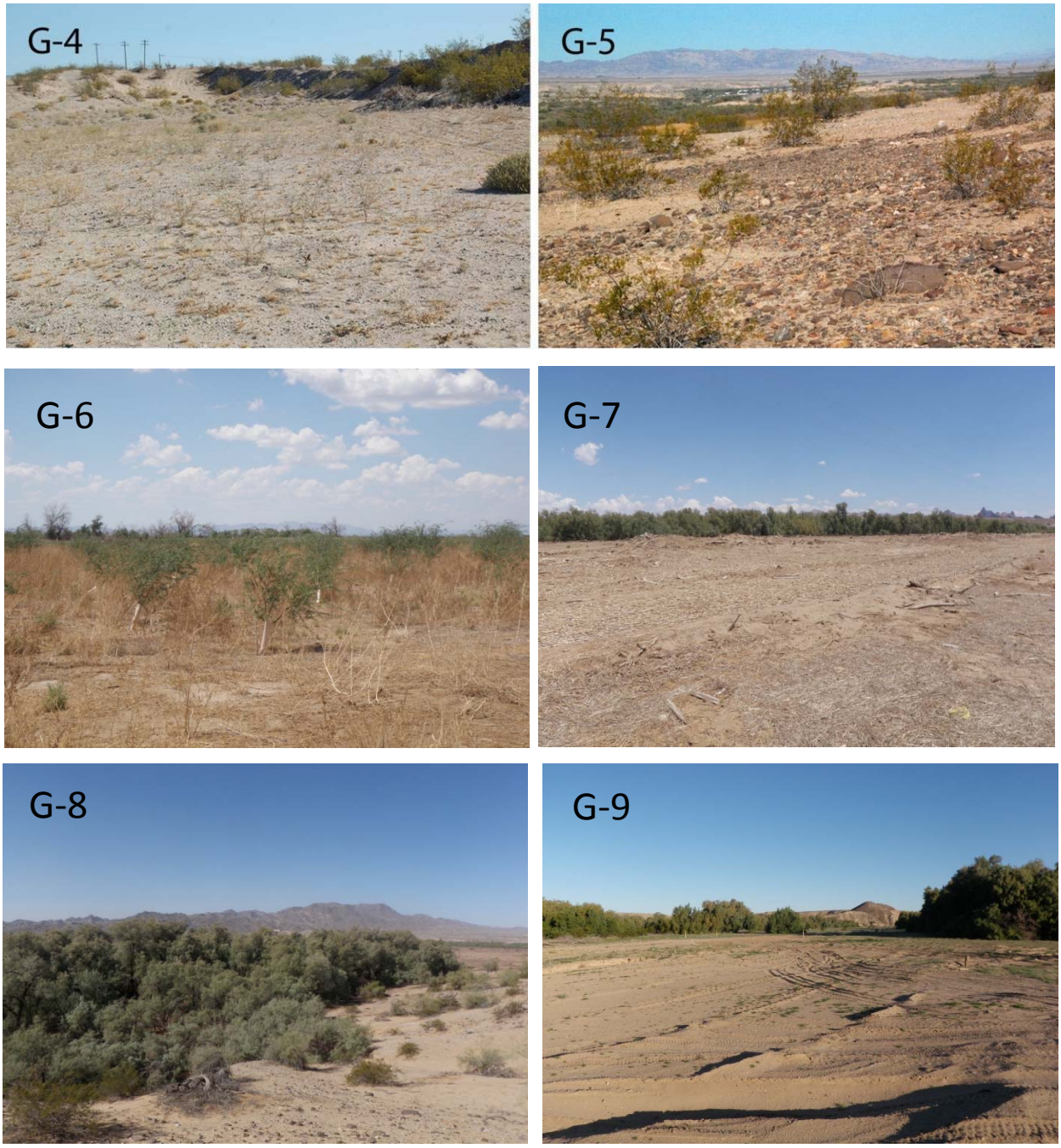


Plate 6. Segments G and H. (G-10) Sandy area with spring annuals including multi-paired suncup, stevia pincushion, brittle spineflower, *Cryptantha* spp., Spanish needles, and desert sunflower. (G-11) Upland rocky area dominated by creosote bush scrub. (H-1) Steep, disturbed, and eroded alluvial terraces below Topock Compressor Station. (H-2) Upper reaches of Bat Cave Wash below the compressor station. (H-3) Decomposing granitic bedrock of the Chemehuevi Mountains next to dissected alluvial terraces in Segment H. (H-4) Metamorphic rocks of the Chemehuevi Mountains in the eastern part of Segment H.

