Appendix A
Analytical Data, Disturbed Areas Map, and Various Survey Methodologies/Reports

A1: Analytical Data (*on CD-ROM only*)

A2: Aerial Map of Disturbed Areas

A3: Mapping of OHWM and USACE/CDFW Jurisdictional Areas
(*on CD-ROM only*)

A4: Technical Memoranda on Methodologies of Mature Plant Surveys and Floristic Surveys and the Mature Plants Survey Report and Addendum (*on CD-ROM only*)

A5: Topock Groundwater Remediation Project Floristic Survey Reports (*on CD-ROM only*)

A6: Instream Habitat Typing Survey Technical Memorandum (*on CD-ROM only*)

A7: Topock Groundwater Remediation Project Ethnobotanical Survey Reports
(*on CD-ROM only*)

A8: Supplemental Baseline Sound Level Measurement Technical Memorandum and Responses to Comments (*on CD-ROM only*)

A9: Paleontological Resources Management Plan: MMRP CUL-3

Appendix A1
Analytical Data
(*on CD-ROM only*)

This appendix is an Excel file presented on the CD-ROM version of this report.

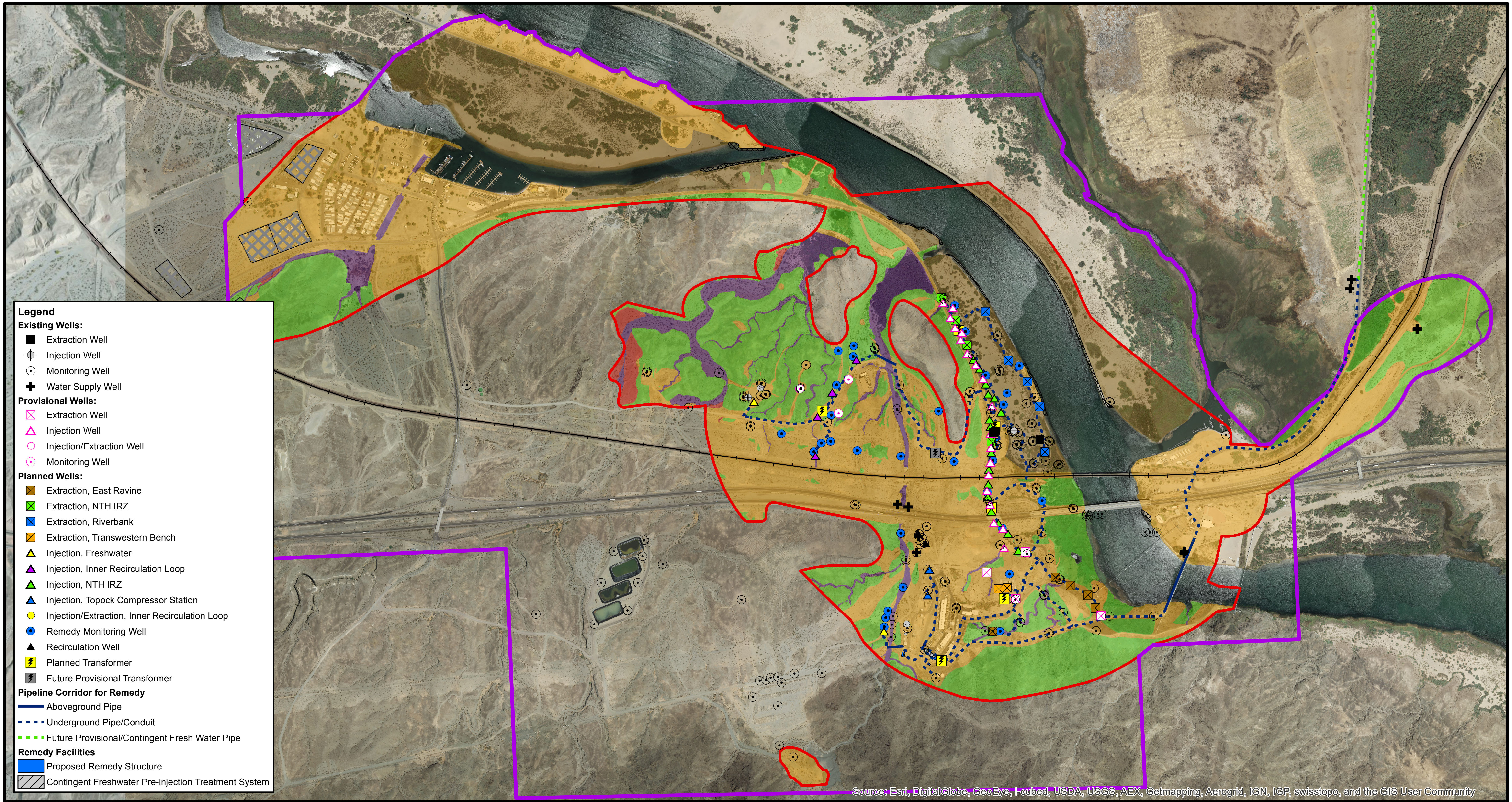
Field Name	Description
EventCode	Event Name
SampleID	Unique Sample ID
LocID	Location Name
LocID_Post	Location Name used in reports and on figures
SampleDate	Date sample was collected
DataSource	Source of the data
SmplResultTypeCode	Sample type code, LS - primary sample, LFD - field duplicate, FS - field measurements, LRLF - low recharge, low flow, LRLR -low recharge, low rate, PD - purges dry, low recharge
SampleMatrixCode	Sample Matrix; GW - groundwater, Surfacewater - Surface Water
SampleMethodCode	Sample Method Collection Code; G - grab; WV - well volume; LF - low flow; PP - Peristatlic Pump; unk - unknown
LabCode	Laboratory that performed the analysis
CategoryCode	Analyte category code; Anions, metals, etc.
AnalyteMethodCode	Analyte code name
PrepMethodCode	analytical extraction (prep) method
AnalyteCode	Database analyte code
AnalyteLC	analyte name
Result	analysis result. Reporting limit listed for nondetect values.
FinalQualifierCode	Validation qualifier. See qualcode tab for lookup.
RL	reporting limit
UnitsCode	units of measure
ExcludeForStats	Y - exclude from statistics. Rejected data and false positives are not used in statistics.
GWRFI	Data selected for use in GW RFI and Basis of Design
	y/y1 = Original data used in RFI
	y3/4 - data used in RFI addendum
	y5/6 - add for basis of design (30%)
	y7/8 - add for basis of design (60%)
	y9/10 - coded but not used in a RFI or BOD yet
	y11/12 - 2013 samples coded but not used in a RFI or BOD yet
	ybk/y1b - background/historic samples added

Lab Code Key:

AEN	American Environmental Network
APCL	Applied P&Ch Laboratory
APPF	APPF
AVTS	Advanced Technology Laboratories
CHMC	Advanced Sciences, Corvallis, OR
DTEK	D-Tek Labs
EMXT	Emax Laboratories, Inc
SERR	SIERRA
STL	SevernTrent Analytical Labs
STL-SEA	TestAmericaSeatle
STLSF	SevernTrent Analytical Labs SF
SVLL	From Arcadis
TLI	Truesdail Laboratories Inc.
UNK	Unknown
XYM	Zymax Envirotechnology Inc.

Appendix A2
Aerial Map of Disturbed Areas
(November 2011)

The Draft Aerial Map was prepared in compliance with EIR Mitigation Measure CUL-1a-9.



LEGEND

Railroad
Area of Potential Effects (APE)
EIR Project Area
Main Construction Yard/ Long-term Soil Storage

Surface Condition

Rip Rap
Mechanical Soil Surface Damage
Dredged Sand
Active Wash Channel
Inactive Wash Channel
Undisturbed

N

0 460 920 1,840 Feet

Notes:

1. Per "EIR CUL-1a9" disturbed areas are defined as those areas outside documented archaeological site boundaries that have experienced ground disturbance within the last 50 years. Note that it may not be possible to distinguish between disturbance before and after the 50 year time frame, so for the purpose of this mapping, unless it was known that disturbance was limited to that older than 50 years, it has been included as a disturbed area.

Aerial Source:
Toponex Inc. aerial flyover, conducted August 2011

AERIAL MAP OF DISTURBED AREAS JUNE 2014 (EIR MITIGATION MEASURE CUL-1A-9 REQUIREMENT)

GROUNDWATER REMEDY BASIS OF DESIGN REPORT
PRE-FINAL (90%) DESIGN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS\MapFiles\2014\CMS\Pct90\Disturbance_June2014_v2.mxd 7/14/2014 9:28:05 AM

Appendix A3
Mapping of OHWM and USACE/CDFW Jurisdictional Areas
(*on CD-ROM only*)

Pacific Gas and Electric Company®

Prepared for Pacific Gas and Electric Company

Prepared by CH2M HILL

Technical Memorandum

Date:	November 18, 2011
To:	Curt Russell, PG&E
From:	Barry Collom and Robert Hernandez
cc:	Christina Hong, Jay Piper
Re:	Topock Compressor Station Groundwater Remediation Project, Ordinary High Water Mark (OHWM) Identification/Mapping Methodology

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Introduction

The purpose of this technical memorandum (memo) is to describe the methodology used for identifying, surveying, and documenting the Ordinary High Water Mark (OHWM) in the PG&E Topock Compressor Station Groundwater Remediation Project (project) area. The identification of the OHWM (marking the United States Army Corps of Engineers (USACE) Jurisdictional limits of the California side of the Colorado River) was conducted to comply with the January 2011 Final Environmental Impact Report (EIR) (AECOM 2011) requirements as set forth in Mitigation Measure AES-2a. This Mitigation Measure is from the Aesthetics (AES) portion of the mitigation plan presented in the EIR and is intended to ensure the protection of views from specific vantage points, as discussed in greater detail below.

During the October 19, 2011 Consultative Work Group (CWG) meeting, the Fort Mojave Indian Tribe requested a written copy of the methodology used when performing the identification/ mapping required by the EIR. This technical memo was prepared in response to this request and to document the OHWM identification/mapping effort.

At the request of PG&E, CH2M HILL conducted a field survey to delineate the OHWM along the riverbank in March 2011. The survey included:

- Reviewing available aerial photography and photographs of the area;
- Examining the bank of the Colorado River by foot and by boat to identify the OHWM based on available indicators including vegetation, soil, and hydrology;
- Collecting data points with a Global Positioning System (GPS) device;
- Taking photographs at locations accessible from land; and

- Generating a map showing the OHWM.

The OHWM identification map is provided on Figure 1 and a series of photographs collected of the survey area documenting the OHWM identification is provided in Attachment 1. Figure 1 shows the individual GPS data points collected to define the OHWM and the locations where the photographs were taken. The photographs in Attachment 1 show the identified high water marks at each photographed location.

Survey Area Description

The survey area included the California side of the Colorado River bank, between the mouth of Bat Cave Wash and the BNSF railroad bridge (Figure 1) located within the Project Area. The survey area is located in San Bernardino County, California. The land along the Colorado River where the survey took place is managed by the Bureau of Land Management (BLM).

Methodology

Field Survey Preparation

Pursuant to Mitigation Measure AES-2a,

> *"A minimum setback requirement of 20 feet from the water (ordinary high water mark) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the riverbank."*

The requirement for the 20-foot setback from the OHWM is relevant to the aesthetic value of the Project Area from Key View 11. A "Key View", according to the EIR, is a vantage point offering a view of some or all of the Project Area from one of eleven specified points. Each Key View vantage point is located and described in Section 4, volume II, of the EIR. Key View 11 is from the Colorado River and looks southwest toward the floodplain, IM-3 Facility, and compressor station (see below).

Key View 11—View west toward the floodplain, IM-3, and compressor station.
(Photograph taken by AECOM in 2009)

The extent of waters of the United States (USACE jurisdictional limits) is generally identified as the limits of the OHWM of a stream or drainage as extended by any adjacent wetlands. To identify the OHWM for the purpose of determining the 20-foot setback requirements, CH2M

HILL reviewed and followed guidelines outlined in both the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008). As their names imply, the 1987 USACE document focuses primarily on the delineation of USACE jurisdictional wetlands, and the 2008 USACE document is a guide to delineating OHWMs typically associated with ephemeral/intermittent channel forms that dominate the Arid West landscape (where OHWM delineations can be quite complex). It is important to note that for the most part, the Colorado River in the area of Key View 11 has very definitive incised-cut banks (described in more detail below and on the photographs in Attachment 1), making the OHWM identification relatively straight forward. Aerial photos and photographs of the survey area were used during the field survey and for conducting a preliminary OHWM identification prior to the field survey.

Field Survey

The field survey was conducted in March 2011. The protocol for the survey was developed by Robert Hernandez (CH2M HILL) and the field surveyor was Barry Collom (CH2M HILL). The OHWM identification process (as specified in the USACE guidance documents) involves the visual identification of features associated with high water. Typical items that are checked along a stream or river bank include vegetation and soil types, erosion features, drainage patterns, presence of drift lines (e.g., debris or branches), sediment deposition, watermarks, cut banks, scour lines, etc. (Part IV, Section D, USACE 1987; Section 2.1, USACE 2008) The established protocols were in conformance with the appropriate guidelines (USACE 1987, 2008) and included a preliminary identification based on aerial photo followed by a field investigation using typical OHWM indicators to identify the OHWM. The field work was then re-verified using the aerial photograph.

Significant flexibility is incorporated into the guidance documents because of the variety of different information sources and methods of investigation that may prove helpful to a given OHWM identification. As specified in the guidance, the surveyor is not required to obtain information from all identified sources and indicators (USACE, 1987). Varying degrees of investigations are considered acceptable depending on the complexity of the identification and the quantity and quality of available information.

In dry-land fluvial systems typical of the Arid West (where the Project Area is located), a clear natural scour line impressed on the bank, recent bank erosion, destruction of native terrestrial vegetation, and the presence of litter and debris are the most commonly used physical characteristics to indicate the OHWM (Section 2.1 USACE 2008). Table 5 of the USACE 2008 document summarizes potential common geomorphic OHWM indicators below, at, and above ordinary high water. Several of the indicators from Table 5 in the USACE 2008 document noted in the field survey of the Project Area include: break in bank slope, upper limit of sand sized particles, change in particle size distribution, litter (organic debris, small twigs and leaves), and drift (organic debris, larger than twigs). These were the primary indicators used in the identification of the OHWM. Several of these indicators are visible on the photographs included in Attachment 1.

With two exceptions, most of the survey area has thick vegetative cover that made approach on land impossible. In those areas, the surveyor was able to access land by nosing a boat close enough to shore that he could get out on foot. The two exceptions are the area near the mouth of Bat Cave Wash to the north and the area near MW-27 to the south of the survey area (see Figure 1). Those two areas were accessed from land. The OHWM was identified and tracked during the survey using GPS data collected with a Trimble Geo-XT with sub-meter accuracy. Figure 1 shows the identification of the OHWM based on the aerial photography review and the field survey.

Deliverables

The primary deliverables resulting from the OHWM survey is the OHWM Map (Figure 1) that depicts the location of the OHWM identified and photographs taken of the field survey area (Attachment 1). The locations where the photographs were taken are shown on Figure 1.

References

AECOM. 2011. *Final Environmental Impact Report for the TopockCompressor Station Groundwater Remediation Project*. Prepared for theCalifornia Department of Toxic Substances Control. January.

U.S. Army Corps of Engineers. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. Vicksburg, MS. Wetlands Research Program, Environmental Laboratory.

U.S. Army Corps of Engineers. 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. A Delineation Manual*. R.W. Lichvar and S.M. McColley, ed. ERDC/CRRTEL TR-08-12. Hanover, NH. U.S. Army Engineer Research and Development Center.

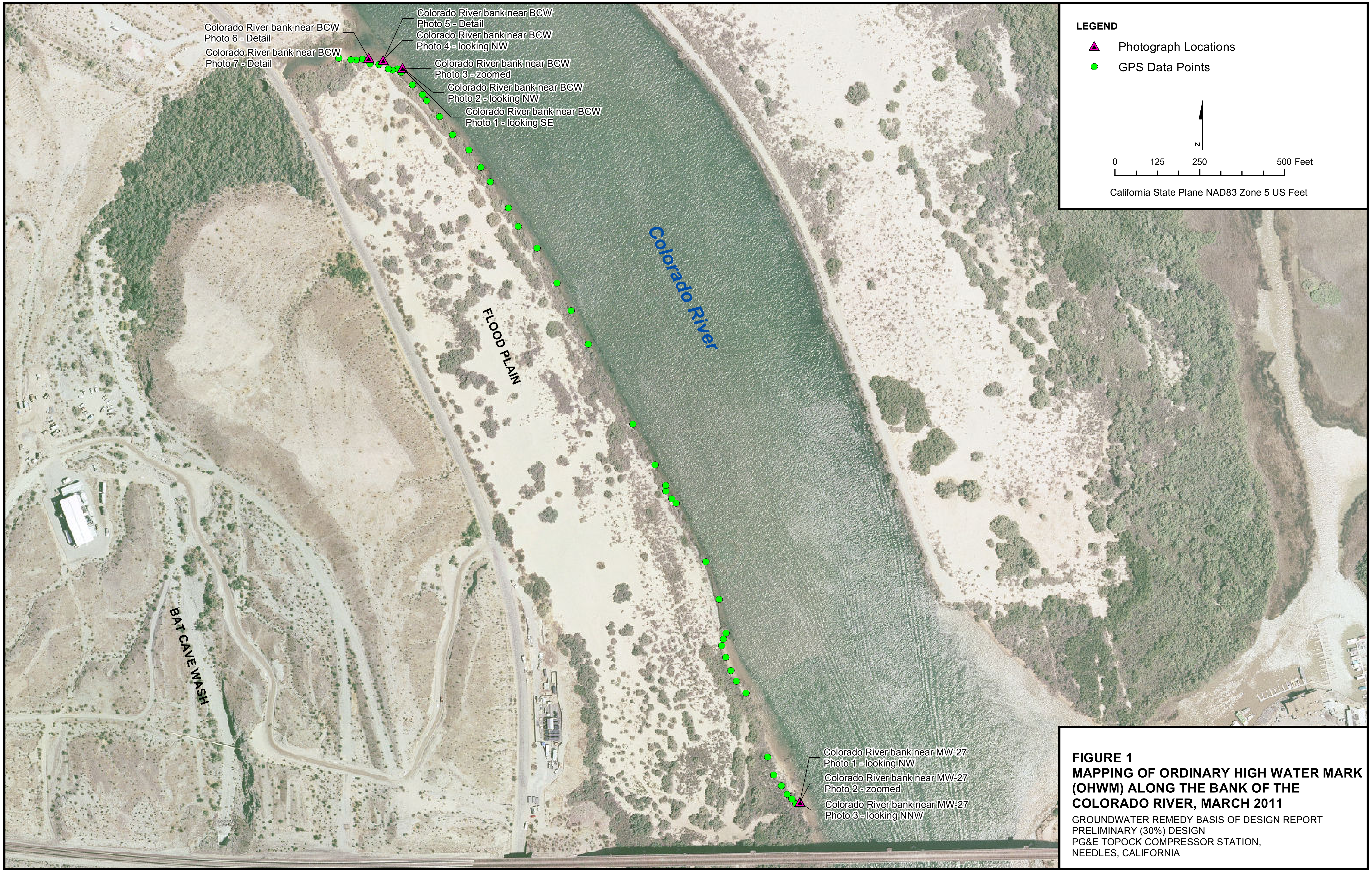
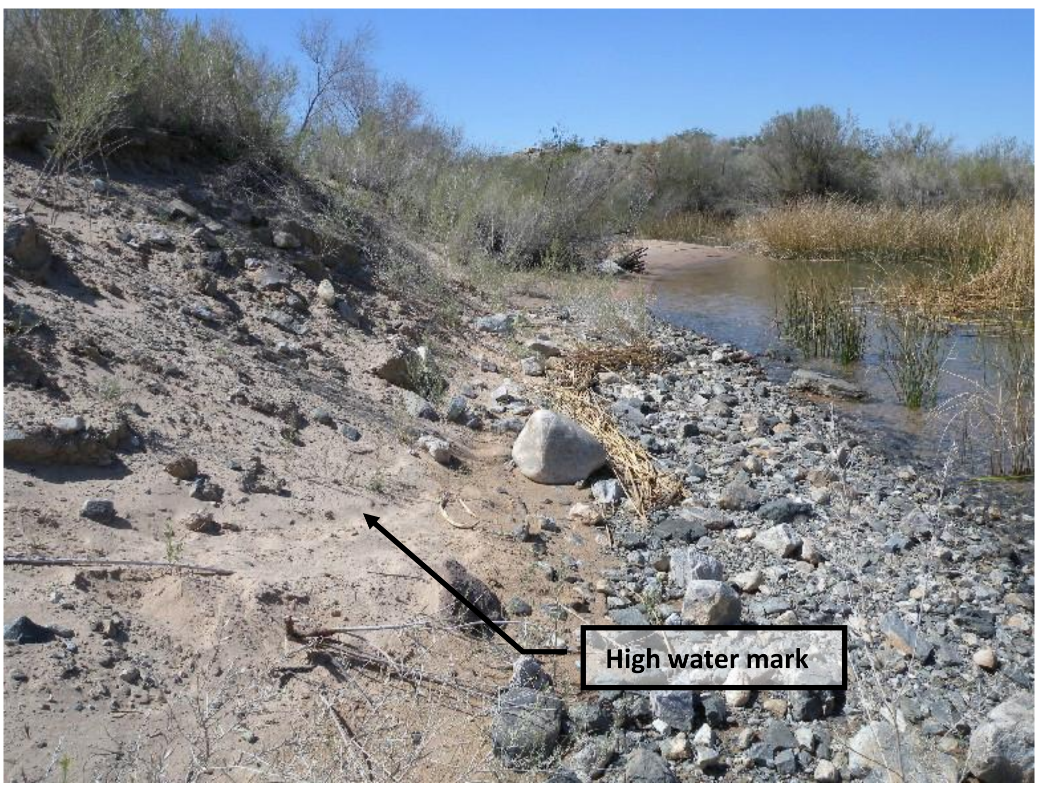


FIGURE 1
MAPPING OF ORDINARY HIGH WATER MARK (OHWM) ALONG THE BANK OF THE COLORADO RIVER, MARCH 2011

GROUNDWATER REMEDY BASIS OF DESIGN REPORT
PRELIMINARY (30%) DESIGN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

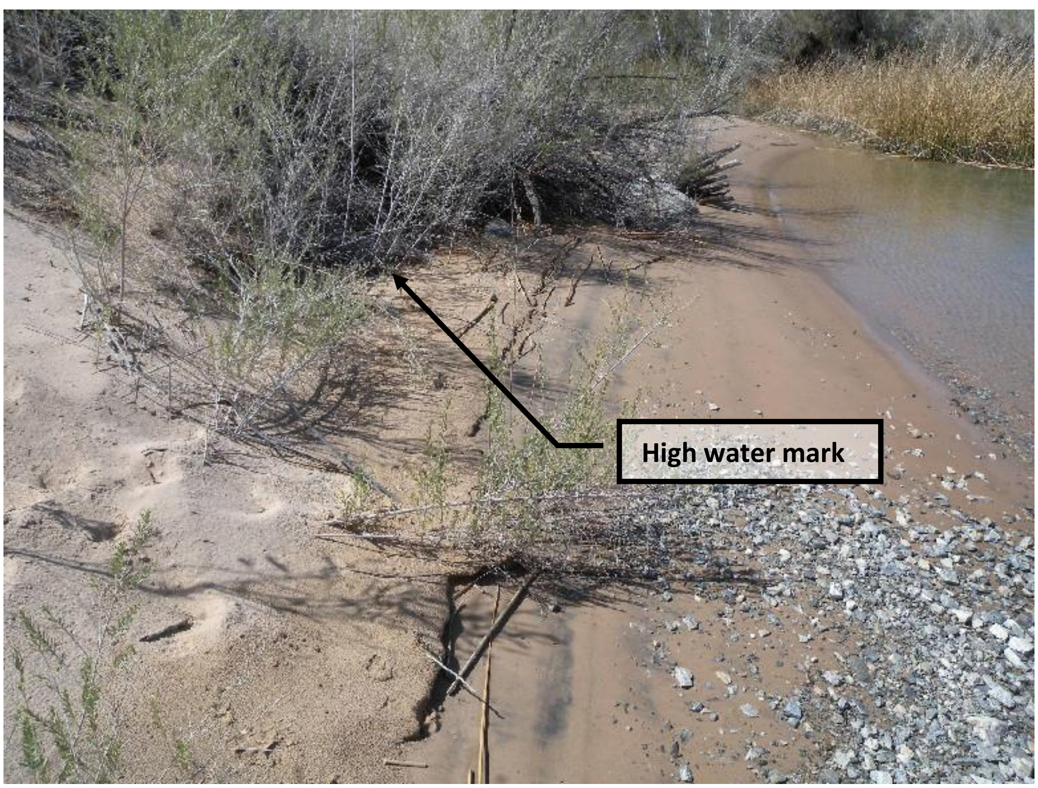
D:\Projects\Topock\MapFiles\2011\CMS\HighwaterLine_Photo

Colorado River Bank near BCW. Photo 1 (looking SE)

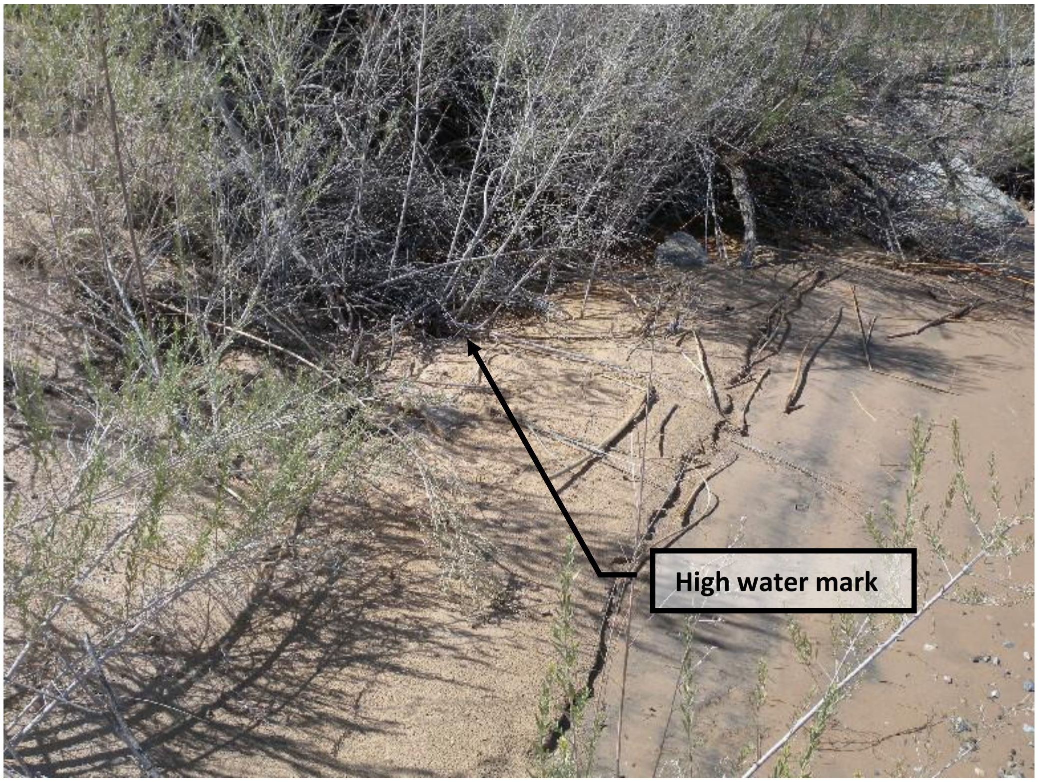


Colorado River Bank near BCW. Photo 2 (looking NW)

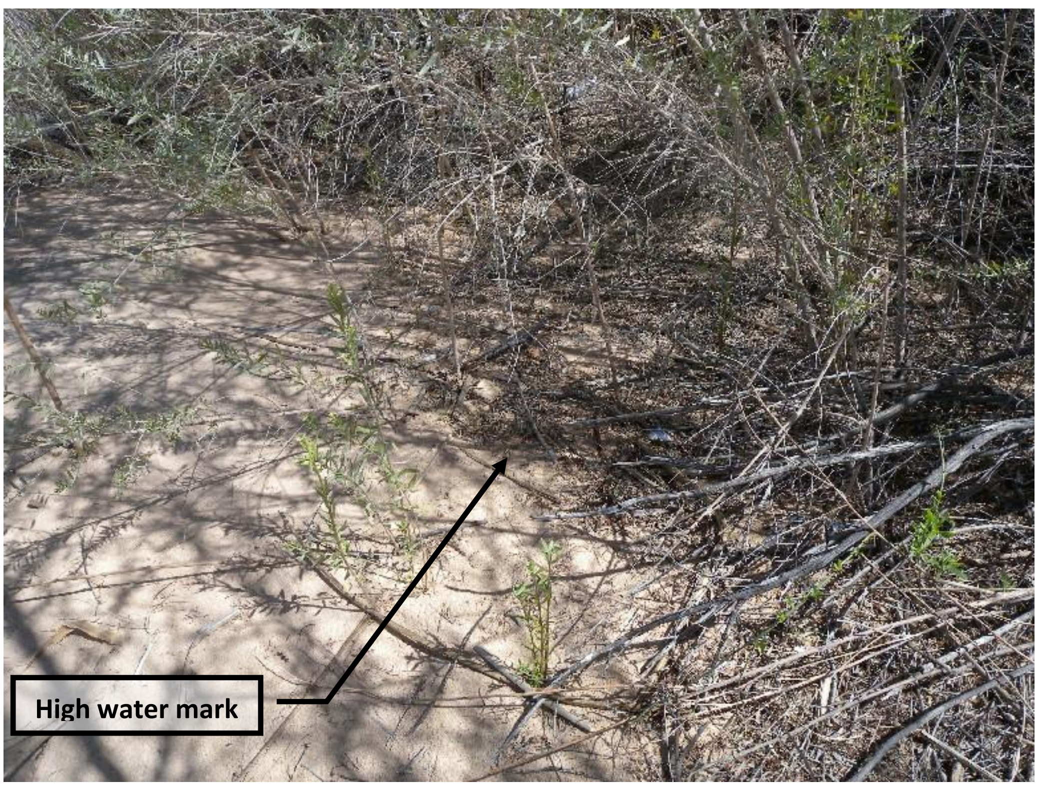
Colorado River Bank near BCW. Photo 3 (zoomed)



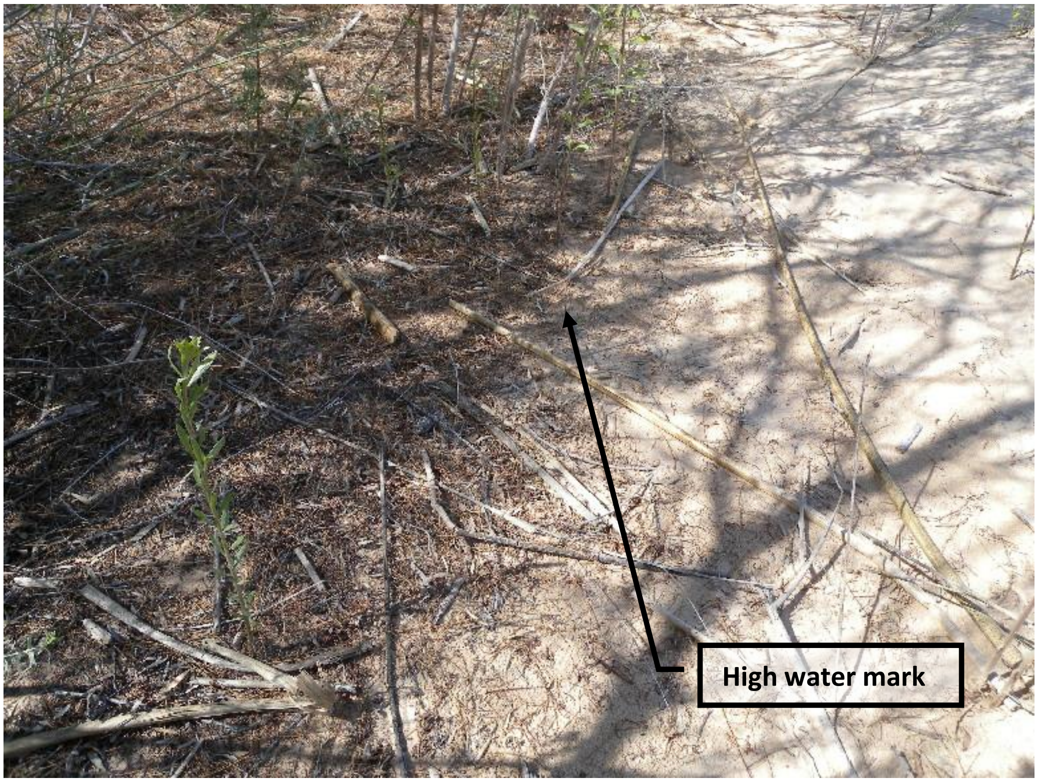
Colorado River Bank near BCW. Photo 4 (looking NW)



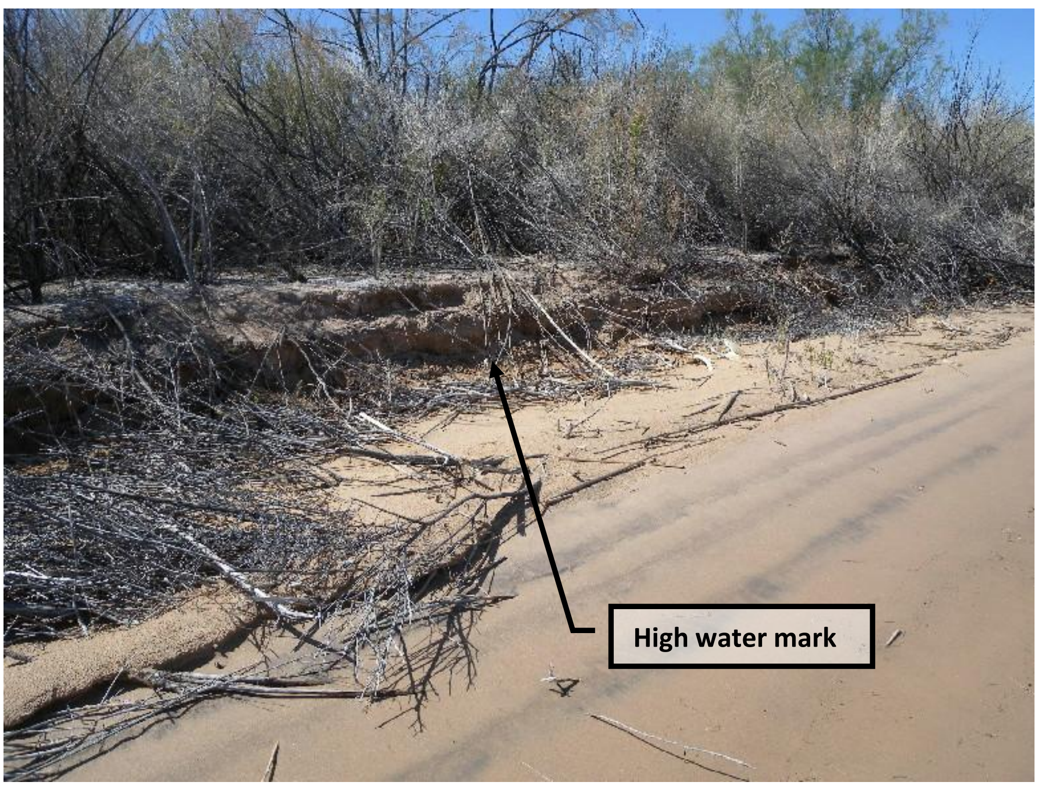
Colorado River Bank near BCW. Photo 5 (detail)



Colorado River Bank near BCW. Photo 6 (detail)



Colorado River Bank near BCW. Photo 7 (detail)



Colorado River Bank near MW-27. Photo 1 (looking NW)

Colorado River Bank near MW-27. Photo 2 (zoomed)

Colorado River Bank near MW-27. Photo 3 (looking NNW)

Topock Project Executive Abstract

Document Title: Wetlands and Waters of the United States, Final Delineation for the Topock Compressor Station Groundwater Remediation Project (PGE20130822A) Submitting Agency: DTSC, DOI Final Document? ☒ Yes ☐ No	Date of Document: April 18, 2014 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 ☒ 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 complies with the EIR mitigation measure BIO-1. If this work was not performed, it would constitute a non-compliance with the EIR mitigation measure BIO-1.	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 cleanup. Mitigation measures for biological impacts included BIO-1, which requires a field survey for delineation of Wetlands and Waters of the United States (U.S.), and for use in remedy design planning to be protective of jurisdictional waters and wetlands and associated habitat. The field work was performed in February and December 2012. This report presents the results of the field survey and detailed maps showing the delineation and classification of riverine and palustrine wetlands, as well as other information such as field data sheets, soil logs and transect notes; other water level, soil and botanical data reviewed with the survey; and photographs. This delineation was submitted in August 2013 for review by the California Department of Toxic Substances Control (DTSC) and the U.S. Department of the Interior. The DTSC and DOI had no comments, and this delineation is now submitted as final.

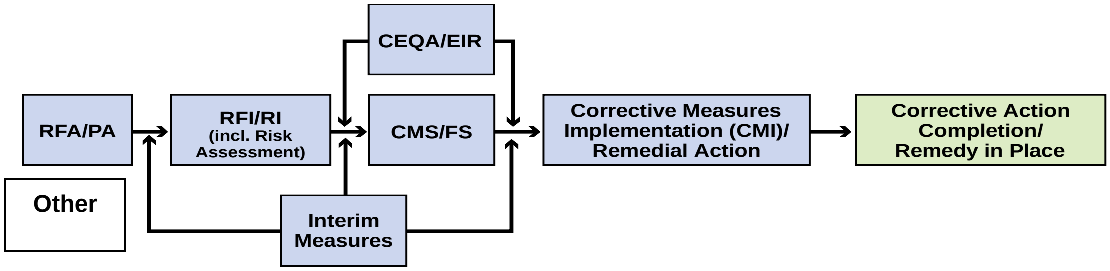
Written by: PG&E

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 Wetlands and Waters of the U.S. Final Delineation Report complies with EIR mitigation measure BIO-1.

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

Yvonne J. Meeks
Manager

Environmental Remediation

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4325 South Higuera Street
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805.234.2257
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E-Mail: yjm1@pge.com

April 18, 2014

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

Subject: *Wetlands and Waters of the United States, Final Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California* (Document ID: PGE20130822A)

Dear Mr. Yue:

Enclosed is the *Wetlands and Waters of the United States, Final Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California*. This report complies with EIR mitigation measure BIO-1 (excerpt below), and will be used in groundwater remedy design.

"Before any ground-disturbing project activities begin in areas that contain potentially jurisdictional wetlands, the wetland delineation findings shall be documented in a detailed report and submitted to USACE for verification as part of the formal Section 404 wetland delineation process and to DTSC."

Please note that in a letter dated July 10, 2013, the USACE confirmed that a Section 404 permit is not required for the Topock remediation project because the site is exempted under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(e)(1). The USACE also confirmed that it will not verify a jurisdictional delineation for this action because a permit is not required. Therefore, PG&E is not submitting this report to the USACE.

This delineation was submitted in August 2013 for review by the California Department of Toxic Substances Control (DTSC) and the U.S. Department of the Interior. The DTSC and DOI had no comments, and this delineation is now submitted as final.

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

Yvonne Meeks
Topock Project Manager

Enclosure
Wetlands and Waters of the United States, Final Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California

cc: Karen Baker/DTSC
Pam Innis/DOI

Wetlands and Waters of the United States, Final Delineation for the Topock Compressor Station Groundwater Remediation Project San Bernardino County, California

Prepared for

Pacific Gas and Electric Company

April 18, 2014

Contents

Appendices

Acronyms and Abbreviations

°F	degrees Fahrenheit
BNSF	Burlington Northern-Santa Fe
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWA	Clean Water Act
DTSC	California Department of Toxic Substances Control
EM	Emergent
FACW	facultative wetland
FEIR	Final Environmental Impact Report
GPS	Global Positioning System
HUC	Hydrologic Unit Code
I-40	Interstate 40
msl	mean sea level
NHD	National Hydrologic Dataset
NRCS	Natural Resources Conservation Service
OBL	obligate
P	Palustrine
PEMC	Palustrine Emergent Seasonally Flooded
PEMH	Palustrine Emergent Permanently Flooded
PG&E	Pacific Gas and Electric
PSSA	Palustrine Scrub-Shrub Temporarily Flooded
PSSB	Palustrine Scrub-Shrub Saturated
PUBHx	Palustrine Unconsolidated Bottom Permanently Flooded Excavated
R	Riverine
RCRA	Resource Conservation and Recovery Act
R2UB2	Riverine Lower Perennial Unconsolidated Bottom Sand
R2UB2x	Riverine Lower Perennial Unconsolidated Bottom Sand Excavated
R4SB3A	Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded
SS	Scrub-Shrub
UB	Unconsolidated Bottom
U.S.	United States

USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

SECTION 1

Introduction

This report presents the results of a wetland and waters delineation for the Pacific Gas and Electric (PG&E) Topock Compressor Station Groundwater Remediation Project in San Bernardino County, California. Wetlands and other waters are ecological habitats protected under the federal Clean Water Act (CWA). Activities that discharge dredged or fill materials into waters of the United States (U.S.), including wetlands, typically must be authorized by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA. Additionally, any structures or fill material placed within a navigable water of the U.S. generally require authorization from the USACE under Section 10 of the Rivers and Harbors Act. Activities implemented for the Topock groundwater remediation on-site, however, are part of a CERCLA response action, and as such are covered under the permit exemption codified in Section 121(e)(1) of CERCLA. CERCLA Section 121(e)(1) provides that: "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site where such remedial action is selected and carried out in compliance with this section." 42 U.S.C. § 9621(e)(1). Due to the application of the permit exception, PG&E is not required to comply with the administrative or procedural elements (e.g., preparing and submitting permit applications and obtaining permits) of applicable law, but must comply with the substantive requirements of such laws. Further, the USACE's Nationwide Permit 38 states that "Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act." Accordingly, here, the USACE has confirmed in a letter dated July 10, 2013 that no permit is required from the USACE. The USACE has also stated that it will therefore not verify the wetland and waters delineation contained herein (G. Salas USACE, e-mail communication to V. Nez PG&E, July 12, 2013 – included in Appendix A).

A general description of the project location and environmental setting are provided below. Survey methods and results are provided in Sections 2 and 3, respectively.

1.1 Project Description

In December 1951, the Topock Compressor Station began operations to compress natural gas supplied from the southwestern U.S. for transport through pipelines to PG&E's service territory in central and northern California. The compressor station is still active and is anticipated to remain active into the foreseeable future. The operations at the compressor station consist of six major activities: water conditioning; compressing natural gas; cooling compressed natural gas and compressor lubricating oil; wastewater treatment; facility and equipment maintenance; and miscellaneous operations.

In 1996, PG&E entered into a Corrective Action Consent Agreement with the California Department of Toxic Substances Control (DTSC) to oversee the investigation and remediation of the Topock Compressor Station site under California state law. DTSC is the California state lead agency authorized to direct investigative activities in the action area in accordance with the Resource Conservation and Recovery Act (RCRA). In July 2005, PG&E and the Federal Agencies entered into an Administrative Consent Agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). DTSC issued a Final Environmental Impact Report (FEIR) for the project in January 2011. In 2012, PG&E and the United States executed a Consent Decree ("CD") for the Remedial Design/Remedial Action and it was lodged with the U.S. District Court for the Central District of California in January 2013. The CD will be effective upon approval by the court.

The purpose of this wetlands delineation is to determine the presence of and map the extent of wetlands and other waters of the U.S. located within the EIR project area and additional study areas identified on Figure 1-2 (Wetlands Delineation Study Area). PG& E will take appropriate and practical steps to avoid and/or minimize impacts to these areas, consistent with Section 404 of the CWA. Under the CERCLA exception no federal permit is required from the USACE; however, PG&E is obligated to comply with any substantive elements that would normally be required by the permit.

This report is also submitted to DTSC in satisfaction of Final EIR (FEIR) mitigation measure BIO-1.

BIO-1 requires that:

> "If during the design process it is shown that complete avoidance of habitats under USACE jurisdiction is not feasible, the Section 404 permitting process shall be completed, or the substantive equivalent per CERCLA Section 121(e)(1). In either event, the acreage of affected jurisdictional habitat shall be replaced and/or rehabilitated to ensure 'no-net-loss' Before any ground-disturbing project activities begin in areas that contain potentially jurisdictional wetlands, the wetland delineation findings shall be documented in a detailed report and submitted to USACE for verification as part of the formal Section 404 wetland delineation process and to DTSC. For all jurisdictional areas that cannot be avoided as described above, authorization for fill of wetlands and alteration of waters of the United States shall be secured from USACE through the Section 404 permitting process before project implementation. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to USACE and consistent with applicable county and agency policies and codes. Minimization and compensation measures adopted through any applicable permitting processes shall be implemented.
>
> Alternatively, if USACE declines to assert jurisdiction because it determines that CERCLA Section 121(e)(1) applies, the substantive equivalent of the Section 404 permitting process shall be complied with by ensuring that the acreage of jurisdictional wetland affected is be replaced on a "no-net-loss" basis in accordance with the substantive provisions of USACE regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods consistent with USACE methods, and consistent with the purpose and intent of applicable county and agency policies and codes. Minimization and compensation measures adopted through any applicable permitting processes shall be implemented. In any event, a report shall be submitted to DTSC to document compliance with these mandates."

Based on the application of the CERCLA permit exemption and the plain language of BIO-1, because the USACE has determined that no Section 404 permit is required and consistent with USACE direction, PG&E is not seeking verification from the USACE for the wetlands and waters of the U.S. delineation contained in this report. Rather, PG&E assumes that the jurisdictional waters and wetlands delineated in the report, and identified as such in Figures 1-3 through 3-8, are all jurisdictional waters under Section 404 of the CWA.

1.2 Project Location and Land Use

The Topock Compressor Station is located near the California and Arizona border in eastern San Bernardino County, approximately 12 miles southeast of the city of Needles, California (Figure 1-1). Topock, Arizona is located approximately one-half mile to the east of the compressor station. 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 approximately two miles along the Colorado River to the Topock Compressor Station.

For the purposes of this wetland delineation, the 1,169-acre wetland delineation survey area includes the following sites (Figure 1-2):

- The 780-acre project area covered in the EIR
- 389 acres evaluated for three potential locations of freshwater well sites in Arizona: Site A (93.5 acres), Site B and an existing location of a Havasu National Wildlife Refuge well site (182.7 acres), and Site C (112.8 acres). Site B is still under consideration for a freshwater well site, while Sites A and C have been eliminated from consideration. The U.S. Department of Interior ("DOI"), in a letter to PG&E dated March 26, 2013, determined that elimination of Sites A and A-Alt was in the best interests of the Havasu National Wildlife Refuge. Additionally, per a December 31, 2012 letter from DTSC to PG&E, DTSC determined that Site C would not be approved due in part to the proximity of Site C to culturally sensitive areas and a BLM-designated Area of Critical Environmental Concern.