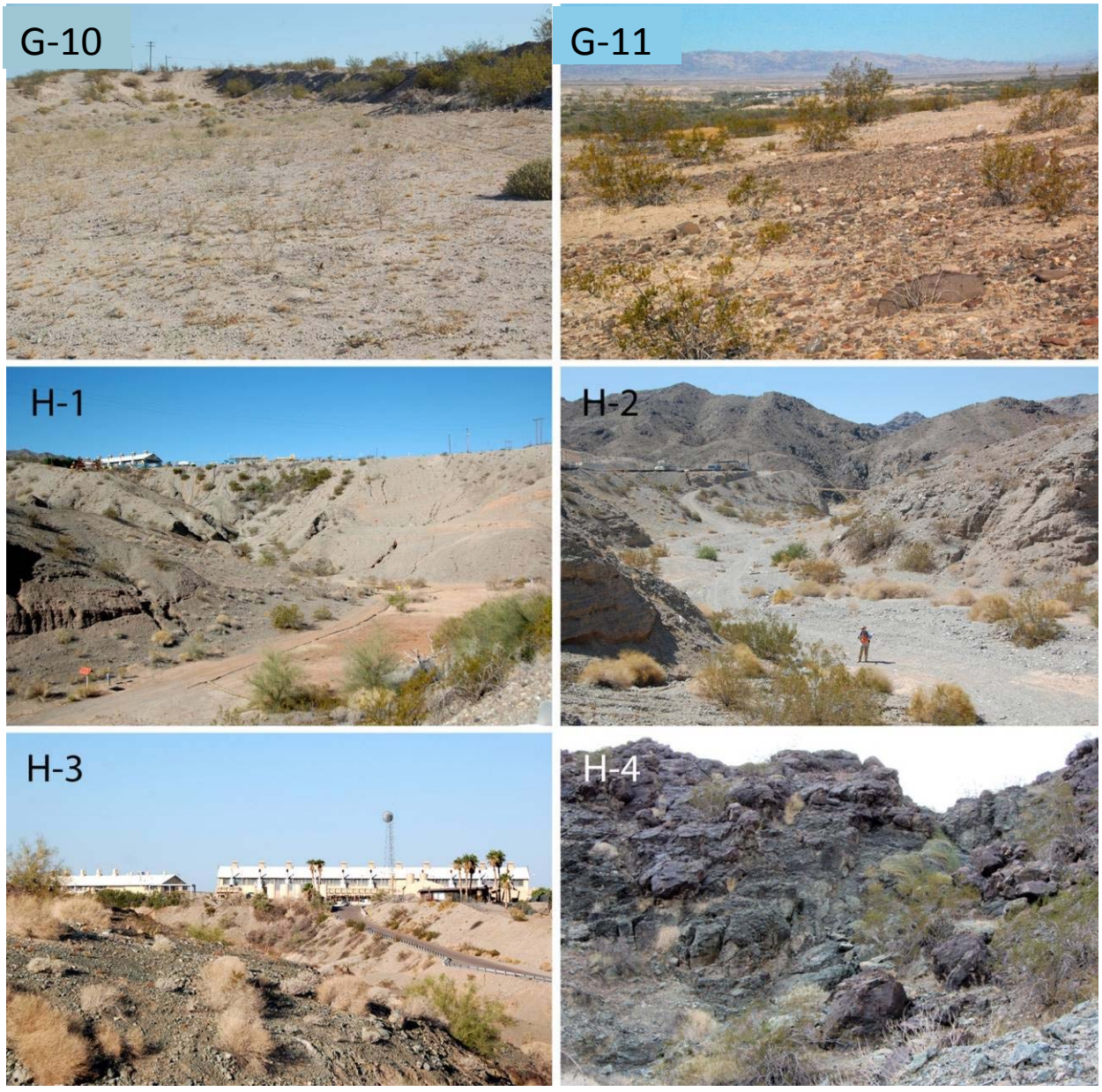
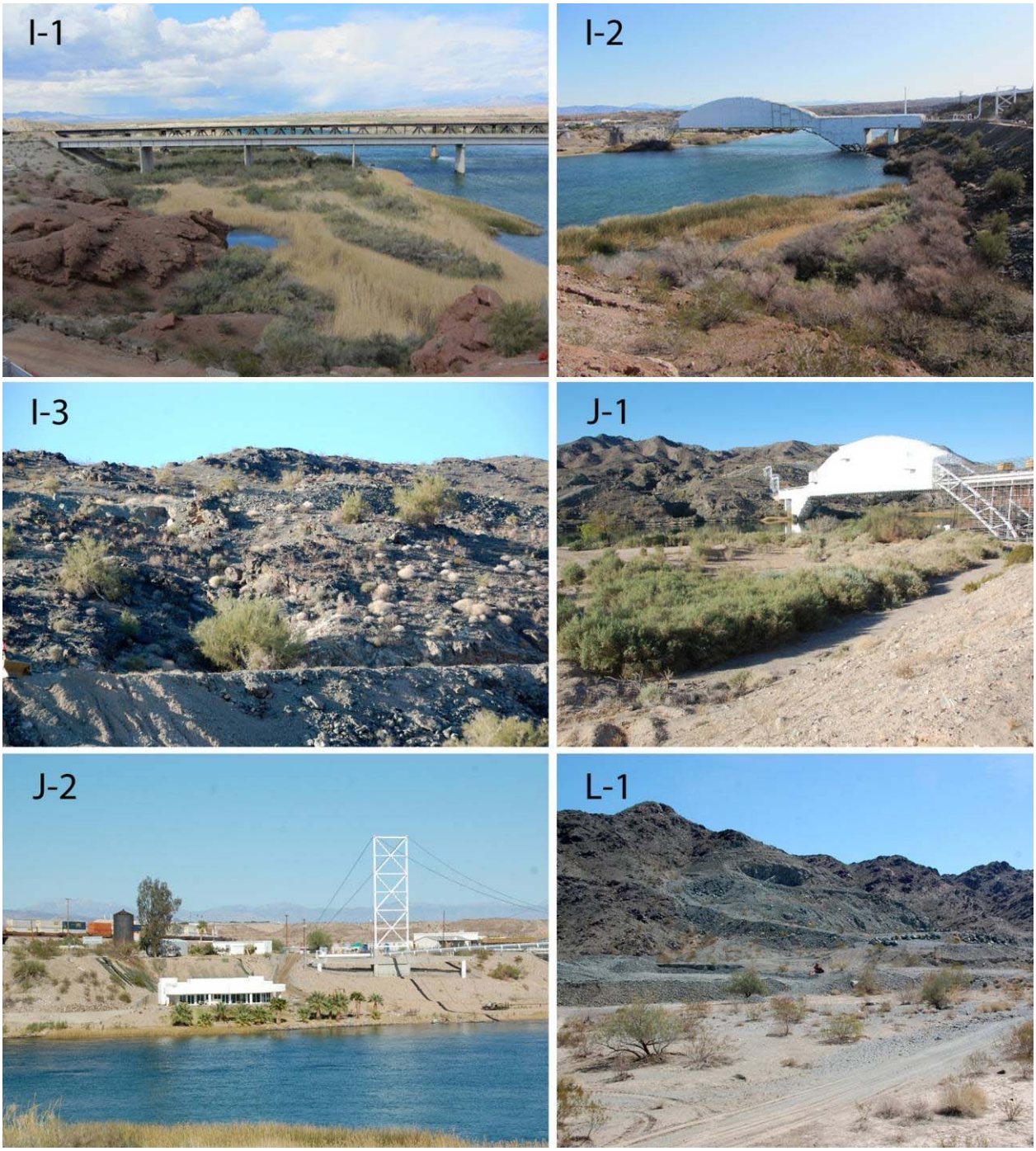