The survey area is located on the Whale Mountain and Topock U.S. Geological Survey (USGS) Quadrangles. In California the survey area occurs in Sections 5, 6, 7, 8 and 9 of Township 07 north, Range 24 east; Section 1 of Township 07 north, Range 23 east; and Section 36 of Township 08 north, Range 23 east. In Arizona, the survey area occurs in Sections 34 and 35 of Township 16 north, Range 21 west; and in Section 2 of Township 15 north, Range 21 west. The Topock Compressor Station is located at 34.7143 degrees north latitude and 114.4930 degrees west longitude.

Land use in the survey area is primarily open space, with several prominent exceptions. I-40 and the Burlington Northern-Santa Fe (BNSF) railway roughly bisect the southern part of the survey area in an east-west direction. On the Arizona side, Highway 95 roughly bisects the survey area from north to south. The compressor station, a pipeline metering station, and other developed facilities associated with remedial and investigative measures are located in the southern portion of the survey area. Moabi Regional Park and the Pirate Cove Resort and Marina are located in the western portion of the survey area. These developed areas include numerous mobile home sites, boat docks, parking areas, campgrounds and other associated buildings, facilities, and infrastructure. The Topock Marina and private residences are located on the Arizona side of the river, near the BNSF railway and I-40 bridges. Various unpaved roadways as well as gas transmission pipelines traverse the survey area; these are primarily sub-surface pipelines, with occasional above-ground segments (e.g., to bridge ravines or the river).

Land ownership in the survey area includes parcels owned by PG&E, as well as lands owned and/or managed by federal and local government agencies that include the Bureau of Land Management, the U.S. Fish and Wildlife Service (Havasu National Wildlife Refuge), the U.S. Bureau of Reclamation and San Bernardino County; lands owned by the Fort Mojave Indian Tribe; BNSF; California Department of Transportation; and privately owned parcels.

1.3 Environmental Setting

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

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

1.3.1 Terrestrial Vegetation and Land Cover Types

Approximately 14 percent of the survey area is characterized by developed and landscaped areas. Four terrestrial plant community types, including creosote bush scrub, tamarisk thickets, blue palo verde woodlands and arrow weed thickets account for nearly 64 percent of the terrestrial land cover types. Open water associated with the Colorado River and Park Moabi Slough account for approximately 10 percent of survey area. Approximately 4 percent of the survey area includes a part of the Havasu National Wildlife Refuge that burned during a 2008 wildfire. In 2011, the U.S. Fish and Wildlife Service cleared this area of dead trees and woody debris and the area was essentially devoid of vegetation at the time of the 2012 survey. The remaining land cover is comprised of various natural vegetation communities that collectively make up less than 8 percent of the total land cover. Descriptions of the four primary terrestrial vegetation communities in the survey area are provided in the following sections. A vegetation map of the survey area is provided in Appendix A).

1.3.1.1 Creosote Bush Scrub

The most common and widespread plant community in the survey area is creosote bush scrub. This vegetation type is characterized by widely-spaced creosote bush (*Larrea tridentata*) with associated species such as allscale saltbush (*Atriplex polycarpa*), white bur-sage (*Ambrosia dumosa*), white rhatany (*Krameria bicolor*), brittlebush (*Encelia farinosa*), beavertail (*Opuntia basilaris* var*. basilaris*), silver cholla (*Cylindropuntia echinocarpa*), and desert trumpet (*Eriogonum inflatum*). Creosote brush scrub occurs throughout the dissected alluvial terraces in the survey area.

1.3.1.2 Tamarisk Thicket

Tamarisk thicket is primarily found on the sandy terraces along the Colorado River and Park Moabi Slough as well as along the east side of Highway 95. This vegetation type is also found near the terminus of the larger ephemeral washes in the dissected terraces south of the National Trails Highway. Vegetation is characterized by open to dense stands of the non-native and invasive saltcedar (*Tamarix ramosissima*) and/or athel (*Tamarix aphylla*), which occur as monocultures in many locations. In other areas associated trees and shrubs include honey mesquite (*Prosopis glandulosa* var*. torreyana*), screw bean (*Prosopis pubescens*), blue palo verde (*Parkinsonia florida*), and arrow-weed (*Pluchea sericea*). Herbaceous vegetation is absent with in dense tree/shrub stands. Scattered species such as fan-leaf tiquilia (*Tiquilia plicata*), Spanish needle (*Palafoxia arida*) and *Cryptantha* spp. are commonly found in the understory of more open tree/shrub stands.

1.3.1.3 Blue Palo Verde Woodland

Blue palo verde woodland occurs along the edges and channel bottoms of the ephemeral washes in the dissected terraces in the southern and western parts of the survey area and is also found on the low sandy hills at the northern end of the survey area along the Highway 95. Total vegetation cover is generally low, but species diversity is relatively high as compared to the other vegetation types in the area. Blue palo verde is the dominant tree with scattered saltcedar, athel, and smoke tree (*Psorothamnus spinosus*) also present in some areas. Associated shrubs include catclaw (*Senegalia greggii*), Anderson's box-thorn (*Lycium andersonii*), brittlebush, sweetbush (*Bebbia juncea* var*. aspera*), cheesebush (*Ambrosia salsola*), trailing townula (*Funastrum hirtellum*), desert lavender (*Hyptis emoryi*), white bur-sage, white rhatany, and creosote bush. Common herbaceous species include spurge (*Chamaesyce* spp.), small-flowered California poppy (*Eschscholzia minutiflora*), Emory's rock daisy (*Perityle emoryi*), Spanish needle, and Arizona lupine (*Lupinus arizonicus*).

1.3.1.4 Arrow-Weed Thicket

Arrow-weed thicket is found on the low sandy terraces along the Colorado River and Park Moabi Slough. Arrow-weed is the sole dominate shrub species occurring in open sandy areas, with widely scattered shrubs to dense, nearly impenetrable stands. Occasional associated species include saltcedar, smoke tree, honey mesquite, brittlebush, allscale saltbush and broom baccharis (*Baccharis sarothroides*). Scattered herbaceous vegetation in the more open areas includes fan-leaf tiquilia, Spanish needle, *Cryptantha* spp., and Mediterranean grass (*Schismus barbatus*).

1.3.2 Climate and Hydrology

Regional climate data was obtained from Needles Airport, located approximately 7.5 miles northwest of the survey area. Average monthly temperatures range from a low of 42 degrees Fahrenheit (°F) in December and January to a high of 109°F in July. Average annual precipitation is 4.5 inches with rainfall occurring during summer thunderstorms between July and September and winter rains between January and March. Very little rainfall occurs in May and June. The growing season, defined as having a 50-percent probability of temperatures at or above 32°F, extends throughout the year for a total of 365 days (NRCS 2002).

The majority of the survey area is located within the Havasu – Mohave Lakes Watershed (Hydrologic Unit Code [HUC] 15030101). Most of the survey area, including the areas to the north and west of the compressor station, is located within Bat Cave Wash – Colorado River Subwatershed, which encompasses approximately 35 square miles in California and Arizona. A small portion of the survey area to the south and east of the compressor station is in the Mohave Wash – Colorado River Subwatershed which encompasses approximately 56 square miles in California and Arizona. The area along Highway 95 is located in the Sacramento Wash Watershed (HUC 15030103) which has a total drainage area of 1,290 square miles, extending north and west of Kingman, Arizona and south in the vicinity of Lake Havasu City, Arizona. This part of the survey area is located in the Powel Peak – Sacramento Wash Subwatershed, which has a drainage area of approximately 44 square miles.

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

1.3.3 Geology and Soils

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

No published soil survey is available for the California side of the survey area. General soils types in this area were inferred based on information provided in the FEIR and the *Soil Survey of Mohave County, Arizona, Southern Part* (NRCS 2006b). Lower elevation areas within the survey area are likely characterized by soils belonging to the Gilman Series where higher elevations are likely characterized by Calvista Soils. The dredged sands on the terraces along the Colorado River are likely part of the Lagunita Series. Mapped soil types in the survey area in Arizona include: Carrizo Family very gravelly loamy sand, Coolidge-Denure Families Complex, Gunsight very gravelly sandy loam, Huevi very gravelly loam, Lagunita sand and Rositas Family superstition and torriorthents soils (NRCS 2006). General information on soil characteristics was obtained from *Soil Survey of Mohave County, Arizona, Southern Part* (NRCS 2006b) and the NRCS (2012) *Official Soil Series Descriptions.* General soil descriptions are provided below. All soil colors are for moist soils. Soils maps and detailed descriptions are provided in Appendix B.

1.3.3.1 Gilman Series

The Gilman series includes very deep, well drained soils that formed in stratified stream alluvium. These soils occur on nearly level flood plains and alluvial fans. In a typical profile the surface is a brown (10 YR 4/3), moderately alkaline (pH 8.0) loam to a depth of 13 inches. From 13 to 28 inches the soil is a brown (10 YR 4/3), moderately alkaline (pH 8.0), very fine sandy loam. These soils have slow runoff and moderate permeability.

1.3.3.2 Calvista Series

Soils in the Calvista series include well drained, shallow soils formed from granitic rock sources. These soils occur on mountain ridges with slopes up to 30 percent. In a typical profile the surface is a brown (10 YR 5/3), moderately alkaline (pH 8.0) sandy loam to a depth of 7 inches. From 7 to 16 inches the soil is a yellowish brown (10 YR 5/4), moderately alkaline (pH 8.4) heavy sandy loam. Hard granitic rock is encountered below 16 inches. These soils have medium to rapid runoff and moderately rapid permeability.

1.3.3.3 Lagunita Series

The Lagunita series includes very deep, excessively drained soils that formed in stratified stream alluvium from mixed sources. These soils are found on level to slightly sloped floodplains. In a typical profile the surface is a dark brown (10 YR 3/3), moderately alkaline (pH 8.0) loamy sand. Between 8 and 30 inches the soil is a brown

(10 YR 3/3), moderately alkaline (pH 8.2), weakly stratified loamy sand. These soils have low runoff and rapid permeability.

1.3.3.4 Carrizo Series

Carrizo soils are very deep, excessively drained soils that formed in mixed igneous alluvium. These soils are found on floodplains, fan piedmonts and basin floors. In a typical profile the surface is covered with approximately 70 percent gravel and around 10 percent mixed cobbles and stones. The surface layer is a brown (10 YR 4/3), moderately alkaline (pH 8.0), extremely gravelly sand to a depth of 2 inches. From 2 to 60 inches the soil is a pale brown (10 YR 6/3), moderately alkaline (pH 8.4) extremely to very gravelly coarse sand. These soils have negligible to low runoff and high saturated hydraulic conductivity.

1.3.3.5 Coolidge Series

Coolidge soils are very deep, well drained soils derived from fan and stream alluvium. These soils occur on stream and fan terraces and relict basin floors. In a typical profile the surface is a light yellowish brown (10 YR 4/3), moderately alkaline (pH 8.2), sandy loam to a depth of 13 inches. From 13 to 24 inches the soil is a dark yellowish brown (10 YR 4/4), moderately alkaline (pH 8.2), sandy loam. The soils have very low to medium runoff and moderately rapid permeability.

1.3.3.6 Denure Series

Denure soils are very deep, somewhat excessively drained soils found on relict basin floors, stream terraces and fan terraces. These soils formed in material derived from fan or stream alluvium. In a typical profile the A horizon is only one inch thick and is brown (7.5 YR 4/3), slightly alkaline (pH7.6) gravelly sandy loam. The B horizon (1 to 30 inches) consists of a brown (7.5 YR 4/4) gravelly sandy loam. Soil in the upper part of the B horizon are slightly alkaline (pH 7.6) but become moderately alkaline (pH 8.2) below 12 inches. Gravel makes up between 20 and 30 percent of the profile in the upper 30 inches. The soils have medium runoff where they occur on moderate to gentle slopes and very low to low runoff on nearly level slopes. Permeability is moderately rapid.

1.3.3.7 Gunsight Series

Gunsight soils occur on fan and stream terraces were they formed in alluvium derived from mixed sources. These soils are very deep, somewhat excessively drained and strongly calcareous. In a typical profile the surface is a brown (10 YR 4/4), moderately alkaline (pH 8.2) very gravelly loam to a depth of 2 inches. From 2 to 60 inches the soil is a pinkish gray (7.5YR 5/2 and brown (7.5 YR 5/4) very to extremely gravelly loam. Soils are moderately alkaline (pH 8.2-8.3) in the upper 10 inches but are strongly alkaline (pH 8.5) between 10 and 18 inches. Gravel comprises between 40 to 70 percent of the profile. These soils have very low to high runoff and moderate to moderately rapid permeability.

1.3.3.8 Huevi Series

These soils are found on fan remnants and fan terraces. This series consists of very deep, well drained soils that formed in mixed gravelly alluvium. In a typical profile the surface is a strongly alkaline (pH 8.5) extremely gravelly sandy loam to a depth of 5 inches. From 5 to 18 inches the soils is a brown (10 YR 4/3), moderately alkaline (pH 8.4) very gravelly sandy loam. Below 18 inches the soil is a brown (10 YR 4/3) extremely cobbly coarse sandy loam to a depth of 60 inches. These soils have low to high runoff and moderate to moderately rapid permeability.

1.3.3.9 Rositas Series

The Rositas series includes very deep, somewhat excessively drained soils formed in sandy eolian material. These soils are found on dunes and sand sheets. In a typical profile the soil is a strong brown (7.5 YR 5/6), moderately alkaline (pH 8.0) fine sand to a depth of 60 inches. These soils have negligible to low runoff and rapid permeability.

SECTION 2
Methods

A wetland delineation was completed for the 780-acre EIR project area by Wetland Ecologist Russell Huddleston and Botanist Dr. Kim Steiner between February 13 and 17, 2012. Additional wetland delineation surveys of the 182.7 acres along Highway 95 that include the existing Havasu National Wildlife Refuge well site and proposed new freshwater well location B, were completed by Mr. Huddleston and Biologist Melissa Fowler on July 16 and 17, 2012. Wetland delineation surveys for the 93.5-acre formerly proposed well site A and 112.8 –acre formerly proposed well site C were completed by Mr. Huddleston on December 12 and 13, 2012. The wetland delineation survey area is shown in Figure 1-2.

The purpose of the wetland delineation surveys was to determine the geographical boundaries of wetlands and other non-wetland waters of the U.S. within the 1,169-acre wetland delineation survey area. Wetland maps prepared in 2005 as part of the draft Environmental Impact Report and detailed vegetation mapping of the EIR project area completed in 2010 were used as a basis for this report. The 2005 wetlands and ephemeral wash polygon data was loaded onto a Trimble® Global Positioning System (GPS) device that was used throughout the delineation. High resolution aerial photograph base maps, showing the previously mapped boundaries, were also utilized during the survey. The primary focus of the field delineation was to confirm and update the 2005 wetland maps, provide additional documentation based on the 2008 USACE Arid Region Supplement to the Corps Wetland Delineation Manual, as well as to identify and map wetland and waters in the added study area (Figure 1-2). The following sections describe the pre-field investigations, field sampling procedures, methods used to delineate the wetlands boundaries, and wetland classification.

2.1 Pre-field Investigation

In addition to the Hydrologic and Wetland Resources Sections of the Draft and Final Environmental Impact Reports, other relevant information pertaining to site conditions, wetlands and other water resources were reviewed prior to conducting the wetland delineation surveys. The following materials (provided in the appendices as indicated) were included in this data review:

- Existing vegetation map of the EIR project area (A complete vegetation map of the wetland delineation survey area is included in Appendix A)
- Arizona soil maps and descriptions (Appendix B)
- Historical aerial photographs and information on dredging history (Appendix C)
- USGS river gauge (09423550) at the Topock Marsh inlet near Needles, California (Appendix D)
- Information from on-site ground water monitoring wells and surface water elevation data from the Final EIR (Appendix E)
- National Wetlands Inventory maps (Appendix F)
- National Hydrologic Data Set maps (Appendix G)
- USGS Topock and Whale Mountain topographic quadrangle maps (Appendix H)

2.2 Wetlands Delineation

The wetlands delineation methodology, described in this report, followed the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). This included consideration of potential "vernal pools, grassy playas, seeps, springs, and riparian wetlands associated with ephemeral, intermittent, and perennial streams and rivers." Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008) at 14.

A total of 37 sample points (Figures 3-1 through 3-8) were established to characterize wetland areas, adjacent uplands, and the terraces along the Colorado River, Park Moabi Slough and Topock Marsh. To the extent possible, at least one sample point was taken from within each wetland area, and one sample point was taken in the adjacent upland habitat. In a few locations, steep topography or dense vegetation prevented the establishment of sample points. Seven broad transects were established along the low terraces along Colorado River and Park Moabi Slough and three transects were established east of the Topock Marsh. Transects were distributed in such a way as to include at least one sample point in each vegetation type present on the lower terraces.

At each sample location information on vegetation, soil, and hydrology indicators was recorded on a wetland determination data sheet. Wetland determination data sheets are provided in Appendix I. Patches of emergent vegetation such as southern cattail (*Typha domingensis*), common reed (*Phragmites australis*), giant reed (*Arundo donax*) and southern bulrush (*Schoenoplectus californicus*) growing below the ordinary high water mark along the shoreline of the Colorado River and Park Moabi Slough were characterized and mapped from a boat. No sample points were taken in these locations. Representative site photographs are included in Appendix J.

The following sections provide additional details on the field methods used during the wetlands delineation.

2.2.1 Vegetation

At each sample point, plant species were identified and the percent cover was visually estimated and recorded. Herbaceous vegetation was sampled in an approximately 5-foot radius around the sample point. Trees and shrubs around each sample point were recorded in a 30-foot and 10-foot radius, respectively. Taxonomic designations follow *The Jepson Manual: Vascular Plants of California* (Baldwin et al. 2012). The wetland indicator status was determined using the *North American Digital Flora: National Wetland Plant List, version 2.4.0* (Lichvar and Kartesz 2009). Dominant species included the most abundant species whose cumulative cover accounted for at least 50 percent of the total cover, and any single species that accounted for at least 20 percent of the total vegetative cover. Strata with less than 5 percent total cover were not included in the dominance test. A list of plant species observed in the survey area is included in Appendix K.

2.2.2 Soils

Descriptions of soils were made by examining soil pits excavated using a 3-inch diameter hand auger and/ or a shovel. Test pits were generally excavated to a depth of at least 24 inches; however, in a few locations the depth of excavation was limited by large cobbles and gravels. At each sample point, soil morphological features such as texture, color, and redoximorphic features (if present) were noted. Soil texture was estimated in the field by feel (Thien 1979), and moist soil colors were determined using Munsell® color charts. Chemical dyes including Bromthymol Blue and Thymol Blue were used to determine soil pH at some sample locations. In areas where no hydric soil indicators were observed, hydric conditions were assumed to be present where the following conditions existed:

- Dominant vegetation was composed entirely of obligate (OBL) and facultative wetland (FACW) plant species as indicated on the *North American Digital Flora: National Wetland Plant List, version 2.4.0* (Lichvar and Kartesz 2009)
- There was evidence of seasonal wetland hydrology
- There was a noticeable difference between the vegetation and/or topographic position of the wetland area and the adjacent upland habitat

2.2.3 Hydrology

The presence of wetland hydrology was determined based on field observations or other indicators of surface water, shallow ground water or saturated soils. Surface and ground water elevations recorded during periods of peak flows (May-July) of the Colorado River from on-site gauges and existing monitoring wells were also used to determine the presence or absence of wetland hydrology (Appendix E). Seasonal rainfall, site drainage, landscape position, and general site topography were also taken into consideration while making wetland hydrology determinations.

2.2.4 Wetland Boundary Determination and Mapping

Wetland boundaries were determined in the field based on observations of hydrophytic vegetation, the presence of wetland hydrology or hydrology indicators, and site topography. Soil characteristics were generally not useful in differentiating the wetlands boundaries. A Trimble® GPS unit with the 2005 wetlands boundaries loaded as a background file and 2005 wetlands maps overlaid on high resolution aerial photographs were used in the field to confirm or update the wetlands boundaries. To the extent possible, changes and additions to wetlands boundaries were mapped with the GPS unit and where access was limited, the boundaries were noted on the aerial photograph base maps and later digitized.

2.2.5 Delineation of Non-wetland Waters of the United States

Non-wetland water of the U.S. include such features as rivers, streams, lakes, ponds and ephemeral washes and drainages that are tributary to or have a significant nexus to traditional navigable waters. In the absence of adjacent wetlands, the jurisdiction of the USACE extends to the limits of the ordinary high-water mark, which is defined as “the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (33 CFR 328.3 [e]). The OHWM serves as the lateral limit of jurisdiction in a non-navigable tributary where there are no adjacent wetlands. 33 CFR 328.4(c).

The limits of the ordinary high water for the Colorado River and Park Moabi Slough were determined based on information from the USGS river gauge near the inlet of the Topock Marsh (Appendix D), surface water elevation data collected from near the I-40 bridge (Appendix E), and field observations of high water marks such as water staining, erosional cut banks and drift debris deposits.

The previously mapped extent of the ephemeral washes and drainages in the survey area were verified and amended as needed by walking the channel bed and noting the characteristics of the feature such as substrate, in channel and adjacent vegetation, and evidence of flows on the active floodplain. In addition, hydrologic modifications such as culverts, impoundments and dams were also recorded and mapped. As with the wetland features, the limits of the previously mapped drainages were loaded onto the Trimble® GPS and included on aerial photograph base maps. In the added survey areas (former Sites A and C, and Site B) and where changes or modifications to the existing data were necessary the channels were mapped using the GPS unit or the revisions were noted on the high resolution aerial photographs and later digitized.

Additional information to support the delineated boundaries of the ephemeral washes was also collected following the methods and procedures described in *A Field Guide to Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010).

A total of 23 transects (Figures 3-1 through 3-8) were established perpendicular to the flow direction of the channel in the larger ephemeral washes. The hydrogeomorphic floodplain units (low flow channels, active floodplain and low terrace) along each transect (if present) were characterized to determine the extent of the ordinary high water mark. Field observations included sediment size, indicators of flow events such as drift and debris deposits, scouring, mud cracks, defined bed and bank, and the presence or absence of vegetation. The ordinary high water mark was then determined based on the lateral extent of the active floodplain representative of low to moderate flow events that are expected to occur every five to ten years. Transect data sheets are provided in Appendix L. Due to unsafe conditions such as potential flash floods associated with winter storms, no transects were established at former potential well Sites A and C, however, the general channel characteristics and vegetation of these areas were noted at the time of the survey. Sites A and C have been dropped from consideration and will not be impacted by the remediation project.

An additional 34 sample locations (Figures 3-1 through 3-8) were recorded in smaller tributary drainages to the larger washes. These smaller drainage features are generally characterized by a single, relatively narrow low-flow channel confined by relatively steep side slopes, and therefore full transects were not established. However, similar data on the channel substrate and evidence of flow and vegetation was collected at each sample location. Tributary feature sample point data sheets are also provided in Appendix M.

2.3 Classification

Classification of wetlands and other waters identified during the wetland delineation survey follow the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). This classification methodology was developed by the U.S. Fish and Wildlife Service as part of the National Wetland Inventory program and is the Federal standard used for wetland classification (61 Federal Register 39465). The hierarchical classification includes systems, subsystems, and classes to generally categorize aquatic habitats. Modifiers are used to denote specific water regimes and/or highly altered areas (excavated or impounded wetlands). Additional details on the classification of wetlands identified in the survey area are provided in the following section.

SECTION 3

Results

3.1 Field Conditions

With the exception of recent routine maintenance in a flood control channel through Park Moabi conducted by San Bernardino County and not associated with this project, no significant recent disturbance was observed in the 780-acre EIR project area during the February 2012 field survey. Total rainfall recorded at an onsite weather station between July 2011 and January of 2012 was 2.2 inches. This represents approximately 70 percent of the average rainfall (3.1 inches) for this same period based on long-term records from the Needles Airport, located approximately 7.5 miles northwest of the survey area (WRCC 2012). Average flows in the Colorado River as measured at the USGS Gauge station at the Topock Marsh inlet were 40 cubic feet per second (cfs), which is typical for this time of year (Appendix D). Based on rainfall records from the Needles Airport, as well as observations from onsite staff, the last significant storm event prior to the February 2012 survey that resulted in substantial flows in the ephemeral washes occurred in early 2010, when over 2.6 inches of rainfall (over half the total annual average) fell over a 3-day period from January 19 through January 21.

Both disturbance history and rainfall conditions were significant prior to the July 2012 delineation of the 182.7-acre area along Highway 95 in Arizona (Site B). In October of 2008, a wildfire burned 240 acres of dense tamarisk in the Havasu National Wildlife Refuge on the west side of the highway in this area. After the fire, the U.S. Fish and Wildlife Service began clearing the area of dead trees, logs and woody debris. In the spring of 2011, a portion of the burn area was planted with a variety of native trees, shrubs, and grasses. At the time of the July 2012 delineation, most of the burned area west of the highway was devoid of vegetation, with the exception of the revegetation area planted in 2011.

Immediately prior to the July 2012 delineation, significant rainfall was recorded in the regional vicinity that affected conditions in the Sacramento Wash. Between July 12 and July 14, 2012 a total of 1.08 inches of rainfall was recorded in Lake Havasu City, Arizona and a total of 1.60 inches of precipitation was measured in Kingman, Arizona. These summer rainstorms resulted in high flows within the Sacramento Wash and short duration flooding in some areas of east of the Topock Marsh. Storm water flow in the Sacramento Wash was high enough to cause flooding and deposition of a large amount of sand along a section of Highway 95, temporarily closing the roadway in this area.

Widespread winter rain storms occurred on December 13, 2012 (0.4 inches of precipitation reported at the Needles Airport on this date) resulting in potentially unsafe working conditions in the desert washes. Therefore no transects were established in the additional areas for former potential freshwater well sites A and C, but the general channel characteristics and vegetation in these areas was noted at the time of the survey.

3.2 Wetlands and Waters

Wetlands and other waters identified in the survey area include Riverine and Palustrine wetlands as defined by the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). As shown in Table 3-1 below, a total of 185.66 acres of Riverine wetlands and 15.55 acres of Palustrine wetlands are present in the survey area. Figures 3-1 through 3-8, included at the end of this document, show the extent of wetlands and other waters identified in the survey area as well as sample point and transect locations based on Cowardin et al. (1979). Apart from the classification of wetland types described above, the terms “waters of the U.S.” and “wetlands” have specific regulatory definitions under the CWA. Section 328.3 (a) of the CWA’s implementing regulations defines waters of the U.S. as:

“(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.

(8) Waters of the United States do not include prior converted cropland."

Wetlands are defined as areas that are "inundated by surface water or groundwater with a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (Title 40 Code of Federal Regulations [CFR], Section 230.3, and Title 33 CFR, Section 328.3(b).

Wetlands are distinguished from other waters of the U.S. by the following environmental characteristics:

- **Vegetation.** The prevalent vegetation consists of plants that are typically adapted to areas with saturated soil conditions. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic conditions.
- **Hydric Soil.** Hydric soil is a term used to describe a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part (NRCS, 2010).
- **Hydrology**. The area is inundated either permanently or periodically at mean water depths less than 6.6 feet, or the soil is saturated to the surface for at least 5 percent of the growing season or more.

Wetlands and other waters are identified in Table 3-1 and Figure 3-9 shows the extent of jurisdictional wetlands and other non-wetland waters of the U.S. within the limits of the survey area. General descriptions of these wetlands and other waters of the U.S. are provided in the following sections. As discussed further in Section 3.4 below, PG&E assumes in this wetlands delineation that all of the wetlands and other waters delineated in the report, and identified as such in Figures 1-3 through 3-8, are jurisdictional waters under Section 404 of the CWA, with the exception of discontinuous ephemeral drainages.

TABLE 3-1
Summary of Wetland and Other Waters identified in the Survey Area
Wetland Delineation for the PG&E Topock Compressor Station

Feature ID	Acreage	Wetlands or Other Waters of the U.S.
Riverine Wetlands		
R2UB2 – Colorado River	88.79	Other Waters of the U.S
R2UB2x – Park Moabi Slough	29.52	Other Waters of the U.S
R4SB3A – Ephemeral Washes / Drainages	56.36	Other Waters of the U.S
R4SB4A – Sacramento Wash	10.63	Other Waters of the U.S
R4SB4A – Discontinuous Ephemeral Drainages	0.36	Non-Jurisdictional (Isolated)
Total Riverine Wetlands	*185.66*	

TABLE 3-1
Summary of Wetland and Other Waters identified in the Survey Area
Wetland Delineation for the PG&E Topock Compressor Station

Feature ID	Acreage	Wetlands or Other Waters of the U.S.
Total Other Waters of the U.S	*185.30*	
Palustrine Wetlands		
PEMH – Shore Zone Wetlands; Topock Marsh; Pond		
EM-1	0.105	Wetland
EM-2	0.432	Wetland
EM-3	0.074	Wetland
EM-4	0.053	Wetland
EM-6	0.691	Wetland
EM-7	0.018	Wetland
EM-8	0.037	Wetland
EM-9	0.135	Wetland
EM-10	0.029	Wetland
EM-11	0.035	Wetland
EM-12	0.034	Wetland
EM-13	0.146	Wetland
EM-14	0.113	Wetland
EM-15	0.272	Wetland
EM-18	0.018	Wetland
Total PEMH Wetlands	**2.192**	
PEMC – Adjacent Wetlands		
EM-05	0.134	Wetland
EM-15	0.073	Wetland
EM-17	2.179	Wetland
Total PEMC Wetlands	**2.386**	
PSSB – Adjacent Wetlands	0.120	Wetland
PSSA – Scrub-Shrub Wetlands Associated with Washes		Wetland
SS-1	1.307	Wetland
SS-2	2.872	Wetland
SS-3	4.966	Wetland
Total PSSA Wetlands	**9.145**	
PUBHx – Park Moabi Pond: P-1	**0.109**	Other Waters of the U.S
Total Palustrine Wetlands	*13.832*	
Total Jurisdictional Wetlands	*13.723*	
Total Jurisdictional Other Waters of the U.S.	*.109*	

TABLE 3-1
Summary of Wetland and Other Waters identified in the Survey Area
Wetland Delineation for the PG&E Topock Compressor Station

Feature ID	Acreage	Wetlands or Other Waters of the U.S.

Notes:
R2UB2 = Riverine Lower Perennial Unconsolidated Bottom Sand
R2UB2x = Riverine Lower Perennial Unconsolidated Bottom Sand Excavated
R4SB3A = Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded
R4SB4A = Riverine Intermittent Stream Bed Sand Temporarily Flooded
PEMC = Palustrine Emergent Seasonally Flooded
PEMH = Palustrine, Emergent, Permanently Flooded
PSSA = Palustrine Scrub-Shrub Temporarily Flooded
PSSB = Palustrine Scrub-Shrub Saturated
PUBHx = Palustrine Unconsolidated Bottom Permanently Flooded Excavated

3.2.1 Riverine Features

The Riverine (R) system includes all wetlands that are contained within a channel, with the exception of channelized wetlands dominated by over 30 percent cover of trees, shrubs, or persistent emergent vegetation and channels containing ocean-derived salts in excess of 0.5 parts per thousand (Cowardin et al. 1979). Under this system, a channel is defined as “an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water” (Cowardin et al. 1979). Riverine subsystems identified in the survey area include Lower Perennial and Intermittent. The Lower Perennial subsystem includes non-tidal, low gradient rivers and streams with slow water velocity, sandy or muddy substrates and at least some water flow throughout the year. Lower Perennial Riverine features identified in the survey area include the Colorado River and Park Moabi Slough. The Intermittent subsystem includes channels that contain flowing water for only part of the year. Intermittent Riverine features identified in the survey area include the Sacramento Wash, Bat Cave Wash, and other ephemeral washes, as well as drainages occurring throughout the dissected terraces in the survey area. Both the Colorado River and Park Moabi Slough were considered to be traditional navigable waters based on the use of these water features by recreational boating including by the Pirate’s Cove and the Topock Marina (USACE, 2007). Ephemeral washes that are direct tributaries to Colorado River or the Topock Marsh were considered to be non-wetland waters of the United States (Table 1).

3.2.1.1 Colorado River (R2UB2)

The Colorado River is the primary surface water feature in the survey area and is classified as a Riverine, Lower Perennial channel with an Unconsolidated Bottom comprised predominantly of sand (R2UB2). The Colorado River flows approximately 6,400 feet through the central part of the survey area (Figure 1-2). Upstream of the I-40 Bridge, the river channel ranges from approximately 600 to 740 feet wide. Downstream of the bridge, the river traverses the exposed bedrock of the Chemehuevi Mountains, and the channel width narrows to approximately 435 feet.

Significant changes to the Colorado River hydraulic regime in the vicinity of the survey area occurred after construction of Hoover Dam and Parker Dam. With the completion of Hoover Dam in 1936, annual spring floods and associated scouring events ended. With the closure of Parker Dam in 1938, and subsequent filling of Lake Havasu, the Colorado River channel between Needles and Topock rapidly aggraded (Metzger and Loeltz 1973). By 1944, the aggradation of the river channel caused elevated groundwater levels and flooding in low-lying areas. In response to this condition, the U.S. Bureau of Reclamation conducted extensive dredging of the river channel to maintain channel geometry and reduce flooding. A summary of historical dredging and channel modification in this area is provided in Appendix C.

The flow of the Colorado River is dynamic, fluctuating seasonally and daily as a result of upstream flow regulation from the Davis Dam, located approximately 41 river miles upstream of the survey area. Data from the USGS river gauge at the Topock Marsh inlet shows that average flows in this section of the river ranges from a low of 14 cfs in January to a high of 99 cfs in June (Figure 3-10). Daily surface water elevation data for the Colorado River has been measured near the I-40 Bridge since the middle of June 2003 as part of the ongoing monitoring program at the compressor station (Appendix D). The average water level elevation recorded for this period was 454.9 feet above msl, with a minimum of 450.6 feet above msl and a maximum of 458.7 feet above msl. The ordinary high water level, based on the peak discharge periods between June and July, is 457.0 feet above msl. In addition to the gauge data, other evidence of ordinary high water observed during the field survey included water marks on bridge piers and rip-rap within and along the channel, scouring along the banks and debris deposits.

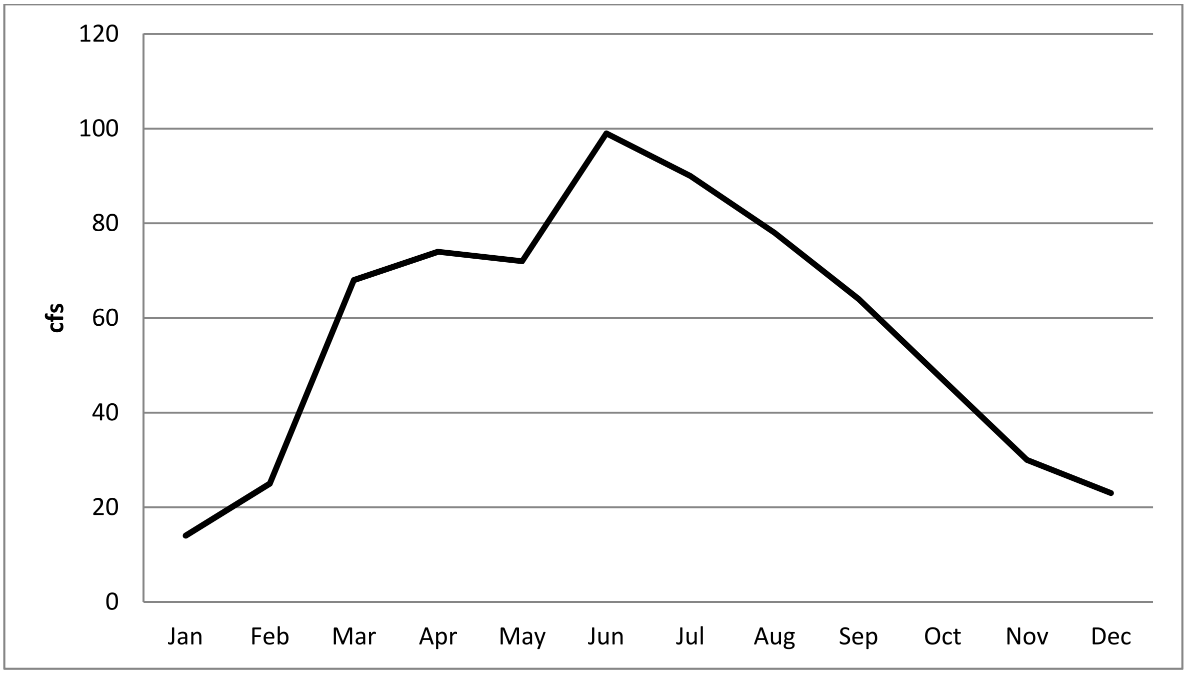

Figure 3-10. Average flow rate (cfs) for the Colorado River as measured at the USGS River Gauge (09423550) at the Topock Marsh Inlet near Needles, California between January 1967 and September 2011.

The channel banks along the Arizona side of the river north of the Topock Marina are characterized by steep slopes that have been armored with large boulders. The elevation at the top of the bank is approximately 466 feet above msl. The banks along the inlet to the Topock Marina are characterized by narrow sandy beaches and eroded sandy banks at elevations ranging from around 460 to 463 feet above msl. Low sandy beaches are also present along the Arizona side of the river south of the Topock Marina and the BNSF railroad bridge. Steep sandy banks with dense vegetation are present along most of the channel on the California side of the river, with narrow sandy beaches occurring in scattered locations. Along the California side of the channel north of the Park Moabi inlet/slough (outside of the survey area), the banks have been modified by constructed elevated campgrounds and low sandy beaches.

Within the survey area, patches of emergent vegetation including southern cattail, southern bulrush, common reed and giant reed occur in scattered locations along edges of the river. Wetland features associated with the “shore zone” are considered separately from the Riverine system (Cowardin et al., 1979) and are described under Palustrine wetlands below.

This section of the Colorado River is a traditional navigable water body, and, because the state line between California and Arizona is located near the center of the river it is also an interstate water body. Interstate commerce associated with the river includes recreational boating, camping and fishing.

3.2.1.2 Park Moabi Slough (R2UB2x)

Park Moabi Slough is classified as a Riverine, Lower Perennial channel with an Unconsolidated Bottom comprised predominantly of Sand. Because the slough (in its current configuration) was created by major dredging activities done by the Bureau of Reclamation in 1965, it is assigned a modifier to indicate that the channel was excavated (R2UB2x). The historical photographs indicate that much of the present shoreline, bank stabilization, and sand dune features in the Park Moabi area were completed during in the mid 1960's (Appendix C). Within the survey area, most of the northern banks of the slough are characterized by open sandy beaches that are routinely maintained as part of the park. Vegetated areas along the north shoreline are limited to the low terrace at the western edge of the survey area. On the west side of the survey area, the south banks of the slough are characterized by developed beaches, vacation cabins, boat docks and boat ramps associated with the Pirates Cove Resort and Park Moabi. East of the developed areas, the south shore of the slough are characterized by relatively steep sandy and rocky banks with dense vegetation.

As with the main channel of the Colorado River, patches of emergent vegetation occur in some locations along the edges of the slough. These features are described below under Palustrine wetlands.

Park Moabi slough is a direct tributary to the Colorado River and is also used for interstate commerce including recreational boating and fishing.

3.2.1.3 Ephemeral Drainages and Washes North and West of the Compressor Station (R4SB3A)

The alluvial terraces located along the south side of the Colorado River and north of the Chemehuevi Mountains are characterized by numerous incised drainage channels and ephemeral washes. These features are classified as Riverine, Intermittent Stream Bed channels with a Cobble-Gravel substrate that are Temporarily Flooded (R4SB3A).

One of the largest ephemeral drainages in the survey area is Bat Cave Wash, a primarily north-south trending channel immediately west of the Topock Compressor Station. Bat Cave Wash is shown as an intermittent blue line stream on the USGS Topock topographic quadrangle map and is also included as an intermittent stream in the National Hydrologic Dataset (NHD) (Appendices G and H respectively). Large volume surface flows are generally infrequent and occur only briefly in response to high intensity rainfall events. Bat Cave Wash is a tributary of the Colorado River. Storm water flows are conveyed directly into the river under a bridge along the National Trails Highway. Within the survey area the upper part of Bat Cave Wash is confined by steep rocky slopes and has an approximately 30-foot wide gravel-cobble floodplain. Vegetation in the upper reaches is sparse consisting of scattered shrubs such as Anderson's box-thorn, catclaw and desert lavender. As the wash continues down slope, the channel broadens to over 190 feet wide in some areas and multiple low flow channels are present throughout the active floodplain. Vegetation cover also increases down slope with blue palo verde and saltcedar trees scattered throughout the active floodplain. Other common shrubs on or immediately adjacent to the active floodplain include brittlebush, creosote bush, white bur-sage, sweetbush and white rhatany. Total vegetative cover throughout most of the wash is less than 30 percent, with the exception of a dense stand of saltcedar present at the northern end of the wash, just south of the National Trails Highway. Evidence of an ordinary high water mark, observed during the survey, included a defined bed and bank, drift/debris deposits, scouring, sand/silt deposits, and mud cracks.

A second large ephemeral wash is present to the west of Bat Cave Wash. There is no blue line stream indicated on the USGS Topock quadrangle map in this area nor is there any mapped feature in the NHD at this location. The active floodplain of this channel ranges from approximately 100 feet to 240 feet wide and is characterized by a sandy-pebble-cobble substrate with multiple low flow channels. Scattered perennial vegetation throughout the channel includes blue palo verde, catclaw, Anderson's box-thorn, sweetbush, creosote bush, white rhatany and cheesebush. Similar to Bat Cave Wash, there is a dense thicket of saltcedar and honey mesquite at the northern (down slope) end of the wash feature. Evidence of flow observed in this area included a defined bed and bank, scouring, drift/debris deposits, benches and sand/silt deposits. A large earthen dam has been constructed near the downstream terminus of this feature and there is no longer a direct hydrologic connection to the Colorado River. A perennial pond is located immediately north of the dam that is connected to a small wetland adjacent to the Colorado River via a large culvert that passes under the National Trails Highway. This pond and the adjacent wetland are described in more detail below under Palustrine wetlands.

There are several additional smaller, incised tributary drainages that flow directly into either Bat Cave Wash or the western wash system within the survey area. These channels are characterized by a single low flow channel and generally have sandy-gravel, cobble or rocky substrates. Most of the low flow channels are devoid of vegetation or have only sparse scattered herbaceous species such as spurge, Spanish needle, ovate plantain (*Plantago ovata*) and needle grama (*Bouteloua aristidoides var. aristidoides*). Common trees and shrubs along the lower slopes and channel edges in these areas include blue palo verde, catclaw, Anderson's box-thorn, creosote bush, white bur-sage, white rhatany, and sweetbush.

3.2.1.4 Park Moabi Drainages (R4SB3A)

Three ephemeral drainages are present in the western part of the survey area, originating south of the developed portion of Moabi Regional Park. Two of these drainages are shown as un-named blue line streams of the USGS Whale Mountain Topographic quadrangle map and are include as intermittent streams in the NHD (Appendix G and H respectively). These ephemeral channels are characterized by relatively steep vertical side banks and sand-pebble-cobble beds that are largely devoid of vegetation. These drainages are also classified as Riverine, Intermittent Stream Beds characterized by a cobble gravel substrate that are temporarily flooded (R4SB3A). Scattered blue palo verde trees and occasional shrubs such as cheesebush, brittlebush, and creosote bush are present along the edges and side slopes of the channels. Evidence of flow observed during the survey included drift/debris deposits, mud cracks, scouring, and cut banks. All three channels flow into a broad retention basin located on the south side of the National Trails Highway, west of Park Moabi Road. There are six 48-inch diameter culverts in the northeast corner of the retention basin that convey flows under the National Trails Highway into a broad U-shaped, routinely maintained, storm water channel in the developed area of the park. At the time of the survey the sandy-gravel substrate of the storm water channel was devoid of vegetation and due to recent maintenance activities. At the north end of the u-shaped channel there is a 24-inch-diameter culvert under a paved road that drains into a low topographic swale characterized by upland vegetation. The swale feature continues to the north where storm water flows are discharged into Park Moabi Slough near the southwest corner of the Pirate Cove Marina.

3.2.1.5 Sacramento Wash (R4SB4A)

The Sacramento Wash is located at near the northern end of the survey area east of the Topock Marsh. Within the survey area Highway 95 bisects the wash with an at-grade crossing. The Sacramento wash is shown as a blue line stream on the Topock USGS 7.5minute quadrangle and as an intermittent stream in the National Hydrologic Dataset (NHD) (Appendices G and H respectively).Within the survey area the Sacramento Wash is a broad, open sandy channel that is largely confined within constructed levees. The channel ranges from approximately 50 to 70 feet wide and has a flat, generally uniform bed that lacks well defined low flow channels. There are minor benches and terraces along the channel in a few locations, but there is no active floodplain outside of the channel as a result of the constructed levees along this section of the wash. On the east side of Highway 95, the channel is devoid of vegetation with extensive athel tamarisk thickets present along both sides of the wash. On the west side of the road, the wash continues to flow through a channel confined by levees for approximately 950 feet where it then broadens out along the floodplain adjacent to the Topock Marsh just west of the survey area. Some blue palo verde trees are present along the levees on the west side of the road and a few small trees and shrubs including saltcedar, smoke tree, bush seepweed (*Suaeda nigra*) and creosote bush occur within the wash channel. Prior to a large wildfire in October of 2008, dense tamarisk thickets were also present along both sides of the wash in this area. As a result of the significant rainfall immediately prior to the July 2012 surveys, evidence of recent flow including debris, flow lines, cracked soils, water marks and in some cases moist to saturated soil were noted throughout the channel. The Sacramento Wash has a large and generally unaltered watershed, and as a result significant flows and flooding of the highway area are relatively common in this area when heavy rainstorms occur in the region (Personal Communication with B. Collom, July 2012).