Plate 7. Segments I, J and L. (I-1) Common reed and California bulrush marshes at north end of Segment I with Miocene conglomerate outcrop in lower left of picture. (I-2) California bulrush marsh in river, western honey mesquite at base of upland slope and hillside palo verde slightly higher up slope. (I-3) Hillside palo verde on slopes of Segment I above the Colorado River with white bursage and brittle bush. (J-1) Arrow weed and big saltbush in area below private residence along the Colorado River. (J-2) Private residence with landscaped areas (Mexican fan palms) and creosote bush scrub on slopes. (L-1) Blue palo verde woodland in sandy wash at quarry site; gravel piles visible at foot of Chemehuevi Mountains in background.



Appendix D
Photographs of Special-status Plants Found in the Project Area

APPENDIX D

Photographs of Special-status Plants Found in the Project Area

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 Segment 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.

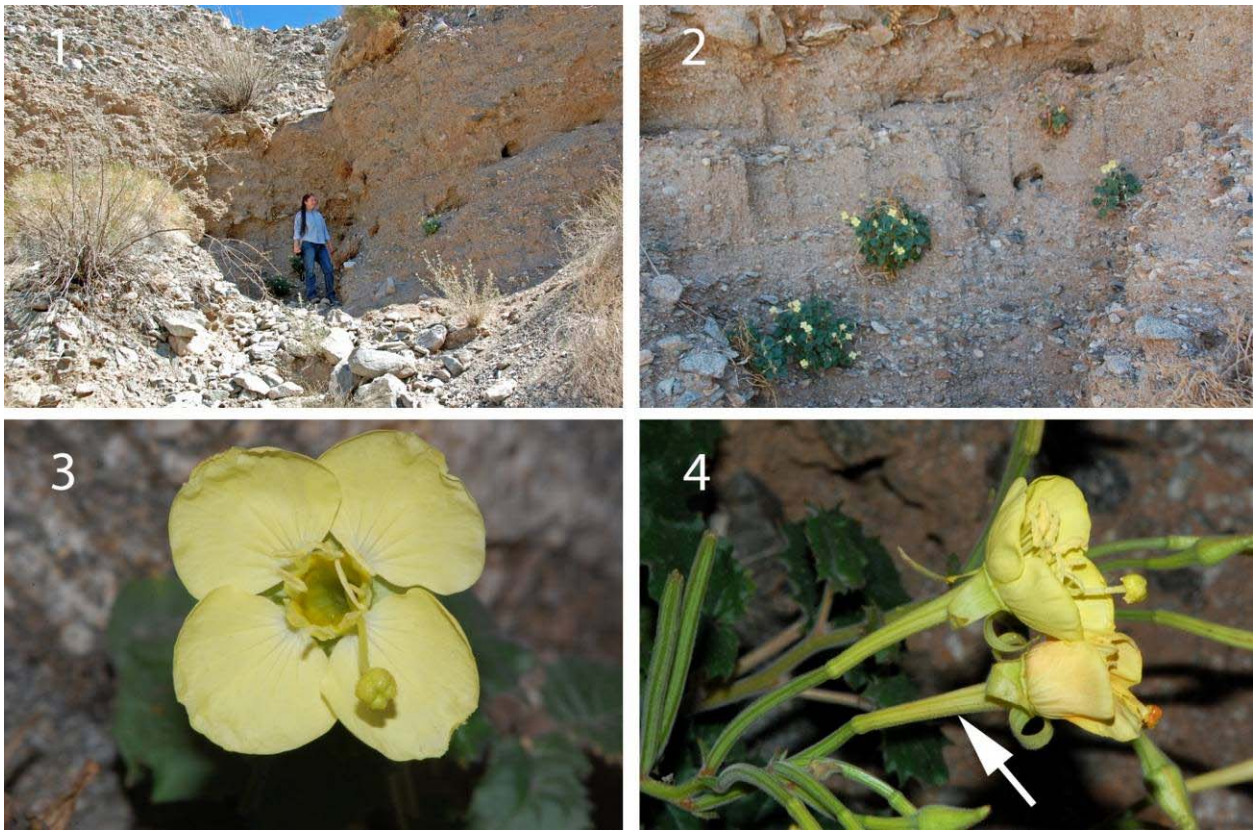


Plate 2. Hillside palo verde (*Parkinsonia microphylla*), CRPR 2.2. (1) Habit of hillside palo verde on rocky hillside in segment H. (2) Branches of hillside palo verde showing numerous small leaves. (3) Close-up of flower.

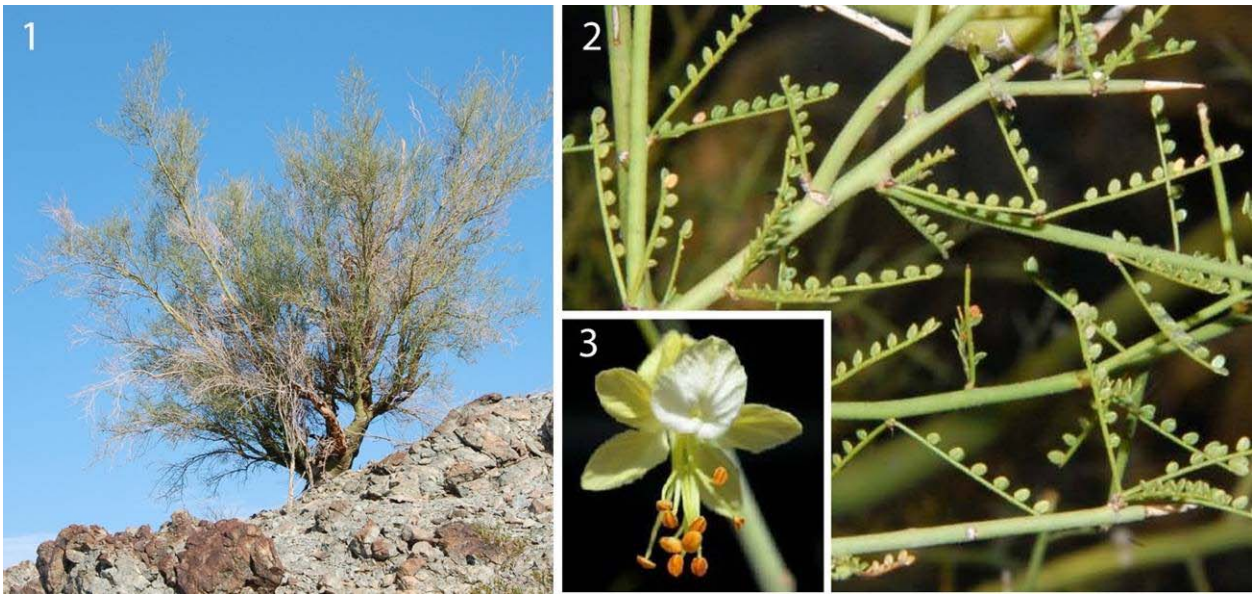


Plate 3. Gravel milkvetch (*Astragalus sabulonum*), CRPR 2.2. Habit of plant growing along the edge of the Sacramento Wash in the northern part of Segment G (added survey area).

Plate 4. Spiny-haired blazing star (*Mentzelia tricuspis*) CRPR 2.1; Photographs of this plant are included, because although not considered rare in Arizona, it is considered rare in California. (1) Habitat on steep scree slope on north side of railroad tracks in Survey Segment G with plant indicated by arrow. (2) Habit of *Mentzelia tricuspis* on scree slope. (3) Flower of *M. tricuspis* from a site near Golden Shores, Arizona. (4) Inflorescence of *Mentzelia tricuspis* with arrow pointing to a floral bract. (5) Arrow pointing to corresponding bract in white-bracted mentzelia (*Mentzelia involucrata*) that was found in the Project Area in California.

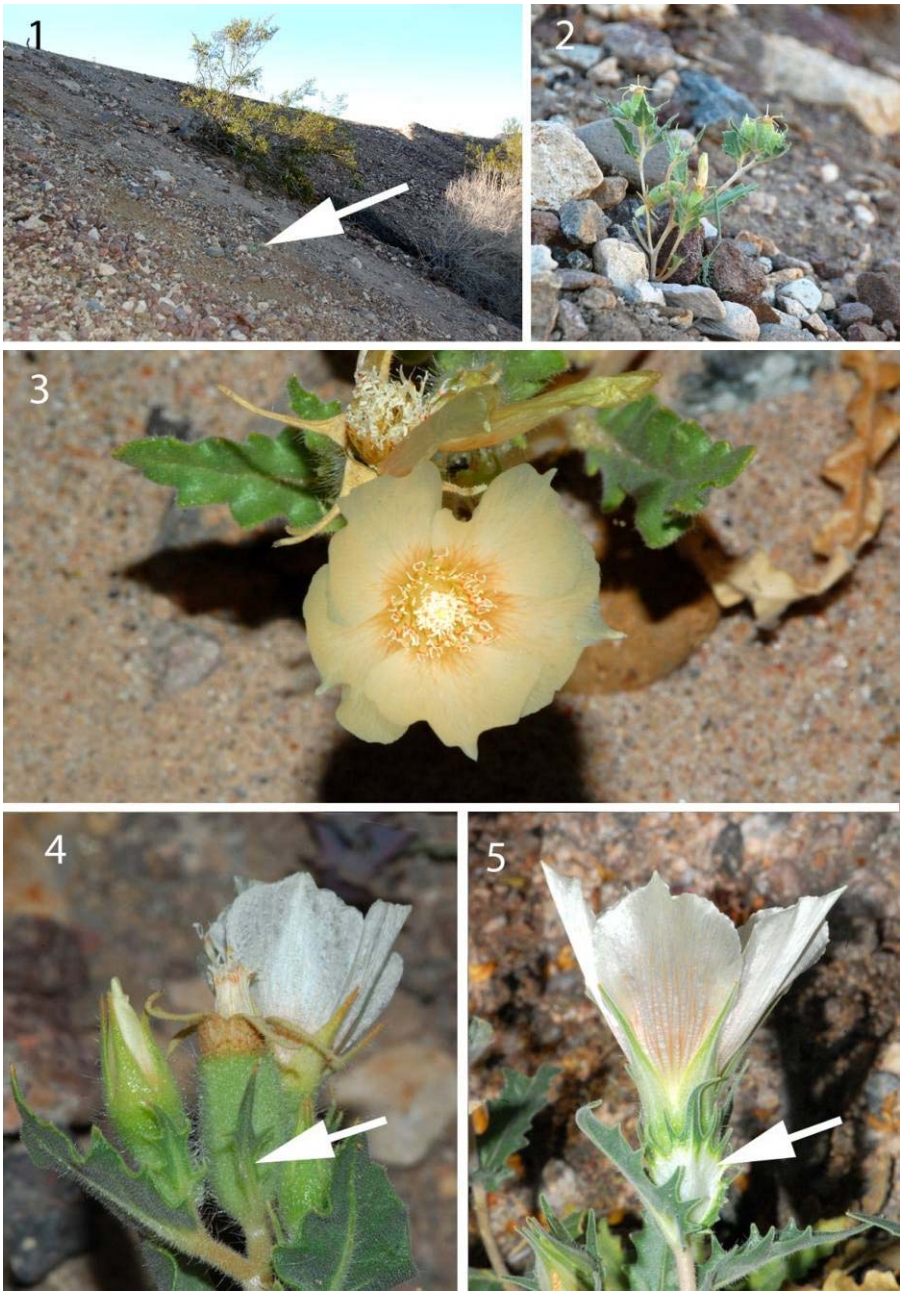


Plate 5. Small-flowered androstephian (*Androstephium breviflorum*) CRPR 2.2; (1) Habit of plant in sandy soil on the west side of BN&SF railroad tracks in added survey area in Survey Segment G (2) Close up of flowers

Appendix E
Plants Protected Under California Desert Native Plants Act and/or by the Arizona Department of Agriculture

APPENDIX E

Plants Protected Under California Desert Native Plants Act (CDNPA) and or the Arizona Department of Agriculture

Plate 1. CDNPA and ADA List C: Palo verde. (1) Blue palo verde (*Parkinsonia florida*) showing characteristic growth habit. (2) Blue paloverde leaves with few, large bluish leaflets. (3) Close-up of blue palo verde flower. (4) Hillside palo verde (*Parkinsonia microphylla*) growth habit (5) Hillside palo verde leaves with many, small green leaflets. (6) Close-up of hillside palo verde flower.