3.2.1.6 Ephemeral Drainages at former Well Site C

Former freshwater well site C is located on the southwest side of the Colorado River just north of the Park Moabi Campground. Most of the site is characterized by highly dissected terraces composed of Tertiary and Quaternary alluvium and surficial deposits consisting of moderately consolidated sandy gravel and silty-clayey gravel. A portion of the site is located on the low terrace along the Colorado River that is comprised of Quaternary and recent floodplain deposits. The majority of the vegetation in this area is characterized by open creosote bush shrubs with areas of dense saltcedar along the low terrace adjacent to the Colorado River. The natural hydrology of the area has been significantly altered by a large railroad berm that is present along the southwestern edge of the former Site C area. Water flows in this area are channeled under a large wooden railroad trestle at the southwestern former Site C boundary. On the northeast side of the trestle the wash broadens out into a wide floodplain characterized by multiple low flow channels. Near the northeastern corner of former Site C the wash is confined by a large roadway berm that has been partially reinforced with concrete. There is a narrow area where the road dips down allowing flows to continue to the east, where the floodplain quickly broadens out and eventually becomes unconfined sheet flow through dense saltcedar, eventually discharging into the Colorado River. This large wash is shown as a blue line stream on the Whale Mountain USGS topographic quadrangle map and is also included in the NHD as an ephemeral stream. A smaller wash feature is also present along the northern border of the site, but appears to have a smaller watershed as a result of the railroad berm. This small wash is not shown as a blue line stream on the USGS topographic map, nor is it included in the NHD; however, it exhibits a defined channel with an active floodplain, contains typical wash vegetation and is a direct tributary to the Colorado River.

The vegetation associated with the larger wash features is notably different that the surrounding creosote bush scrub and saltcedar thickets. Within the active floodplain areas the vegetation is characterized by native species such as blue palo verde and cheesebush with scattered catclaw, smoke tree, sweetbush, and desert lavender. Some creosote bush is also present. Herbaceous vegetation was largely absent at the time of the survey with the exception of scattered spurge.

3.2.2 Palustrine Wetlands

Wetlands classified as part of the Palustrine (P) system are nontidal, freshwater wetlands that are vegetated with over 30 percent cover of trees, shrubs, herbaceous vegetation or mosses, and lichens. Also included are wetlands lacking such vegetation but with all of the following four characteristics: 1) the total area is less than 20 acres; 2) there are no active wave-formed or bedrock shoreline features; 3) water depth in the deepest part of basin is less than 6 feet at low water; and 4) salinity due to ocean-derived salts is less than 0.5 parts per thousand (Cowardin et al., 1979). Palustrine wetlands identified in the survey area fall into three Classes: Emergent (EM), Scrub-Shrub (SS), and Unconsolidated Bottom (UB). The Emergent Class includes wetlands that are characterized by erect, rooted, herbaceous plants adapted to grow under flooded and/or saturated conditions. The Scrub-Shrub Class includes wetlands that are characterized by trees and shrubs less than 20 feet tall. Unconsolidated Bottom wetlands have sand, silt or mud substrates and less that 30 percent vegetative cover. Water regimes of the Palustrine wetlands identified in the survey area include permanently flooded and seasonally flooded. Permanently flooded wetlands have water covering the land surface throughout the year. Seasonally flooded wetlands have surface water present for extended periods of the year and when surface water is absent, the water table is often near the land surface. With the exception of the constructed pond in Park Moabi, all of the Palustrine wetlands identified in the survey area were considered to meet the wetland criteria for hydrophytic vegetation, hydric soils and wetland hydrology. These areas were all located either within or immediately adjacent to the Colorado River, Park Moabi Slough or other non-wetland waters of the U.S. identified in the survey area. Descriptions of the Palustrine wetlands are provided in the following sections.

3.2.2.1 Shore Zone Emergent Wetlands (PEMH)

Shore zone emergent wetlands include scattered patches of southern cattail, southern bulrush, common reed and giant reed growing along the edges of the Colorado River and Park Moabi Slough, below the ordinary high water line. As previously noted these wetlands are classified separately from the open water Riverine wetlands in which they occur (Cowardin et al., 1979). All of the shore zone wetlands in the survey area are classified as Palustrine Emergent Permanently Flooded (PEMH) wetlands. These wetlands are most common along the southern banks of the Park Moabi Slough, but are also found along the north banks of the slough in the western most part of the survey area. Shore zone wetlands are less common along the Colorado River and occur in scattered locations along the south/west bank as well as in the vicinity of the Topock Marina. Also included are areas with California bulrush along the outlet of Bat Cave Wash and areas with broad-leaved cattail (*Typha latifolia*) in the outlet of the East Ravine near the southern boundary of the survey area.

3.2.2.2 Adjacent Emergent Wetlands (PEMC and PSSB)

Adjacent emergent wetlands include wetland features that are immediately adjacent to the Colorado River or Park Moabi Slough, but occur above the ordinary high water and inland of the shore zone wetlands. Four adjacent wetland areas were identified in the survey area.

The first and largest adjacent wetland (EM-17) is located on the south side of the I-40 Bridge on the west side of the Colorado River. This wetland is characterized by a dense monoculture of common reed. The surface soil in this area is a brown (10 YR 4/3) sand mixed with organic material to a depth of 6 inches. From 6 to 10 inches the soil is a dark grayish brown (10 YR 4/2) sand underlain by a brown (10 YR 5/3) sand to a depth of 21 inches. At the time of the survey saturated soils and ground water were present at a depth of 8 inches. Based on the location and elevation of this wetland surface water is likely present in the summer months (May-July) during higher flow levels and therefore this feature was classified as a Palustrine Emergent Seasonally flooded (PEMC) wetland.

The second adjacent wetland (EM-15a) is on the east side of the Colorado River, north of the Topock Marina. This wetland is characterized by a strip of emergent wetland immediately above the shore line and also includes a narrow band of low trees and shrubs (SS-4) further inland. Emergent vegetation is characterized by iris-leaved rush (*Juncus xiphioides*), dallis grass (*Paspalum dilatatum*), and marsh pennywort (*Hydrocotyle verticillata*) with scattered common reed and southern bulrush. The surface soil in this area is a dark grayish brown (10 YR 4/2) silt loam with approximately 5 percent dark reddish brown (5 YR 3/4) concentrations to a depth of 8 inches. From 8 to 24 inches the soil is a brown (10 YR 5/3) sandy loam with grayish brown (10 YR 5/2) ped surfaces and approximately 2 percent yellowish brown (10 YR 5/4) concentrations in the matrix. A shallow water table and saturated soils were present at 12 inches below ground surface at the time of the February 2012 survey. This area appears to be just above the ordinary high water elevation of the river. Given the low topographic position this area is likely subject to some flooding during higher flows and appears to have saturated conditions in the upper part of the soil for most of the year. This narrow strip was classified as a Palustrine, Emergent Seasonally Flooded Wetland (PEMC). Immediately inland the vegetation is characterized by small saltcedar trees and shrubs, arrow-weed, broom baccharis and scattered narrow-leaved willow (*Salix exigua*). Herbaceous vegetation in this area is limited to sparse common reed. Soils in this area are the same as in the emergent wetland area and a shallow water table was encountered at a depth of 15 inches below the ground surface during the February 2012 survey. This wetland area was classified as a Palustrine Scrub-Shrub Saturated wetland (PSSB).

The third adjacent wetland (EM-5) is on the south bank of the Colorado River, approximately 600 feet downstream of the confluences of the Park Moabi Slough and the Colorado River. This low depressional area is filled with dense growth of southern cattail. Soil in this area is a yellowish brown (10 YR 5/4) sandy loam to a depth of 24 inches. No redoximorphic features were observed. At the time of the February 2012 survey, shallow groundwater and saturated soils were present at a depth of 10 inches below the ground surface. A culvert connects this area to a pond on the south side of the National Trails Highway. Given the low topographic position, hydrologic connection to the pond south of the road, and shallow ground water noted at the time of the survey, it is likely that this area is subject to shallow seasonal flooding for part of the year. This feature was classified as a Palustrine, Emergent, Seasonally Flooded wetland (PEMC).

The fourth adjacent wetland (EM-20) occurs on the north side of Park Moabi Slough to the northwest of the Moabi Regional Park parking area and boat ramp. This wetland is located on the landward side of shore zone and is characterized by Iris leaved rush, marsh pennywort, and dallis grass with scattered southern cattail. The surface soil is a very dark grayish brown (10 YR 3/2) sandy loam to a depth of 2 inches. From 2 to 20 inches the soil is a brown (10 YR 3/2) sand. No redoximorphic features were evident. Shallow ground water and saturated soils were encountered at 11 inches below the ground surface in this area during the February 2012 survey. This wetland area appears to be located just above the ordinary high water level, but it is at a low enough elevation that some flooding likely occurs during periods of higher flows and the surface soils are presumably saturated for extended periods during the growing season. This feature was classified as a Palustrine, Emergent Seasonally Flooded wetland (PEMC).

3.2.2.3 Topock Marsh (PEMH)

The survey area includes a small piece of the Topock Marsh on the north side of Highway 95 in Arizona. In this location the marsh is characterized by dense growth of southern bulrush. The surface soil is a dark grayish brown (10 YR 4/2) silty clay loam to depth of 2 inches underlain by a dark gray (10 YR 4/1) silty clay. No redoximorphic features were observed. Surface water to a depth of 7 inches was present at the sample location at the time of the February 2012 survey. This part of the Topock Marsh was classified as a Palustrine Emergent Permanently Flooded wetland (PEMH).

3.2.2.4 Pond (PEMH)

There is a pond on the south side of the National Trails Highway approximately 800 feet southeast of the confluence of Park Moabi Slough and the Colorado River. An earthen dam separates the pond from the ephemeral wash system that extends to the south. The pond is connected to an adjacent emergent wetland on the north side of the National Trails Highway via a large culvert. The southern half of the pond is characterized by dense growth of southern cattail, while the northern part is open water. Several feet of water was observed in the pond during both the February and July 2012 surveys. A beaver lodge is present near the center of the pond at the edge of the cattails. This area was classified as a Palustrine, Emergent, Permanently Flooded wetland (PEMH).

3.2.2.5 Scrub-Shrub Wetlands Associated with Ephemeral Washes (PSSA)

Dense thickets of saltcedar are present at the northern ends of larger ephemeral washes south of the National Trails Highway. As previously noted, there is a dense thicket of saltcedar at the northern end of Bat Cave Wash and a dense thicket of saltcedar intermixed with honey mesquite present at the terminus of the ephemeral wash system west of Bat Cave Wash. Sample points were not collected in these locations due to density of the vegetation; however, flooding was observed in the saltcedar area in Bat Cave Wash following the January 2010 storm event (Personal Communication with B. Collom, 2012). While these areas are part of the ephemeral wash system they are considered Palustrine Scrub-Shrub Temporarily Flooded (PSSA) wetlands because vegetative cover exceeds 30 percent.

The storm water impoundment area in the western part of the survey area, south of Moabi Regional Park, also supports relatively dense saltcedar and blue palo verde with scattered creosote bush and brittlebush. This feature collects water from three ephemeral drainages south of Moabi Regional Park. Evidence of flooding observed in this area during the survey included drainage patterns, drift deposits, large mud cracks and extensive debris at the 48-inch diameter culverts in the northeast corner. This area was also classified as a Palustrine Scrub-Shrub Temporarily Flooded (PSSA) wetland.

3.2.2.6 Park Moabi Pond (PUBHx)

There is a pond in the northeast corner of Moabi Regional Park between the boat ramp and the Pirate Cove Marina. The small pond is square in shape and was created as part of a water-supply project, but is located immediately adjacent to Park Moabi Slough. With the exception of sparse southern bulrush the pond is characterized by open water with saltcedar, honey mesquite and arrow-weed surrounding the pond. This feature was classified as a Palustrine Unconsolidated Bottom Permanently Flooded (PUBHx) wetland that has been excavated. Due to the lack of vegetation this feature was considered to be a non-wetland waters of the U.S.

3.3 Non-Jurisdictional Features

Several sample points were established along the lower terraces adjacent to the Colorado River, Park Moabi Slough and east of the Topock Marsh. Vegetation in these areas is characterized by saltcedar, athel, and arrow-weed with honey mesquite, desert smoke tree and broom baccharis are also present in some areas. While some of these species may occur in wetlands, many of them are also phreatophytes, capable of tapping into ground water as much as 20 feet below the ground surface. The low terraces along the Colorado River and Park Moabi Slough north of the I-40 Bridge are characterized by sand deposits from the extensive dredging of the river from the late-1940s through the mid-1960s (Appendix C). In addition, flows in this section of the Colorado River are highly regulated by releases from upstream dams including the Hoover Dam and the Davis Dam, and natural flooding no longer occurs along this reach of the river. Based on data collected at the sample point locations s and field observations the features described below were all considered not to be wetlands or other waters of the U.S.

Two sample points (SP-10 and SP-13) were taken south of the I-40 Bridge on what appears to be the natural floodplain surface of the Colorado River. Vegetation in these areas is characterized by saltcedar, screw bean, and arrow-weed with scattered broom baccharis and sparse common reed. At SP-10, the soil is a yellowish brown (10 YR 5/4) sand intermixed with gravels and cobbles. This location is above the elevation of the ordinary high water level in the river and there was no evidence to suggest shallow soil saturation or surface inundation in this area. At the nearby sample point SP-13 the surface soil is a dark yellowish brown (10 YR 4/4) sand mixed with gravel and cobbles to a depth of 10 inches. Below 10 inches the soil is a yellowish brown (10 YR 5/4) sand to a depth of at least 50 inches. While soil moisture notably increased with depth in this area, there was no evidence of saturation or a shallow water table in the upper 4 feet at this location.

Several sample locations were located on the adjacent low terraces north of the I-40 Bridge along the Colorado River and Park Moabi Slough. In these areas, dredged river sands have been piled over the natural stream terraces. Vegetation is characterized by open to dense stands of saltcedar and arrow-weed with occasional honey mesquite and desert smoke tree also present in a few locations. Soils consist of dark yellowish brown (10 YR 4/4) to light yellowish brown (10 YR 6/4) sand. No saturated soils or shallow ground water was evident in the upper 2 feet in any of the soil sample points taken in these areas. Ground water elevations, measured in several monitoring wells scattered throughout the low terraces along the Colorado River, indicate that the ground water elevation during periods of peak flow (May – July) ranges from approximately 2.5 to 7 feet below the ground surface (Appendix E). This shallow ground water is well within reach of the deep rooted trees and shrubs that are characteristic of this area, but not shallow enough to meet the criteria for wetland hydrology, which requires a shallow water table to be within 12 inches of the soil surface (USACE 2008).

Seven sample points were taken along the low terrace east of the Topock Marsh. Four sample points were established on the west side of the Highway 95. One sample point was established in an area characterized by big saltbush (*Atriplex lentiformis*) scrub and one sample point was established in the area that was burned in the 2008 wildfire that was recently planted with native trees, shrubs and grasses including screw bean, four-wing saltbush (*Atriplex canescens*) and alkali sacaton (*Sporobolus airoides*). Two sample points were established in areas formerly characterized by saltcedar and athel that were cleared following the 2008 wildfire, but were not yet re-vegetated. Three sample points were established on the east side of the highway including one in an area with bush seepweed, and two in the athel tamarisk thicket. Soil in all of these areas consisted of brown (10 YR 5/3, 10 YR 4/3) to yellowish brown (10 YR 5/4) and dark yellowish brown (10 YR 4/4) sand. Soils in this area ranged from moderately alkaline (pH 8.2) to very strongly alkaline (pH 9.6). Evidence of flooding as a result of the significant precipitation immediately prior to the July 2012 field surveys was noted in some parts of the cleared area west of the highway, but there was no evidence of prolonged surface inundation or shallow groundwater (within 24 inches of the surface) at any of the sample locations in this area.

Two low, open sandy ephemeral drainages are present in the area east of the Oatman-Topock Highway. Both of the drainages flow through semi-circular culverts under the BNSF railroad just east of the survey area. These two drainages are characterized by low sandy substrates that lack defined channel banks. Both of the drainages are devoid of vegetation and exhibited evidence of recent flows including sediment deposits, debris lines and scouring at the time of the July 2012 survey. Unlike the Sacramento Wash, these smaller drainages dissipate into sheet flow on the east side of the highway and have no apparent hydrologic connection to the Topock Marsh.

A number of small erosional features are present in the survey area at former potential freshwater well site C that were likely formed prior to the construction of the railroad and roadway berms. These features all occur within the creosote bush scrub habitat and lack most of the plant species typically found in the larger washes. None of these features are shown as blue line streams on the USGS topographic maps or in the National Hydrologic Dataset. In general these features are only moderate to weakly expressed and were not considered to be waters of the U.S.

3.4 Jurisdictional Determination

The EPA and USACE 2008 Guidance Document "Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States" ("2008 Rapanos Guidance") was also followed in this wetlands delineation. Following the 2006 *Rapanos* decision, the agencies have identified three categories of waters and wetlands over which the agencies will assert jurisdiction either categorically or on a case by case basis. These three categories are: (1) traditional navigable waters and their adjacent wetlands; (2) relatively permanent non-navigable tributaries of traditional navigable waters and wetlands that directly abut such tributaries with a continuous surface connection with such tributaries; and (3) on a case by case basis, the following waters that have a significant nexus with a traditional navigable water: (a) non-navigable tributaries that are not relatively permanent; (b) wetlands adjacent to non-navigable tributaries that are not relatively permanent; and (c) wetlands adjacent to, but not directly abutting, a relatively permanent tributary. A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary, including consideration of hydrologic and ecologic factors, to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters. Generally, the agencies will not assert jurisdiction over swales, erosional features and ditches that do not carry a relatively permanent flow of water. This guidance was taken into account when determining the potential jurisdictional status of wetlands and other waters of the United States in Table 3-1.

The USACE regulates the discharge of dredged and/or fill material (concrete, riprap, soil, cement block, gravel, sand, etc.) into waters of the U.S. including adjacent wetlands under Section 404 of the Clean Water Act. Additionally any work and/or structures placed in or affecting (above, over, under) a navigable water of the U.S. (e.g., the Colorado River, its impoundments, sloughs, backwaters, old channels, oxbows, etc.) typically requires a permit under Section 10 of the River and Harbor Act of 1899. Because of the application here of the CERCLA Section 121(e)(1) permit exemption, the USACE has confirmed in a letter dated July 10, 2013 that no Section 404 permit or authorization is required from the USACE. Because no Section 404 permit is required from the USACE, the USACE has confirmed it will not verify the wetland and waters delineation contained herein (Appendix A). Therefore PG&E will assume that all of the waters and wetlands delineated in the report, and identified as such in Figures 1-3 through 3-8, are all jurisdictional waters under Section 404 of the CWA, except for the identified discontinuous ephemeral drainages.

The EIR also requires that: "…the acreage of jurisdictional wetland affected is be replaced on a "no-net-loss" basis in accordance with the substantive provisions of USACE regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods consistent with USACE methods, and consistent with the purpose and intent of applicable county and agency policies and codes. Minimization and compensation measures adopted through any applicable permitting processes shall be implemented. In any event, a report shall be submitted to DTSC to document compliance with these mandates." Based on the data provided in this delineation report there are a total of 13.723 acres of jurisdictional wetlands within the survey area (Table 3-1). The wetland areas within the survey area are shown in Figure 3-9.

SECTION 4
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Figures

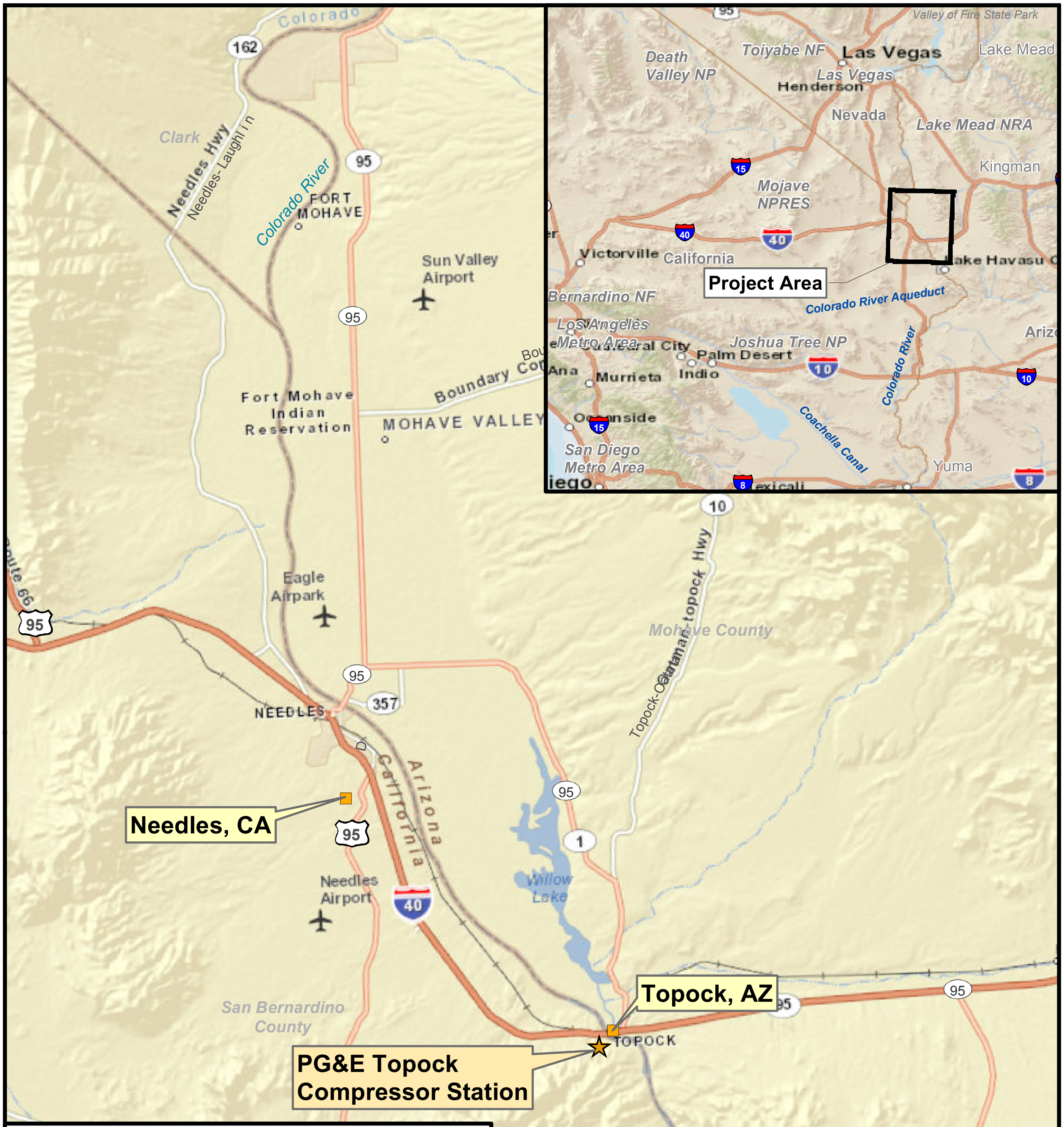

FIGURE 1-1
SITE LOCATION MAP
WETLANDS AND OTHER WATERS OF THE U.S.
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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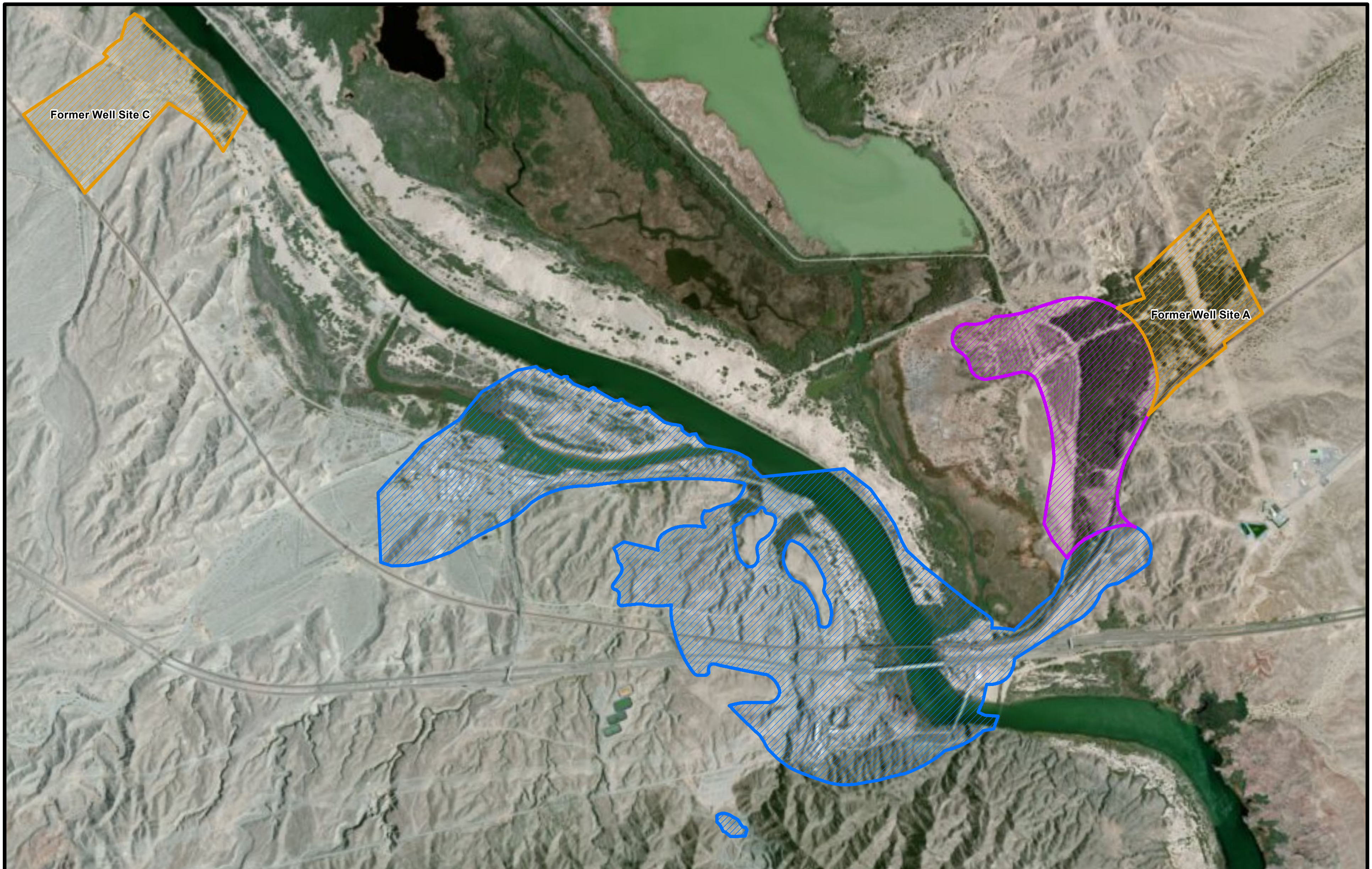

LEGEND

- EIR Project Area and Wetlands Delineation Area (780 Acres)
- Additional Wetlands Delineation Area - Well Site B (183 Acres)
- Former Potential Freshwater Well Sites (206 Acres)

N

0 1,500 3,000 Feet

FIGURE 1-2
WETLANDS DELINEATION STUDY AREA
Wetlands and Other Waters of the U.S.
PG&E Topock Compressor Station
Needles, California

CH2MHILL

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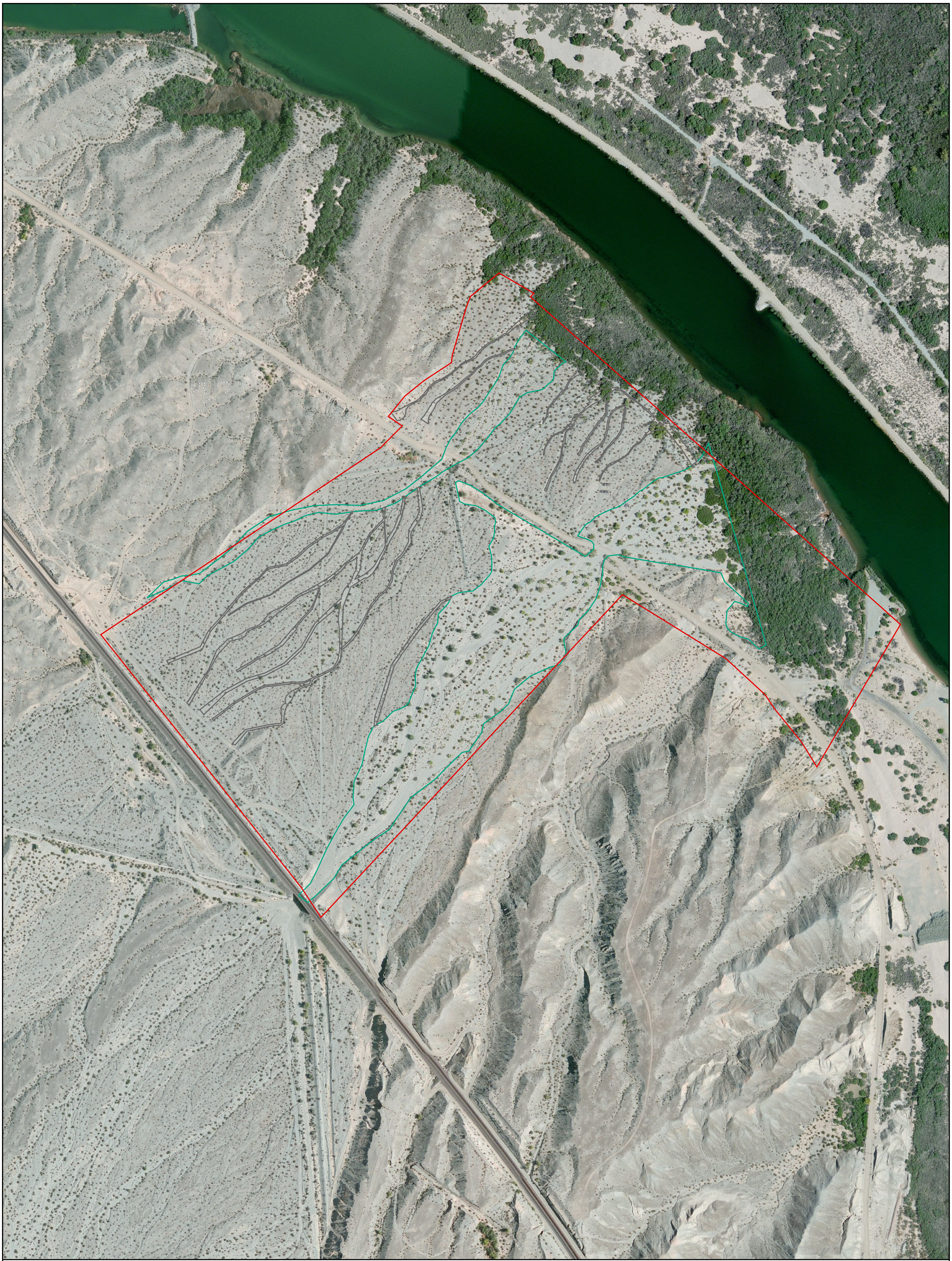


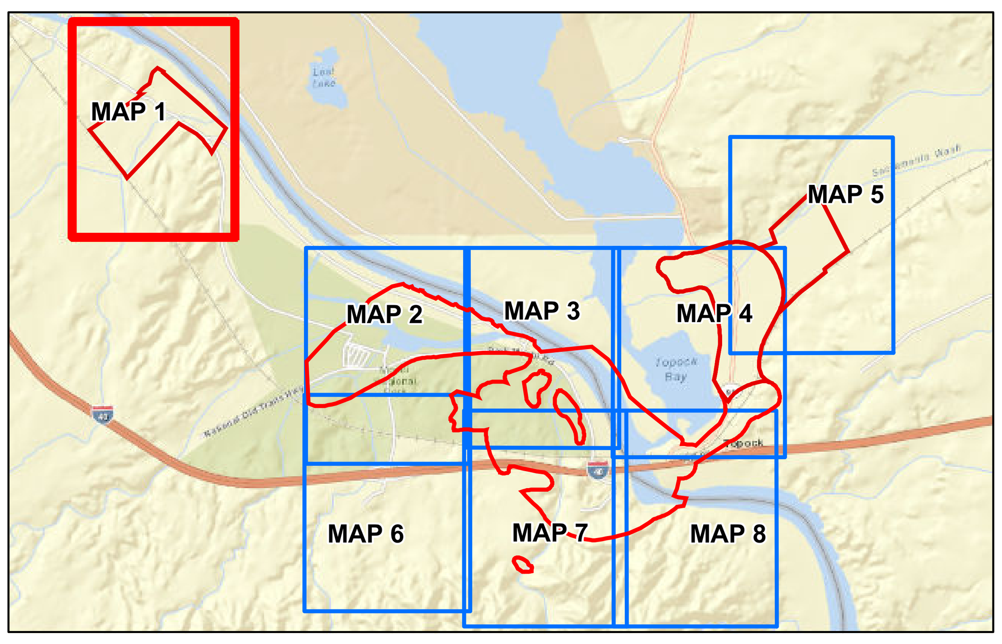
LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.



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0 140 280 560 Feet

FIGURE 3-1
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 1 OF 8

PG&E Topock Compressor Station
Needles, California

CH2MHILL

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LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

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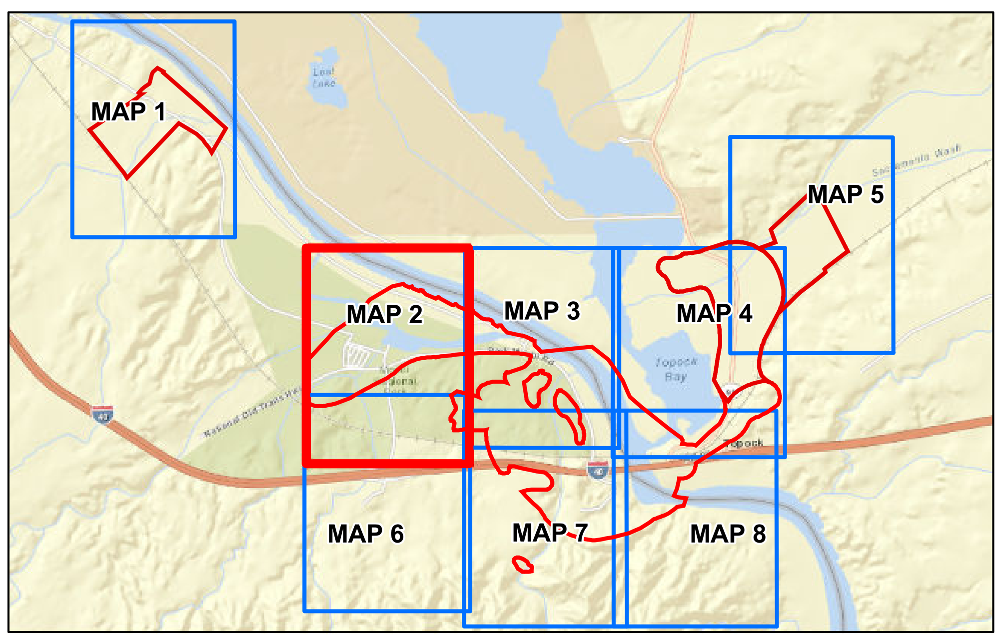

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FIGURE 3-2
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 2 OF 8

PG&E Topock Compressor Station
Needles, California

CH2MHILL

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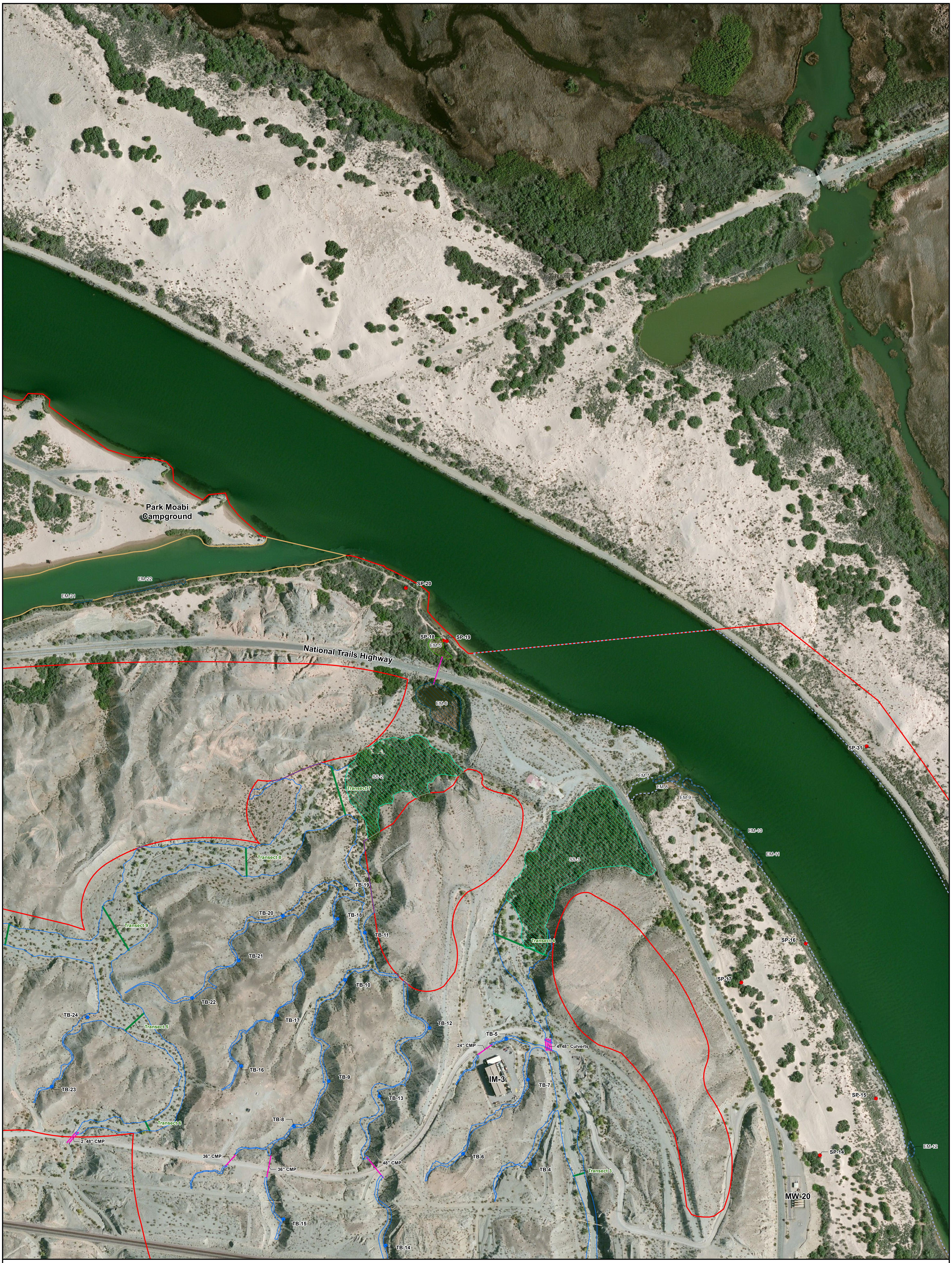

LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
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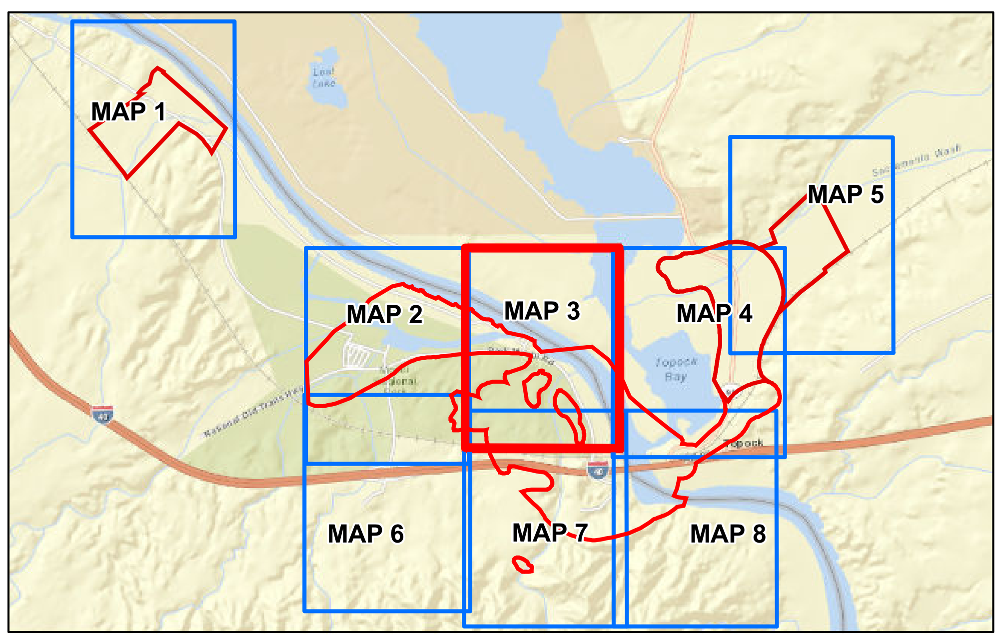

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0 135 270 540 Feet

FIGURE 3-3
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 3 OF 8
PG&E Topock Compressor Station
Needles, California

CH2MHILL

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LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
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R. Huddleston and M. Fowler.
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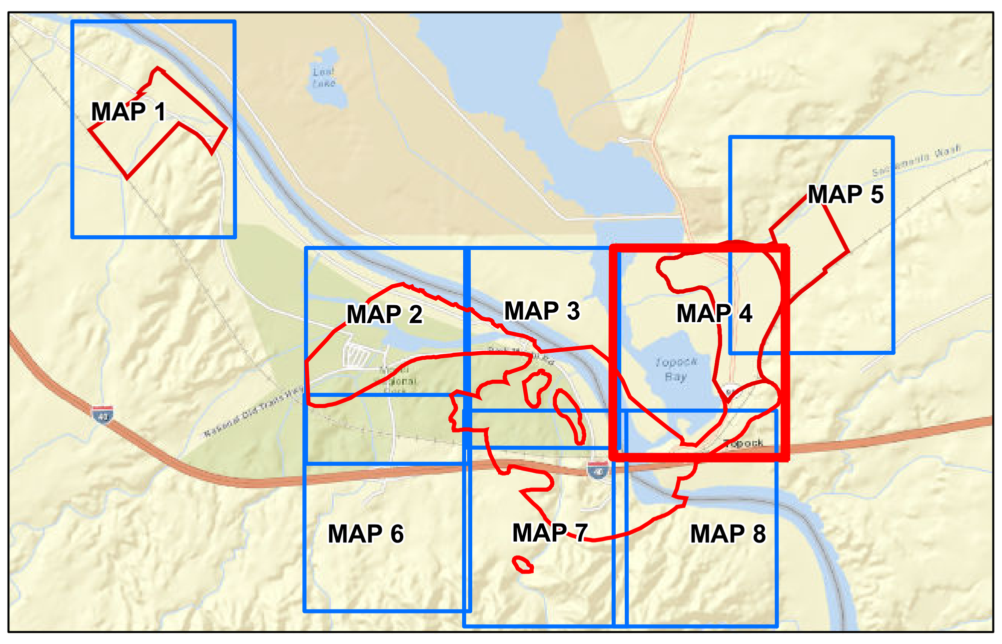

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FIGURE 3-4
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 4 OF 8

PG&E Topock Compressor Station
Needles, California

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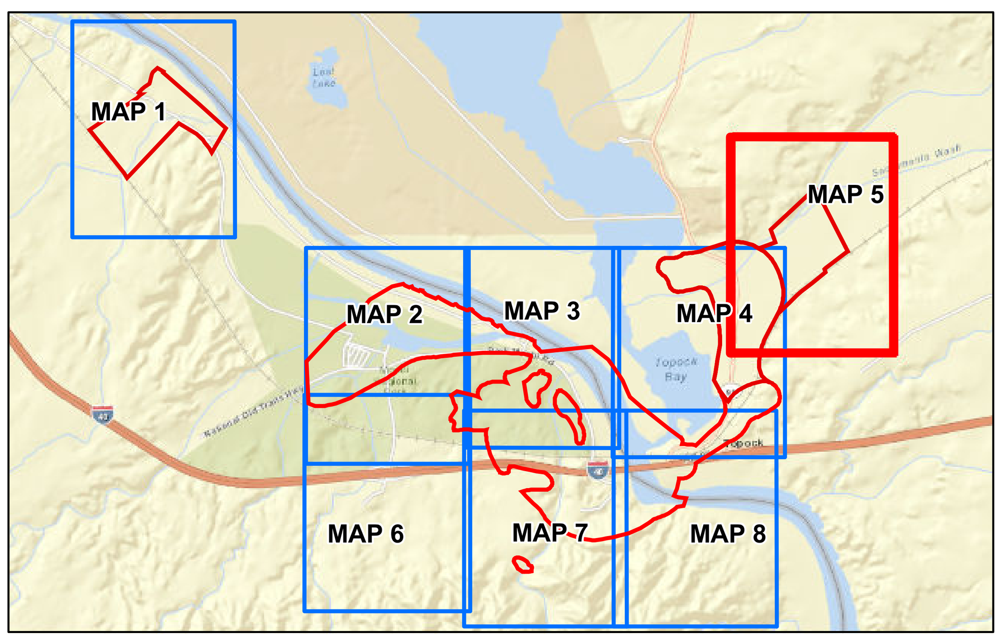
LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.