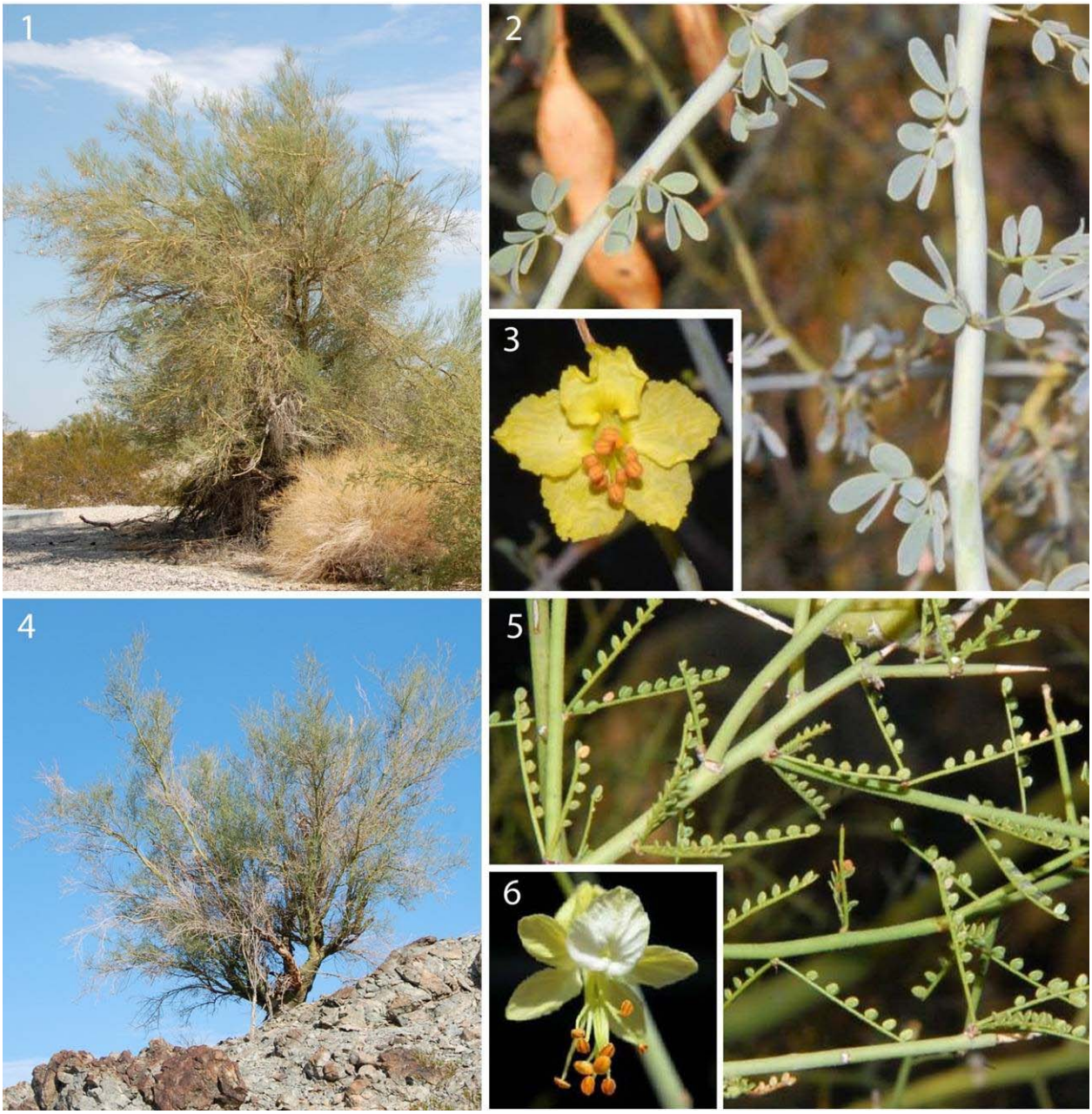


Plate 2. CDNPA and ADA List B cacti. 1) Habit of buckhorn cholla (*Cylindropuntia acanthocarpa* ssp. *coloradensis*). 2) Flower close-up of buckhorn cholla. 3) Habit of silver cholla (*Cylindropuntia echinocarpa*). 4) Flower close-up of silver cholla. 5) Habit of California barrel cactus (*Ferocactus cylindraceus* var. c*ylindraceus*). 6) Habit of corkseed mammillaria (*Mammillaria tetrancistra*).

Plate 3. CDNPA and ADA List B cacti and shrubs. 1) Habit of teddy bear cholla (*Cylindropuntia bigelovii*). 2) Habit of beavertail cactus (*Opuntia basilaris* ssp. *basilaris*). 3) Habit of ocotillo (*Fouquieria splendens*). 4) Flower close-up of ocotillo. 5) Close-up of holly-leaved saltbush (*Atriplex hymenelytra*).

Plate 4. CDNPA and ADA List C Trees. 1) Western honey Mesquite (*Prosopis glandulosa* var. *torreyana*) branches. 2) Close-up of western honey mesquite fruit. 3) Screwbean Mesquite (*Prosopis pubescens*) branches and fruit. 4) Catclaw acacia (*Senegalia greggii*) habit. 5) Close-up of fruiting branch of catclaw acacia. 6) Smoke tree (*Psorothamnus spinosa*) habit. 7) Close-up of smoke tree branches.

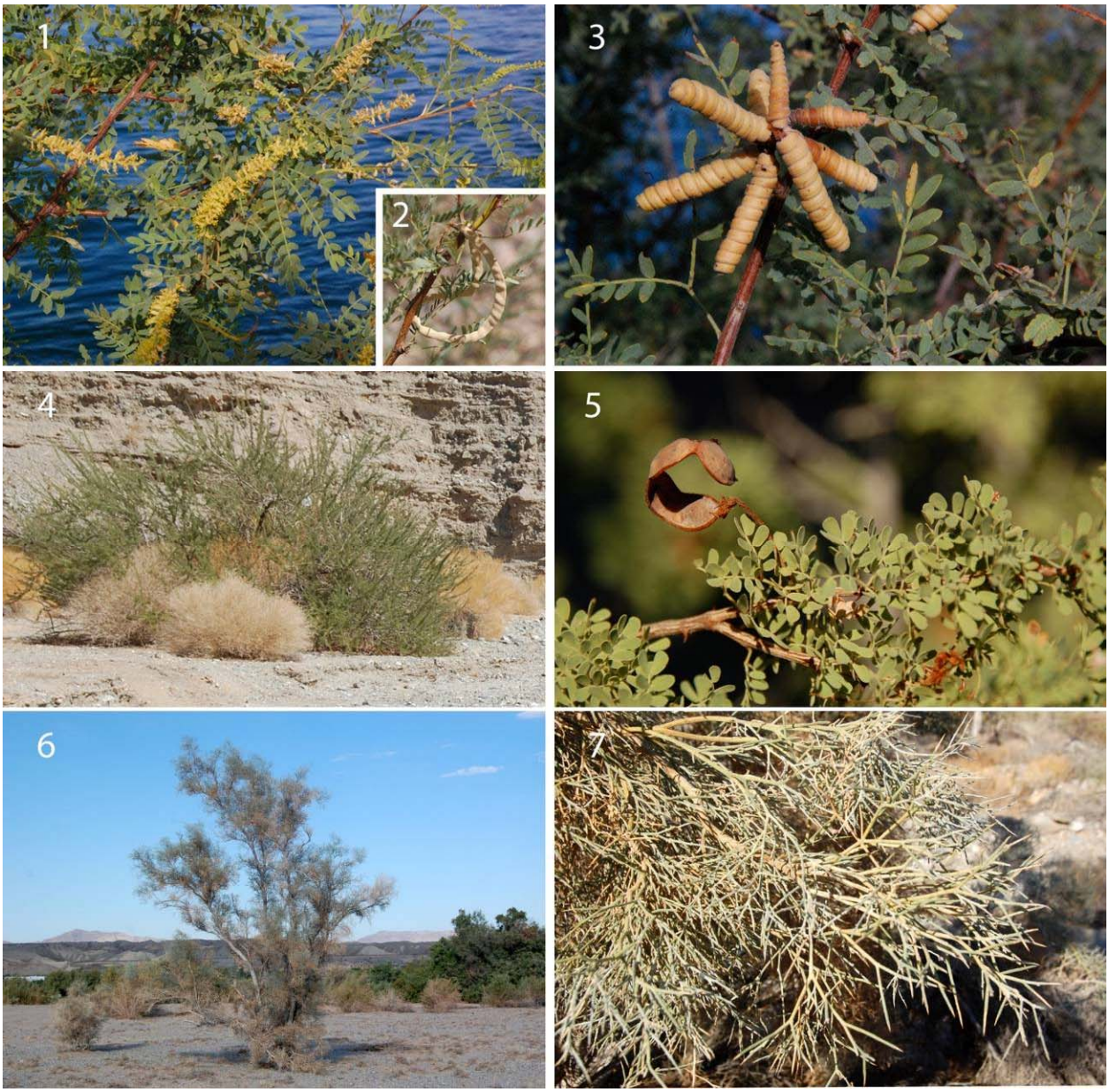
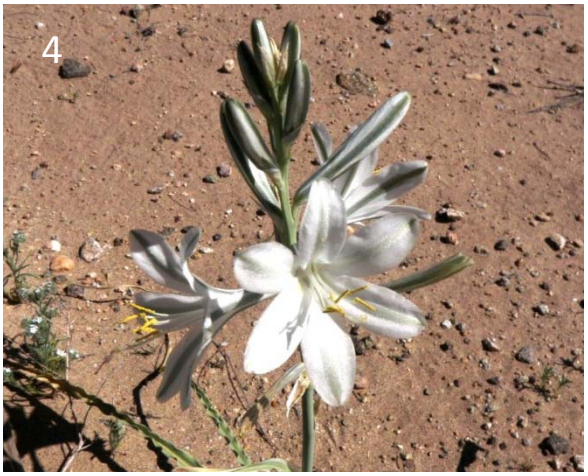