N

0 140 280 560 Feet

FIGURE 3-5
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 5 OF 8

PG&E Topock Compressor Station
Needles, California

CH2MHILL

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LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
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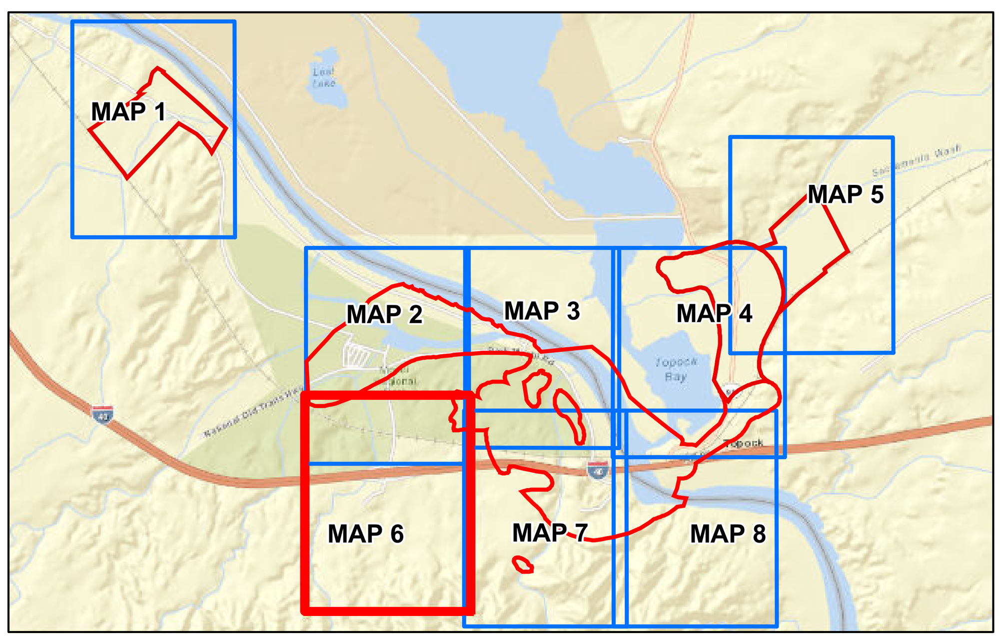


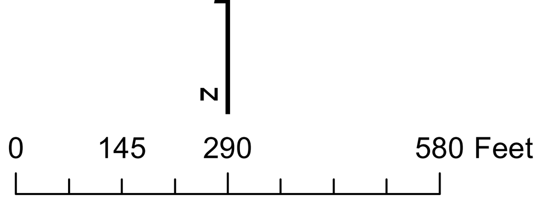
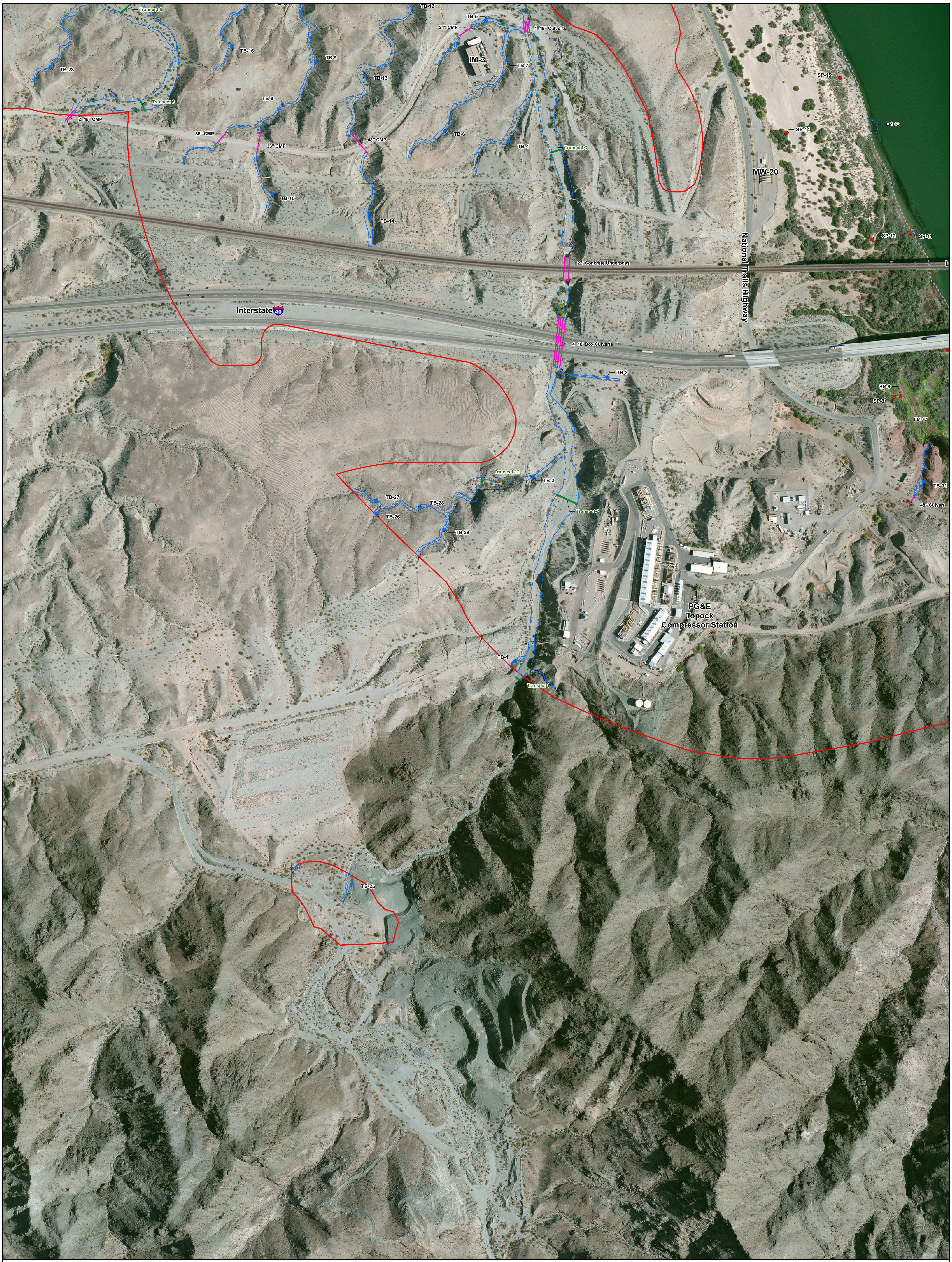


FIGURE 3-6
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 6 OF 8

PG&E Topock Compressor Station
Needles, California

CH2MHILL



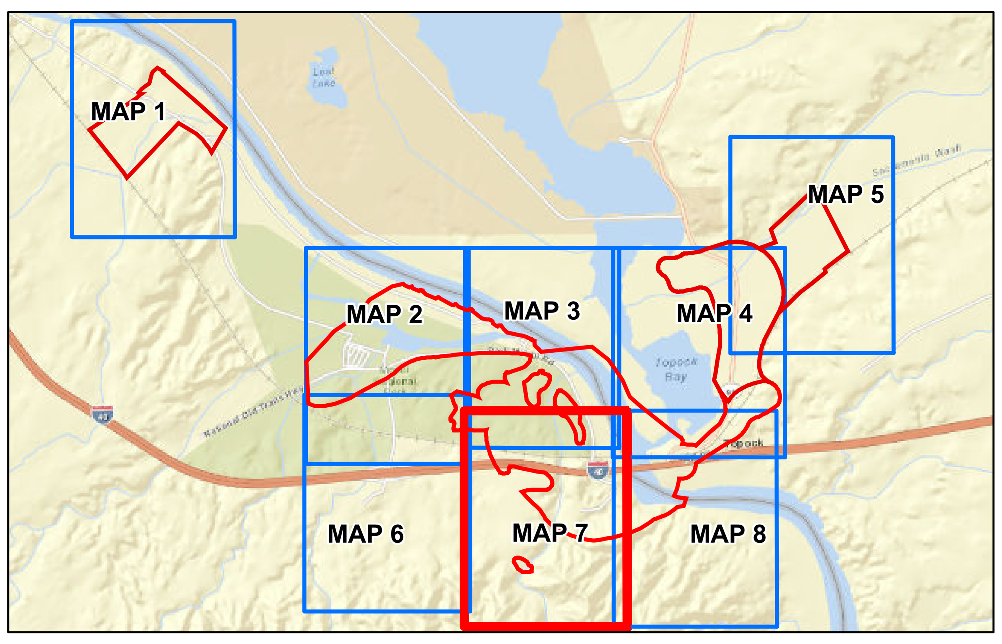
LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.



N

0 140 280 560 Feet

FIGURE 3-7
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 7 OF 8
PG&E Topock Compressor Station
Needles, California

CH2MHILL

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LEGEND

- Sample Point
- Tributary Sample Point
- Wetland Delineation Boundary
- Culvert
- Survey Transects

Water Types

- Erosional Feature
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (R4SB4A)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)
- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x)
- Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2)

Source:
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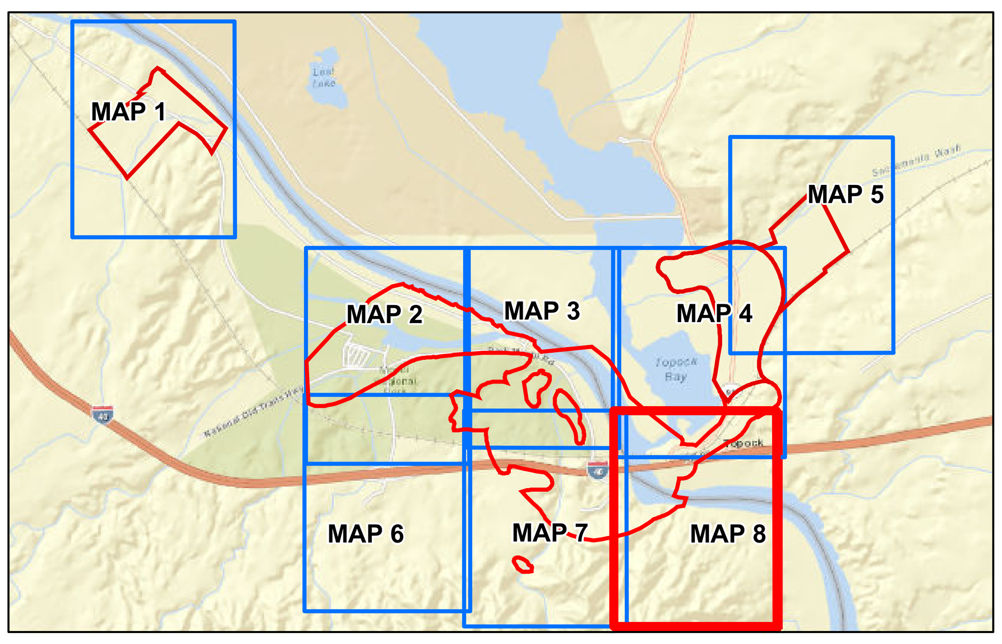
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.



N

0 140 280 560 Feet

FIGURE 3-8
WETLANDS AND OTHER WATERS OF THE U.S.
MAP 8 OF 8
PG&E Topock Compressor Station
Needles, California

CH2MHILL

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LEGEND

Wetlands Survey Area Boundary

EIR Project Boundary

Wetlands

Non-Wetland Waters

N

0 750 1,500 3,000 Feet

FIGURE 3-9
CLEAN WATER ACT WETLANDS AND OTHER NON-WETLAND WATERS
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Appendix A
Letter and E-mail from Gerry Salas, Regulatory Division of the U.S. Army Corps of Engineers

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

July 10, 2013

REPLY TO
ATTENTION OF

Regulatory Division

Yvonne Meeks
Environmental Remediation
Pacific Gas and Electric Company
6588 Ontario Rd
San Luis Obispo, CA 93405

Dear Ms. Meeks:

I am responding to your request (File No. SPL-2013-00476) dated February 12, 2013, for clarification on whether a Department of the Army Permit is required for the Topock Remediation Project, located near the city of Needles, San Bernardino County, California.

By this letter, the Corps verifies, although this activity may qualify for Nationwide Permit 38 (*Cleanup of Hazardous and Toxic Waste*), activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. The attached U.S. Department of the Interior Memorandum dated November 16, 2007 verifies CERCLA applies to the Topock site. Therefore, a Section 404 permit is not required for the Topock Remediation Project.

If you have any questions, please contact me at 213-452-3417 or via e-mail at Gerardo.Salas@usace.army.mil. Please be advised that you can now comment on your experience with Regulatory Division by accessing the Corps web-based customer survey form at: http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Gerardo Salas
Project Manager
L.A. & San Bernardino Section
North Coast Branch
Regulatory Division

Enclosure

United States Department of the Interior

OFFICE OF THE SOLICITOR

MEMORANDUM

TO: Kris Doebbler
Remedial Project Manager, PG&E Topock CERCLA Site

FROM: Melissa Derwart
Attorney-Advisor, Office of the Solicitor

RE: CERCLA Permit Exemption

DATE: November 16, 2007

Per your request, the following memorandum is provided to describe the scope and effect of the permit exemption codified in Section 121(e)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"). The Administrative Consent Agreement ("Consent Agreement"), executed July 11, 2005, between the United States Department of the Interior, the Bureau of Land Management, the U.S. Fish and Wildlife Service, the Bureau of Reclamation (collectively, the "Federal Agencies"), and Pacific Gas & Electric Company ("PG&E") expressly provides that any response action conducted at the PG&E Topock CERCLA Site (the "Site"), including studies, shall be subject to the permit exemption in CERCLA Section 121(e).[1] This memorandum provides further guidance on the language and purpose of the permit exemption and its applicability to the Site.

CERCLA Permit Exemption - Section 121(e)(1)

CERCLA Section 121(e)(1) provides that: "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section."[2] This

[1] *See* Consent Agreement, Section XI (Other Applicable Laws).
[2] 42 U.S.C. §9621(e)(1).

provision, applies to all administrative requirements, whether or not they are actually styled as "permits." In other words, Section 121(e)'s permit exemption relieves a party from the permitting process, or any other administrative or procedural requirements (e.g. requirements for preparing and submitting permit applications). Any substantive elements that would be required by the permit, however, must still be attained.[3]

The permit exemption was developed by the U.S. Environmental Protection Agency ("EPA") in promulgating the National Contingency Plan ("NCP"), and subsequently codified by Congress in amendments to CERCLA, to ensure that CERCLA response actions "proceed in an expeditious manner, free from potentially lengthy delays associated with the permit process."[4] The rationale for the permit exemption, as articulated by EPA, is that procedural and administrative requirements typically required by a permit process should not be required during a CERCLA response action because "CERCLA and the NCP already provide a procedural blueprint" for a CERCLA response.[5] Therefore, exempting CERCLA response actions from external permitting processes would preclude delay, cost increases, and duplication, making the response process far more efficient.

When determining the applicability of the permit exemption, there are two threshold elements. First, there must be a "qualifying action," which is defined as any CERCLA response action "...conducted by a lead agency or by a potentially responsible person or other person under an order or consent decree..."[6] Second, the permit exemption applies only to the portion of the removal or remedial action which is conducted entirely "on-site." The NCP defines "on-site" as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action."[7] EPA guidance and the NCP preamble further explains that "areal" refers to surface areas, the air above the site, the soil, and any groundwater plume that are to be remediated.[8]

---

[3] *See In the Matter of U.S. Department of Energy Hanford Nuclear Reservation*, Determination Regarding CERCLA and RCRA Jurisdictional Relationship, EPA ALJ Opinion, February 9, 2000.

[4] EPA Guidance Document, *RCRA, Superfund & EPCRA Hotline Training Module; Introduction to Applicable or Relevant and Appropriate Requirements*, EPA540-R-98-020, June 1998.

[5] *Id.*

[6] EPA Guidance Document, *Permits and Permit "Equivalency" Processes for CERCLA On-Site Response Actions*, OSWER Directive 9355.7-03, February 19, 1992.

[7] *Id.*; 40 CFR § 300.400(e)(1).

[8] *See* EPA Guidance, *Permits and Permit "Equivalency"*; *See also*, 55 FR 8689, March 8, 1990.

Applicability to the Topock Site

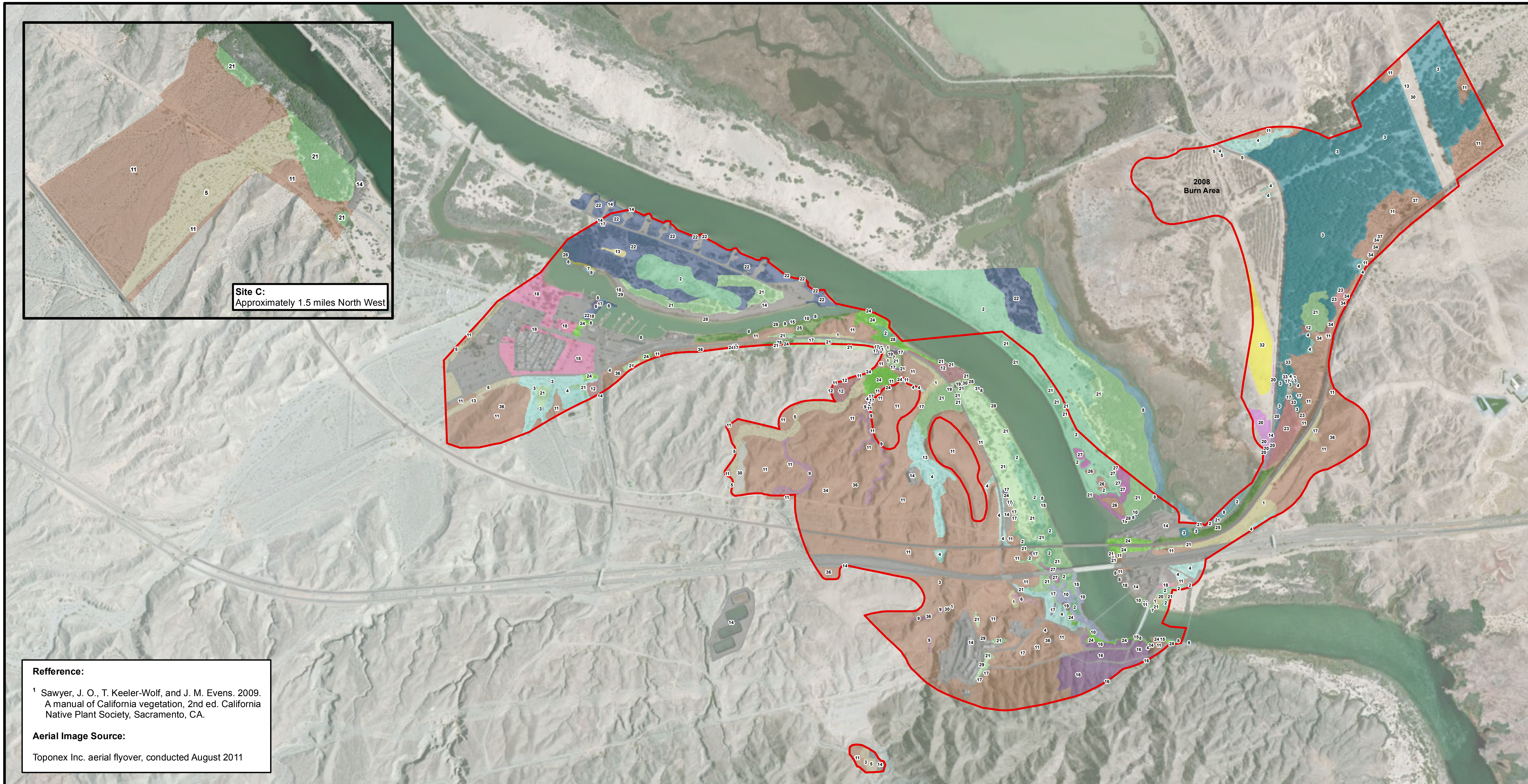
The Consent Agreement provides for PG&E to perform both a Remedial Investigation and a Feasibility Study in a manner consistent with CERCLA and the NCP, and subject to the oversight of the Federal Agencies. Therefore, all activities conducted by PG&E pursuant to the Consent Agreement at the Site are qualifying actions to which the permit exemption applies.

In addition, the Consent Agreement defines the Site as "all areas where hazardous substances released at or from the Compressor Station have come to be located, including areas where hazardous substances are discovered in the course of performing the Work."[9] Hence, any response action performed within the boundaries of the Site, or areas in very close proximity to the Site that are necessary for implementation of the response action, are subject to the permit exemption. Response actions include, but are not limited to, groundwater pump and treat measures, in situ treatment, the collection and analysis of samples, and any other soil or groundwater investigation or cleanup.

I hope that this memorandum clarifies the scope and effect of the CERCLA permit exemption and its applicability to the Topock CERCLA Site. Please do not hesitate to contact me if you need any more information.

[9] Consent Agreement, Section VII (Definitions). "Work" is defined in the Consent Agreement as "all response actions and corrective actions associated with releases of hazardous substances at the Site performed by PG&E, including all activities to be performed by PG&E as described in Article IX (Work to Be Performed) and all activities conducted by PG&E pursuant to the CACA.

Appendix B
Detailed Site Vegetation Map



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 B-1
VEGETATION COMMUNITIES IN PROJECT AREA

FLORISTIC SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix C
Soil Maps and Descriptions

United States Department of Agriculture

NRCS

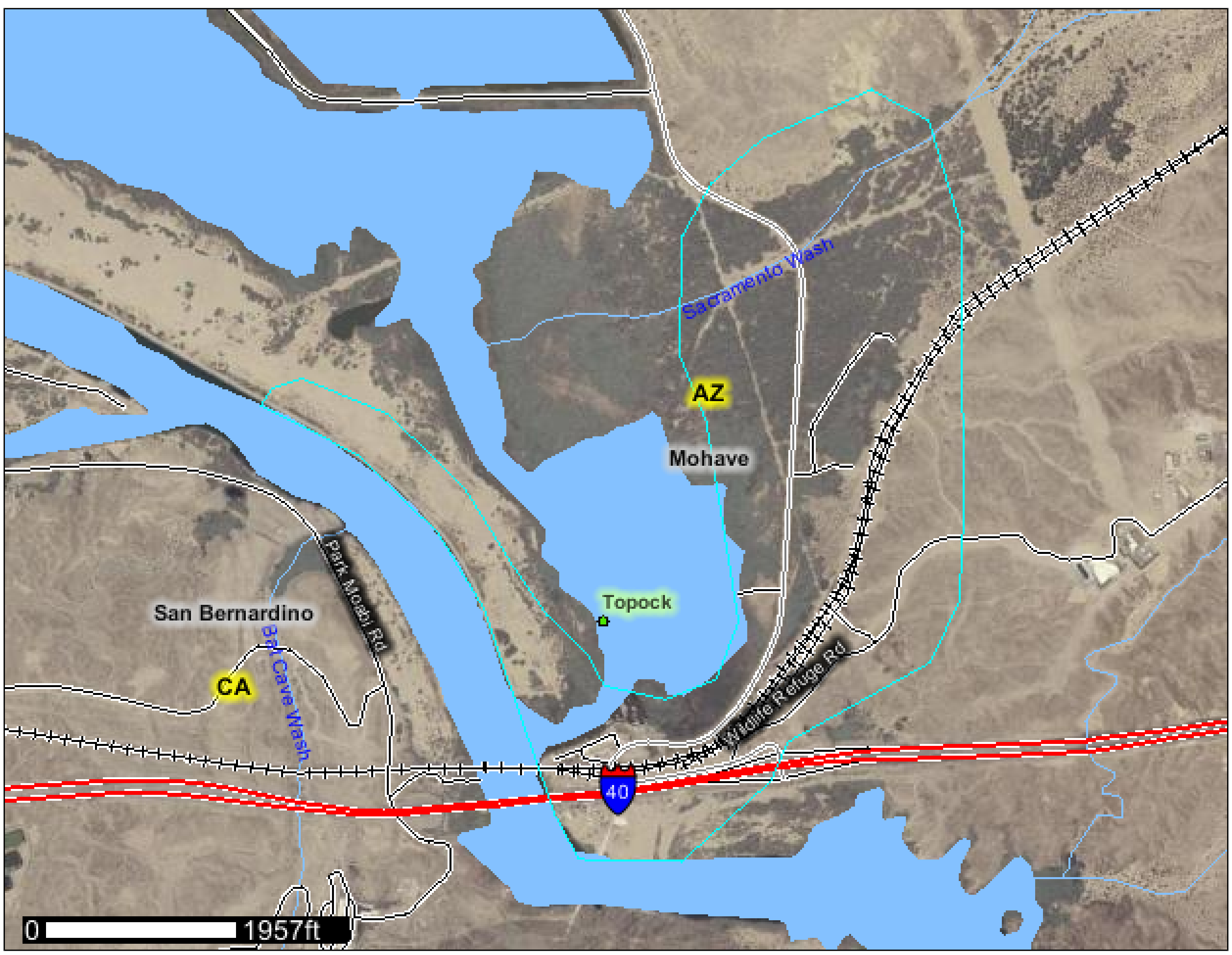
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Mohave County, Arizona, Southern Part

Mojave County, Arizona



August 15, 2012

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

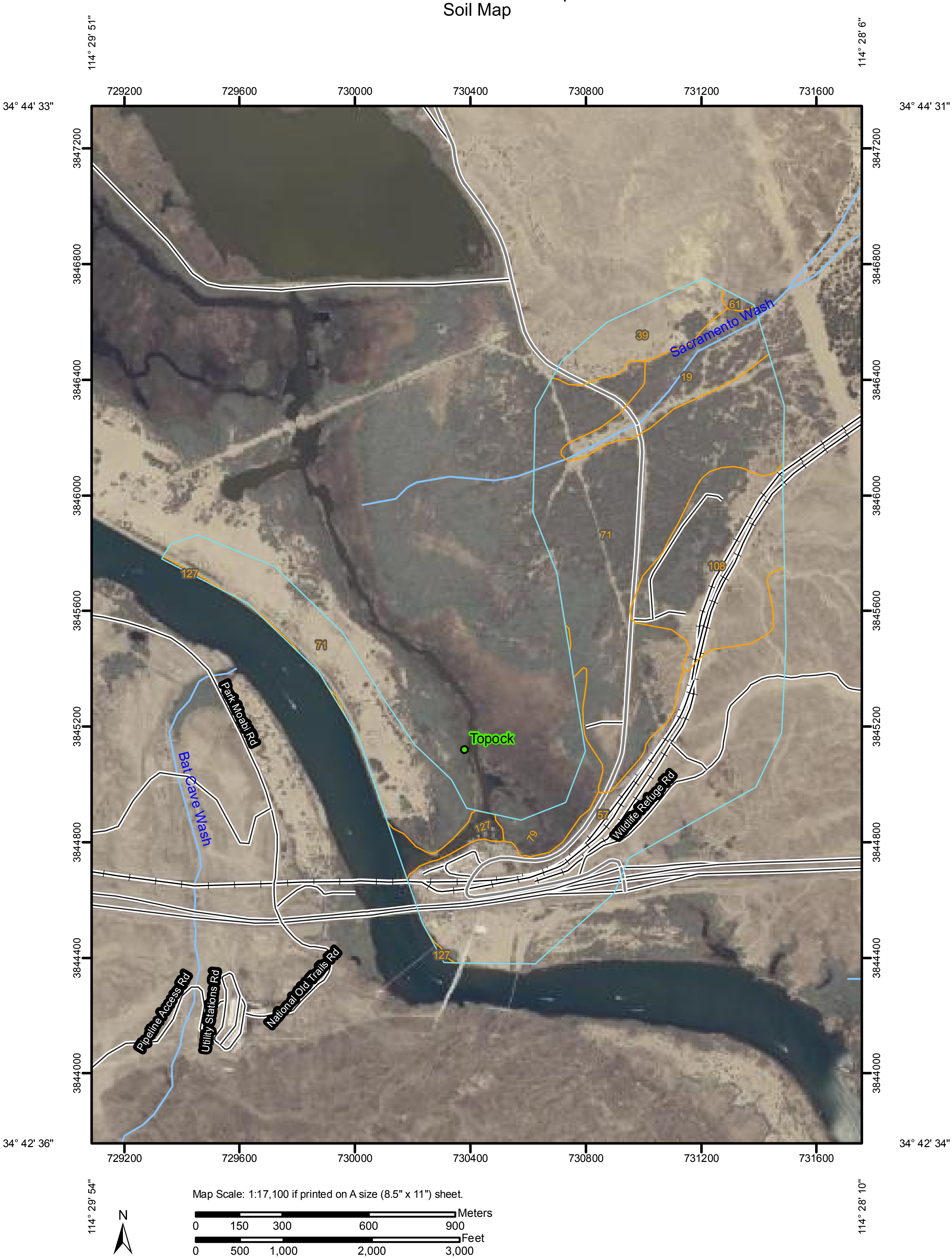
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


114° 29' 51"
114° 28' 6"
729200
729600
730000
730400
730800
731200
731600
34° 44' 33"
34° 44' 31"
3847200
3846800
3846400
3846000
3845600
3845200
3844800
3844400
3844000
34° 42' 36"
34° 42' 34"
114° 29' 54"
114° 28' 10"
Sacramento Wash
Bat Cave Wash
Topock
Park Moabi Rd
Wildlife Refuge Rd
Pipeline Access Rd
Utility Stations Rd
National Old Trails Rd
61
39
19
71
108
127
57
79
Map Scale: 1:17,100 if printed on A size (8.5" x 11") sheet.
N
Meters
0 150 300 600 900
Feet
0 500 1,000 2,000 3,000

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:17,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Mohave County, Arizona, Southern Part
Survey Area Data: Version 9, Sep 12, 2008

Date(s) aerial images were photographed: 6/9/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Mohave County, Arizona, Southern Part (AZ627)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
19	Carrizo family very gravelly loamy sand, 1 to 3 percent slopes	28.8	6.1%
39	Coolidge-Denure families complex, 1 to 7 percent slopes	24.0	5.1%
57	Gunsight very gravelly sandy loam, 10 to 40 percent slopes	130.6	27.7%
61	Huevi very gravelly loam, 10 to 40 percent slopes	1.1	0.2%
71	Lagunita sand, 0 to 1 percent slopes	206.1	43.7%
79	Marshes	13.6	2.9%
108	Rositas family, superstition and torriorthents soils, 1 to 60 percent slopes	59.4	12.6%
127	Water	7.9	1.7%
Totals for Area of Interest		**471.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Mohave County, Arizona, Southern Part

19—Carrizo family very gravelly loamy sand, 1 to 3 percent slopes

Map Unit Setting

Elevation: 500 to 1,800 feet
Mean annual precipitation: 3 to 7 inches
Mean annual air temperature: 70 to 74 degrees F
Frost-free period: 250 to 325 days

Map Unit Composition

Carrizo family and similar soils: 75 percent

Description of Carrizo Family

Setting

Landform: Flood plains, alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very low (about 2.1 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Sandy Wash 3-7" p.z. (R040XD416AZ)

Typical profile

0 to 1 inches: Very gravelly loamy sand
1 to 9 inches: Loamy sand
9 to 60 inches: Very gravelly coarse sand

39—Coolidge-Denure families complex, 1 to 7 percent slopes

Map Unit Setting

Elevation: 500 to 1,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 70 to 74 degrees F

Frost-free period: 250 to 325 days

Map Unit Composition

Coolidge family and similar soils: 40 percent
Denure family and similar soils: 35 percent

Description of Coolidge Family

Setting

Landform: Stream terraces, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from mixed

Properties and qualities

Slope: 1 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Limy Fan 3-6" p.z. (R030XA105AZ)

Typical profile

0 to 2 inches: Gravelly loam
2 to 8 inches: Gravelly sandy loam
8 to 29 inches: Sandy loam
29 to 41 inches: Sandy loam
41 to 60 inches: Gravelly sand

Description of Denure Family

Setting

Landform: Stream terraces, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from mixed

Properties and qualities

Slope: 1 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent

Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Limy Fan 3-6" p.z. (R030XA105AZ)

Typical profile

0 to 1 inches: Very gravelly loamy sand
1 to 11 inches: Loamy sand
11 to 60 inches: Sandy loam

57—Gunsight very gravelly sandy loam, 10 to 40 percent slopes

Map Unit Setting

Elevation: 460 to 2,400 feet
Mean annual precipitation: 3 to 7 inches
Mean annual air temperature: 70 to 74 degrees F
Frost-free period: 250 to 325 days

Map Unit Composition

Gunsight and similar soils: 85 percent

Description of Gunsight

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from mixed

Properties and qualities

Slope: 10 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Limy Slopes 3-7" p.z. (R040XD408AZ)

Typical profile

0 to 3 inches: Very gravelly sandy loam
3 to 6 inches: Very gravelly sandy loam
6 to 28 inches: Extremely gravelly sandy loam

28 to 50 inches: Extremely gravelly coarse sandy loam
50 to 60 inches: Extremely gravelly loamy sand

61—Huevi very gravelly loam, 10 to 40 percent slopes

Map Unit Setting

Elevation: 600 to 2,400 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 70 to 74 degrees F
Frost-free period: 250 to 325 days

Map Unit Composition

Huevi and similar soils: 85 percent

Description of Huevi

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from mixed

Properties and qualities

Slope: 10 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water capacity: Very low (about 3.0 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Limy Slopes 3-6" p.z. (R030XA107AZ)

Typical profile

0 to 2 inches: Very gravelly loam
2 to 9 inches: Very gravelly sandy loam
9 to 27 inches: Very gravelly sandy loam
27 to 40 inches: Extremely gravelly sandy loam
40 to 60 inches: Very gravelly loamy sand

71—Lagunita sand, 0 to 1 percent slopes

Map Unit Setting

Elevation: 500 to 700 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 70 to 74 degrees F
Frost-free period: 250 to 325 days

Map Unit Composition

Lagunita and similar soils: 85 percent

Description of Lagunita

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Other vegetative classification: unassigned (041XC320AZ)

Typical profile

0 to 2 inches: Sand
2 to 60 inches: Loamy sand

79—Marshes

Map Unit Composition

Marshes: 100 percent

Description of Marshes

Properties and qualities

Frequency of ponding: Frequent

108—Rositas family, superstition and torriorthents soils, 1 to 60 percent slopes

Map Unit Setting

Elevation: 450 to 950 feet
Mean annual precipitation: 3 to 7 inches
Mean annual air temperature: 70 to 74 degrees F
Frost-free period: 250 to 325 days

Map Unit Composition

Rositas family and similar soils: 40 percent
Torriorthents and similar soils: 25 percent
Superstition and similar soils: 25 percent

Description of Rositas Family

Setting

Landform: Sand sheets, dunes
Landform position (two-dimensional): Backslope, summit
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands derived from mixed

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (2.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 4.0 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Deep Sand 3-7" p.z. (R040XD423AZ)

Typical profile

0 to 17 inches: Fine sand
17 to 60 inches: Sand

Description of Superstition

Setting

Landform: Sand sheets

Landform position (two-dimensional): Summit, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands derived from mixed

Properties and qualities

Slope: 1 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability (nonirrigated): 7c
Ecological site: Limy Fan 3-7" p.z. Sandy (R040XD406AZ)

Typical profile

0 to 1 inches: Gravelly fine sand
1 to 7 inches: Fine sand
7 to 60 inches: Fine sand

Description of Torriorthents

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Lacustrine deposits

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 4 to 60 inches to lithic bedrock
Drainage class: Well drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability (nonirrigated): 7c

127—Water

Map Unit Composition

Water: 100 percent

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LOCATION CALVISTA CA

Established Series
Rev. GAW/LCL/JJJ
01/2003

CALVISTA SERIES

The Calvista series consists of shallow, well drained soils that formed in material from granitic rock that has seams of calcite. Calvista soils are on mountains ridges on slopes of 2 to 30 percent slopes. The mean annual precipitation is about 6 inches and the mean annual air temperature is about 65 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, thermic Lithic Haplocalcids

TYPICAL PEDON: Calvista sandy loam - native desert vegetation. (Colors are for dry soil unless otherwise noted)

A1--0 to 3 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common very fine roots; many very fine interstitial, common very fine tubular pores; noncalcareous; moderately alkaline (pH 8.0); abrupt smooth boundary. (3 to 4 inches thick)

A2--3 to 7 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, nonplastic; common very fine roots; many very fine interstitial, common very fine tubular pores; noncalcareous; moderately alkaline (pH 8.0); clear smooth boundary. (4 to 5 inches thick)

Bk--7 to 16 inches; light yellowish brown (10YR 6/4) heavy sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine, few very fine roots; many very fine interstitial, common very fine and fine tubular pores; spots of lime in soft masses; disseminated lime, slightly effervescent; moderately alkaline (pH 8.4); clear smooth boundary. (7 to 11 inches thick)

R--16 to 17 inches; hard (slightly weathered upper 1/2 inch) granitic rock that has seams of calcite. Some places in the weathered rock and fracture joints there are a few moderately thick, reddish brown clay films in pores and as bridges.

TYPE LOCATION: Los Angeles County, California; 200 feet west and 790 feet north of the SE corner of sec. 24, SE 1/4 SE 1/4, T. 7 N., R. 8 W., near San Bernardino County Line.

RANGE IN CHARACTERISTICS: Hard rock occurs at a depth of 14 to 20 inches. Gravel and coarser rock fragments are present, but do not exceed 35 percent by volume in the soil mantle. The mean soil temperature is about 65 degrees F. The soils are usually dry throughout the year and are moist for less than 60 days in the winter and spring of most years. All horizons are weakly expressed; there is little difference between horizons labeled A1, AC or C. They are brown, yellowish brown, pale brown, and light yellowish brown in 10YR hue (5/3, 5/4, 6/3, 6/4). The lower part of the profile tends to have chroma of 4. Textures are sandy loam or coarse sandy loam. Structure is weak or the soils are massive. The upper horizons are noncalcareous and mildly alkaline to moderately alkaline. All pedons are calcareous below 10 inches. The amount of lime ranges widely. Some segregations are present, but amounts of calcium carbonate are less than 15 percent.

COMPETING SERIES: These are the Cieneba, Courthouse, Gaviota, Hi Vista, Tidwell, and Tollhouse series. Courthouse soils have 5YR to 10R hue. Cieneba soils are shallow but lack hard rock. Gaviota soils are continuously moist for more than 90 days in the winter and spring. Hi Vista soils have B2t horizons. Tidwell soils are calcareous in the upper part and lack secondary lime segregations in the lower part of the profile. Tollhouse soils have mollic epipedons and a mean soil temperature below 59 degrees F.

GEOGRAPHIC SETTING: Calvista soils are on gentle to steep slopes on low mountains, ridges, buttes, and domes in the deserts of southern California at elevations of 1,000 to 4,000 feet. The soils formed in residuum from granite and other closely related rocks. Rock outcrops may be present. The climate is arid. Precipitation is about 4 to 8 inches. There are very infrequent summer thunder showers and gentler rains of longer duration in winter. The mean temperature is about 62 to 67 degrees F, the average July temperature is about 80 to 84 degrees F, the average January temperature is about 45 to 48 degrees F. Frost-free season is 210 to 240 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Adelanto, Arizo, Cajon soils and the competing Hi Vista soils. Adelanto, Arizo, and Cajon soils are deep alluvial soils and lack a lithic contact.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; moderately rapid permeability.

USE AND VEGETATION: Used mainly for desert range; small areas used for homesites. Native vegetation is creosotebush, Mormon tea, very small amounts of perennial grasses, and annual grasses and forbs.

DISTRIBUTION AND EXTENT: Desert mountains of Southern California in MLRA 30 and possibly adjacent portions of Arizona and Nevada. The series is not extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Los Angeles County, California, 1971.

REMARKS: The Calvista soils were formerly classified as Lithosols. Series reclassified on September, 1994. The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET

Last revised by the state on 7/72.

National Cooperative Soil Survey
U.S.A.

LOCATION CARRIZO CA+AZ NV

Established Series
Rev. LJL/PBF/CAH/ET
05/2012

CARRIZO SERIES

The Carrizo series consists of very deep, excessively drained soils formed in mixed igneous alluvium. Carrizo soils are on numerous landforms on flood plains, fan piedmonts and bolson floors. Slopes range from 0 to 15 percent. The mean annual precipitation is about 100 millimeters (4 inches) and the mean annual air temperature is about 21.5 degrees C (71 degrees F).

TAXONOMIC CLASS: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents

TYPICAL PEDON: Carrizo extremely gravelly sand, rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.) The soil surface is covered by approximately 70 percent gravel, 6 percent cobbles and 4 percent stones.

A -- 0 to 5 centimeters (0 to 2 inches); pale brown (10YR 6/3) extremely gravelly sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine interstitial pores; 55 percent gravel, 6 percent cobbles and 4 percent stones; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. (2.5 to 10 centimeters thick)

C -- 5 to 152 centimeters (2 to 60 inches); pale brown (10YR 6/3) stratified extremely gravelly and very gravelly coarse sand, brown (10YR 4/3) moist; massive to single grain; soft, slightly hard, or loose, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and few fine and medium interstitial pores; averages 55 percent gravel, 10 percent cobbles and 5 percent stones; very slightly effervescent and slightly effervescent; moderately alkaline (pH 8.4) and slightly alkaline (pH 7.8).

TYPE LOCATION: San Bernardino County, California; approximately 18.5 kilometers (11.5 miles) southwest of Amboy; about 610 meters (2,000 feet) south and 305 meters (1,000 feet) west of the NE corner of section 18, T. 4 N., R. 11 E., San Bernardino Base and Meridian; USGS Lead Mountain Northeast, CA 7.5 minute topographic quadrangle; 34 degrees, 26 minutes, 11.1 seconds north latitude and 115 degrees, 51 minutes, 47.8 seconds west longitude; UTM 11S, 0604440e 3810938n (DTM: NAD83).

RANGE IN CHARACTERISTICS:

Soil moisture control section: usually dry, moist in some parts for short periods during winter and early spring and for 10 to 20 days cumulative between July and September following convection storms. The soils have a typic-aridic soil moisture regime.

Soil temperature: 22 to 25 degrees C (72 to 77 degrees F).
Surface rock fragments: 25 to 100 percent, with 25 to 95 percent gravel, 0 to 40 percent cobbles, 0 to 25 percent stones and 0 to 2 percent boulders.

Control section
Rock fragments: averages 35 to 80 percent, gravel, cobbles and stones.
Clay content: averages 0 to 8 percent.
Effervescence: noneffervescent through violently effervescent.
Reaction: slightly acid through strongly alkaline.

A horizon

Hue: 7.5YR, 10YR or 2.5Y.
Value: 4 to 7 dry, 2 to 6 moist.
Chroma: 2 to 6 dry, 2 to 4 moist.
Clay content: 1 to 10 percent.
Texture of the fine earth: sand, loamy sand, sandy loam or fine sandy loam.
Rock fragments: 5 to 65 percent, with 5 to 65 percent gravel, 0 to 25 percent cobbles and 0 to 5 percent stones.
Effervescence: noneffervescent through violently effervescent.
Reaction: slightly acid through strongly alkaline.

C horizons

Hue: 7.5YR, 10YR or 2.5Y.
Value: 4 to 7 dry, 2 to 6 moist.
Chroma: 2 to 6 dry, 2 to 4 moist.
Clay content: averages 0 to 8 percent, ranges from 0 to 12 percent.
Texture of the fine earth: coarse sand, sand, loamy coarse sand or loamy sand. Some pedons have thin strata of fine sand, loamy fine sand or sandy loam.
Rock fragments: 10 to 85 percent, with 10 to 80 percent gravel with more than 50 percent as medium or coarse-sized, 0 to 25
percent cobbles and 0 to 10 percent stones.
Effervescence: noneffervescent through violently effervescent.
Reaction: slightly acid through strongly alkaline.
Silica: 0 to 25 percent as films on rock fragments.

COMPETING SERIES: These are the Carrwash (NV), Chemwash (CA), Goldenhills (CA) and Rizzo (CA) series. Carrwash and Chemwash soils are dominated by 2 to 5 millimeter (fine) gravel. Chemwash and Rizzo soils have mean annual soil temperatures that average greater than 25 degrees C, do not receive appreciable summer precipitation, and are generally dry throughout the moisture control section for most of the year. Goldenhills soils are formed in colluvium and residuum, have a surface C horizon with more than 80 percent rock cover, and are deep to a lithic contact.

GEOGRAPHIC SETTING: Carrizo soils are on numerous landforms on flood plains, fan piedmonts and bolson floors. Slopes range from 0 to 15 percent. The soils formed in mixed igneous alluvium. Elevations are -82 to 793 meters (-270 to 2,600 feet). The climate is arid with hot, dry summers and warm, moist winters. Precipitation is greatest in the winter with a lesser secondary peak in the summer. The mean annual precipitation is 75 to 125 millimeters (3 to 5 inches); mean January temperature is 12 degrees C (53 degrees F); mean July temperature is 35 degrees C (95 degrees F); mean annual air temperature is 20 to 23 degrees C (68 to 73.5 degrees F), and the frost-free season is 300 to 340 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bristolake, Clegorpass, Heleweiser, Pintobasin, and Riverbend soils. Bristolake soils are on nearby fan skirts and lower fan aprons, have a sandy particle size control section and are slightly saline with an SAR of 5 to 13 in the control section. Clegorpass and Heleweiser soils are on nearby fan remnants and have loamy-skeletal particle size control sections. In addition, Clegorpass soils have an argillic horizon and Heleweiser soils have a calcic horizon. Pintobasin soils are on similar landscape positions and are sandy throughout the particle size control section. Riverbend soils are on more stable landforms and have a calcic horizon.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained; negligible to low runoff; high saturated hydraulic conductivity.

USE AND VEGETATION: These soils are used for rangeland, recreation and wildlife habitat. Present vegetation is creosote bush, burrobush, burrobrush and range ratany.

DISTRIBUTION AND EXTENT: Mojave Desert of southeastern California, western Arizona, and southern Nevada; MLRA 30. These soils are extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California.

SERIES ESTABLISHED: Imperial County (El Centro Area), California; 1918.

REMARKS: The type location was relocated in 2006 to the Marine Corps Air Ground Combat Center, Twentynine Palms, California to better represent the series concept. The series has been overused throughout the Southwestern deserts including areas with precipitation ranging from 2 to 12 inches. Soils with extreme aridic moisture regimes should consider using the Rizzo series proposed for use in the Lower Colorado Desert (MLRA 31) with a moisture control section that is typically dry throughout for most of the year. New series should be proposed for the high precipitation zones. Use in MLRA 40 should also be reevaluated.

Diagnostic horizons and features in this pedon include:
Ochric epipedon - from a depth of 0 to 18 centimeters (A and part of the C horizons).
Particle size control section - from a depth of 25 to 100 centimeters (part of the C horizon).

National Cooperative Soil Survey
U.S.A.

LOCATION COOLIDGE AZ

Established Series
Rev. MHL/FOY/MB
04/2009

COOLIDGE SERIES

The Coolidge series consists of very deep, well drained soils formed in fan or stream alluvium. Coolidge soils are on fan terraces, stream terraces or relict basin floors. Slopes are 0 to 5 percent. The mean annual precipitation is about 7 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids

TYPICAL PEDON: Coolidge sandy loam - cultivated. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 13 inches; light yellowish brown (10YR 6/4) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine tubular pores; violently effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. (6 to 14 inches thick)

Bk1--13 to 24 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine tubular pores; many fine irregular calcium carbonate filaments; violently effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. (8 to 16 inches thick)

Bk2--24 to 42 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many fine tubular pores; many soft calcium carbonate filaments and masses; violently effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary. (10 to 30 inches thick)

Bk3--42 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; very hard, very friable, slightly sticky and slightly plastic; few medium tubular pores; 5 percent gravel; many fine soft calcium carbonate filaments and masses; violently effervescent; moderately alkaline (pH 8.4).

TYPE LOCATION: Maricopa County, Arizona; 900 feet west and 2,600 feet north of the northeast corner of section 8, T. 1 N., R. 2 W., latitude 33 degrees, 26 minutes, 33 seconds N., longitude 112 degrees, 28 minutes, 54 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July - September and December - February. Driest during May and June. Typic aridic soil moisture regime.

Soil Temperature - 72 to 80 degrees F.

Rock fragments - Averages less than 15 percent in the particle size control section; but can have up to 35 percent in any one horizon

Depth to calcic horizon - 14 to 40 inches

Calcium carbonate equivalent - ranges from 6 to about 25 percent; as segregated soft masses or concretions. Some horizons have calcium carbonate filaments and coatings on ped or rock faces. All horizons contain disseminated calcium carbonate.

A horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 3, 4 or 5 moist
Chroma: 2, 3, 4 or 6, dry or moist
Organic matter: less than 1 percent

B horizon
Hue: 10YR, 7.5YR, 5YR
Value: 5, 6, 7 or 8 dry, 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6, dry or moist
Texture: Sandy loam, fine sandy loam; some pedons have thin (1/4 to 1 inch thick) strata of finer or coarser soil material in the control section

COMPETING SERIES: These are the Aco (CA), Garywash (T)(CA), Laveen (AZ), Rillito (AZ), and Toltec (AZ) series. Aco and Garywash soils are moist in some part of the soil moisture control section for less than 20 days cumulative between July and September. Aco soils have fine sand below the particle-size control section. Garywash soils have secondary accumulations of silica and gypsum in the control section. Laveen soils are loam and very fine sandy loam in the particle-size control section. Rillito soils have 15 to 35 percent gravel. Toltec soils have a calcic horizon that consists of a disintegrated hardpan.

GEOGRAPHIC SETTING: Coolidge soils are on fan terraces, stream terraces or relict basin floors and have slopes of 0 to 5 percent. Elevation ranges from 300 to 1,900 feet. These soils formed in stratified stream or fan alluvium from mixed sources. The climate is hot arid continental. The mean annual precipitation is 3 to 10 inches. Mean annual air temperature ranges from 68 to 74 degrees F. The frost-free period is 240 to 325 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Antho, Denure, Mohall and competing Rillito soils. Antho soils do not have calcic horizons. Denure soils have cambic horizons. Mohall soils are fine-loamy and have argillic horizons.

DRAINAGE AND PERMEABILITY: Well drained; very low to medium runoff; moderately rapid permeability.

USE AND VEGETATION: These soils are used for livestock grazing, wildlife habitat and irrigated cropland. Present vegetation is cacti, creosotebush, mesquite, triangleleaf bursage, annual weeds and grasses.

DISTRIBUTION AND EXTENT: Southern Arizona. The series is extensive. Total extent is about 102,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Pinal County, Arizona; Casa Grande Area soil survey; 1936.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 13 inches (Ap horizon)

Calcic horizon - the zone from 13 to 60 inches (Bk1, Bk2, Bk3 horizons)

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 12/2008, WWJ.

National Cooperative Soil Survey
U.S.A.

LOCATION DENURE AZ

Established Series
Rev. WWJ/JDP
04/2009

DENURE SERIES

The Denure series consists of very deep, somewhat excessively drained soils formed in fan or stream alluvium. Denure soils are on relict basin floors, stream terraces or fan terraces and have slopes of 0 to 8 percent. The mean annual precipitation is about 6 inches and the mean annual air temperature is about 70 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

TYPICAL PEDON: Denure gravelly sandy loam - rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 1 inch; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common fine irregular pores; 30 percent gravel; noneffervescent; slightly alkaline (pH 7.6), abrupt smooth boundary. (1 to 4 inches thick)

Bw--1 to 12 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 20 percent gravel; noneffervescent; slightly alkaline (pH 7.6); clear wavy boundary. (9 to 14 inches thick)

Bk--12 to 30 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores, a few thin patchy calcium carbonate coats on sand grains and in pores; 25 percent gravel; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. (1 to 19 inches thick)

C--30 to 60 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable; nonsticky and nonplastic; few very fine irregular pores; 20 percent gravel; strongly effervescent; moderately alkaline.

TYPE LOCATION: Maricopa County, Arizona; 750 feet south and 1350 feet east of the northwest corner of section 33, T. 5 N., R. 2 W. Latitude of 33 degrees, 44 minutes, 11 seconds N, Longitude of 112 degrees, 28 minutes, 38 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July September and December - February. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature - 72 degrees F. or more at a depth of 20 inches

Rock fragments - 5 to 35 percent (weighted average for the particle-size control section). Some undisturbed areas have a weak desert pavement.

Calcium carbonate - Noneffervescent or slightly effervescent in the A and B horizons; slightly to violently effervescent in the lower B and C horizons. Calcium carbonate is disseminated and occurs as soft masses or coatings on gravel in the Bk horizon. Typically the calcium carbonate equivalent is less than 5 percent, however, when greater than 5 percent occurs the horizon is either to thin or to deep to be diagnostic in the classification of the profile.

Reaction - Neutral through moderately alkaline

Sodium adsorption ratio - Usually less than 4, but ranges to 13 in some pedons

Electrical conductivity (dS/m) - Usually less than 4, but ranges up to 50 in some pedons

A horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 4 or 5 moist
Chroma: 3, 4 or 6, dry or moist
Organic matter content: less than 1 percent

Bw horizon
Hue: 10YR, 7.5YR
Value: 4, 5 or 6 dry, 4 or 5 moist
Chroma: 3, 4 or 6, dry or moist
Texture: coarse sandy loam, sandy loam, fine sandy loam; can have some minor strata of coarser or finer textures
Rock fragments: 5 to 75 percent gravel in any one subhorizon
Structure: weak or moderate subangular blocky; massive in a few pedons

C horizon
Hue: 7.5YR, 10YR
Value: 4, 5, 6 or 7 dry, 4, 5 or 6 moist
Chroma: 3, 4 or 6, dry or moist
Texture: sandy loam, coarse sandy loam; can have some minor strata of finer or coarser textures
Rock fragments: 5 to 75 percent gravel in any one subhorizon

A buried Bt horizon is present in some areas at depths greater than 40 inches

COMPETING SERIES: These are the Dateland (AZ), and Pahaka (AZ) series. Dateland soils are dominantly medium textured (loam and very fine sandy loam) in the control section. Pahaka soils have a buried argillic horizon at depths of 20 to 40 inches.

GEOGRAPHIC SETTING: Denure soils are on stream terraces, fan terraces or relict basin floors. Slopes are dominantly less than 3 percent but range up to 8 percent. These soils formed in stratified stream or fan alluvium from acid and basic igneous rock and eolian deposits. Elevation is 500 to 2200 feet. The climate is hot, arid continental. The mean annual precipitation is 2 to 10 inches occurring as gentle winter rains and erratic high intensity summer thunderstorms. The mean annual air temperature is 68 to 74 degrees F. The frost-free period is 240 to 325 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Dateland and the Antho, Gilman, and Momoli soils. Antho and Gilman soils do not have cambic horizons. Momoli soils are loamy-skeletal.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; runoff is medium on the gentle slopes and very low and low on nearly level slopes; moderately rapid permeability.

USE AND VEGETATION: Most areas are used for livestock grazing and wildlife habitat. Some areas are now being irrigated and used to grow citrus, cotton, alfalfa, and small grains. Vegetation is creosotebush, white bursage, annual forbs and grasses.

DISTRIBUTION AND EXTENT: Southern Arizona. The series is extensive. Total extent is about 392,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Maricopa County, Arizona; Soil survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties; 1982.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 1 inch (A horizon)

Cambic horizon - the zone from 1 to 12 inches (Bw horizon)

The type location was moved from the Gila BendAjo Area to the present location in the Aguila-Carefree Area in 1983. The present type location better typifies the concept of the series and the distinction between it and the competing Dateland series.

The name is from the old DeNure Ranch near Gila Bend.

Classified according Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 12/2008, WWJ

National Cooperative Soil Survey
U.S.A.

LOCATION GILMAN AZ

Established Series
Rev. MSJ/YHH
04/2009

GILMAN SERIES

The Gilman series consists of very deep, well drained soils that formed in stratified stream alluvium. Gilman soils are on flood plains and alluvial fans and have slopes of 0 to 3 percent. The mean annual precipitation is about 7 inches and the mean annual air temperature is about 71 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, calcareous, hyperthermic Typic Torrifluvents

TYPICAL PEDON: Gilman loam - cultivated. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 13 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and medium roots; few fine tubular and common fine irregular pores; common fine and very fine mica flakes; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. (6 to 18 inches thick)

C1--13 to 28 inches; pale brown (10YR 6/3) stratified very fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; common fine and few medium roots; few fine tubular and common fine irregular pores; common to many fine and very fine mica flakes; few fine gravel; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. (8 to 40 inches)

C2--28 to 60 inches; brown (10YR 5/3) stratified very fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and slightly plastic; few fine roots; few fine tubular and common fine and very fine irregular pores; common fine and very fine mica flakes; few fine gravel; strongly effervescent; moderately alkaline (pH 8.2).

TYPE LOCATION: Maricopa County, Arizona; 2,500 feet south and 1,270 feet east of the northwest corner of section 10, T. 2 S., R. 7 E. Latitude of 33 degrees, 16 minutes, 14 seconds N., Longitude of 111 degrees, 37 minutes, 50 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July-September and December-February. Driest during May and June. Typic aridic soil moisture regime.

Rock fragments - Less than 35 percent gravel

Reaction - Neutral to very strongly alkaline

Salinity- Nonsaline to strongly saline

SAR- Usually is less than 4, but ranges up to 15 in some pedons

A horizon
Hue: 10YR, 7.5YR
Value: 4 through 7 dry, 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry, 2, 3, 4 or 5 moist
Texture: loamy sand to clay
Organic matter: less than 1 percent; decreases irregularly with depth
Calcium Carbonate: noneffervescent to strongly effervescent

C horizon
Hue: 10YR, 7.5YR
Value: 3, 4, 5, 6 or 7 dry, 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry, 2 through 6 moist
Texture: loam, very fine sandy loam, silt loam; some have minor strata of finer or coarser textures.
Calcium Carbonate: slightly to violently effervescent; disseminated or mycelia-like filaments.
Buried horizons: buried argillic horizons occur below 40 inches in some pedons

COMPETING SERIES: These are the Antho (AZ) and Maripo (AZ) series. Antho soils have moderately coarse textured (sandy loam and fine sandy loam) C horizons. Maripo soils are underlain by sand at 20 to 40 inches.

GEOGRAPHIC SETTING: The Gilman soils are on flood plains and alluvial fans and have slopes of 0 to 3 percent. Elevations are 75 to 2500 feet. The soil formed in stratified stream alluvium from mixed sources. The mean annual precipitation is 2 to 10 inches. Mean annual air temperature is 70 to 76 degrees F. Frost-free period is about 240 to 350 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Antho soils and the similar Carrizo, Glenbar, Mohall, Pimer and Vint soils. Carrizo soils are skeletal. Glenbar soils are fine-silty. Mohall soils have argillic horizons. Pimer soils are fine-silty and have more than 1 percent organic matter. Vint soils are sandy.

DRAINAGE AND PERMEABILITY: Well drained; slow runoff; moderate permeability.

USE AND VEGETATION: Used for livestock grazing and irrigated cropland. Under cultivation, Gilman soils are used for growing alfalfa, cotton, grains, sugar beets and truck crops such as melons, lettuce, onion, carrots, broccoli and potatoes. Native vegetation is mesquite, catclaw, creosotebush, arrowweed and saltbush. Cottonwoods, willows and salt cedar grow in open areas.

DISTRIBUTION AND EXTENT: Southern Arizona. Gilman soils are extensive. Total extent is about 409,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Gila River Project, Soil Conservation Service, Arizona; 1936.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Entisol feature - the absence of diagnostic subsurface horizons

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 01/2009, WWJ

National Cooperative Soil Survey
U.S.A.

LOCATION GUNSIGHT AZ

Established Series
Rev. EGC/MSJ/YHH
04/2009

GUNSIGHT SERIES

The Gunsight series consists of very deep, somewhat excessively drained, strongly calcareous soils that formed in alluvium from mixed sources. Gunsight soils are on fan terraces or stream terraces and have slopes of 0 to 60 percent. The mean annual precipitation is about 7 inches. Mean annual air temperature is about 71 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

TYPICAL PEDON: Gunsight very gravelly loam - rangeland. (Colors are for dry soil unless otherwise noted.) 50 to 60 percent of surface is covered with gravel.

A--0 to 2 inches; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; many very fine and fine irregular pores; 50 percent gravel; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. (2 to 4 inches thick)

Bw--2 to 10 inches; pink (7.5YR 7/4) very gravelly loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and medium roots; common very fine irregular pores; 50 percent gravel; violently effervescent; few fine calcium carbonate filaments; moderately alkaline (pH 8.3); clear wavy boundary. (8 to 16 inches thick)

Bk1--10 to 18 inches; white (N 8/) and pinkish gray (7.5YR 7/2) extremely gravelly loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common very fine irregular pores; 70 percent calcium carbonate coated gravel; violently effervescent; many large calcium carbonate masses; strongly alkaline (pH 8.5); gradual wavy boundary. (6 to 10 inches thick)

Bk2--18 to 32 inches; pinkish white (7.5YR 8/2), pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) extremely gravelly sandy loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and moderately plastic; few very fine roots; common very fine irregular pores; 75 percent calcium carbonate coated gravel; violently effervescent; many large calcium carbonate masses; moderately alkaline (pH 8.3); gradual wavy boundary. (12 to 20 inches thick)

Bk3--32 to 60 inches; pinkish white (7.5YR 8/2), pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) very gravelly loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and moderately plastic; common very fine irregular pores; 40 percent calcium carbonate coated gravel; violently effervescent; many large calcium carbonate masses; moderately alkaline (pH 8.3).

TYPE LOCATION: Pima County, Arizona; Organ Pipe Cactus National Monument Area; 2,640 feet south and 1,400 feet east of the northwest corner of section 1, T. 18 S., R. 5 W. Latitude of 31 degrees, 53 minutes, 17 seconds N., Longitude of 112 degrees, 44 minutes, 21 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July-September and December-February. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature - 72 to 78 degrees F.

Depth to calcic horizon - 3 to 20 inches

Calcium Carbonate - More than 15 percent calcium carbonate equivalent in the calcic horizon. Occurs as small to large masses or nodules; weakly to strongly cemented in some pedons.

Rock fragments - Averages more than 35 percent in the control section. Some subhorizons have as much as 80 percent. Predominantly 1/2 to 3 inches in diameter. Some areas have a desert pavement with a moderate patina.

Reaction - Moderately or strongly alkaline

Sodicity- Nonsodic to strongly sodic

Texture- Fine sandy loam, sandy loam, loam in the particle-size control section. A few thin strata of less gravelly material occur in some pedons. Averages less than 18 percent clay.

A horizon
Hue: 7.5YR, 10YR
Value: 6, 7 or 8 dry, 4 or 5 moist
Chroma: 2 through 6, dry or moist

Bw horizon
Hue: 7.5YR, 10YR
Value: 5, 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4, dry or moist

Bk horizon
Hue: 7.5YR, 10YR
Value: 5 through 8 dry, 4 through 8 moist
Chroma: 2 through 4, dry or moist

COMPETING SERIES: These are the Chemehuevi (CA), Heleweiser (NV), Oldswede (T)(CA), and Supplymine (T)(CA) series. Chemehuevi soils have less than 15 percent calcium carbonate equivalent in the upper part of the calcic horizon and have secondary accumulations of silica and gypsum in the lower part of the calcic horizon. Heleweiser soils have gypsum in the lower part of the profile. Oldswede and Supplymine do not have OSDs and cannot be competed.

GEOGRAPHIC SETTING: Gunsight soils are on stream terraces or fan terraces. They formed in stratified alluvium from mixed sources. Slopes are dominantly 1 to 25 percent, but range from 0 to 60 percent. Elevations are 400 to 2600 feet. The climate is hot, arid and continental. Mean annual precipitation is 2 to 10 inches occurring as summer thunderstorms and gentle winter rains. Mean annual air temperature is 68 to 76 degrees F. The frost-free period is about 240 to 350 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Chuckawalla, Cipriano, Ebon, Harqua, Tremant and the similar Rillito soils. Chuckawalla, Ebon, Harqua and Tremant soils have argillic horizons. Cipriano soils have a duripan. Rillito soils have 15 to 35 percent gravel.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; very low to high runoff; moderate or moderately rapid permeability.

USE AND VEGETATION: Used for livestock grazing and recreation. The vegetation is creosotebush, ocotillo, paloverde, saguaro, cholla, and triangle bursage.

DISTRIBUTION AND EXTENT: Southwest and south central Arizona. The series is extensive. Total extent is about 585,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Pima County, Arizona; Soil Survey of Organ Pipe Cactus-Cabeza Prieta Area, Arizona, Parts of Pima and Yuma Counties, 1971.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 2 inches (A horizon)

Calcic horizon - the zone from 10 to 40 inches (Bk1, Bk2, Bk3 horizons)

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 2/2009, WWJ

National Cooperative Soil Survey
U.S.A.

LOCATION HUEVI NV AZ

Established Series
Rev. DJM/LJL/RLB/ET
05/2006

HUEVI SERIES

The Huevi series consist of very deep, well drained soils that formed in mixed gravelly alluvium. The Huevi series are on fan remnants, ballenas and fan terraces. Slope ranges from 1 to 70 percent. The mean annual precipitation is about 5 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, hyperthermic Durinodic Haplocalcids

TYPICAL PEDON: Huevi extremely gravelly sandy loam, rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.) The soil surface is covered by approximately 60 percent pebbles and 15 percent cobbles.

A--0 to 5 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 60 percent pebbles and 15 percent cobbles; strongly effervescent; strongly alkaline (pH 8.5); clear smooth boundary. (2 to 6 inches thick)

Bkq--5 to 18 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine interstitial and few fine tubular pores; common medium calcium carbonate and silica coats on the bottom of rock fragments; common medium calcium carbonate occurring as concretions and soft masses; 50 percent pebbles and 5 percent cobbles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary. (6 to 15 inches thick)

2Bqk--18 to 60 inches; very pale brown (10YR 7/3) extremely cobbly coarse sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine through medium roots; common fine interstitial pores; 40 percent discontinuously weakly silica and calcium carbonate cemented with common medium strongly silica and calcium carbonate cemented masses occurring as lenses and concretions that are brittle when moist; common coarse silica and calcium carbonate coats and pendants on the bottom of rock fragments; 35 percent pebbles and 40 percent cobbles; violently effervescent; moderately alkaline (pH 8.4).

TYPE LOCATION: Clark County, Nevada; located in Cottonwood Valley, Lake Mead National Recreation Area; approximately 1.3 miles southeast of the Nine Mile Basin road turn off, along the powerline road; about 2,480 feet north and 2,330 feet west of the southeast corner of section 36, T. 29 S., R. 65 E.; USGS Spirit Mountain NW, NV 7.5 minute topographic quadrangle; 35 degrees, 22 minutes, and 35 seconds north latitude, 114 degrees, 40 minutes, and 55 seconds west longitude; UTM 11s, 710573e, 3917251n; NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Usually dry, moist in some part during winter and spring and intermittingly moist in the upper part following summer convection storms; typic aridic soil moisture regime.

Soil temperature - 72 to 78 degrees F.

Depth to calcic horizon - 2 to 6 inches.

Depth to duric feature - 8 to 21 inches.

Control section - Clay content: 8 to 18 percent.

Rock fragments: 35 to 80 percent gravel and cobbles.

Calcium carbonate equivalent in the less than 20 millimeter fraction: 15 to 35 percent.

A horizon - Hue: 10YR or 7.5YR

Value: 5 to 7 dry, 4 or 5 moist.

Chroma: 2 to 6 dry, 3 or 4 moist

Bkq horizon - Hue: 10YR or 7.5YR

Value: 6 or 7 dry, 4 to 6 moist.

Chroma: 2 to 6 dry, 3 or 4 moist

Texture: Sandy loam, fine sandy loam, loam.

Consistence: Soft or slightly hard, very friable or friable.

Structure: Massive or subangular blocky.

2Bqk horizon - Hue: 10YR or 7.5YR

Value: 6 to 8 dry, 4 to 6 moist.

Chroma: 2 to 6 dry or moist

Texture: Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam.

Consistence: Slightly hard through hard, friable or firm.

Structure: Massive or platy.

Cementation: Discontinuously weakly cemented silica and calcium carbonate, with 20 to 50 percent strong silica and calcium carbonate cementation occurring as concretions, durinodes, or lenses within the matrix. These are hard or very hard when dry, very firm when moist, brittle, and does not slake in dilute hydrochloric acid.

COMPETING SERIES: There are no competing series.

GEOGRAPHIC SETTING: Huevi soils are on fan remnants, ballenas and fan terraces. These soils formed in mixed gravelly alluvium. Slope ranges from 1 to 70 percent. The elevations are 480 to 3,000 feet. The climate is low-latitude desert, with mild winters and very hot summers. Precipitation is greatest in the winter with a lesser secondary peak in summer, typical of the Mojave Desert.. The mean annual precipitation is 3 to 7 inches; the mean annual air temperature is 70 to 78 degrees F., and the frost free season is 240 to 365 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Carrizo, Cipriano, and Riverbend series. Carrizo soils lack a calcic horizon and have a sandy-skeletal particle-size control section. Cipriano soils have a duripan at depths of less than 20 inches. Riverbend soils have a sandy-skeletal particle-size control section and lack a silica cemented horizon.

DRAINAGE AND PERMEABILITY: Well drained; low through high runoff; moderate or moderately rapid permeability.

USE AND VEGETATION: These soils are used for rangeland and wildlife habitat. The present vegetation is mainly creosote bush, range ratany, and various annuals.

DISTRIBUTION AND EXTENT: Mojave Desert of southern Nevada and northwestern Arizona; MLRA 30. These soils are extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Mohave County, Arizona; Soil survey of the Shivwits Area, Arizona, Part of Mohave County; 1994.

REMARKS: Classified according to Keys to Soil Taxonomy Ninth Edition, 2003.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - 0 to 5 inches (A horizon)

Calcic horizon - 5 to 18 inches (Bkq horizon)

Duric feature - 18 to 60 inches (2Bqk horizon)

Particle-size control section - 10 to 40 inches (Bkq and 2Bqk horizons)

National Cooperative Soil Survey
U.S.A.

LOCATION LAGUNITA AZ

Established Series
Rev. RLB/HEJ/PDC/RKS/HCD
10/2006

LAGUNITA SERIES

The Lagunita series consists of very deep, excessively drained soils that formed in stratified stream alluvium from mixed sources. Lagunita soils are on flood plains and generally have slopes of 0 to 3 percent, but range to 5 percent. The mean annual precipitation is about 4 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Mixed, hyperthermic Typic Torripsamments

TYPICAL PEDON: Lagunita loamy sand - desert. (Colors are for dry soil unless otherwise noted.)

A--0 to 8 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; single grain; loose, dry and moist; many very fine roots; many very fine irregular pores; few very fine black sandy biotite flakes in thin strata; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. (4 to 12 inches thick)

C1--8 to 30 inches; pale brown (10YR 6/3) weakly stratified loamy sand, brown (10YR 4/3) moist; single grain; loose, dry and moist; many very fine and fine roots; many very fine irregular pores; many very fine black sandy biotite flakes in thin strata; slightly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. (15 to 25 inches thick)

C2--30 to 60 inches; pale brown (10YR 6/3) weakly stratified loamy sand, brown (10YR 4/3) moist; single grain; loose dry and moist; many very fine roots; many very fine irregular pores; many very fine black sandy biotite flakes in thin strata; slightly effervescent; moderately alkaline (pH 8.2).

TYPE LOCATION: Yuma County, Arizona; 1,000 feet south and 2,200 feet east of the southeast corner of section 24, R. 17 W., R. 8 S.

RANGE IN CHARACTERISTICS:

Soil moisture - Usually dry, intermittently moist in some part of the soil moisture control section during July - September and December - February. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature - 72 to 77 degrees F.

Rock fragments - Mainly less than 15 percent gravel by volume.

Organic matter content - Less than 1 percent decreasing irregularly with depth.

Calcium carbonate - Noneffervescent to violently effervescent. Calcium carbonate is disseminated; less than 5 percent calcium carbonate equivalent.

Salinity- Slightly to strongly saline

Reaction - Slightly or moderately alkaline

A horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 3, 4 or 5 moist
Chroma: 3 or 4, dry or moist

C horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 5 dry, 3 or 4 moist
Texture: Stratified loamy sand, sand, coarse sand, and loamy coarse sand

COMPETING SERIES: These are the Carsitas (CA), Myoma (CA), Pintobasin (T)(CA), and Rositas (CA) series. Carsitas soils average 15 to 35 percent coarse fragments in the control section. Myoma soils have hue of 10YR or yellower and are not subject to flooding. Pintobasin soils average more than 15 percent rock fragments, dominantly gravel, in the control section and are slightly acid to neutral throughout. Rositas soils have less than 15 percent coarse and very coarse sand and are on sand dunes.

GEOGRAPHIC SETTING: Lagunita soils are on flood plains and generally have slopes of 0 to 3 percent, but range to include 5 percent. They formed in stratified stream alluvium from mixed sources. Elevations are 75 to 1,400 feet. The climate is hot, arid and continental. Mean annual precipitation is 2 to 10 inches, which occurs as summer thunderstorms and as gentle winter rains. Mean annual air temperature ranges 69 to 76 degrees F. Frost-free period is about 240 to 325 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are Glenbar, Indio and Ripley soils. Glenbar soils have a fine-silty control section. Indio soils have a coarse-silty control section. Ripley soils have a coarse-silty over sandy control section.

DRAINAGE AND PERMEABILITY: Excessively drained; low runoff; rapid permeability.

USE AND VEGETATION: Used mainly for livestock grazing and wildlife habitat, but citrus, alfalfa and small grains are grown under irrigation in some areas. The vegetation is mainly fourwing saltbush, mesquite, creosotebush, globe mallow and sand verbena.

DISTRIBUTION AND EXTENT: Southern Arizona. The soils are moderately extensive. MLRA is 31 and 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Yuma County (Yuma-Wellton Area), Arizona; 1978.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

This soil does not have stratification with soil material finer than loamy sand.

Classified according to Keys to Soil Taxonomy, Ninth Edition, 2003.

National Cooperative Soil Survey
U.S.A.

LOCATION ROSITAS CA AZ NV

Established Series
Rev. RPZ/LAB/PDC/ET
03/2006

ROSITAS SERIES

The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy eolian material. Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent with hummocky or dune micro relief. Mean annual precipitation is about 4 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Mixed, hyperthermic Typic Torripsamments

TYPICAL PEDON: Rositas fine sand - rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.)

C1--0 to 9 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; single grained; loose, nonsticky and nonplastic; common fine and medium roots; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. (4 to 10 inches thick)

C2--9 to 60 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; single grained; loose, nonsticky and nonplastic; few fine roots; strongly effervescent; moderately alkaline (pH 8.0).

TYPE LOCATION: Imperial County, California; about 17 miles east of Holtville; about 4,000 feet west, 300 feet south of the main entrance to Imperial Irrigation District, Experiment Farm No. 2; NW 1/4 of section 5, T.17 S., R.19 E.

RANGE IN CHARACTERISTICS:

Soil moisture: The soil is usually dry and is not moist for as long as 60 consecutive days. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature: 72 to 80 degrees F.

Organic matter: less than 0.5 percent and decreases regularly with depth

Control section Rock fragments: 0 to 5 percent fine gravel.

Clay content: 0 to 10 percent.

Effervescence: Slightly effervescent to strongly effervescent.

C1 horizon - Hue: 10YR, 7.5YR, 5YR

Value: 5 through 7, dry or moist

Chroma: 2 through 7, dry or moist

Rock fragments: 0 to 35 percent.

Other features: Some pedons are noneffervescent.

C2 horizon(s) - Hue: 10YR, 7.5YR, 5YR

Value: 5 through 7, dry or moist

Chroma: 2 through 7, dry or moist

Texture: Sand, loamy sand, fine sand, loamy fine sand. The 10 to 40 inch control section has less than 15 percent coarse and very coarse sand.

Salinity: 0 to 8 decisiemens/meter

Sodium adsorption ratio: 0 to 90

Reaction: Neutral to very strongly alkaline

Other features: Some pedons have few soft masses of calciumcarbonate.

COMPETING SERIES: These are the Carsitas (CA), Lagunita (AZ), Myoma (CA), and Pintobasin (CA) series. Carsitas soils have more than 15 percent rock fragments and are stratified. Lagunita soils are stratified, have an irregular decrease in organic carbon and are subject to flooding. Myoma soils have hue of 2.5Y or yellower throughout. Pintobasin soils are noneffervescent or very slightly effervescent in the particle-size control section and formed from mixed alluvium.

GEOGRAPHIC SETTING: Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent. These soils formed in sandy eolian material. Elevations are 270 feet below sea level to 2000 feet. The climate is low-latitude desert, with mild winters and very hot summers. Precipitation is greatest in the winter with lesser secondary peak in the summer. The mean annual precipitation is 0 to 8 inches. The mean January temperature is about 53 degrees F., mean July temperature is 92 degrees F., and the mean annual air temperature is 70 to 77 degrees F. The frost-free period is about 250 to 365 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Aco, Holtville, Imperial, Meloland, Niland, and Vint series. Aco soils are sandy loam in the control section. Holtville soils are clayey in the upper part of the control section. Imperial soils are fine textured throughout the control section. Meloland soils are sandy loam in the upper part and fine in the lower part of the control section. Niland soils are fine textured in the lower part of the control section. Vint soils have an irregular decrease in organic carbon.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; negligible to low runoff; rapid permeability.

USE AND VEGETATION: Rositas soils are used for rangeland and wildlife habitat, and growing citrus fruits, grapes, alfalfa, and truck crops. Present vegetation is creosotebush, white bursage, desert buckwheat and mesquite.

DISTRIBUTION AND EXTENT: Southern California, southwestern Arizona and southern Nevada. Rositas soils are extensive in MLRAs 30 and 31 and are mapped in MLRA 40 within the Sonoran Desert.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Imperial County (El Centro Area), California; 1918.

Remarks: Diagnostic horizons and features recognized in this pedon are:

Entisol feature - The absence of diagnostic subsurface horizons

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National Cooperative Soil Survey
U.S.A.

LOCATION CALVISTA CA

Established Series
Rev. GAW/LCL/JJJ
01/2003

CALVISTA SERIES

The Calvista series consists of shallow, well drained soils that formed in material from granitic rock that has seams of calcite. Calvista soils are on mountains ridges on slopes of 2 to 30 percent slopes. The mean annual precipitation is about 6 inches and the mean annual air temperature is about 65 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, thermic Lithic Haplocalcids

TYPICAL PEDON: Calvista sandy loam - native desert vegetation. (Colors are for dry soil unless otherwise noted)

A1--0 to 3 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common very fine roots; many very fine interstitial, common very fine tubular pores; noncalcareous; moderately alkaline (pH 8.0); abrupt smooth boundary. (3 to 4 inches thick)

A2--3 to 7 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky, nonplastic; common very fine roots; many very fine interstitial, common very fine tubular pores; noncalcareous; moderately alkaline (pH 8.0); clear smooth boundary. (4 to 5 inches thick)

Bk--7 to 16 inches; light yellowish brown (10YR 6/4) heavy sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine, few very fine roots; many very fine interstitial, common very fine and fine tubular pores; spots of lime in soft masses; disseminated lime, slightly effervescent; moderately alkaline (pH 8.4); clear smooth boundary. (7 to 11 inches thick)

R--16 to 17 inches; hard (slightly weathered upper 1/2 inch) granitic rock that has seams of calcite. Some places in the weathered rock and fracture joints there are a few moderately thick, reddish brown clay films in pores and as bridges.

TYPE LOCATION: Los Angeles County, California; 200 feet west and 790 feet north of the SE corner of sec. 24, SE 1/4 SE 1/4, T. 7 N., R. 8 W., near San Bernardino County Line.

RANGE IN CHARACTERISTICS: Hard rock occurs at a depth of 14 to 20 inches. Gravel and coarser rock fragments are present, but do not exceed 35 percent by volume in the soil mantle. The mean soil temperature is about 65 degrees F. The soils are usually dry throughout the year and are moist for less than 60 days in the winter and spring of most years. All horizons are weakly expressed; there is little difference between horizons labeled A1, AC or C. They are brown, yellowish brown, pale brown, and light yellowish brown in 10YR hue (5/3, 5/4, 6/3, 6/4). The lower part of the profile tends to have chroma of 4. Textures are sandy loam or coarse sandy loam. Structure is weak or the soils are massive. The upper horizons are noncalcareous and mildly alkaline to moderately alkaline. All pedons are calcareous below 10 inches. The amount of lime ranges widely. Some segregations are present, but amounts of calcium carbonate are less than 15 percent.

COMPETING SERIES: These are the Cieneba, Courthouse, Gaviota, Hi Vista, Tidwell, and Tollhouse series. Courthouse soils have 5YR to 10R hue. Cieneba soils are shallow but lack hard rock. Gaviota soils are continuously moist for more than 90 days in the winter and spring. Hi Vista soils have B2t horizons. Tidwell soils are calcareous in the upper part and lack secondary lime segregations in the lower part of the profile. Tollhouse soils have mollic epipedons and a mean soil temperature below 59 degrees F.

GEOGRAPHIC SETTING: Calvista soils are on gentle to steep slopes on low mountains, ridges, buttes, and domes in the deserts of southern California at elevations of 1,000 to 4,000 feet. The soils formed in residuum from granite and other closely related rocks. Rock outcrops may be present. The climate is arid. Precipitation is about 4 to 8 inches. There are very infrequent summer thunder showers and gentler rains of longer duration in winter. The mean temperature is about 62 to 67 degrees F, the average July temperature is about 80 to 84 degrees F, the average January temperature is about 45 to 48 degrees F. Frost-free season is 210 to 240 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Adelanto, Arizo, Cajon soils and the competing Hi Vista soils. Adelanto, Arizo, and Cajon soils are deep alluvial soils and lack a lithic contact.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; moderately rapid permeability.

USE AND VEGETATION: Used mainly for desert range; small areas used for homesites. Native vegetation is creosotebush, Mormon tea, very small amounts of perennial grasses, and annual grasses and forbs.

DISTRIBUTION AND EXTENT: Desert mountains of Southern California in MLRA 30 and possibly adjacent portions of Arizona and Nevada. The series is not extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Los Angeles County, California, 1971.

REMARKS: The Calvista soils were formerly classified as Lithosols. Series reclassified on September, 1994. The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET

Last revised by the state on 7/72.

National Cooperative Soil Survey
U.S.A.

LOCATION CARRIZO CA+AZ NV

Established Series
Rev. LJL/PBF/CAH/ET
05/2012

CARRIZO SERIES

The Carrizo series consists of very deep, excessively drained soils formed in mixed igneous alluvium. Carrizo soils are on numerous landforms on flood plains, fan piedmonts and bolson floors. Slopes range from 0 to 15 percent. The mean annual precipitation is about 100 millimeters (4 inches) and the mean annual air temperature is about 21.5 degrees C (71 degrees F).

TAXONOMIC CLASS: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents

TYPICAL PEDON: Carrizo extremely gravelly sand, rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.) The soil surface is covered by approximately 70 percent gravel, 6 percent cobbles and 4 percent stones.

A -- 0 to 5 centimeters (0 to 2 inches); pale brown (10YR 6/3) extremely gravelly sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine interstitial pores; 55 percent gravel, 6 percent cobbles and 4 percent stones; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. (2.5 to 10 centimeters thick)

C -- 5 to 152 centimeters (2 to 60 inches); pale brown (10YR 6/3) stratified extremely gravelly and very gravelly coarse sand, brown (10YR 4/3) moist; massive to single grain; soft, slightly hard, or loose, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and few fine and medium interstitial pores; averages 55 percent gravel, 10 percent cobbles and 5 percent stones; very slightly effervescent and slightly effervescent; moderately alkaline (pH 8.4) and slightly alkaline (pH 7.8).

TYPE LOCATION: San Bernardino County, California; approximately 18.5 kilometers (11.5 miles) southwest of Amboy; about 610 meters (2,000 feet) south and 305 meters (1,000 feet) west of the NE corner of section 18, T. 4 N., R. 11 E., San Bernardino Base and Meridian; USGS Lead Mountain Northeast, CA 7.5 minute topographic quadrangle; 34 degrees, 26 minutes, 11.1 seconds north latitude and 115 degrees, 51 minutes, 47.8 seconds west longitude; UTM 11S, 0604440e 3810938n (DTM: NAD83).

RANGE IN CHARACTERISTICS:

Soil moisture control section: usually dry, moist in some parts for short periods during winter and early spring and for 10 to 20 days cumulative between July and September following convection storms. The soils have a typic-aridic soil moisture regime.

Soil temperature: 22 to 25 degrees C (72 to 77 degrees F).
Surface rock fragments: 25 to 100 percent, with 25 to 95 percent gravel, 0 to 40 percent cobbles, 0 to 25 percent stones and 0 to 2 percent boulders.

Control section
Rock fragments: averages 35 to 80 percent, gravel, cobbles and stones.
Clay content: averages 0 to 8 percent.
Effervescence: noneffervescent through violently effervescent.
Reaction: slightly acid through strongly alkaline.

A horizon

Hue: 7.5YR, 10YR or 2.5Y.
Value: 4 to 7 dry, 2 to 6 moist.
Chroma: 2 to 6 dry, 2 to 4 moist.
Clay content: 1 to 10 percent.
Texture of the fine earth: sand, loamy sand, sandy loam or fine sandy loam.
Rock fragments: 5 to 65 percent, with 5 to 65 percent gravel, 0 to 25 percent cobbles and 0 to 5 percent stones.
Effervescence: noneffervescent through violently effervescent.
Reaction: slightly acid through strongly alkaline.

C horizons

Hue: 7.5YR, 10YR or 2.5Y.
Value: 4 to 7 dry, 2 to 6 moist.
Chroma: 2 to 6 dry, 2 to 4 moist.
Clay content: averages 0 to 8 percent, ranges from 0 to 12 percent.
Texture of the fine earth: coarse sand, sand, loamy coarse sand or loamy sand. Some pedons have thin strata of fine sand, loamy fine sand or sandy loam.
Rock fragments: 10 to 85 percent, with 10 to 80 percent gravel with more than 50 percent as medium or coarse-sized, 0 to 25
percent cobbles and 0 to 10 percent stones.
Effervescence: noneffervescent through violently effervescent.
Reaction: slightly acid through strongly alkaline.
Silica: 0 to 25 percent as films on rock fragments.

COMPETING SERIES: These are the Carrwash (NV), Chemwash (CA), Goldenhills (CA) and Rizzo (CA) series. Carrwash and Chemwash soils are dominated by 2 to 5 millimeter (fine) gravel. Chemwash and Rizzo soils have mean annual soil temperatures that average greater than 25 degrees C, do not receive appreciable summer precipitation, and are generally dry throughout the moisture control section for most of the year. Goldenhills soils are formed in colluvium and residuum, have a surface C horizon with more than 80 percent rock cover, and are deep to a lithic contact.

GEOGRAPHIC SETTING: Carrizo soils are on numerous landforms on flood plains, fan piedmonts and bolson floors. Slopes range from 0 to 15 percent. The soils formed in mixed igneous alluvium. Elevations are -82 to 793 meters (-270 to 2,600 feet). The climate is arid with hot, dry summers and warm, moist winters. Precipitation is greatest in the winter with a lesser secondary peak in the summer. The mean annual precipitation is 75 to 125 millimeters (3 to 5 inches); mean January temperature is 12 degrees C (53 degrees F); mean July temperature is 35 degrees C (95 degrees F); mean annual air temperature is 20 to 23 degrees C (68 to 73.5 degrees F), and the frost-free season is 300 to 340 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bristolake, Clegorpass, Heleweiser, Pintobasin, and Riverbend soils. Bristolake soils are on nearby fan skirts and lower fan aprons, have a sandy particle size control section and are slightly saline with an SAR of 5 to 13 in the control section. Clegorpass and Heleweiser soils are on nearby fan remnants and have loamy-skeletal particle size control sections. In addition, Clegorpass soils have an argillic horizon and Heleweiser soils have a calcic horizon. Pintobasin soils are on similar landscape positions and are sandy throughout the particle size control section. Riverbend soils are on more stable landforms and have a calcic horizon.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Excessively drained; negligible to low runoff; high saturated hydraulic conductivity.

USE AND VEGETATION: These soils are used for rangeland, recreation and wildlife habitat. Present vegetation is creosote bush, burrobush, burrobrush and range ratany.

DISTRIBUTION AND EXTENT: Mojave Desert of southeastern California, western Arizona, and southern Nevada; MLRA 30. These soils are extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California.

SERIES ESTABLISHED: Imperial County (El Centro Area), California; 1918.

REMARKS: The type location was relocated in 2006 to the Marine Corps Air Ground Combat Center, Twentynine Palms, California to better represent the series concept. The series has been overused throughout the Southwestern deserts including areas with precipitation ranging from 2 to 12 inches. Soils with extreme aridic moisture regimes should consider using the Rizzo series proposed for use in the Lower Colorado Desert (MLRA 31) with a moisture control section that is typically dry throughout for most of the year. New series should be proposed for the high precipitation zones. Use in MLRA 40 should also be reevaluated.

Diagnostic horizons and features in this pedon include:
Ochric epipedon - from a depth of 0 to 18 centimeters (A and part of the C horizons).
Particle size control section - from a depth of 25 to 100 centimeters (part of the C horizon).

National Cooperative Soil Survey
U.S.A.

LOCATION COOLIDGE AZ

Established Series
Rev. MHL/FOY/MB
04/2009

COOLIDGE SERIES

The Coolidge series consists of very deep, well drained soils formed in fan or stream alluvium. Coolidge soils are on fan terraces, stream terraces or relict basin floors. Slopes are 0 to 5 percent. The mean annual precipitation is about 7 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids

TYPICAL PEDON: Coolidge sandy loam - cultivated. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 13 inches; light yellowish brown (10YR 6/4) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine tubular pores; violently effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. (6 to 14 inches thick)

Bk1--13 to 24 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine tubular pores; many fine irregular calcium carbonate filaments; violently effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. (8 to 16 inches thick)

Bk2--24 to 42 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many fine tubular pores; many soft calcium carbonate filaments and masses; violently effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary. (10 to 30 inches thick)

Bk3--42 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; very hard, very friable, slightly sticky and slightly plastic; few medium tubular pores; 5 percent gravel; many fine soft calcium carbonate filaments and masses; violently effervescent; moderately alkaline (pH 8.4).

TYPE LOCATION: Maricopa County, Arizona; 900 feet west and 2,600 feet north of the northeast corner of section 8, T. 1 N., R. 2 W., latitude 33 degrees, 26 minutes, 33 seconds N., longitude 112 degrees, 28 minutes, 54 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July - September and December - February. Driest during May and June. Typic aridic soil moisture regime.

Soil Temperature - 72 to 80 degrees F.

Rock fragments - Averages less than 15 percent in the particle size control section; but can have up to 35 percent in any one horizon

Depth to calcic horizon - 14 to 40 inches

Calcium carbonate equivalent - ranges from 6 to about 25 percent; as segregated soft masses or concretions. Some horizons have calcium carbonate filaments and coatings on ped or rock faces. All horizons contain disseminated calcium carbonate.

A horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 3, 4 or 5 moist
Chroma: 2, 3, 4 or 6, dry or moist
Organic matter: less than 1 percent

B horizon
Hue: 10YR, 7.5YR, 5YR
Value: 5, 6, 7 or 8 dry, 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6, dry or moist
Texture: Sandy loam, fine sandy loam; some pedons have thin (1/4 to 1 inch thick) strata of finer or coarser soil material in the control section

COMPETING SERIES: These are the Aco (CA), Garywash (T)(CA), Laveen (AZ), Rillito (AZ), and Toltec (AZ) series. Aco and Garywash soils are moist in some part of the soil moisture control section for less than 20 days cumulative between July and September. Aco soils have fine sand below the particle-size control section. Garywash soils have secondary accumulations of silica and gypsum in the control section. Laveen soils are loam and very fine sandy loam in the particle-size control section. Rillito soils have 15 to 35 percent gravel. Toltec soils have a calcic horizon that consists of a disintegrated hardpan.

GEOGRAPHIC SETTING: Coolidge soils are on fan terraces, stream terraces or relict basin floors and have slopes of 0 to 5 percent. Elevation ranges from 300 to 1,900 feet. These soils formed in stratified stream or fan alluvium from mixed sources. The climate is hot arid continental. The mean annual precipitation is 3 to 10 inches. Mean annual air temperature ranges from 68 to 74 degrees F. The frost-free period is 240 to 325 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Antho, Denure, Mohall and competing Rillito soils. Antho soils do not have calcic horizons. Denure soils have cambic horizons. Mohall soils are fine-loamy and have argillic horizons.

DRAINAGE AND PERMEABILITY: Well drained; very low to medium runoff; moderately rapid permeability.

USE AND VEGETATION: These soils are used for livestock grazing, wildlife habitat and irrigated cropland. Present vegetation is cacti, creosotebush, mesquite, triangleleaf bursage, annual weeds and grasses.

DISTRIBUTION AND EXTENT: Southern Arizona. The series is extensive. Total extent is about 102,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Pinal County, Arizona; Casa Grande Area soil survey; 1936.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 13 inches (Ap horizon)

Calcic horizon - the zone from 13 to 60 inches (Bk1, Bk2, Bk3 horizons)

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 12/2008, WWJ.

National Cooperative Soil Survey
U.S.A.

LOCATION DENURE AZ

Established Series
Rev. WWJ/JDP
04/2009

DENURE SERIES

The Denure series consists of very deep, somewhat excessively drained soils formed in fan or stream alluvium. Denure soils are on relict basin floors, stream terraces or fan terraces and have slopes of 0 to 8 percent. The mean annual precipitation is about 6 inches and the mean annual air temperature is about 70 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocambids

TYPICAL PEDON: Denure gravelly sandy loam - rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 1 inch; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common fine irregular pores; 30 percent gravel; noneffervescent; slightly alkaline (pH 7.6), abrupt smooth boundary. (1 to 4 inches thick)

Bw--1 to 12 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 20 percent gravel; noneffervescent; slightly alkaline (pH 7.6); clear wavy boundary. (9 to 14 inches thick)

Bk--12 to 30 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores, a few thin patchy calcium carbonate coats on sand grains and in pores; 25 percent gravel; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary. (1 to 19 inches thick)

C--30 to 60 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable; nonsticky and nonplastic; few very fine irregular pores; 20 percent gravel; strongly effervescent; moderately alkaline.

TYPE LOCATION: Maricopa County, Arizona; 750 feet south and 1350 feet east of the northwest corner of section 33, T. 5 N., R. 2 W. Latitude of 33 degrees, 44 minutes, 11 seconds N, Longitude of 112 degrees, 28 minutes, 38 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July September and December - February. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature - 72 degrees F. or more at a depth of 20 inches

Rock fragments - 5 to 35 percent (weighted average for the particle-size control section). Some undisturbed areas have a weak desert pavement.

Calcium carbonate - Noneffervescent or slightly effervescent in the A and B horizons; slightly to violently effervescent in the lower B and C horizons. Calcium carbonate is disseminated and occurs as soft masses or coatings on gravel in the Bk horizon. Typically the calcium carbonate equivalent is less than 5 percent, however, when greater than 5 percent occurs the horizon is either to thin or to deep to be diagnostic in the classification of the profile.