Plate 5. Desert Lily (*Hesperocallis undulata*) *ADA* List B. (1) Desert lily leaves and buds. (2) Desert lily growth habit in sandy soils west of BN&SF railroad tracks in added area of Segment G. (3) Close up of leaves. (4) Close up of flower.



Appendix F
CNDDB Forms for Special-status Plants in the Project Area

APPENDIX F

CNDDB Forms for Special-status Plants in the Project Area

(1) Mousetail suncup (*Chylismia arenaria*)

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): 03/12/2012

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Chylismia arenaria*

Common Name: mousetail suncup

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 11 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Kim Steiner
Address: 1791 Inverness Dr.
Petaluma, CA 94954
E-mail Address: ksteiner15@gmail.com
Phone: (415) 342-9362

Plant Information

Phenology: 2 % vegetative 7 % flowering 2 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Steep vertical walls of Bat Cave Wash below theTopock 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 13844664.794 mN 729

County: San Bernadino Landowner / Mgr.: PG&E

Quad Name: NA Elevation: 122-136 m

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Trimble GeoXT

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 14 feet meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates:

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):*

Edge of dry wash on vertical conglomerate cliff faces, blue palo verde woodland with Parkinsonia florida, Bebbia juncea, Hyptis emoryii, creosote bushes.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: No immediate land use surrounding population, injection wells for ground water re-mediation nearby

Visible disturbances: No obvious disturbances

Threats: Possible erosion of main population site if heavy rain falls. No obvious threat from re-mediation activities.

Comments:

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): Jepson 2
☐ Compared with specimen housed at: _____
☑ Compared with photo / drawing in: Cal Flora
☑ By another person (name): Jim Andre
☐ Other: _____

Photographs: *(check one or more)* Slide Print Digital

Plant / animal ☐ ☐ ☑
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☑

May we obtain duplicates at our expense? yes ☑ no ☐

DFG/BDB/1747 Rev. 6/16/09

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

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

For Office Use Only
Source Code ____ Quad Code ____
Elm Code ____ Occ. No. ____
EO Index No. ____ Map Index No. ____

Date of Field Work (mm/dd/yyyy): 11/05/2011

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Parkinsonia microphylla*

Common Name: hillside palo verde

Species Found? ☑ Yes ☐ No ____ If not, why?

Total No. Individuals 150 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? ____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: ____ Number ____ Museum / Herbarium

Reporter: Kim E. Steiner
Address: 1791 Inverness Dr., Petaluma, CA 94954
E-mail Address: ksteiner@garciaandassociates.com
Phone: (415) 342-9362

Plant Information

Phenology: 99 % vegetative 0 % flowering 1 % fruiting

Animal Information

adults ____ # juveniles ____ # larvae ____ # egg masses ____ # unknown ____

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map *AND/OR* fill out your choice of coordinates, below)**

County: San Bernadino Landowner / Mgr.: Havasu National Wildlife Refuge
Quad Name: ____ Elevation: 175 m
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of ____ ¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin GeoXT
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 17 feet meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates:

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):*

Parkinsonia microphylla shrubland on rocky NE-facing slope above the western banks of the Colorado River with Encelia farinosa, Bebbia juncea var. aspera and Larrea tridentata. Northern edge of the Chemeheuvi Mountains in California.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Most of population is within the Havasu National Wildlife Refuge just above Colorado River.

Visible disturbances: gravel roads through population, disturbance from buried gas pipelines

Threats: No obvious threats

Comments: Sympatric with Parkinsonia florida on edge of population. Several individuals appear to be hybrids

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): ____
☐ Compared with specimen housed at: ____
☑ Compared with photo / drawing in: Jepson Online Interchange
☑ By another person (name): James Andre
☐ Other: ____

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☑
Habitat ☐ ☐ ☑
Diagnostic feature ☐ ☐ ☑

May we obtain duplicates at our expense? yes ☑ no ☐

DFG/BDB/1747 Rev. 6/16/09