Reaction - Neutral through moderately alkaline

Sodium adsorption ratio - Usually less than 4, but ranges to 13 in some pedons

Electrical conductivity (dS/m) - Usually less than 4, but ranges up to 50 in some pedons

A horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 4 or 5 moist
Chroma: 3, 4 or 6, dry or moist
Organic matter content: less than 1 percent

Bw horizon
Hue: 10YR, 7.5YR
Value: 4, 5 or 6 dry, 4 or 5 moist
Chroma: 3, 4 or 6, dry or moist
Texture: coarse sandy loam, sandy loam, fine sandy loam; can have some minor strata of coarser or finer textures
Rock fragments: 5 to 75 percent gravel in any one subhorizon
Structure: weak or moderate subangular blocky; massive in a few pedons

C horizon
Hue: 7.5YR, 10YR
Value: 4, 5, 6 or 7 dry, 4, 5 or 6 moist
Chroma: 3, 4 or 6, dry or moist
Texture: sandy loam, coarse sandy loam; can have some minor strata of finer or coarser textures
Rock fragments: 5 to 75 percent gravel in any one subhorizon

A buried Bt horizon is present in some areas at depths greater than 40 inches

COMPETING SERIES: These are the Dateland (AZ), and Pahaka (AZ) series. Dateland soils are dominantly medium textured (loam and very fine sandy loam) in the control section. Pahaka soils have a buried argillic horizon at depths of 20 to 40 inches.

GEOGRAPHIC SETTING: Denure soils are on stream terraces, fan terraces or relict basin floors. Slopes are dominantly less than 3 percent but range up to 8 percent. These soils formed in stratified stream or fan alluvium from acid and basic igneous rock and eolian deposits. Elevation is 500 to 2200 feet. The climate is hot, arid continental. The mean annual precipitation is 2 to 10 inches occurring as gentle winter rains and erratic high intensity summer thunderstorms. The mean annual air temperature is 68 to 74 degrees F. The frost-free period is 240 to 325 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Dateland and the Antho, Gilman, and Momoli soils. Antho and Gilman soils do not have cambic horizons. Momoli soils are loamy-skeletal.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; runoff is medium on the gentle slopes and very low and low on nearly level slopes; moderately rapid permeability.

USE AND VEGETATION: Most areas are used for livestock grazing and wildlife habitat. Some areas are now being irrigated and used to grow citrus, cotton, alfalfa, and small grains. Vegetation is creosotebush, white bursage, annual forbs and grasses.

DISTRIBUTION AND EXTENT: Southern Arizona. The series is extensive. Total extent is about 392,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Maricopa County, Arizona; Soil survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties; 1982.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 1 inch (A horizon)

Cambic horizon - the zone from 1 to 12 inches (Bw horizon)

The type location was moved from the Gila BendAjo Area to the present location in the Aguila-Carefree Area in 1983. The present type location better typifies the concept of the series and the distinction between it and the competing Dateland series.

The name is from the old DeNure Ranch near Gila Bend.

Classified according Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 12/2008, WWJ

National Cooperative Soil Survey
U.S.A.

LOCATION GILMAN AZ

Established Series
Rev. MSJ/YHH
04/2009

GILMAN SERIES

The Gilman series consists of very deep, well drained soils that formed in stratified stream alluvium. Gilman soils are on flood plains and alluvial fans and have slopes of 0 to 3 percent. The mean annual precipitation is about 7 inches and the mean annual air temperature is about 71 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, calcareous, hyperthermic Typic Torrifluvents

TYPICAL PEDON: Gilman loam - cultivated. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 13 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and medium roots; few fine tubular and common fine irregular pores; common fine and very fine mica flakes; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. (6 to 18 inches thick)

C1--13 to 28 inches; pale brown (10YR 6/3) stratified very fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; common fine and few medium roots; few fine tubular and common fine irregular pores; common to many fine and very fine mica flakes; few fine gravel; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. (8 to 40 inches)

C2--28 to 60 inches; brown (10YR 5/3) stratified very fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and slightly plastic; few fine roots; few fine tubular and common fine and very fine irregular pores; common fine and very fine mica flakes; few fine gravel; strongly effervescent; moderately alkaline (pH 8.2).

TYPE LOCATION: Maricopa County, Arizona; 2,500 feet south and 1,270 feet east of the northwest corner of section 10, T. 2 S., R. 7 E. Latitude of 33 degrees, 16 minutes, 14 seconds N., Longitude of 111 degrees, 37 minutes, 50 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July-September and December-February. Driest during May and June. Typic aridic soil moisture regime.

Rock fragments - Less than 35 percent gravel

Reaction - Neutral to very strongly alkaline

Salinity- Nonsaline to strongly saline

SAR- Usually is less than 4, but ranges up to 15 in some pedons

A horizon
Hue: 10YR, 7.5YR
Value: 4 through 7 dry, 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry, 2, 3, 4 or 5 moist
Texture: loamy sand to clay
Organic matter: less than 1 percent; decreases irregularly with depth
Calcium Carbonate: noneffervescent to strongly effervescent

C horizon
Hue: 10YR, 7.5YR
Value: 3, 4, 5, 6 or 7 dry, 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry, 2 through 6 moist
Texture: loam, very fine sandy loam, silt loam; some have minor strata of finer or coarser textures.
Calcium Carbonate: slightly to violently effervescent; disseminated or mycelia-like filaments.
Buried horizons: buried argillic horizons occur below 40 inches in some pedons

COMPETING SERIES: These are the Antho (AZ) and Maripo (AZ) series. Antho soils have moderately coarse textured (sandy loam and fine sandy loam) C horizons. Maripo soils are underlain by sand at 20 to 40 inches.

GEOGRAPHIC SETTING: The Gilman soils are on flood plains and alluvial fans and have slopes of 0 to 3 percent. Elevations are 75 to 2500 feet. The soil formed in stratified stream alluvium from mixed sources. The mean annual precipitation is 2 to 10 inches. Mean annual air temperature is 70 to 76 degrees F. Frost-free period is about 240 to 350 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Antho soils and the similar Carrizo, Glenbar, Mohall, Pimer and Vint soils. Carrizo soils are skeletal. Glenbar soils are fine-silty. Mohall soils have argillic horizons. Pimer soils are fine-silty and have more than 1 percent organic matter. Vint soils are sandy.

DRAINAGE AND PERMEABILITY: Well drained; slow runoff; moderate permeability.

USE AND VEGETATION: Used for livestock grazing and irrigated cropland. Under cultivation, Gilman soils are used for growing alfalfa, cotton, grains, sugar beets and truck crops such as melons, lettuce, onion, carrots, broccoli and potatoes. Native vegetation is mesquite, catclaw, creosotebush, arrowweed and saltbush. Cottonwoods, willows and salt cedar grow in open areas.

DISTRIBUTION AND EXTENT: Southern Arizona. Gilman soils are extensive. Total extent is about 409,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Gila River Project, Soil Conservation Service, Arizona; 1936.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Entisol feature - the absence of diagnostic subsurface horizons

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 01/2009, WWJ

National Cooperative Soil Survey
U.S.A.

LOCATION GUNSIGHT AZ

Established Series
Rev. EGC/MSJ/YHH
04/2009

GUNSIGHT SERIES

The Gunsight series consists of very deep, somewhat excessively drained, strongly calcareous soils that formed in alluvium from mixed sources. Gunsight soils are on fan terraces or stream terraces and have slopes of 0 to 60 percent. The mean annual precipitation is about 7 inches. Mean annual air temperature is about 71 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

TYPICAL PEDON: Gunsight very gravelly loam - rangeland. (Colors are for dry soil unless otherwise noted.) 50 to 60 percent of surface is covered with gravel.

A--0 to 2 inches; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; weak medium platy structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; many very fine and fine irregular pores; 50 percent gravel; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary. (2 to 4 inches thick)

Bw--2 to 10 inches; pink (7.5YR 7/4) very gravelly loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few fine and medium roots; common very fine irregular pores; 50 percent gravel; violently effervescent; few fine calcium carbonate filaments; moderately alkaline (pH 8.3); clear wavy boundary. (8 to 16 inches thick)

Bk1--10 to 18 inches; white (N 8/) and pinkish gray (7.5YR 7/2) extremely gravelly loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common very fine irregular pores; 70 percent calcium carbonate coated gravel; violently effervescent; many large calcium carbonate masses; strongly alkaline (pH 8.5); gradual wavy boundary. (6 to 10 inches thick)

Bk2--18 to 32 inches; pinkish white (7.5YR 8/2), pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) extremely gravelly sandy loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and moderately plastic; few very fine roots; common very fine irregular pores; 75 percent calcium carbonate coated gravel; violently effervescent; many large calcium carbonate masses; moderately alkaline (pH 8.3); gradual wavy boundary. (12 to 20 inches thick)

Bk3--32 to 60 inches; pinkish white (7.5YR 8/2), pinkish gray (7.5YR 7/2) and pink (7.5YR 7/4) very gravelly loam, pinkish gray (7.5YR 7/2) and brown (7.5YR 5/4) moist; massive; hard, friable, slightly sticky and moderately plastic; common very fine irregular pores; 40 percent calcium carbonate coated gravel; violently effervescent; many large calcium carbonate masses; moderately alkaline (pH 8.3).

TYPE LOCATION: Pima County, Arizona; Organ Pipe Cactus National Monument Area; 2,640 feet south and 1,400 feet east of the northwest corner of section 1, T. 18 S., R. 5 W. Latitude of 31 degrees, 53 minutes, 17 seconds N., Longitude of 112 degrees, 44 minutes, 21 seconds W., NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in some part of the soil moisture control section during July-September and December-February. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature - 72 to 78 degrees F.

Depth to calcic horizon - 3 to 20 inches

Calcium Carbonate - More than 15 percent calcium carbonate equivalent in the calcic horizon. Occurs as small to large masses or nodules; weakly to strongly cemented in some pedons.

Rock fragments - Averages more than 35 percent in the control section. Some subhorizons have as much as 80 percent. Predominantly 1/2 to 3 inches in diameter. Some areas have a desert pavement with a moderate patina.

Reaction - Moderately or strongly alkaline

Sodicity- Nonsodic to strongly sodic

Texture- Fine sandy loam, sandy loam, loam in the particle-size control section. A few thin strata of less gravelly material occur in some pedons. Averages less than 18 percent clay.

A horizon
Hue: 7.5YR, 10YR
Value: 6, 7 or 8 dry, 4 or 5 moist
Chroma: 2 through 6, dry or moist

Bw horizon
Hue: 7.5YR, 10YR
Value: 5, 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4, dry or moist

Bk horizon
Hue: 7.5YR, 10YR
Value: 5 through 8 dry, 4 through 8 moist
Chroma: 2 through 4, dry or moist

COMPETING SERIES: These are the Chemehuevi (CA), Heleweiser (NV), Oldswede (T)(CA), and Supplymine (T)(CA) series. Chemehuevi soils have less than 15 percent calcium carbonate equivalent in the upper part of the calcic horizon and have secondary accumulations of silica and gypsum in the lower part of the calcic horizon. Heleweiser soils have gypsum in the lower part of the profile. Oldswede and Supplymine do not have OSDs and cannot be competed.

GEOGRAPHIC SETTING: Gunsight soils are on stream terraces or fan terraces. They formed in stratified alluvium from mixed sources. Slopes are dominantly 1 to 25 percent, but range from 0 to 60 percent. Elevations are 400 to 2600 feet. The climate is hot, arid and continental. Mean annual precipitation is 2 to 10 inches occurring as summer thunderstorms and gentle winter rains. Mean annual air temperature is 68 to 76 degrees F. The frost-free period is about 240 to 350 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Chuckawalla, Cipriano, Ebon, Harqua, Tremant and the similar Rillito soils. Chuckawalla, Ebon, Harqua and Tremant soils have argillic horizons. Cipriano soils have a duripan. Rillito soils have 15 to 35 percent gravel.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; very low to high runoff; moderate or moderately rapid permeability.

USE AND VEGETATION: Used for livestock grazing and recreation. The vegetation is creosotebush, ocotillo, paloverde, saguaro, cholla, and triangle bursage.

DISTRIBUTION AND EXTENT: Southwest and south central Arizona. The series is extensive. Total extent is about 585,000 acres. MLRA is 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Pima County, Arizona; Soil Survey of Organ Pipe Cactus-Cabeza Prieta Area, Arizona, Parts of Pima and Yuma Counties, 1971.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 2 inches (A horizon)

Calcic horizon - the zone from 10 to 40 inches (Bk1, Bk2, Bk3 horizons)

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006.

Revised for the correlation of AZ661, 2/2009, WWJ

National Cooperative Soil Survey
U.S.A.

LOCATION HUEVI NV AZ

Established Series
Rev. DJM/LJL/RLB/ET
05/2006

HUEVI SERIES

The Huevi series consist of very deep, well drained soils that formed in mixed gravelly alluvium. The Huevi series are on fan remnants, ballenas and fan terraces. Slope ranges from 1 to 70 percent. The mean annual precipitation is about 5 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, hyperthermic Durinodic Haplocalcids

TYPICAL PEDON: Huevi extremely gravelly sandy loam, rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.) The soil surface is covered by approximately 60 percent pebbles and 15 percent cobbles.

A--0 to 5 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 60 percent pebbles and 15 percent cobbles; strongly effervescent; strongly alkaline (pH 8.5); clear smooth boundary. (2 to 6 inches thick)

Bkq--5 to 18 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine interstitial and few fine tubular pores; common medium calcium carbonate and silica coats on the bottom of rock fragments; common medium calcium carbonate occurring as concretions and soft masses; 50 percent pebbles and 5 percent cobbles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary. (6 to 15 inches thick)

2Bqk--18 to 60 inches; very pale brown (10YR 7/3) extremely cobbly coarse sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine through medium roots; common fine interstitial pores; 40 percent discontinuously weakly silica and calcium carbonate cemented with common medium strongly silica and calcium carbonate cemented masses occurring as lenses and concretions that are brittle when moist; common coarse silica and calcium carbonate coats and pendants on the bottom of rock fragments; 35 percent pebbles and 40 percent cobbles; violently effervescent; moderately alkaline (pH 8.4).

TYPE LOCATION: Clark County, Nevada; located in Cottonwood Valley, Lake Mead National Recreation Area; approximately 1.3 miles southeast of the Nine Mile Basin road turn off, along the powerline road; about 2,480 feet north and 2,330 feet west of the southeast corner of section 36, T. 29 S., R. 65 E.; USGS Spirit Mountain NW, NV 7.5 minute topographic quadrangle; 35 degrees, 22 minutes, and 35 seconds north latitude, 114 degrees, 40 minutes, and 55 seconds west longitude; UTM 11s, 710573e, 3917251n; NAD 83.

RANGE IN CHARACTERISTICS:

Soil moisture - Usually dry, moist in some part during winter and spring and intermittingly moist in the upper part following summer convection storms; typic aridic soil moisture regime.

Soil temperature - 72 to 78 degrees F.

Depth to calcic horizon - 2 to 6 inches.

Depth to duric feature - 8 to 21 inches.

Control section - Clay content: 8 to 18 percent.

Rock fragments: 35 to 80 percent gravel and cobbles.

Calcium carbonate equivalent in the less than 20 millimeter fraction: 15 to 35 percent.

A horizon - Hue: 10YR or 7.5YR

Value: 5 to 7 dry, 4 or 5 moist.

Chroma: 2 to 6 dry, 3 or 4 moist

Bkq horizon - Hue: 10YR or 7.5YR

Value: 6 or 7 dry, 4 to 6 moist.

Chroma: 2 to 6 dry, 3 or 4 moist

Texture: Sandy loam, fine sandy loam, loam.

Consistence: Soft or slightly hard, very friable or friable.

Structure: Massive or subangular blocky.

2Bqk horizon - Hue: 10YR or 7.5YR

Value: 6 to 8 dry, 4 to 6 moist.

Chroma: 2 to 6 dry or moist

Texture: Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam.

Consistence: Slightly hard through hard, friable or firm.

Structure: Massive or platy.

Cementation: Discontinuously weakly cemented silica and calcium carbonate, with 20 to 50 percent strong silica and calcium carbonate cementation occurring as concretions, durinodes, or lenses within the matrix. These are hard or very hard when dry, very firm when moist, brittle, and does not slake in dilute hydrochloric acid.

COMPETING SERIES: There are no competing series.

GEOGRAPHIC SETTING: Huevi soils are on fan remnants, ballenas and fan terraces. These soils formed in mixed gravelly alluvium. Slope ranges from 1 to 70 percent. The elevations are 480 to 3,000 feet. The climate is low-latitude desert, with mild winters and very hot summers. Precipitation is greatest in the winter with a lesser secondary peak in summer, typical of the Mojave Desert.. The mean annual precipitation is 3 to 7 inches; the mean annual air temperature is 70 to 78 degrees F., and the frost free season is 240 to 365 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Carrizo, Cipriano, and Riverbend series. Carrizo soils lack a calcic horizon and have a sandy-skeletal particle-size control section. Cipriano soils have a duripan at depths of less than 20 inches. Riverbend soils have a sandy-skeletal particle-size control section and lack a silica cemented horizon.

DRAINAGE AND PERMEABILITY: Well drained; low through high runoff; moderate or moderately rapid permeability.

USE AND VEGETATION: These soils are used for rangeland and wildlife habitat. The present vegetation is mainly creosote bush, range ratany, and various annuals.

DISTRIBUTION AND EXTENT: Mojave Desert of southern Nevada and northwestern Arizona; MLRA 30. These soils are extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Mohave County, Arizona; Soil survey of the Shivwits Area, Arizona, Part of Mohave County; 1994.

REMARKS: Classified according to Keys to Soil Taxonomy Ninth Edition, 2003.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - 0 to 5 inches (A horizon)

Calcic horizon - 5 to 18 inches (Bkq horizon)

Duric feature - 18 to 60 inches (2Bqk horizon)

Particle-size control section - 10 to 40 inches (Bkq and 2Bqk horizons)

National Cooperative Soil Survey
U.S.A.

LOCATION LAGUNITA AZ

Established Series
Rev. RLB/HEJ/PDC/RKS/HCD
10/2006

LAGUNITA SERIES

The Lagunita series consists of very deep, excessively drained soils that formed in stratified stream alluvium from mixed sources. Lagunita soils are on flood plains and generally have slopes of 0 to 3 percent, but range to 5 percent. The mean annual precipitation is about 4 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Mixed, hyperthermic Typic Torripsamments

TYPICAL PEDON: Lagunita loamy sand - desert. (Colors are for dry soil unless otherwise noted.)

A--0 to 8 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; single grain; loose, dry and moist; many very fine roots; many very fine irregular pores; few very fine black sandy biotite flakes in thin strata; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary. (4 to 12 inches thick)

C1--8 to 30 inches; pale brown (10YR 6/3) weakly stratified loamy sand, brown (10YR 4/3) moist; single grain; loose, dry and moist; many very fine and fine roots; many very fine irregular pores; many very fine black sandy biotite flakes in thin strata; slightly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary. (15 to 25 inches thick)

C2--30 to 60 inches; pale brown (10YR 6/3) weakly stratified loamy sand, brown (10YR 4/3) moist; single grain; loose dry and moist; many very fine roots; many very fine irregular pores; many very fine black sandy biotite flakes in thin strata; slightly effervescent; moderately alkaline (pH 8.2).

TYPE LOCATION: Yuma County, Arizona; 1,000 feet south and 2,200 feet east of the southeast corner of section 24, R. 17 W., R. 8 S.

RANGE IN CHARACTERISTICS:

Soil moisture - Usually dry, intermittently moist in some part of the soil moisture control section during July - September and December - February. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature - 72 to 77 degrees F.

Rock fragments - Mainly less than 15 percent gravel by volume.

Organic matter content - Less than 1 percent decreasing irregularly with depth.

Calcium carbonate - Noneffervescent to violently effervescent. Calcium carbonate is disseminated; less than 5 percent calcium carbonate equivalent.

Salinity- Slightly to strongly saline

Reaction - Slightly or moderately alkaline

A horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 3, 4 or 5 moist
Chroma: 3 or 4, dry or moist

C horizon
Hue: 10YR, 7.5YR
Value: 5, 6 or 7 dry, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 5 dry, 3 or 4 moist
Texture: Stratified loamy sand, sand, coarse sand, and loamy coarse sand

COMPETING SERIES: These are the Carsitas (CA), Myoma (CA), Pintobasin (T)(CA), and Rositas (CA) series. Carsitas soils average 15 to 35 percent coarse fragments in the control section. Myoma soils have hue of 10YR or yellower and are not subject to flooding. Pintobasin soils average more than 15 percent rock fragments, dominantly gravel, in the control section and are slightly acid to neutral throughout. Rositas soils have less than 15 percent coarse and very coarse sand and are on sand dunes.

GEOGRAPHIC SETTING: Lagunita soils are on flood plains and generally have slopes of 0 to 3 percent, but range to include 5 percent. They formed in stratified stream alluvium from mixed sources. Elevations are 75 to 1,400 feet. The climate is hot, arid and continental. Mean annual precipitation is 2 to 10 inches, which occurs as summer thunderstorms and as gentle winter rains. Mean annual air temperature ranges 69 to 76 degrees F. Frost-free period is about 240 to 325 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are Glenbar, Indio and Ripley soils. Glenbar soils have a fine-silty control section. Indio soils have a coarse-silty control section. Ripley soils have a coarse-silty over sandy control section.

DRAINAGE AND PERMEABILITY: Excessively drained; low runoff; rapid permeability.

USE AND VEGETATION: Used mainly for livestock grazing and wildlife habitat, but citrus, alfalfa and small grains are grown under irrigation in some areas. The vegetation is mainly fourwing saltbush, mesquite, creosotebush, globe mallow and sand verbena.

DISTRIBUTION AND EXTENT: Southern Arizona. The soils are moderately extensive. MLRA is 31 and 40.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Yuma County (Yuma-Wellton Area), Arizona; 1978.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

This soil does not have stratification with soil material finer than loamy sand.

Classified according to Keys to Soil Taxonomy, Ninth Edition, 2003.

National Cooperative Soil Survey
U.S.A.

LOCATION ROSITAS CA AZ NV

Established Series
Rev. RPZ/LAB/PDC/ET
03/2006

ROSITAS SERIES

The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy eolian material. Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent with hummocky or dune micro relief. Mean annual precipitation is about 4 inches and the mean annual air temperature is about 72 degrees F.

TAXONOMIC CLASS: Mixed, hyperthermic Typic Torripsamments

TYPICAL PEDON: Rositas fine sand - rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.)

C1--0 to 9 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; single grained; loose, nonsticky and nonplastic; common fine and medium roots; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. (4 to 10 inches thick)

C2--9 to 60 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; single grained; loose, nonsticky and nonplastic; few fine roots; strongly effervescent; moderately alkaline (pH 8.0).

TYPE LOCATION: Imperial County, California; about 17 miles east of Holtville; about 4,000 feet west, 300 feet south of the main entrance to Imperial Irrigation District, Experiment Farm No. 2; NW 1/4 of section 5, T.17 S., R.19 E.

RANGE IN CHARACTERISTICS:

Soil moisture: The soil is usually dry and is not moist for as long as 60 consecutive days. Driest during May and June. Typic aridic soil moisture regime.

Soil temperature: 72 to 80 degrees F.

Organic matter: less than 0.5 percent and decreases regularly with depth

Control section Rock fragments: 0 to 5 percent fine gravel.

Clay content: 0 to 10 percent.

Effervescence: Slightly effervescent to strongly effervescent.

C1 horizon - Hue: 10YR, 7.5YR, 5YR

Value: 5 through 7, dry or moist

Chroma: 2 through 7, dry or moist

Rock fragments: 0 to 35 percent.

Other features: Some pedons are noneffervescent.

C2 horizon(s) - Hue: 10YR, 7.5YR, 5YR

Value: 5 through 7, dry or moist

Chroma: 2 through 7, dry or moist

Texture: Sand, loamy sand, fine sand, loamy fine sand. The 10 to 40 inch control section has less than 15 percent coarse and very coarse sand.

Salinity: 0 to 8 decisiemens/meter

Sodium adsorption ratio: 0 to 90

Reaction: Neutral to very strongly alkaline

Other features: Some pedons have few soft masses of calciumcarbonate.

COMPETING SERIES: These are the Carsitas (CA), Lagunita (AZ), Myoma (CA), and Pintobasin (CA) series. Carsitas soils have more than 15 percent rock fragments and are stratified. Lagunita soils are stratified, have an irregular decrease in organic carbon and are subject to flooding. Myoma soils have hue of 2.5Y or yellower throughout. Pintobasin soils are noneffervescent or very slightly effervescent in the particle-size control section and formed from mixed alluvium.

GEOGRAPHIC SETTING: Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent. These soils formed in sandy eolian material. Elevations are 270 feet below sea level to 2000 feet. The climate is low-latitude desert, with mild winters and very hot summers. Precipitation is greatest in the winter with lesser secondary peak in the summer. The mean annual precipitation is 0 to 8 inches. The mean January temperature is about 53 degrees F., mean July temperature is 92 degrees F., and the mean annual air temperature is 70 to 77 degrees F. The frost-free period is about 250 to 365 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Aco, Holtville, Imperial, Meloland, Niland, and Vint series. Aco soils are sandy loam in the control section. Holtville soils are clayey in the upper part of the control section. Imperial soils are fine textured throughout the control section. Meloland soils are sandy loam in the upper part and fine in the lower part of the control section. Niland soils are fine textured in the lower part of the control section. Vint soils have an irregular decrease in organic carbon.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; negligible to low runoff; rapid permeability.

USE AND VEGETATION: Rositas soils are used for rangeland and wildlife habitat, and growing citrus fruits, grapes, alfalfa, and truck crops. Present vegetation is creosotebush, white bursage, desert buckwheat and mesquite.

DISTRIBUTION AND EXTENT: Southern California, southwestern Arizona and southern Nevada. Rositas soils are extensive in MLRAs 30 and 31 and are mapped in MLRA 40 within the Sonoran Desert.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Imperial County (El Centro Area), California; 1918.

Remarks: Diagnostic horizons and features recognized in this pedon are:

Entisol feature - The absence of diagnostic subsurface horizons

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National Cooperative Soil Survey
U.S.A.

Appendix D
Dredging History and Historical Aerial Photographs

Historical Records on Colorado River Dredging and Channel Modifications

The following information is taken from Pacific Gas and Electric Companies *Final RCRA Facility Investigation/Remedial Investigation (RFI/RI), PG&E Topock Compressor Station, Needles, California Volume 2 Addendum Report* June 29, 2009. Appendix A1 - selected historical aerial and land-based photographs and drawing of the historic dredging are included following the summary text.

In June 2008, additional information was obtained from the Bureau of Reclamation (BOR) files on dredging of the Colorado River and historical channel improvements that occurred in the vicinity of the study area. The historical records were obtained through a Freedom of Information Act request.

Historical Records on Colorado River Dredging and Channel Modifications

The documents obtained included historical reports, photographs (aerial and land-based), drawings, river gauging data, and other operation records from BOR's Boulder City area office files for the time period from 1944 through 1968. The purpose of this records search was to obtain additional detail on the dredging and bank stabilization operations along the Colorado River channel and shoreline that could have bearing on the surface water and sediment characterization in the RFI/RI. Selected photographic records and drawings relevant to this document review are included following the summary text.

1944 through 1948

The BOR records from 1944 through 1948 document the emergency relief measures that were undertaken in the Needles area to address the aggradation of the Colorado River channel and groundwater level rise due to the closing of Parker Dam and subsequent filling of Lake Havasu. An existing levee near Needles, California was raised and extended. These modifications were considered temporary protection for Needles until Colorado River dredging and channelization could begin. The levee in the Needles area was also rip-rapped in 1948 as a further measure of protection.

1949 through 1953

On January 31, 1949, the BOR initiated dredging of the Colorado River channel from Needles to Topock, Arizona using "The Colorado" dredge. The primary channelization excavation work was completed by April 1951, and maintenance dredging continued through January 1953. During this period, 15,546,000 cubic yards of dredging material were removed from the Needles to Topock channel, according to the BOR Region 3 Reports on River Control Work and Investigations. The total dredging volume was based on the monthly operations records in the BOR reports. The dredge material was used to construct the bank line and levees on this section of the river, and additional material was placed at two sites immediately downstream of Topock (designated Spoil Sites 1 and 2).

1953 through 1961

Once channelization of the Needles to Topock river section was complete, BOR dredging operations commenced in 1953 directly upstream of Needles (Big Bend to Needles section). The purpose of the upstream dredging was to protect the channelization downstream by preventing sediments in the Big Bend to Needles section from moving downstream. This excavation was completed in July 1960. Maintenance dredging of the river channel in the Topock area continued in 1961.

1965 through 1968

The BOR records indicate that major dredging was performed in 1965 to produce the side channel and slough at San Bernardino County's Park Moabi, as shown in Figure 2-1. Historical photographs indicate that much of the present shoreline, bank stabilization, and sand dune area features in the Park Moabi area were completed during this period. In 1965, BOR initiated development of an active water management system for the Topock Marsh for the Havasu National Wildlife Refuge (HNWR). By 1966, a dike and inlet channel were constructed to divert Colorado River flow into Topock Marsh. A small inlet canal and control structure was constructed by dewatering the area and excavating materials from the current inlet. Jetties were constructed upstream of the inlet to form a narrower channel, and to cause the water to scour the sand bar at the entrance to the inlet. Levee systems were also constructed along the Colorado River shoreline during this time period.

In summary, the historical BOR photographs and operations records provide a more complete chronology of the dredging and channel improvements that were completed in the Park Moabi-Topock site area. The overall dredging and channelization work resulted in lower water surface elevations of the Colorado River near Needles, as well as reduction of sediment flows to Lake Havasu downstream of the Topock area. Channel capacity in this section of the river now averages approximately 15,000 cubic feet per second (cfs), with a levee system designed for up to 50,000 cfs.

P423-306-1299A. Jetties constructed on Arizona bank at 300´ and 500´ intervals from Sta. 38-00 to Sta. 67-00. Jan. 31, 1956. Photo by H.B. Burress.

Aerial view of the Colorado River.
P423-306-1334A – CRFW&LS – Sta. 60-100. August 1956.

APPENDIX D-1
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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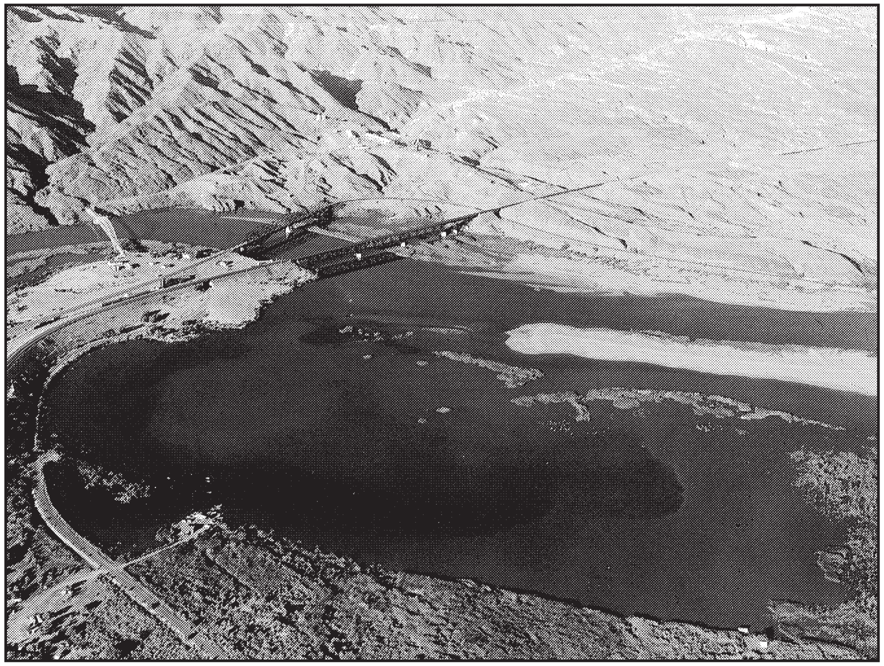


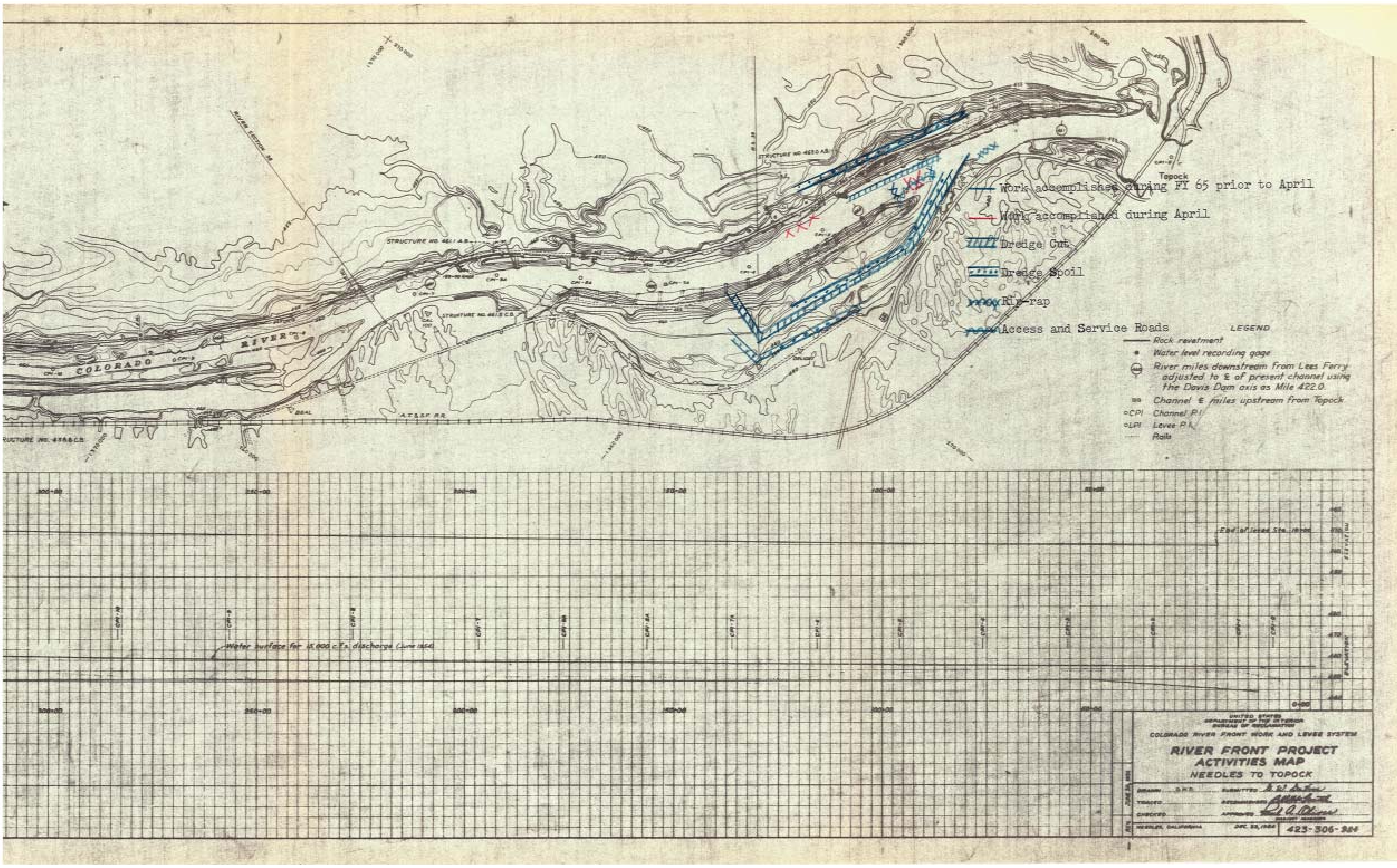
P423-306-371A-CRFW&LS – Topock Bridges. August 1956.

300-4385A. Colorado River Front Work & Levee System.
Photograph of highway bridge across Colorado River near Topock, California, 1962.
Bureau photo by R.C. Middleton.

APPENDIX D-2
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



APPENDIX D-3
COLORADO RIVER FRONT ACTIVITIES MAP, APRIL 1965

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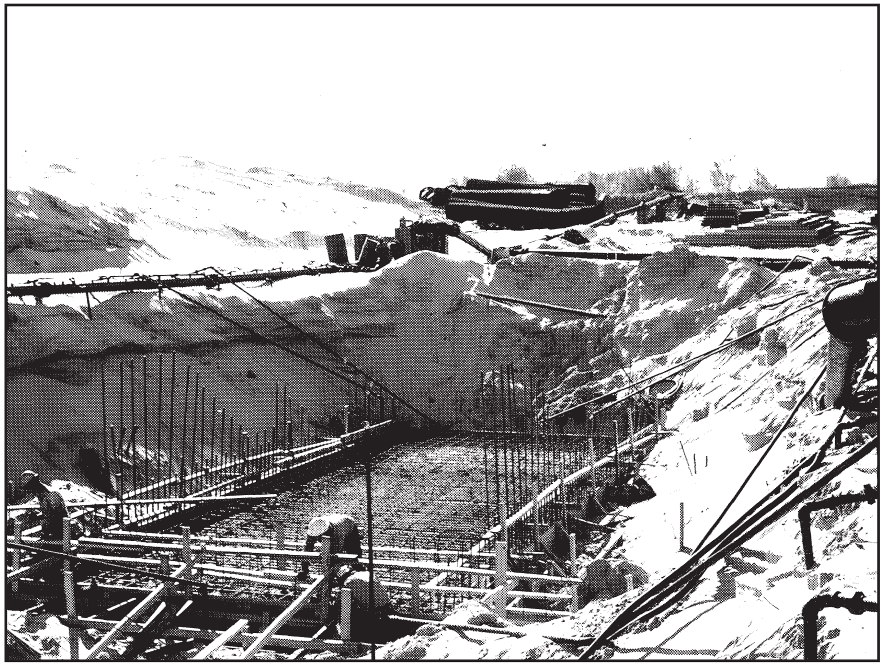
APPENDIX D-4
COLORADO RIVER FRONT ACTIVITIES MAP, JUNE 1965



P423-306-4347 NA. Colorado River Front Work and Levee System, Region 3. Topock Marsh Development. Specifications No. 300C-232. Contractor's forces placing reinforcing steel in floor of inlet structure. 11/29/65. Bureau of Reclamation photo by Fred Burley.

APPENDIX D-5
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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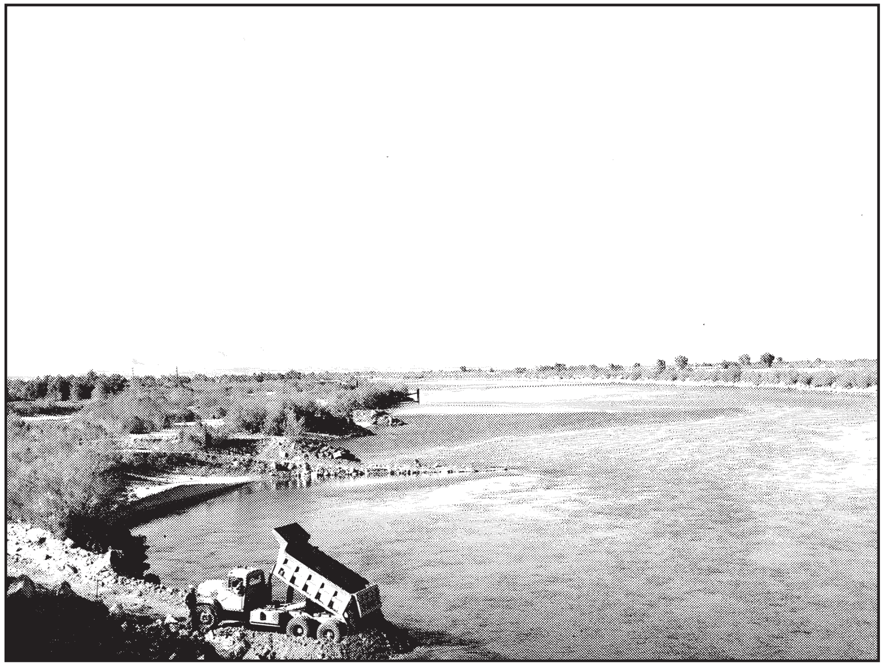

P423-306-4340 NA. Colorado River Front Work and Levee System, Region 3. Needles to Topock Division. Government forces constructing jetty to narrow the width of channel. The channel was narrowed to cause the water to scour sand bar at entrance to Topock Marsh inlet channel structure. Truck at Station 558, California bank. 12/1/65. Bureau of Reclamation photo by Fred Burley.

APPENDIX D-6
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969
RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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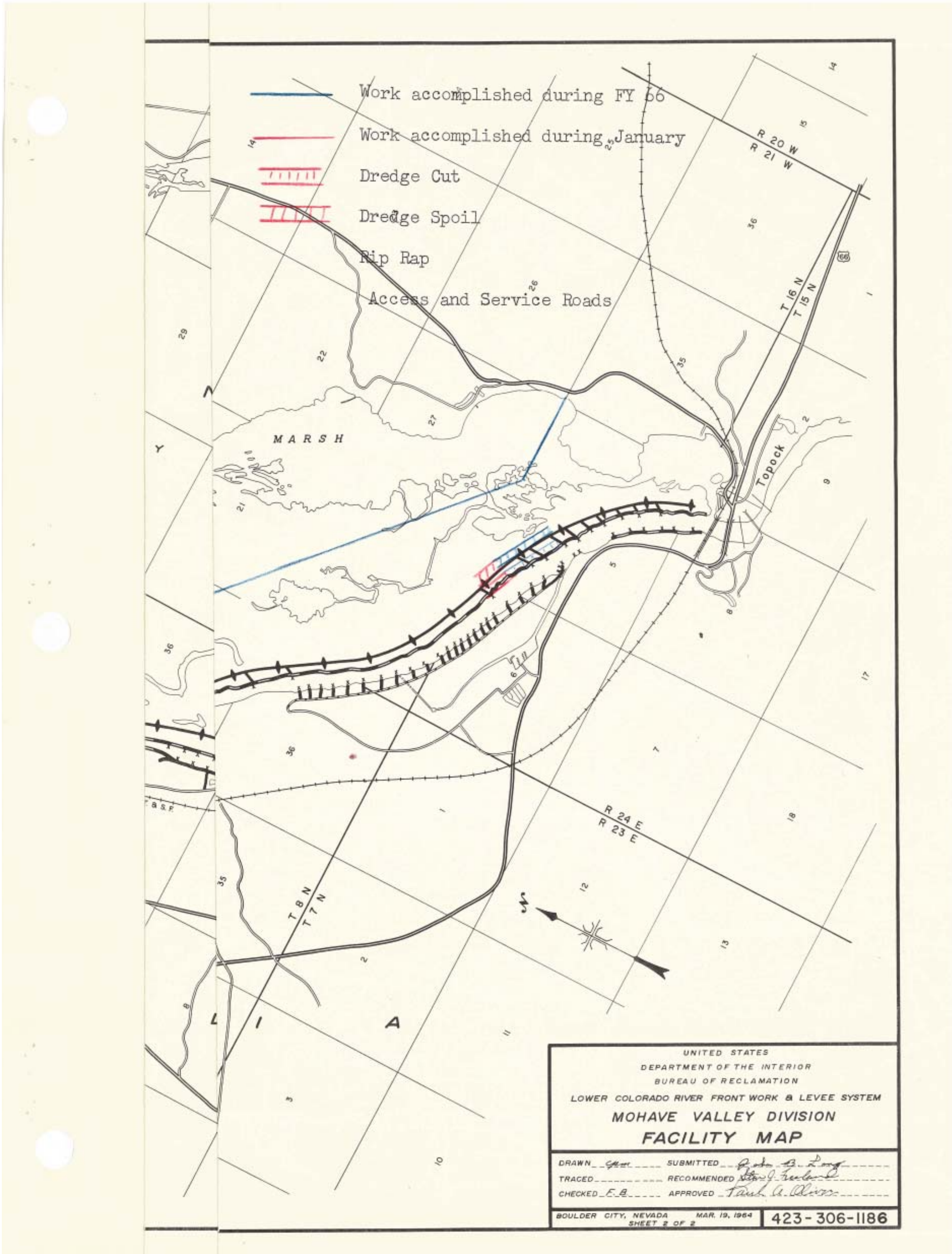
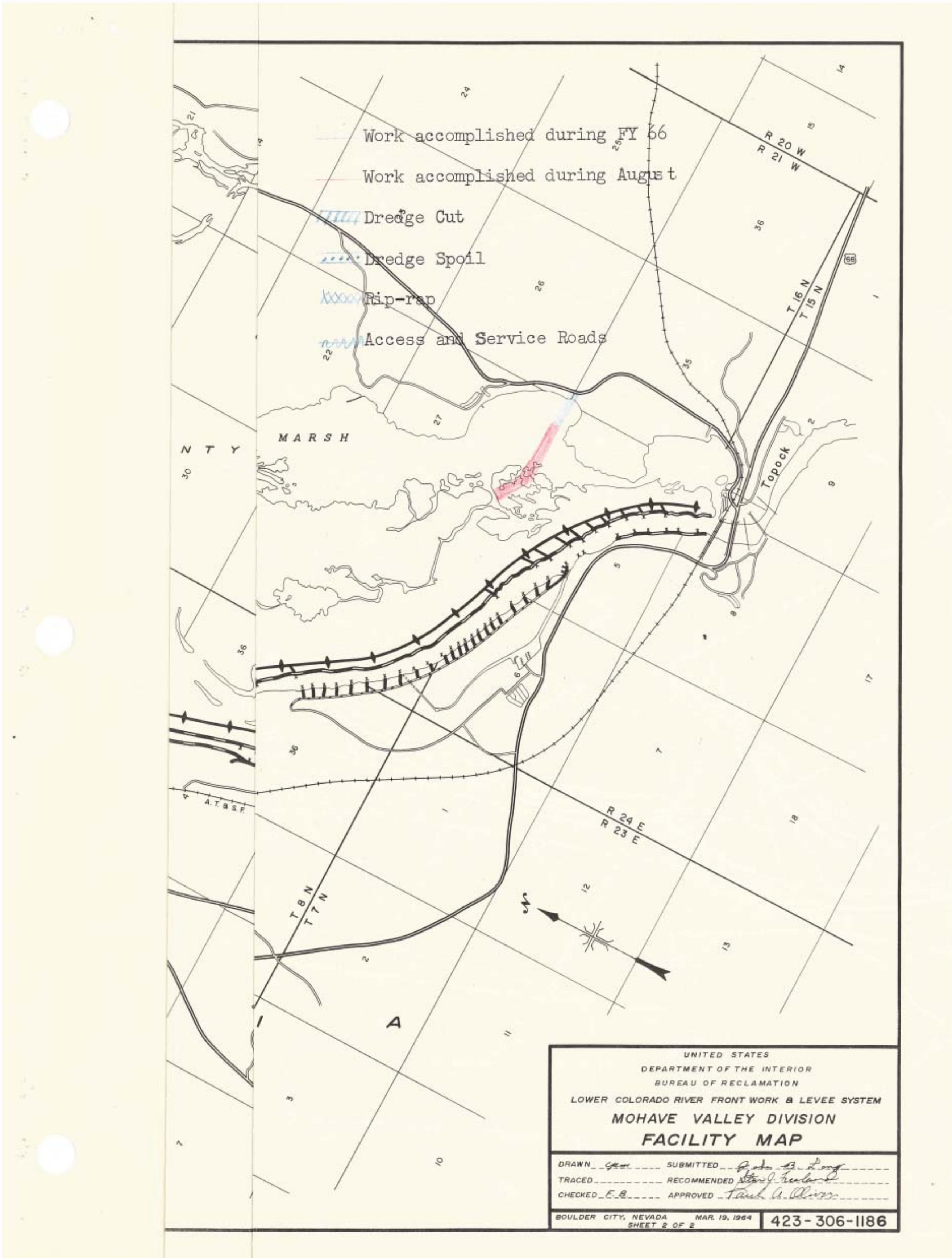
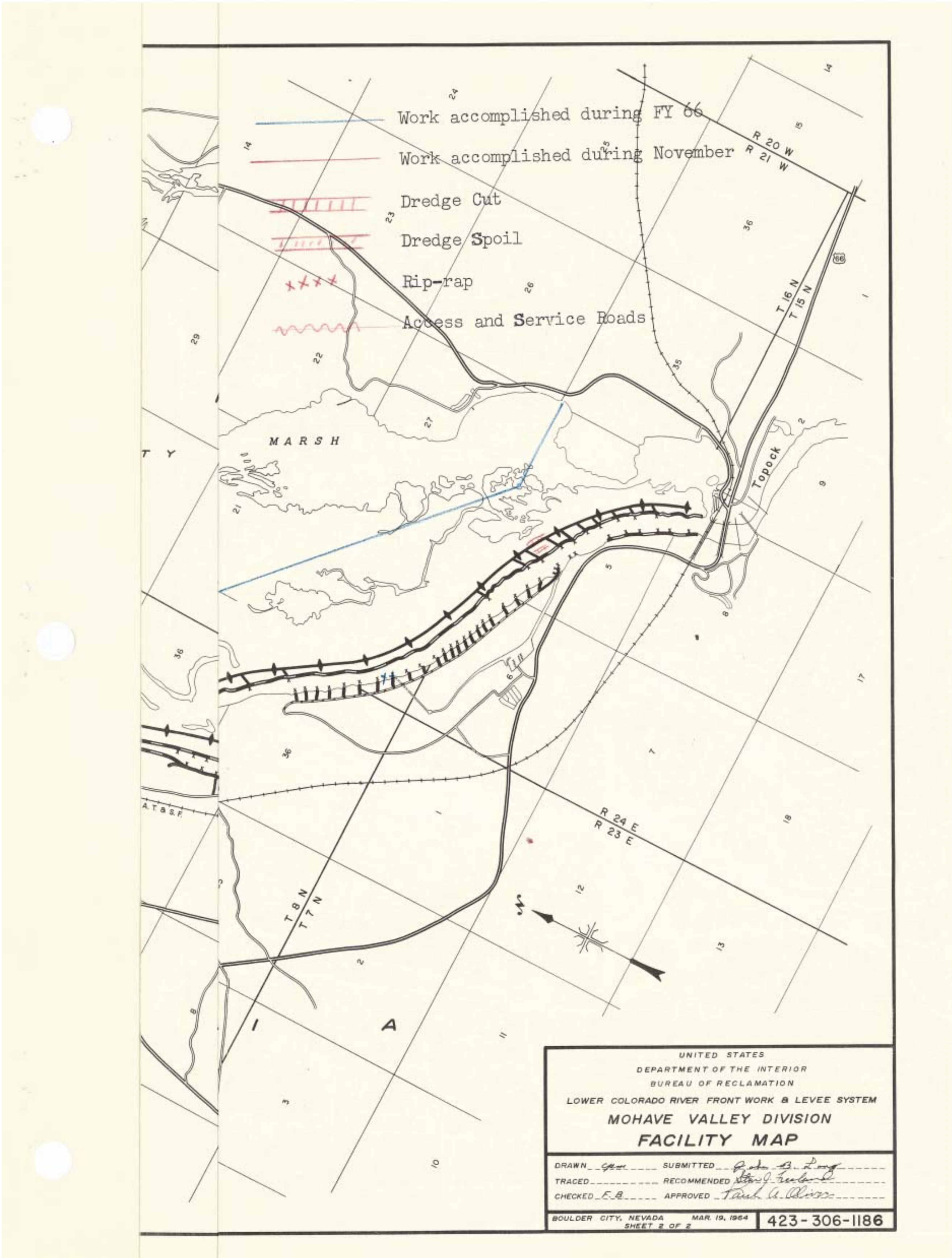


APPENDIX D-7
COLORADO RIVER FRONT ACTIVITIES MAP, JANUARY 1966



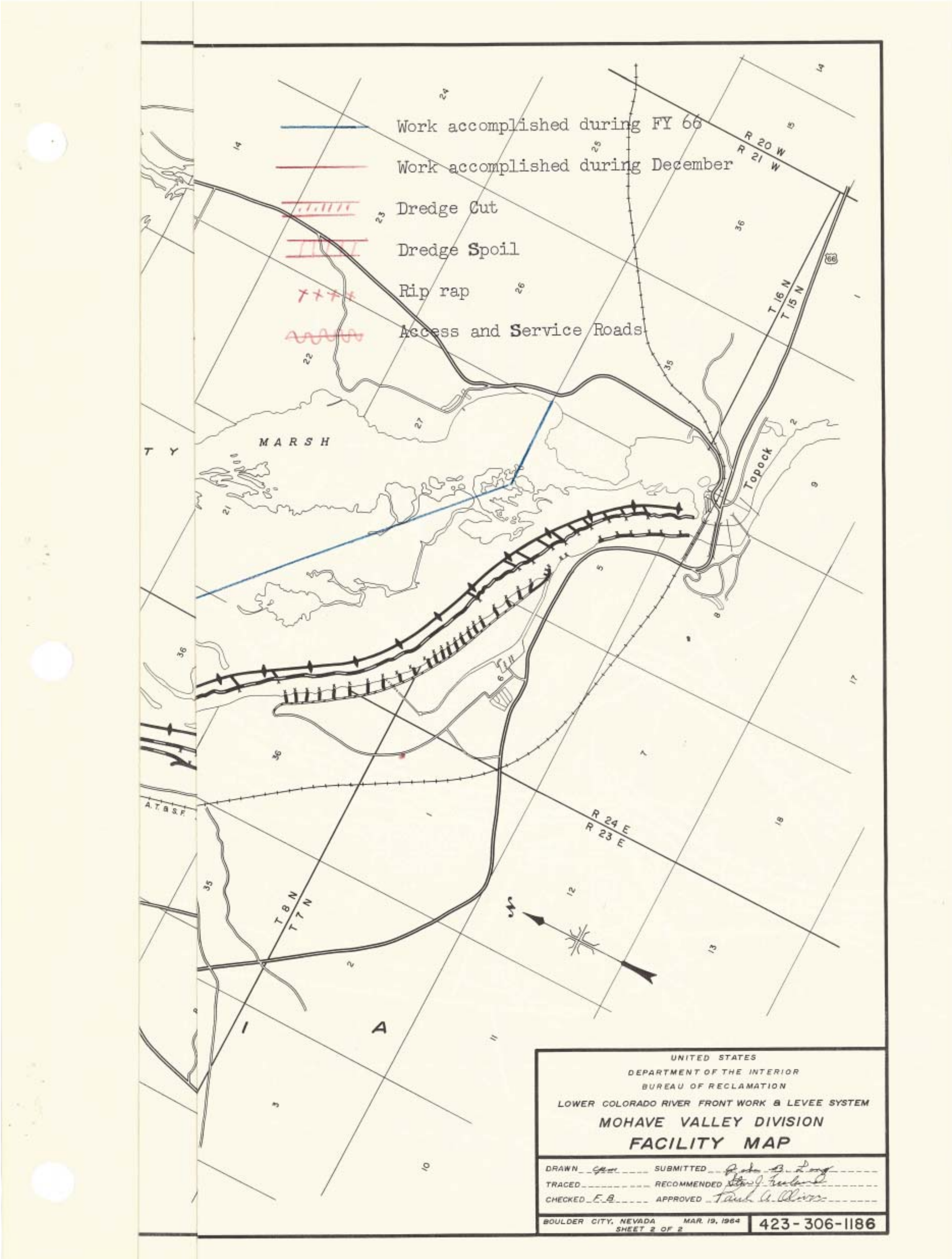
APPENDIX D-8
COLORADO RIVER FRONT ACTIVITIES MAP, AUGUST 1966

APPENDIX D-9
COLORADO RIVER FRONT ACTIVITIES MAP, OCTOBER 1966



APPENDIX D-10
COLORADO RIVER FRONT ACTIVITIES MAP, NOVEMBER 1966

CH2MHILL



APPENDIX D-11
COLORADO RIVER FRONT ACTIVITIES MAP, DECEMBER 1966

P423-300-7748 NA Topock Gorge Division – Colorado River Front Work & Levee System, Arizona-California. Looking upstream at Spoil Site No. 1 (south of U.S. 66). Spoil will be placed here to provide an access site for recreation and wildlife use. The Bureau of Reclamation will provide a parking lot, boat ramp, restroom facilities, and landscape the site for day-use. 2/29/68 Bureau of Reclamation photo by Al R. Jonez.

APPENDIX D-12
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

P423-300-7747 NA Topock Gorge Division – Colorado River Front Work & Levee System, Arizona-California. Looking north at the Topock Ridge which is the start of the Division. Spoil placed on Spoil Site No. 2 on the left, will be landscaped and planted for recreation day-use this spring. Topock Marsh can be seen in the distance (River Mile 465). 2/29/68 Bureau of Reclamation photo by Al R. Jonez.

APPENDIX D-13
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
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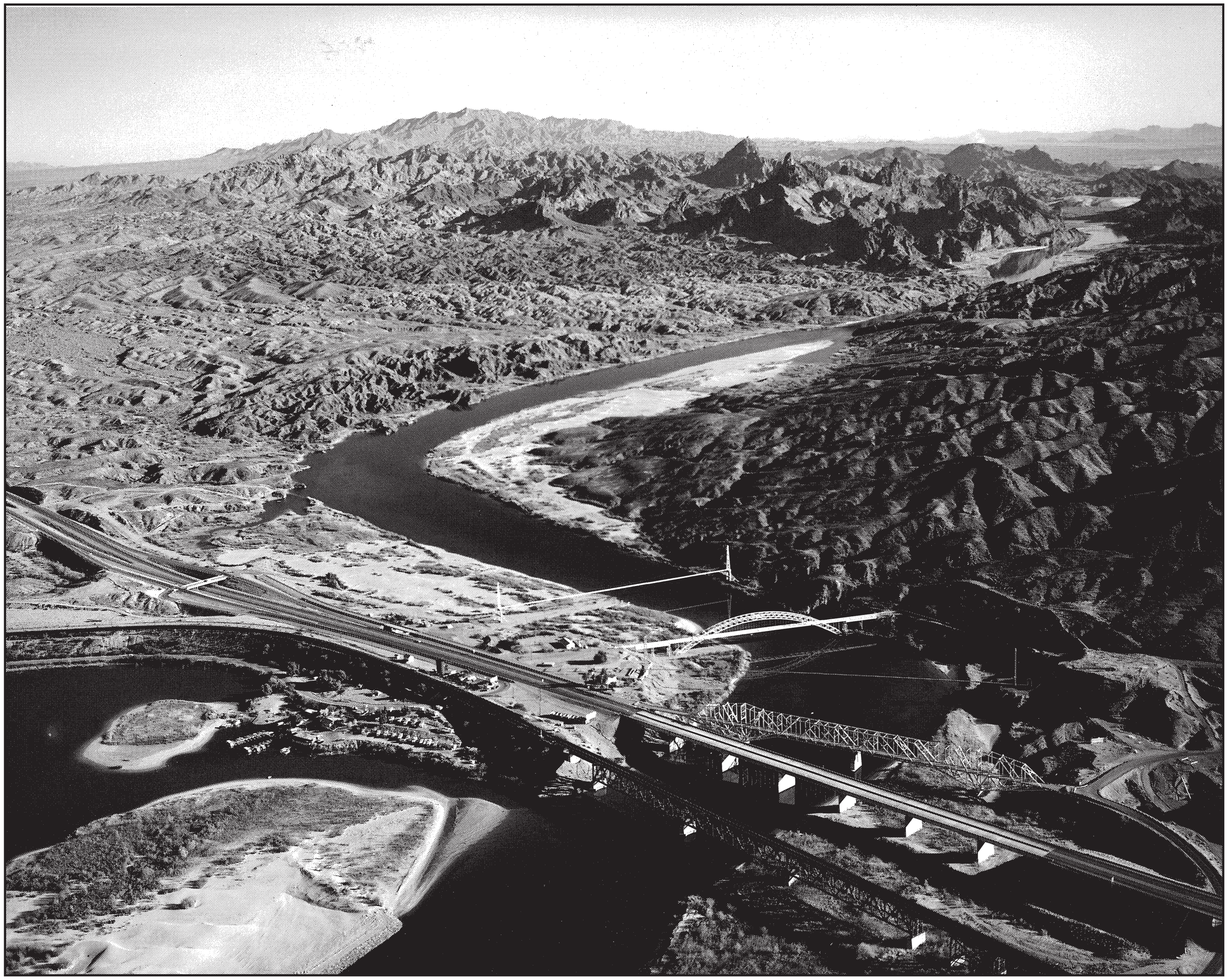

P423-300-8736 NA Mohave Valley Division – Colorado River Front Work & Levee System, Arizona-California. Looking downstream at the end of the Mohave Division and the starting point for the Topock Gorge Division. The bridge crossing the Colorado River at Topock, Arizona, is the dividing point. Golden Shores concession can be seen in the bay on the left before the bridge. Sediment removed from the first 1.7 mile section of the Topock Gorge Division can be seen on the two areas downstream from the bridge. River Mile 463.8 is at the bottom of the photograph. 1/6/69 Bureau of Reclamation photo by E. E. Hertzog.

APPENDIX D-14
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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P423-300-8735 NA Mohave Valley Division – Colorado River Front Work & Levee System, Arizona-California. Looking upstream at the Park Moabi Marina complex operated by the County of San Bernardino. The Reclamation withdrawn lands are leased to the county for park and recreation purposes. River Mile 462.5 is at the bottom of the photograph. 1/6/69 Bureau of Reclamation photo by E. E. Hertzog.

APPENDIX D-15
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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P423-300-8737 NA Topock Gorge Division – Colorado River Front Work & Levee System, Arizona-California. Looking upstream at the start of the Topock Gorge Division area. Portions of this section have been dredged prior to the time that Secretary of the Interior, Stewart Udall, suspended all work in the Topock Gorge Division pending a revaluation of the dredging program. River Mile 465 is at the bottom of the photograph. 1/6/69 Bureau of Reclamation photo by E. E. Hertzog.

APPENDIX D-16
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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P423-300-8734 NA Mohave Valley Division – Colorado River Front Work & Levee System, Arizona-California. Looking upstream in the river section opposite the inlet to Park Moabi Marina. The lake on the right is called Lost Lake. The sandy areas are a by-product of several years settling basin dredging in this section. Part of the sediment moving downstream in the Mohave Division was removed at this location before it moved on into the Topock Gorge Division. River Mile 462 is at the bottom of the photograph. 1/6/69 Bureau of Reclamation photo by E. E. Hertzog.

APPENDIX D-17
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
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Appendix E
USGS River Gauge (09423550) at the Topock Marsh Inlet Near Needles, California

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National Water Information System: Web Interface

USGS Water Resources

Data Category: Surface Water
Geographic Area: United States
GO

News updated November, 2011

USGS Surface-Water Monthly Statistics for the Nation

The statistics generated from this site are based on approved daily-mean data and may not match those published by the USGS in official publications. The user is responsible for assessment and use of statistics from this site. For more details on why the statistics may not match, click here.

USGS 09423550 TOPOCK MARSH INLET NEAR NEEDLES, CA

Available data for this site Time-series: Monthly statistics GO

Mohave County, Arizona Hydrologic Unit Code 15030101 Latitude 34°50'10", Longitude 114°35'03" NAD27 Gage datum 400 feet above NGVD29	**Output formats** HTML table of all data Tab-separated data Reselect output format

00060, Discharge, cubic feet per second,												
YEAR	**Monthly mean in cfs (Calculation Period: 1967-01-01 -> 2011-09-30)**											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1967	77.3	61.9	128.6	121.5	113.8	125.0	126.0	119.1	89.1	87.6	56.2	22.4
1968	84.9	126.6	159.5	156.9	158.5	153.2	188.6	185.4	168.0	120.7	94.8	71.3
1969	5.00	0.000	1.30	27.0	56.5	59.3	108.9	133.4	74.7	11.2	66.2	93.4
1970	0.000	1.80	55.0	29.6	30.0	51.2	88.3	105.4	164.2	138.3	56.4	0.000
1971	5.68	9.40	52.3	54.3	34.5	86.1	66.9	67.8	80.7	62.3	28.4	66.3
1972	0.000	0.000	18.7	43.1	50.7	102.0	108.5	61.4	58.4	56.7	83.3	102.9
1973	26.4	0.000	24.6	26.7	55.0	148.1	89.2	84.2	101.1	101.1	71.1	16.9
1974	0.000	0.000	29.1	56.8	49.4	58.6	48.2	45.9	105.9	91.4	33.2	63.4
1975	0.000	0.000	46.0	57.9	56.1	88.2	108.4	75.5	89.4	60.1	42.5	47.3
1976	0.000	0.000	155.5	14.7	53.4	166.2	29.8	111.4	53.3	51.3	13.6	41.9
1977	0.000	0.000	122.9	16.4	33.4	85.5	67.0	85.9	91.4	73.5	19.2	34.2
1978	0.613	0.000	99.5	20.4	64.7	105.5	56.1	110.2	68.5	30.2	20.7	25.0
1979	2.65	38.0	77.5	74.4	46.0	89.3	98.1	60.3	54.7	84.9	44.5	25.6
1980	15.0	20.8	79.5	60.6	72.2	84.2	70.8	116.9	70.5	28.6	26.9	14.5

1981	8.35	56.2	72.3	40.5	78.7	106.7	76.0	121.5	69.1	17.8	8.55	6.23
1982	18.6	69.0	84.9	72.3	50.8	116.9	130.7	70.9	44.1	25.4	4.97	10.4
1983	99.1	20.5	20.5	43.1	70.4	105.5	0.000	0.000	0.000	0.000	0.000	0.000
1984	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1985	0.000	0.000	0.000	0.000	0.000	18.4	49.2	43.9	54.3	19.6	29.1	34.0
1986	38.9	30.3	26.3	20.9	21.0	77.7	107.0	12.1	50.6	119.5	92.7	35.3
1987	2.74	8.93	47.1	60.7	59.2	97.7	109.5	108.4	39.3	19.5	15.4	59.9
1988	60.6	0.000	54.4	83.0	51.4	98.3	97.9	72.0	59.8	31.9	20.6	14.6
1989	11.2	37.5	96.5	95.1	57.5	103.6	123.9	95.9	64.3	21.3	4.80	0.000
1990	0.000	38.4	95.7	86.6	68.1	80.6	82.3	68.8	53.2	30.2	18.9	10.3
1991	8.86	31.3	53.5	96.3	78.9	99.0	114.9	79.0	43.8	23.5	14.0	10.3
1992	1.84	29.4	21.3	50.6	94.7	70.0	95.1	42.3	21.7	25.6	5.40	22.9
1993	0.377	0.000	0.000	0.000	36.7	178.1	156.6	122.5	76.4	68.4	41.0	0.000
1994	0.000	0.000	60.7	154.4	130.6	161.8	151.9	139.7	91.0	100.6	85.3	14.4
1995	0.778	42.7	155.9	193.2	147.5	160.0	111.6	91.9	55.1	42.3	9.53	12.1
1996	12.0	21.7	94.8	115.2	83.7	92.0	126.1	112.1	64.9	24.6	3.73	8.60
1997	3.92	127.8	95.6	79.4	82.5	147.1	139.4	124.6	65.9	63.3	49.4	5.34
1998	31.2	27.4	100.1	83.3	131.2	127.0	141.8	89.8	105.5	58.1	36.3	13.5
1999	4.59	6.23	97.6	110.3	94.7	121.4	83.4	69.9	76.4	30.5	43.0	4.96
2000	0.894	3.44	50.3	73.3	100.9	120.9	101.4	70.1	40.8	58.5	26.4	27.1
2001	20.8	71.4	65.8	117.4	93.5	115.9	37.7	32.4	47.7	24.4	18.5	13.6
2002	23.6	85.4	89.9	63.6	75.5	115.4	114.1	92.3	64.7	24.4	12.7	6.44
2003	14.6	25.4	114.4	106.9	101.6	96.2	86.9	51.8	39.4	54.6	21.5	21.7
2004	16.6	37.3	105.8	118.7	111.7	110.5	86.8	61.9	66.0	41.6	34.4	36.3
2005	0.155	6.81	9.74	116.7	102.4	97.6	93.5	44.2	59.7	42.3	23.4	1.00
2006	12.5	24.8	61.6	115.7	104.6	92.8	63.7	45.9	35.4	23.1	3.14	3.43
2007	6.51	30.7	71.7	107.8	95.6	93.8	90.4	58.5	46.5	21.3	3.15	0.000
2008	0.000	13.8	85.8	129.6	98.8	94.8	69.2	55.7	33.5	12.4	10.9	0.008
2009	16.4	28.4	109.1	121.4	69.5	56.8	61.2	53.4	49.2	14.6	13.1	4.19
2010	2.03	8.20	64.9	84.9	81.4	87.4	83.0	62.3	60.5	42.5	5.90	1.81
2011	0.333	2.94	11.2	9.27	4.69	7.91	25.7	53.0	45.3			
Mean of monthly Discharge	14	25	68	74	72	99	90	78	64	47	30	23

** No Incomplete data have been used for statistical calculation

Questions about sites/data?
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Data Tips
Explanation of terms
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Title: Surface Water data for USA: USGS Surface-Water Monthly Statistics
URL: http://waterdata.usgs.gov/nwis/monthly?

Page Contact Information: Arizona Water Data Support Team
Page Last Modified: 2012-02-29 17:39:19 EST
0.57 0.48 sdww02

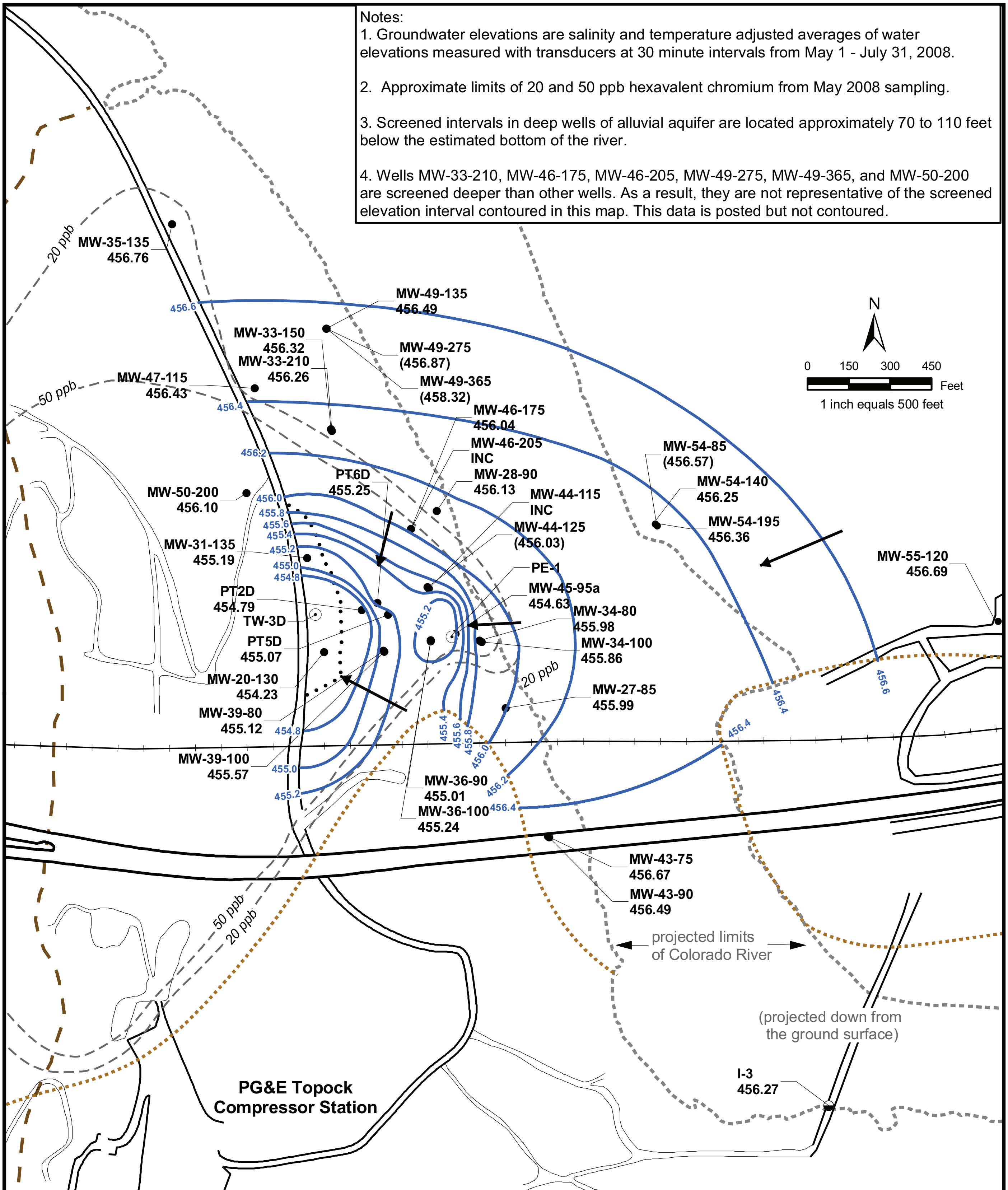
Appendix F
Information from on Site Ground Water Monitoring Wells and Surface Water Elevation Data

Notes:
1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30 minute intervals from May 1 - July 31, 2008.

2. Approximate limits of 20 and 50 ppb hexavalent chromium from May 2008 sampling.

3. Screened intervals in deep wells of alluvial aquifer are located approximately 70 to 110 feet below the estimated bottom of the river.

4. Wells MW-33-210, MW-46-175, MW-46-205, MW-49-275, MW-49-365, and MW-50-200 are screened deeper than other wells. As a result, they are not representative of the screened elevation interval contoured in this map. This data is posted but not contoured.



MW-29 455.85 — Average Groundwater Elevation at Monitoring Station (ft AMSL)

MW-29 (455.85) — Average Groundwater Elevation at Monitoring Station (ft AMSL) Not Used for Contouring

Interpreted Groundwater Flow Direction

Approximate Bedrock Contact at 395 ft AMSL

Monitoring Well

River Station

Extraction Well

Groundwater Elevation Contour 0.2 ft

Inferred Groundwater Elevation Contour 0.2 ft

INC Data incomplete for reporting period

FIGURE F-1
AVERAGE GROUNDWATER ELEVATIONS DEEP WELLS MAY THROUGH JULY 2008

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Ground Water Levels from Selected Monitoring Wells and Colorado River Surface Elevations

Table F-1.
Selected monitoring well data on ground water elevations collected between May 1 and July 31, 2008

Monitoring Well	Surface Elevation at Monitoring Well (Feet)	Average Ground Water Elevation (Feet)	Depth to Ground Water Below Surface (Feet)
MW-20-130	499.1	454.23	44.87
MW-27-85	458.4	455.99	2.41
MW-28-90	464.9	456.13	8.77
MW-31-135	495.1	455.19	39.91
MW33-150	485	456.32	28.68
MW-33-210	485	456.26	28.74
MW-34-100	458.9	455.86	3.04
MW-34-80	459.1	455.98	3.12
MW-35-135	481.2	456.76	24.44
MW-36-100	466.8	455.24	11.56
MW-36-90	466.7	455.01	11.69
MW-39-100	465.3	455.57	9.73
MW-39-80	465.1	455.12	9.98
MW-43-75	462.7	456.67	6.03
MW-43-90	459.9	456.49	3.41
MW-44-125	470.7	456.03	14.67
MW-45-95A	466.6	454.63	11.97
MW-46-175	480.8	456.04	24.76
MW-47-115	482.6	456.43	26.17
MW-49-135	482.6	456.49	26.11
MW-49-275	482.6	456.87	25.73
MW-49-365	482.6	458.32	24.28
MW-54-140	466.4	456.25	10.15
MW-54-195	466.3	456.36	9.94
MW-54-85	466.4	456.57	9.83
MW-55-120	463.6	456.69	6.91

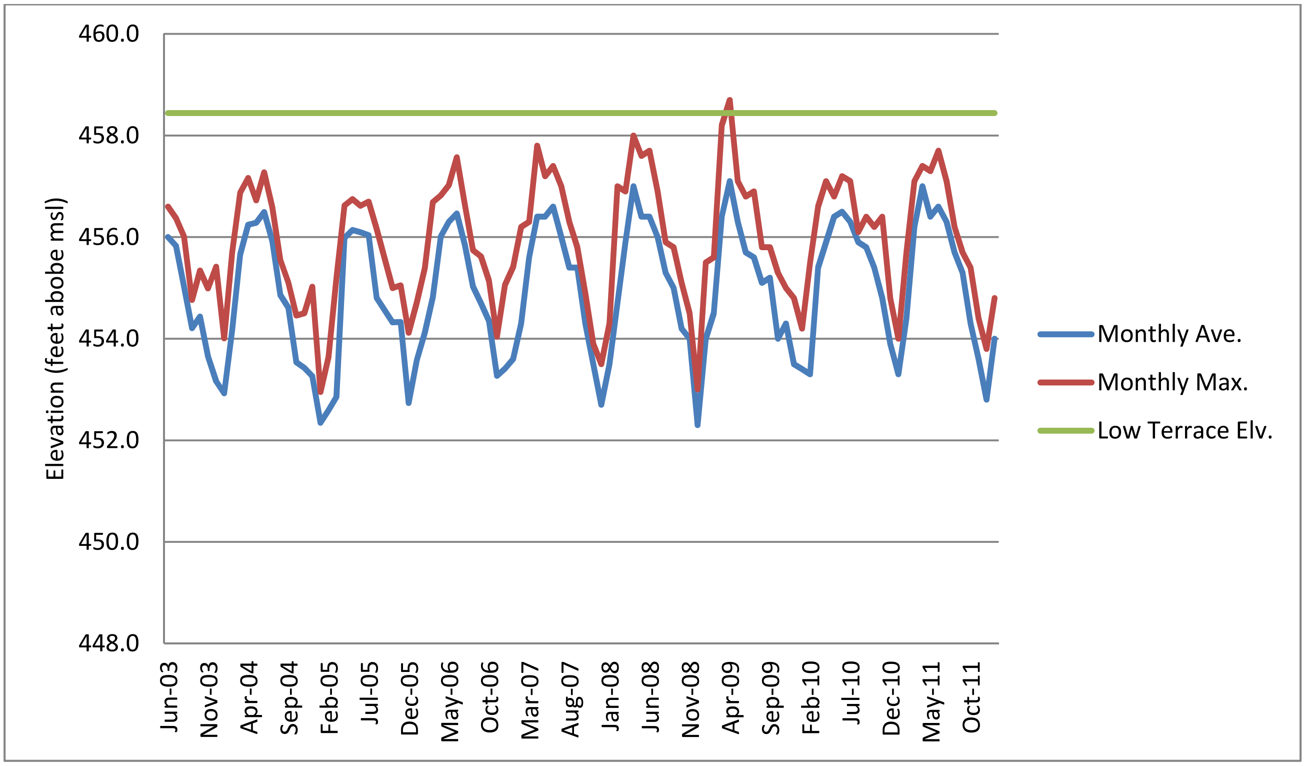


Figure F-2. Colorado River surface water elevations measured at I-3 between June 2003 and January 2012. The low terrace elevation of 458.4 represents the lowest topographic position along the Colorado River. The mean high water mark as determined by water elevations measured during peak flows during the summer months is 457.0 feet.

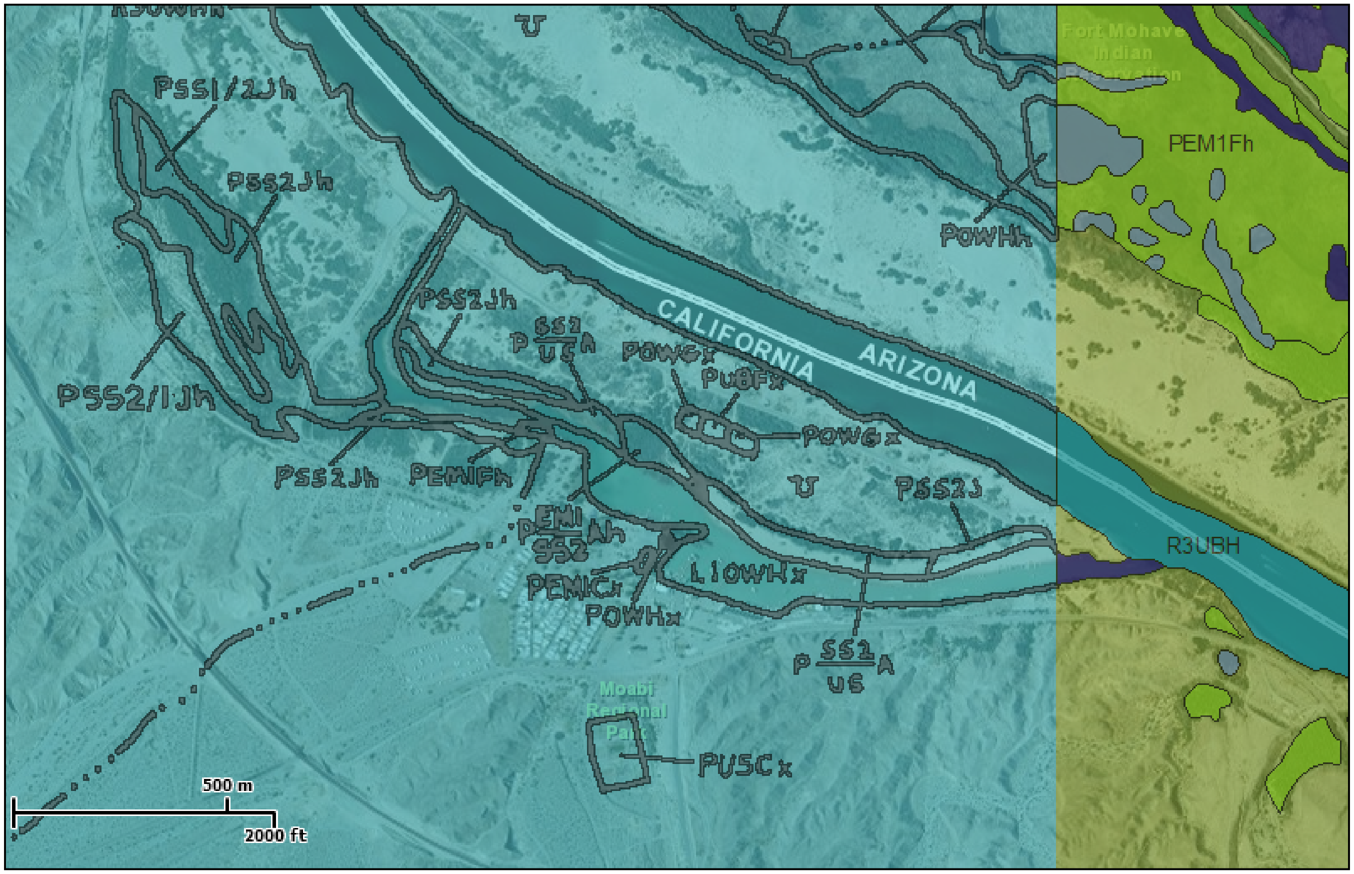
Appendix G
National Wetlands Inventory Maps

U.S. Fish and Wildlife Service

National Wetlands Inventory

Park Moabi

Feb 12, 2012



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

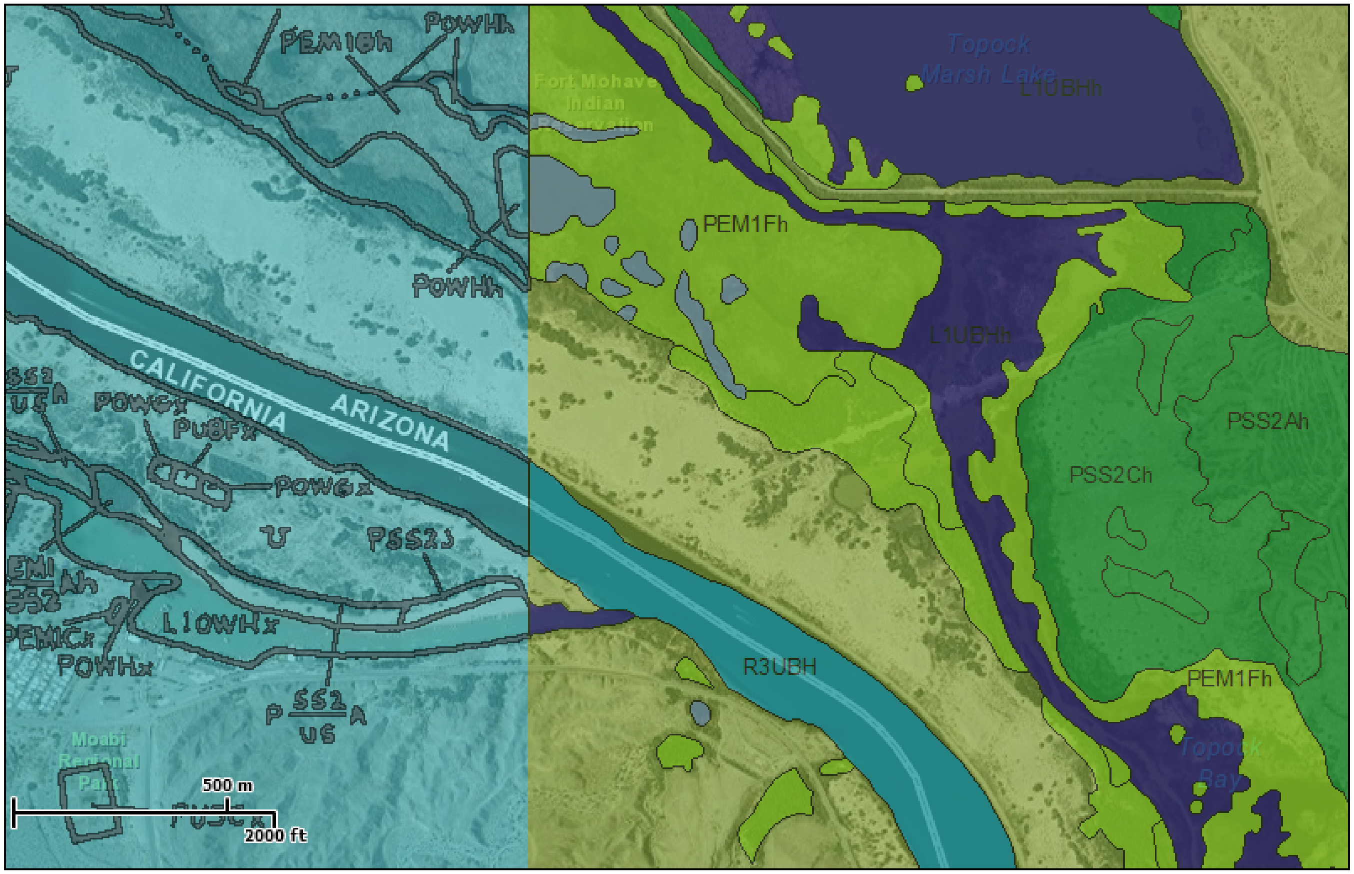
Topock

U.S. Fish and Wildlife Service

National Wetlands Inventory

Topock

Feb 12, 2012



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

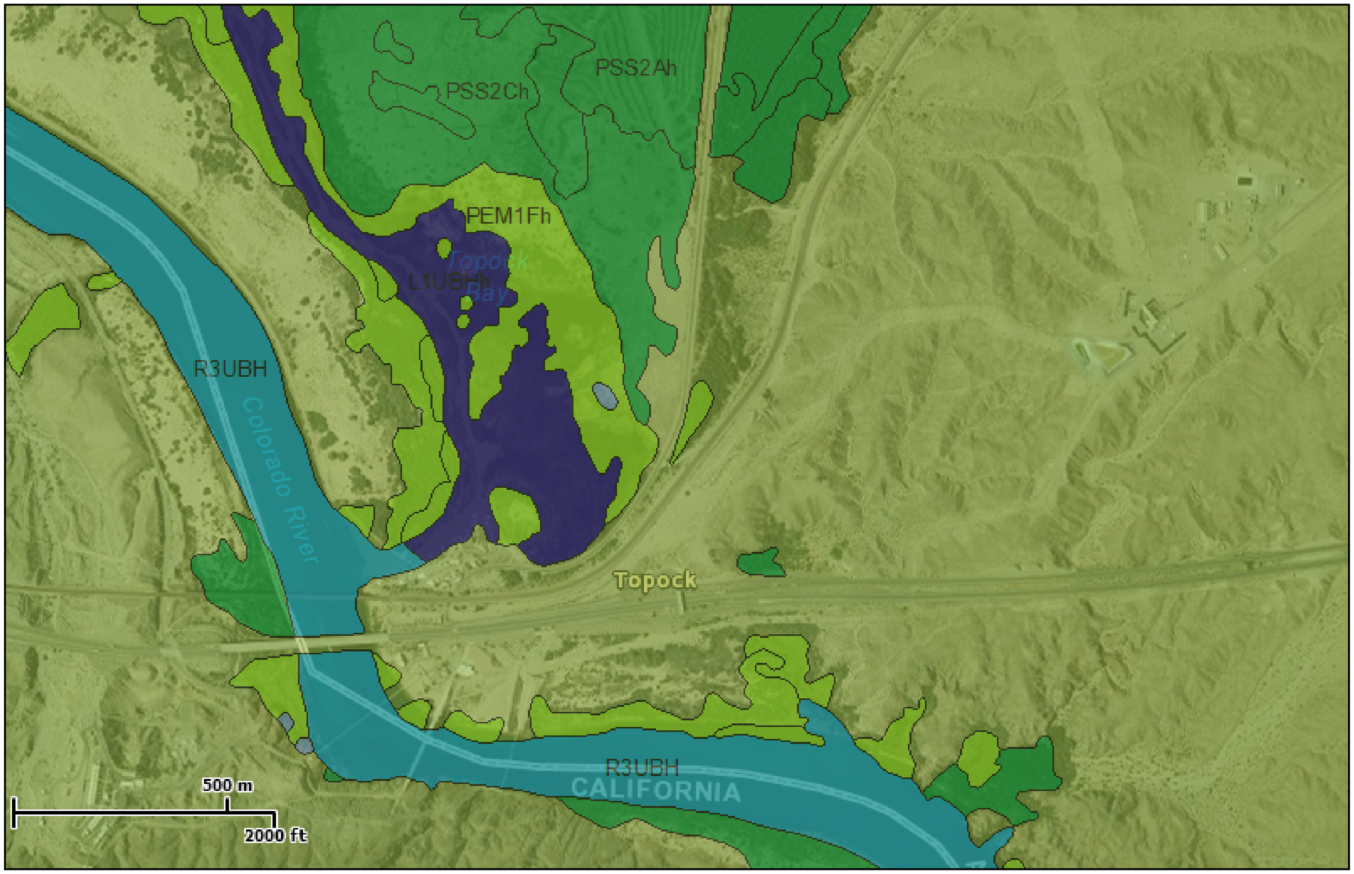
User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

Topock

Feb 12, 2012



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Status

- Digital
- Scan
- Non-Digital
- No Data

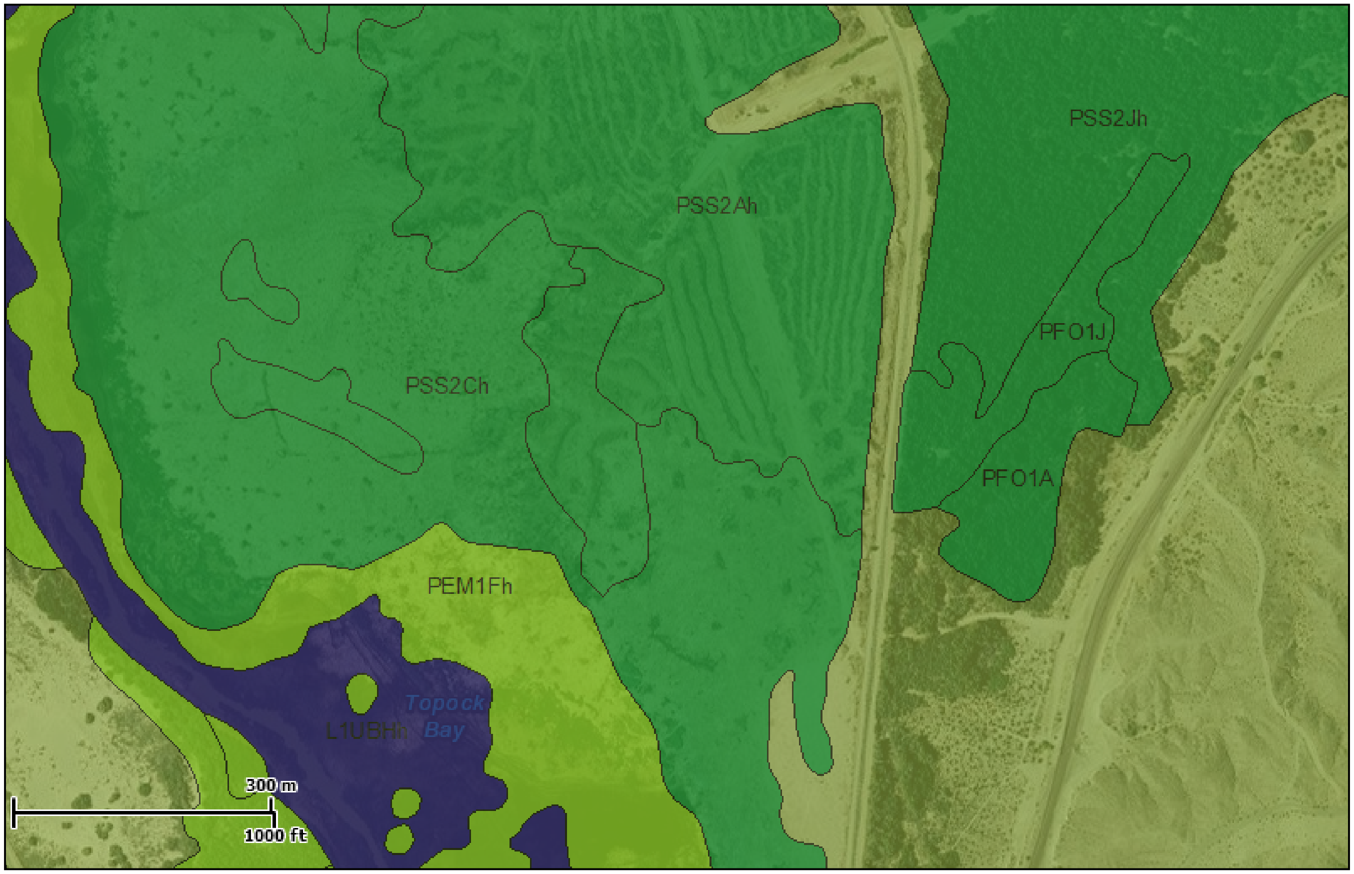
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

U.S. Fish and Wildlife Service
National Wetlands Inventory

Topock

Aug 17, 2012



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

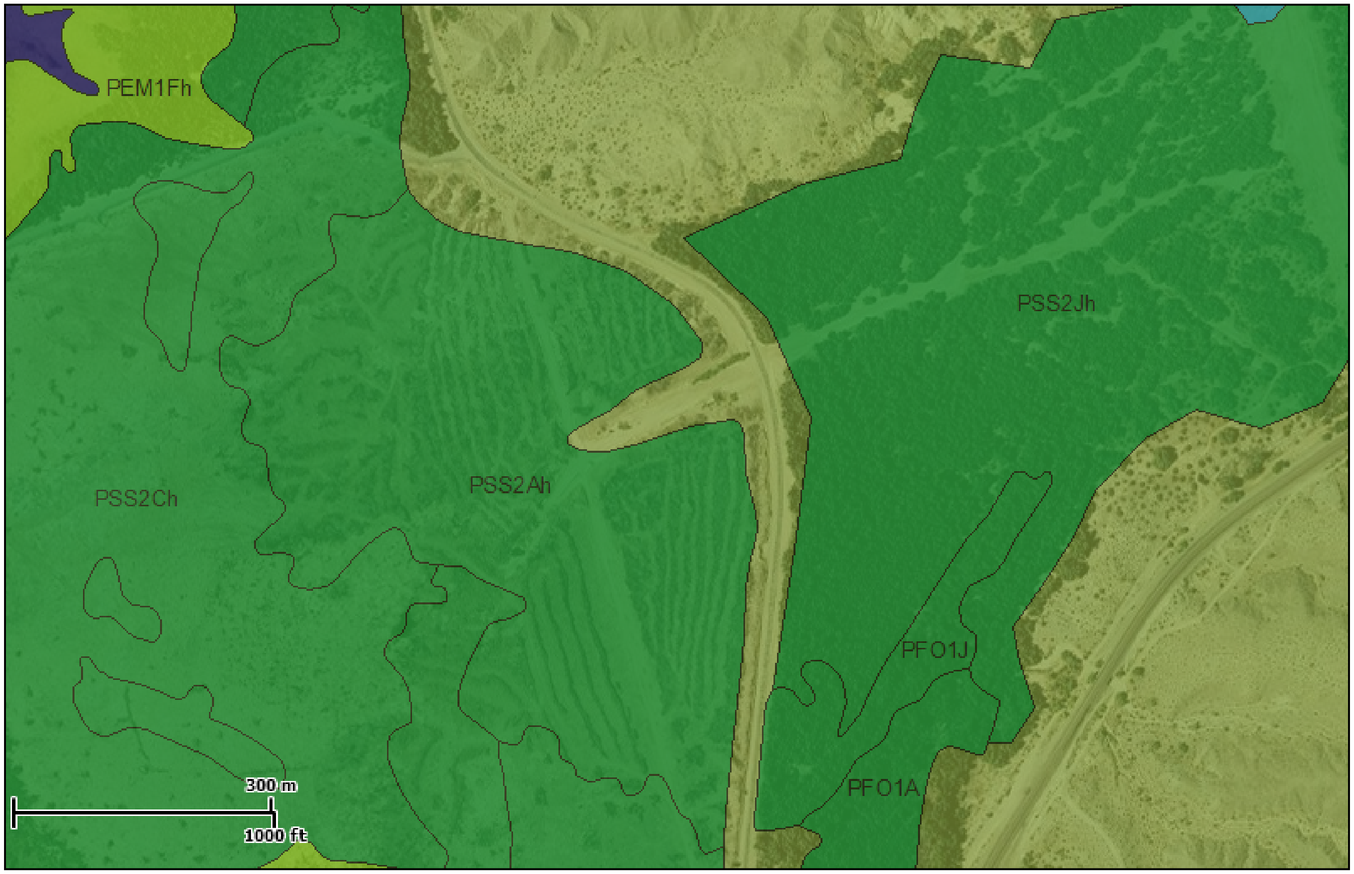
User Remarks:

U.S. Fish and Wildlife Service

National Wetlands Inventory

Topock

Aug 17, 2012



Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

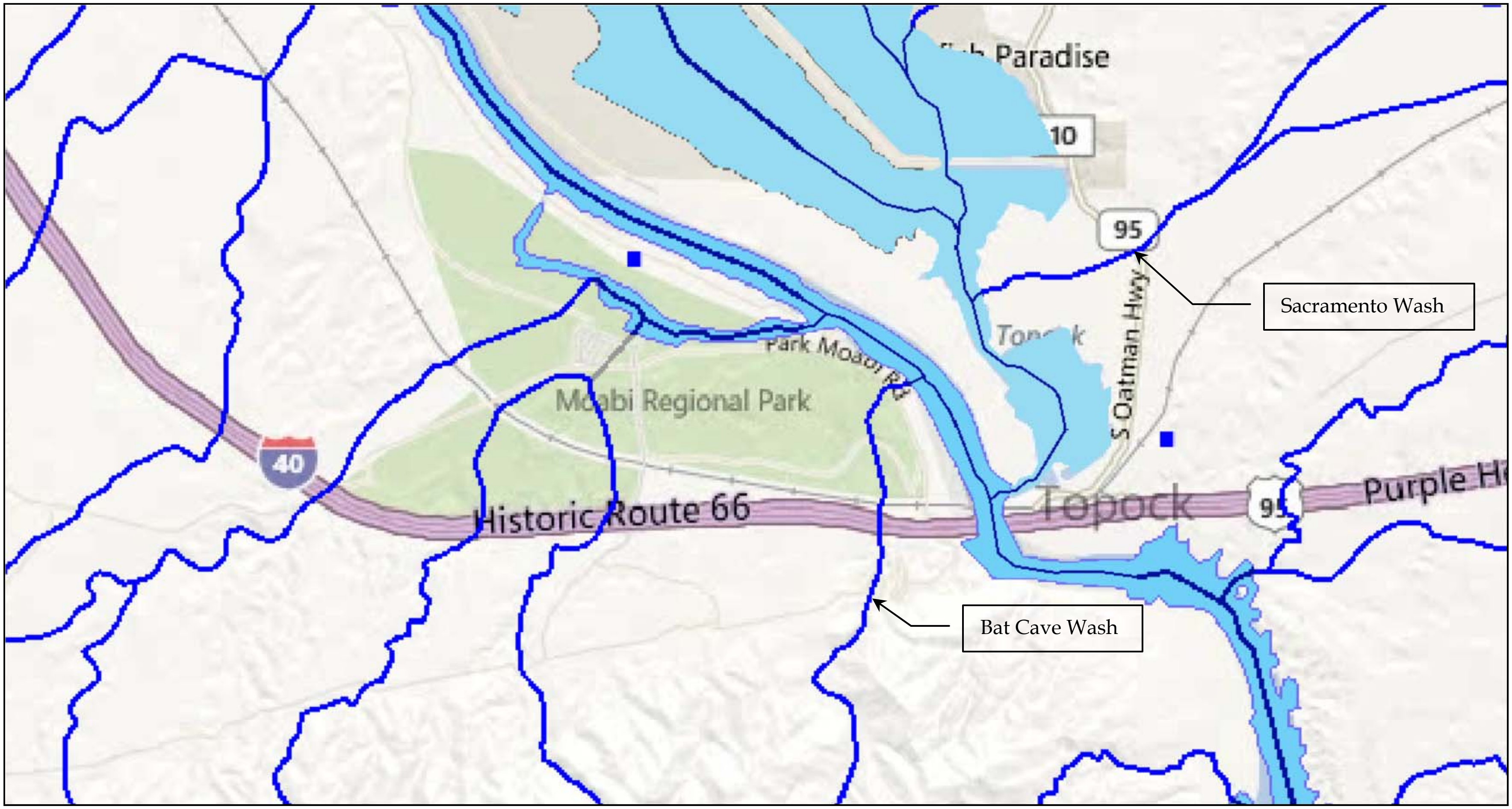
Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

Appendix H
National Hydrologic Data Set Maps



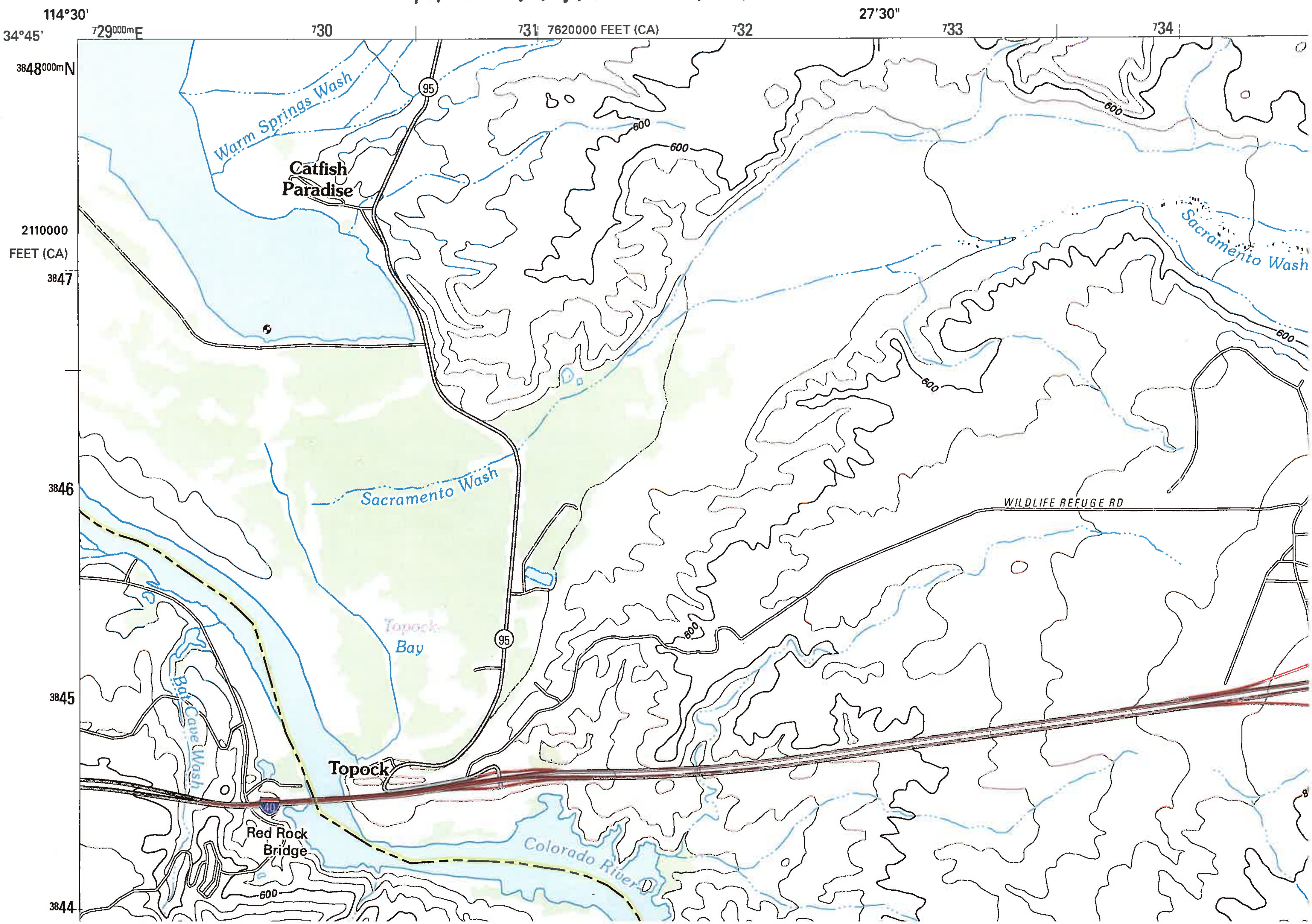
National Hydrography Dataset (NHD) – Map information from the U.S. Environmental Protection Agency: *My WATERS Mapper*
Available at: http://map24.epa.gov/mwm/mwm.html?fromUrl=/

Appendix I
USGS Topock and Whale Mountain Topographic Quadrangle Maps

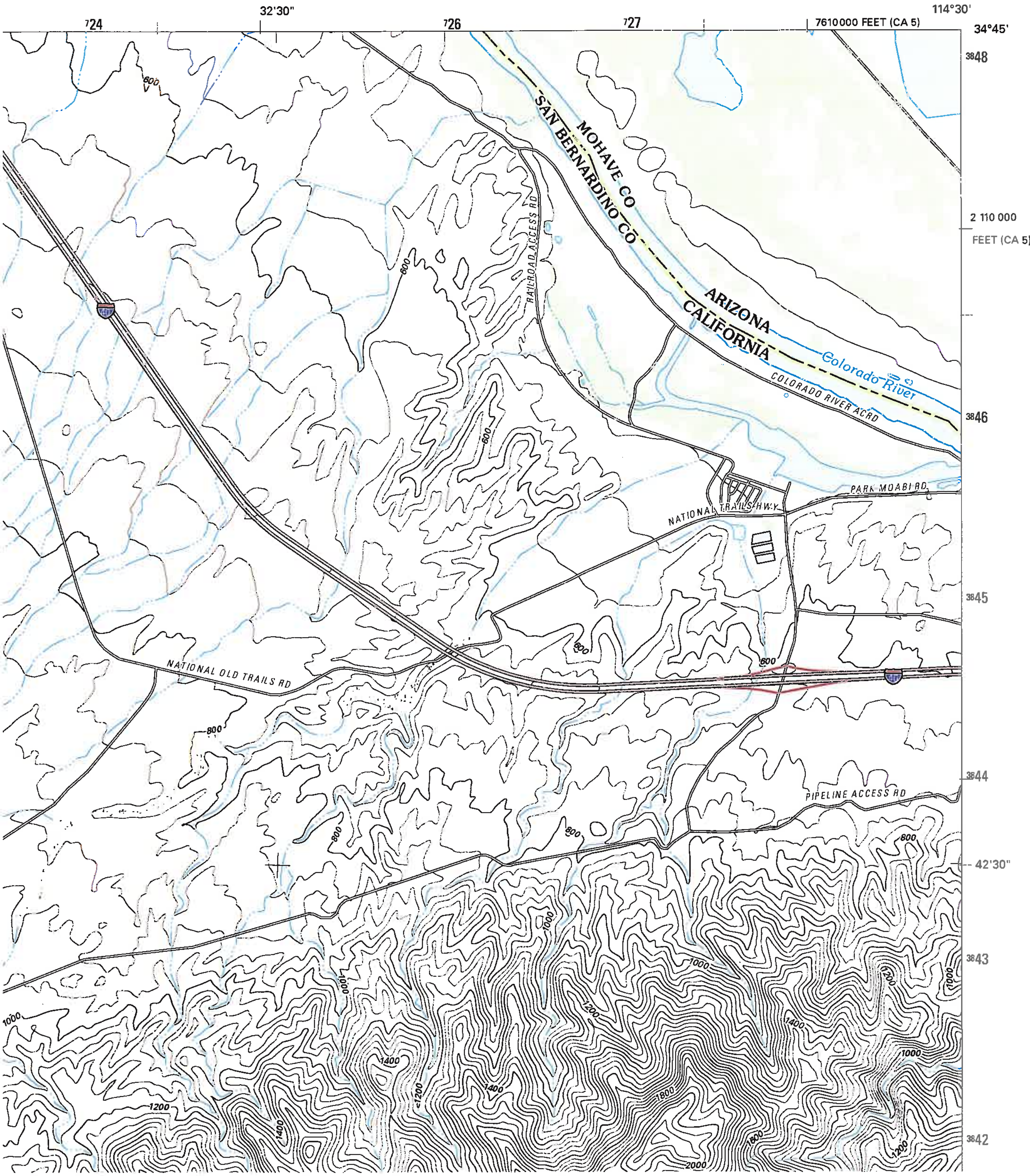
USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY
TOPOCK 7.5 MINUTE SERIES

The National
US T



WHALE MOUNTAIN QUADRANGLE
CALIFORNIA-ARIZONA
7.5-MINUTE SERIES



Appendix J
Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-1

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.730156 Long: -114.510884 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PEM1/SS2Ah

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Low terrace on the north side of Park Moabi Slough, northwest of the Park Moabi boat ramp. Adjacent to a shore zone wetland.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	5	Y	FAC
2.			
3.			
4.			
Total Cover:	5		
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus torreyi*	50	Y	FACW
2. *Hydrocotyle verticillata*	30	Y	OBL
3. *Paspalum dilatatum*	10		FAC
4. *Typha domingensis*	5		OBL
5. *Pluchea odorata*	5		OBL
6. *Eustoma exaltatum*	<1		OBL
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:			Multiply By:	
OBL species	40	×1 =	40	
FACW species	50	×2 =	100	
FAC species	15	×3 =	45	
FACU species		×4 =		
UPL species		×5 =		
Column Totals:	105	(A)	185	(B)

Prevalence Index = B/A = 1.76

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

XX Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Scattered *Salix exigua* also present in this area. Towards the river *Typha* becomes more abundant in the shore zone wetland,below the ordinary high water level of the slough. Most of the plants were senescent at the time of the survey.

SOIL

Sampling Point SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-2	10 YR 3/2	100	--	--	--	--	SL	Many fine roots
2-20	10 YR 5/3	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
X Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks: No reaction to alpha alpha-dipyrdyl; soil pH ~7.4
No Hydric soil indicators observed, but area is characterized by abundant FACW and OBL vegetation and has ground water present at a depth of 11 inches during relatively low flow conditions in the river. During peak summer flows (May-July) this area is likely saturated to the surface and/or inundated for prolonged periods of time; therefore hydric conditions are assumed present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 11
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 11

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh Iinlet near Needles, CA

Remarks: Shallow water table encountered during relatively low river flows. Low terrace along Park Moabi Slough that is likely subject to saturation and flooding during higher flows.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-2

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.730210 Long: -114.510722 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PEM1/SS2Ah

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks: Low terrace on the north side of Park Moabi Slough, northwest of the Park Moabi boat ramp. Adjacent to fringe and shore zone wetlands.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea sericea*	30	Y	FACW
2. *Baccharis sarothroides*	10	Y	FACU
3. *Tamarix ramosissima* (=*T. chinensis*)	<1		FAC
4.			
5.			
Total Cover:	40+		
Herb Stratum			
1. *Paspalum dilatatum*	2		FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	2		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 57+ % Cover of Biotic Crust N/AA

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	30	×2 =	60
FAC species	2	×3 =	6
FACU species	10	×4 =	40
UPL species		×5 =	
Column Totals:	42	(A)	106 (B)

Prevalence Index = B/A = 2.52**

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ___ **No** XX*

Remarks: **Prevalance index is below 3 but no indicators of hydric soil or wetland hydrology were evident at this sample location. Therefore the prevalence index criteria are not met. *Pluchea sericea* is a ruderal phreatophyte that is likely utilizing shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	S	Fine to medium roots

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) -Colorado RRiver Topock Marshlinlet near Needles, CA

Remarks: Soil was moist at depth of 20 inches below ground surface at the time of the survey, but there was no evidence of saturation or a shallow water table in the upper 24 inches at this location. Sample point is located on a low terrace above the ordinary high water level of Park Moabi Slough.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-3

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.730820 Long: -114.509796 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Remarks: Low terrace between Park Moabi Slough and the Colorado River, south of the Park Moabi camping area.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea sericea*	15	Y	FACW
2. *Psorothamnus spinosus*	5	Y	NL
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. *Tiquilia plicata*	15	Y	NL
2. *Cryptantha angustifolia*	<1		NL
3. *Schismus barbatus*	<1		NL
4.			
5.			
6.			
7.			
8.			
Total Cover:	15		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	33%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	15	×2 =	30
FAC species		×3 =	
FACU species		×4 =	
UPL species	20	×5 =	100
Column Totals:	35 (A)		130 (B)

Prevalence Index = B/A = 3.71

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: Relatively sparse vegetation in this area of the terrace, consisting of scattered shrubs and herbaceous species. *Pluchea sericea* is a ruderal phreatophyte that is likely using shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. Understory herbacesous plants are all upland species.

SOIL

Sampling Point SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/3-6/3	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this location are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches):	
Water Table Present?	Yes	___	No	X	Depth (inches):	>24
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches):	>24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: USGS River Gauge (09423550) -Colorado River Topock Marsh inlet near Needles, CAU

Remarks: Sample point is located on a low terrace above the ordinary high water level of Park Moabi Slough and the Colorado River. No evidence of saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-4

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.731043 Long: -114.509487 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Low terrace between Park Moabi Slough and the Colorado River, south of the Park Moabi camping area.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	30	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	30		
Herb Stratum			
1. *Tiquilia plicata*	<1		NL
2. *Cryptantha angustifolia*	<1		NL
3. *Schismus barbatus*	<1		NL
4. *Palafoxia arida*	<1		NL
5.			
6.			
7.			
8.			
Total Cover:	<4		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ~50 % Cover of Biotic Crust N/AA

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	30	×2 =	60
FAC species	20	×3 =	60
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	50 (A)		120 (B)

Prevalence Index = B/A = 2.4*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: Much of the *Pluchea* in this area is in poor condition or dead. Both *Tamarix* and *Pluchea sericea* are phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *Prevalence index criteria not met due to lack of hydric soil and hydrology indicators. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/3	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	
Water Table Present?	Yes ___	No	X	Depth (inches):	>24
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	>24

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Terrace above the ordinary high water level of Park Moabi Slough and the Colorado River;;no evidence to suggest prolonged saturation or inundation occur in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-5

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.730181 Long: -114.506341 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Low terrace between the Colorado River Park Moabi Slough, south of the Park Moabi camping area.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramossissima* (=*T. chinensis*)	50	Y	FAC
2.			
3.			
4.			
Total Cover:	50		
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust N/AA

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species	50	×3 = 150
FACU species		×4 =
UPL species		×5 =
Column Totals:	50 (A)	150 (B)

Prevalence Index = B/A = 3.0*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No X

Remarks: Vegetation in this area is comprised of scattered *Tamarix* trees only with no herbaceous or shurub understory. *Tamarix* is a deep rooted phreatophyte that is likley utilizing shallow ground water in this location. *Prevalence index is not met in this area due to lack of hydric soil and wetland hydrology indicators. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	LFS	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	
Water Table Present?	Yes ___	No	X	Depth (inches):	>24
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	>24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marshlinlet near Needles, CA

Remarks: Terrace above the ordinary high water level of Park Moabi Slough and the Colorado River. No indication of prolonged saturation or inundation at this location.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-6

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.729356 Long: -114.507466 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X		
Wetland Hydrology Present?	Yes ___ No X		

Remarks: Low terrace between Park Moabi Slough and the Colorado River, south of the Park Moabi camping area.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea sericea*	40	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1. *Cryptantha angustifolia*	<1		NL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	<1		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust N/A/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	40	×2 = 80
FAC species		×3 =
FACU species		×4 =
UPL species		×5 =
Column Totals:	40 (A)	80 (B)

Prevalence Index = B/A = 2.00**

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: Lots of dead *Pluchea* in this area and overall the vegetation is in poor condition. *No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met. *Pluchea sericea* is a ruderal phreatophyte that is likely exploiting shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation.

SOIL

Sampling Point SP-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-5	10 YR 5/3	100	--	--	--	--	SIC	
5-24	10 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sediments – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? Yes ___ No X Depth (inches): >24
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marshlinlet near Needles, CA

Remarks: Terrace above the ordinary high water level of Park Moabi Slough and the Colorado River. No evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-7

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.728898 Long: -114.507931 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks: Low terrace between Park Moabi Slough and the Colorado River, north of the Pirate Cove marina.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	25	Y	FAC
2.			
3.			
4.			
Total Cover:	25		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	30	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	30		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:			Multiply By:
OBL species		×1 =	
FACW species	30	×2 =	60
FAC species	25	×3 =	75
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	55 (A)		135 (B)

Prevalence Index = B/A = 2.45*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: Both *Tamarix and Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture; they are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators are present, therefore the prevalance index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/3-6/3	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest that hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	
Water Table Present?	Yes ___	No	X	Depth (inches):	>24
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	>24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marshlinlet near Needles, CA

Remarks: Terrace above the ordinary high water level of Park Moabi Slough and the Colorado River. No evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-8

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Low Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.716436 Long: -114.488999 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Low terrace along the Colorado River, south of the I-40 Bridge on the west side of the channel.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Phragmites australis*	100	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	100		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	100	×2 =	200
FAC species		×3 =	
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

X Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Dense monoculture of *Phragmites* in this area – to the north, along the shoreline of the river there is a small band of *Arundo donax* (FACW) also present within the wetland area.

SOIL

Sampling Point SP-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-6	10 YR 4/3	100	--	--	--	--	S	Mixture of sand and organic material
6-10	10 YR 4/2	100	--	--	--	--	S	
10-21	10 YR 5/3	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: Soils in this area appear to be part of the natural floodplain (dredged sands typically occur to the north of IInterstate 40 bridge in this area). No redoximorphic features or other hydric soil indicators were observed at this location; however, based on topographic position, abundance of FACW vegetation and the presence of wetland hydrology, hydric conditions are assumed to be present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	8
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	8

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: USGS River Gauge (09423550) -Colorado River Topock Marsh inlet near Needles, CA

Remarks: Low depressional area on terrace adjacent to the Colorado River. Shallow water table was present at the time of the surveys during relatively low river flows; the water table is likely higher during peak flows (May and July) resulting in shallow saturation and/or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/14/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-9

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.716429 Long: -114.489100 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks: Terrace along the Colorado River, south of the I-40 Bridge on the west side of the channel. This sample point is located approximately 3 feet above the edge of a low depressional area with dense *Phragmites.*

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	25	Y	FAC
2.			
3.			
4.			
Total Cover:	25		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	70	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	70		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	70	×2 = 140
FAC species	25	×3 = 75
FACU species		×4 =
UPL species		×5 =
Column Totals:	95 (A)	215 (B)

Prevalence Index = B/A = 2.26*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: Both *Tamarix* and *Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and they are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators are present, therefore the prevalance index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-12	10 YR 5/4	97	--	--	--	--	S	Mixed sand with gravel and cobble
	2.5 Y 3/4	2						
	5Y 5/8	1						

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soil in this area appears to be natural river floodplain deposits (dredged sands typically occur north of the Interstate 40 bridge in this area). No evidence suggesting hydric conditions are present at this location. Hard packed sand and large cobbles precluded excavation deeper than 12 inches at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):	>12	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>12	**Wetland Hydrology Present?** **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River and approximately 3 feet above the adjacent wetland; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station | City/County: San Bernardino County | Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company | State: CA | Sampling Point: SP-10

Investigator(s): Russell Huddleston and Kim Steiner | Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): None | Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region | Lat: 34.717022 | Long: -114.488207 | Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils | NWI classification: PEM1AA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	X	X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks: Terrace along the Colorado River, immediately south of the I-40 Bridge on the west side of the channel.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	40	Y	FAC
2. *Prosopis glandulosa*	25		UPL
3.			
4.			
Total Cover:	65		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	20	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	20	×2 = 40
FAC species	40	×3 = 120
FACU species		×4 =
UPL species	25	×5 = 125
Column Totals:	85 (A)	285 (B)

Prevalence Index = B/A = 3.35

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: DDense vegetative cover in this area - no herbaceous understory present. Both *Tamarix* and *Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and they are not considered to be present due to prolonged surface saturation or inundation. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-12	10 YR 4/4	100	--	--	--	--	S	Mixed sand with gravel and cobble

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soil in this area appears to be natural river floodplain deposits (dredged sands typically occur north of the Interstate 40 bridge in this area). No evidence to suggest hydric conditions are present at this location. Hard packed sand and large cobbles precluded excavation deeper than 12 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):	>12	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>12	**Wetland Hydrology Present?** **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-11

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.718588 Long: -114.488747 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PSS2/EM1CC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Remarks: Terrace along the west side of the Colorado River, jjust north of the BNSF railroad tracks.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis pubescens*	30	Y	FAC
2. *Tamarix ramosissima* (=*T. chinensis*)	10	Y	FAC
3.			
4.			
Total Cover:	40		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	50	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	50		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	50	×2 = 100
FAC species	40	×3 = 120
FACU species		×4 =
UPL species		×5 =
Column Totals:	90 (A)	220 (B)

Prevalence Index = B/A = 2.44**

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Both *Tamarix* and *Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List

SOIL

Sampling Point SP-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[a]	Loc[b]	Texture	Remarks
0-28	7.5 YR 6/4	98	7.5 YR 5/8	2	C	M	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand. AA few concentrations are present, but the matrix color does not meet any of the hydric indicators and there is no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):	>28	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>28	**Wetland Hydrology Present?** **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located on a terrace above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-12

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.718536 Long: -114.489370 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PSS2/EM1CC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks: Terrace along the west side of the Colorado River, north of the BNSF railroad tracks.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	40	Y	FAC
2.			
3.			
4.			
Total Cover:	40		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	25	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	25		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	25	×2 = 50
FAC species	40	×3 = 120
FACU species		×4 =
UPL species		×5 =
Column Totals:	65 (A)	170 (B)

Prevalence Index = B/A = 2.61*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No X

Remarks: Both *Tamarix* and *Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List

SOIL

Sampling Point SP-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-12	10YR 4/4	98	7.5 YR 4/6	2	C	M	S	
12-25	10 YR 5/4	98	7.5 YR 4/6	2	C	M	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: Soils in this area are derived from dredged river sand. A few concemtrations are present,,but the matrix soil color does not meet the criteria for hydric soil; no evidence to suggest that hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): >25
Saturation Present? Yes ___ No X Depth (inches): >25
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point is located on a low terrace above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-13

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.716692 Long: -114.488091 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PEM1AA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks: Low terrace on the west side of the Colorado River, south of Interstate 40.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	30	Y	FACW
2. *Baccharis sarothroides*	2		FACU
3.			
4.			
5.			
Total Cover:	32		
Herb Stratum			
1. *Phragmites australis*	5	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	5		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 43 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	35	×2 =	70
FAC species	20	×3 =	60
FACU species	2	×4 =	8
UPL species		×5 =	
Column Totals:	57 (A)		138 (B)

Prevalence Index = B/A = 2.42*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: Both *Tamarix* and *Pluchea sericea* are phreatophyte that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-10	10YR 4/4	100	--	--	-	--	S	Some cobble and gravel
10-50	10 YR 5/4	95%	7.5 YR 5/8	5	C	M	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks: Soil at this location appears to be derived from natural floodplain deposits (dredged sands typically occur north of Interstae 40 in this area). There are some concentrations are present below 10 inches, but the soil matrix color does not meet the hydric soil criteria and there is no evidence to suggest that hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): >50
Saturation Present? Yes ___ No X Depth (inches): >50
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; soil moisture increased with depth but no saturated soils or shallow ground water were encountered in the upper 50 inches. There is no evidence to suggest prolonged saturation or inundation occurs in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-14

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.720001 Long: -114.490691 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks: Terrace along the west side of the Colorado River,,north of monitoring well 20 (MW-20).

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	15	Y	FAC
2.			
3.			
4.			
Total Cover:	15		
Sapling/Shrub Stratum			
1. *Tamarix ramosissima* (=*T. chinensis*)	35	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	35		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species	50	×3 = 150
FACU species		×4 =
UPL species		×5 =
Column Totals:	50 (A)	250 (B)

Prevalence Index = B/A = 3.0*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: V*Tamarix* is a phreatophyte that is likely exploiting shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. T*amarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>24
Saturation Present? (includes capillary fringe)		X	>24

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-15

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 08 07N 24 E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.720703 Long: -114.489792 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Low terrace along the west side of the Colorado River northeast of monitoring well 20 (MW-20).

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea serecia*	70	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	70		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	70	×2 =	140
FAC species		×3 =	
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	70 (A)		140 (B)

Prevalence Index = B/A = 2.0*

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ____ Prevalence Index is ≤3.0*
- ____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Lots of dead *Pluchea* stems in this area. *Pluchea sericea* is a ruderal phreatophyte that is likely exploiting shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met.

SOIL

Sampling Point SP-15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[a]	Loc[b]	Texture	Remarks
0-30	10 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>30
Saturation Present? (includes capillary fringe)		X	>30

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-16

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 05 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.722714 Long: -114.490796 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks: Low terrace along the west side of the Colorado River northeast of monitoring well 20 (MW-20) and south of the mouth of Bat Cave Wash.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea sericea*	70	Y	FACW
2. *Tamarix ramossissima (= T. chinensis)*	10		FAC
3.			
4.			
5.			
Total Cover:	80		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	70	×2 =	140
FAC species	10	×3 =	30
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	80 (A)		170 (B)

Prevalence Index = B/A = 2.13*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0*
___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Both *Tamarix* and *Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-22	10 YR 5/4	100	--	--	--	--	S	
22-24+	10 YR 5/4	100	--	--	--	--	S	Mixed gravels present

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: USGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-17

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 05 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.722246 Long: -114.491816 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No X	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X		
Wetland Hydrology Present?	Yes ___ No X		

Remarks: Terrace along the west side of the Colorado River between the mouth of Bat Cave Wash and monitoring well 20 (MW-20)

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Tamarix ramosissima* (=*T. chinensis*)	40	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species	60	×3 = 180
FACU species		×4 =
UPL species		×5 =
Column Totals:	60 (A)	180 (B)

Prevalence Index = B/A = 3.0*

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0*
- ___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: *Tamarix* is a phreatophyte that is likely exploiting shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 6/3+	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______

Water Table Present? Yes ___ No X Depth (inches): >24

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-18

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 05 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.726751 Long: -114.496245 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: PEM1FF

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ____
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks: Low depressional basin located on terrace along the west side of the Colorado River, south of the mouth of Park Moabi Slough. This low area is hydrologically connected to a pond on the south side of the National Trails Highway via a culvert. This wetland is located immediately adjacent to the Colorado River, but there is no apparent direct surface water connection between the wetland and the river.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha domingensis*	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species	100	×1 = 100
FACW species		×2 =
FAC species		×3 =
FACU species		×4 =
UPL species		×5 =
Column Totals:	100 (A)	100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- X Prevalence Index is ≤3.0*
- ____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Dense monoculture of *Typha* in throughout the low basin.

SOIL

Sampling Point SP-18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	SL	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
X Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks: Soils in this area are derived from dredged river sands. No redoximorphic features were evident in the uper part of the soil in this area; hydric conditions are assumed present based on the abundance of obligate wetland vegetation, topographic position and presence of wetland hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 10
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 10

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: This low basin is connected via a large metal culvert to a perennial pond on the south side of the National Trails Highway. Likley a direct ground water connection between this low area and the Colorado River but there is no apparent direct surface water connection with the river. This area is likley saturated to the surface and/or inundated during periods of high flows (May-July).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-19

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 05 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.726741 Long: -114.496191 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: NoneF

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks: Adjacent to depressional basin on a low terrace along the west side of the Colorado River between Park Moabi Slough and Bat Cave Wash

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	50	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	50		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	50	×2 =	100
FAC species	20	×3 =	60
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	70 (A)		160 (B)

Prevalence Index = B/A = 2.29**

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No X

Remarks: *Both *Tamarix* and *Pluchea sericea* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	7.5 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>24
Saturation Present? (includes capillary fringe)		X	>24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located about 2 feet above the low depressional area and is above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/16/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-20

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 05 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.727439 Long: -114.496798 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks: Terrace along the west side of the Colorado River,,just to the southest of the mouth of Park Moabi Slough.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis glandulosa*	20	Y	UPL
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	35	Y	FACW
2. *Tamarix ramosissima* (=*T. chinensis*)	5		FAC
3. *Baccharis sarothroides*	2		FACU
4.			
5.			
Total Cover:	42		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 38 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	50%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	35	×2 = 70
FAC species	5	×3 = 15
FACU species	2	×4 = 8
UPL species	20	×5 = 100
Column Totals:	62 (A)	193 (B)

Prevalence Index = B/A = 3.11

Hydrophytic Vegetation Indicators:

- ____ Dominance Test is >50%
- ____ Prevalence Index is ≤3.0*
- ____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No XX

Remarks: *Pluchea sericea* and *Tamarix* are ruderal phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
0-24	10 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): >24

Saturation Present? Yes ___ No X Depth (inches): >24 **Wetland Hydrology Present?** **Yes** ___ **No** X
(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: San Bernardino County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: CA Sampling Point: SP-21

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 06 07N 24E (San Bernardino Meridian)

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.726894 Long: -114.505480 Datum: WGS 1984

Soil Map Unit Name: No NRCS Mapped Soils NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks: Low terrace along the south side of Park Moabi Slough, east of the Pirate Cove Resort. Sample point is located near road where there appears to be some dumping of soils and debris.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis glandulosa*	15	Y	UPL
2.			
3.			
4.			
Total Cover:	15		
Sapling/Shrub Stratum			
1. *Tamarix ramosissima* (=*T. chinensis*)	5	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	5		
Herb Stratum			
1. *Suaeda nigra* =	20	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	20		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species	20	×1 = 20
FACW species		×2 =
FAC species	5	×3 = 15
FACU species		×4 =
UPL species	15	×5 = 75
Column Totals:	40 (A)	110 (B)

Prevalence Index = B/A = 2.75**

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No X

Remarks: *Suadea* is often associated with moderately to strongly alkaline soils and its presence and abundance in this area may be a reflection of edaphic,rather than hydrologic environmental conditions. *Tamarix* is a phreatophyte that is likely exploiting shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	S	Mixed with angular gravel

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: Soils in this area are derived from dredged river sand and possibly other fill material. No evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):	>24	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>24	**Wetland Hydrology Present?** Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of Park Moabi Slough and there is no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-22

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 02 15N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.719145 Long: -114.480713 Datum: WGS 1984

Soil Map Unit Name: Marshes NWI classification: L1UBHh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil X, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Sample point taken at the southern edge of theTopock Marsh, north of Highway 95, east of the Topock Marina.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Schoenoplectus californicus*	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species	100	×1 = 100
FACW species		×2 =
FAC species		×3 =
FACU species		×4 =
UPL species		×5 =
Column Totals:	100 (A)	100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

X Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: VVegetation in this area is characterized by a dense monoculture of *Schoenoplectus californicus.* Most of the plants were scenescent at the time of the survey.

SOIL

Sampling Point SP-22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[a]	Loc[b]	Texture	Remarks
0-2	10 YR 4/2	100	--	--	--	--	SICL	Saturated/Flooded
2-12	10 YR 4/1	100	--	--	--	--	SiC	Saturated/Flooded

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
X Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks: No hydric soil indicators are present at this location;,however,, hydric conditions are presumed present based on the abundance of obligate wetland vegetation, topographic position and presnece of wetland hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 7
Water Table Present? Yes ___ No ___ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: This area was flooded at the time of the survey during relatively low flows in the river. The Topock Marsh has a direct surface water connection with the Colorado River.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-24

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 02 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.719091 Long: -114.480063 Datum: WGS 1984

Soil Map Unit Name: GGunsight very gravelly loam 10-40 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No XX
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks: Roadway fill slope along the north side of Highway 95, just outside the southern edge of the Topock Marsh, east of the Topock Marina.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea sericea*	30	Y	FACW
2. *Baccharis sarothroides*	10	Y	FACUU
3. *Tamarix ramosissima* (=*T. chinensis*)	10	Y	FAC
4.			
5.			
Total Cover:	50		
Herb Stratum			
1. *Cynodon dactylon*	20	Y	FACUU
2. *Chenopodium album*	<1		FACU
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	20		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	30	×2 = 60
FAC species	10	×3 = 30
FACU species	30	×4 = 120
UPL species		×5 = V
Column Totals:	70 (A)	210 (B)

Prevalence Index = B/A = 3.00*

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X X

Remarks: Narrow band of vegetaion along the road shoulder and the topock marsh.
*No hydric soil or wetland hydrology indicators were evident at this location, therefore the prevalence index criteria are not met.
Tamarix ramosissima is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Roadway fill slope above the marsh, no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? Yes ___ No X Depth (inches): >24
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point is approximately 3 feet above the marsh; no evidence that this area is subject to prolonged saturation or flooding.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-23

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 35 15N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.722811 Long: -114.478670 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology ____ Significantly disturbed? Are "Normal Circumstances" present? Yes ____ No XX

Are Vegetation ____ , Soil XX , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks: Area was previously characterized by dense *Tamarix* but was burned in a 2008 wildfire. After the fire the US Fish and Wildlife Service cleared the dead trees and woody debris as part a habitat improvement and revegetation program for this part of the Lake Havasu National Wildlife Refuge. DDebris removal and re-planting of some of the burn area occurred in 2011.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Atriplex lentiformis*	40	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species		×2 =	
FAC species	40	×3 =	120
FACU species		×4 =	
UPL species		×5 =	
Column Totals:	40 (A)		120 (B)

Prevalence Index = B/A = 3.0**

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: *Atriplex lentiformis* is a species that is often associated with saline and alkaline soils and its presence here may be more indicative of edaphic rather than hydrologic conditions. **No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met.

SOIL

Sampling Point SP-23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[a]	Loc[b]	Texture	Remarks
0-24	10 YR 5/4	100	--	--	--	--	S	pH 8.6
24-35	10 YR 4/3	95%	7.5 YR 4/6	5%	C	M	SCL	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: No hydric soil indicators were evident at this location in the upper 24 inches of the soils;; some redoximorphic features are present below 24 inches. Soils at this location are strongly alkaline and are considered problematic; however, there is no evidence to suggest the presence of surface saturation or inundation long enough to result in anaerobic conditions in the upper part of the soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______

Water Table Present? Yes ___ No X Depth (inches): >35

Saturation Present? Yes ___ No X Depth (inches): >35
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: No evidence of prolonged inundation or shallow ground water (with the upper 35 inches).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-25

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 03 15N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.719890 Long: -114.486341 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-3 percent slopes NWI classification: PEM1F

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks: Terrace along the east side of the Colorado River,, north of the Topock Marina.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (= *T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Tamarix ramosissima* (= *T. chinensis*)	30	Y	FAC
2. *Pluchea sericea*	10	Y	FFACW
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 40% % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	10	×2 = 20
FAC species	50	×3 = 150
FACU species		×4 =
UPL species		×5 =
Column Totals:	60 (A)	170 (B)

Prevalence Index = B/A = 2.83*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No X

Remarks: Both *Tamarix* and *Pluchea sericea* are phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-50	10 YR 6/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): >50
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >50

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Soil moisture increases with depth but no evidence of saturation at depth of 50 inches below the ground surface. Sample point is above the ordinary high water level of the river.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-26

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 03 15N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.719346 Long: -114.485083 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-3 percent slopes NWI classification: PEM1/SS2A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks: Low terrace along the eastern side of the Colorado River, just north of the Topock Marina, along outlet from the Topock Marsh. Narrow fringe wetland along the waters edge.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus torreyi*	60	Y	FACW
2. *Paspalum dilatatum*	20	Y	FAC
3. *Hydrocotyle verticillata*	10		OBL
4. *Phragmites australis*	5		FACW
5. *Schoenoplectus californicus*	3		OBL
6. *Pluchea odorata*	2		FACW
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species	13	×1 = 13
FACW species	67	×2 = 134
FAC species	20	×3 = 60
FACU species		×4 =
UPL species		×5 =
Column Totals:	100 (A)	207 (B)

Prevalence Index = B/A = 2.07

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

X Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Narrow band of herbaceous wetland on low terrace - between patches of shoreline wetland characterized by *Schoenoplectus californicus* and scrub-shrub wetland area further up on the terrace.

SOIL

Sampling Point SP-26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[a]	Loc[b]	Texture	Remarks
0-8	10 YR 4/2	95	5 YR 3/4	5%	C	M	SIL	
8-24	10 YR 5/3	90%	10 YR 5/4	2%	C	M	SL	
	10 YR 5/2	8%						ped surfaces

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks: Low chroma matrix with redox concentrations in the upper 8 inches of the profile at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes X No ___ Depth (inches): 12
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 12

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample location is immediately adjacent to the Topock Marsh outlet into the Colorado River. Shallow water table was present during a time of lower river flows. Prolonged saturation and flooding are likley common in this area during periods of higher flows (May-July).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-27

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 03 15N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.719303 Long: -114.485018 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-3 percent slopes NWI classification: PEM1/SS2A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation X, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes XX* No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Low terrace along the north side of the outlet of the Topock Marsh into the Colorado River,, north of the Topock Marina and immediately adjacent to narrow fringe wetland. *

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	25	Y	FACW
2. *Baccharis sarothroides*	15	Y	FACUCU
3. *Tamarix ramosissima* (=*T. chinensis*)	10		FAC
4. *Salix exigua*	5		FACW
5.			
Total Cover:	55		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2 (A)
Total Number of Dominant Species Across All Strata:	3 (B)
Percent of Dominant Species that are OBL, FACW, or FAC:	66% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	30	×2 = 60
FAC species	30	×3 = 90
FACU species	15	×4 = 60
UPL species		×5 =
Column Totals:	75 (A)	210 (B)

Prevalence Index = B/A = 2.80

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

X Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** XX* **No** ____

Remarks: *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-8	10 YR 4/2	95	5 YR 3/4	5%	C	M	SIL	
8-24	10 YR 5/3	98%	10 YR 5/4	2%	C	M	SL	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes _X_ No ___

Remarks: ASoil at this location has a low chroma matrixxwith approximately 5 percent redox concentrations in the upper part.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ______
Water Table Present? Yes _X_ No ___ Depth (inches): 15
Saturation Present? (includes capillary fringe) Yes _X_ No ___ Depth (inches): 15

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Shallow ground water was present at the time of the survey during realtively low flows. Ground water levels are likely closer to the surface in this area during periods of higher flows (May-July); however, this are is slightly higher in elevation than the adjacent fringe wetland it is likley only saturated near the surface during high flows and may be infrequantly flooded.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: MojaveCounty Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-28

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 03 15N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.719291 Long: -114.485317 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-3 percent slopes NWI classification: PEM1/SS2A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Terrace along the east side of the Colorado River,,north of the Topock Marina.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2. *Prosopis glandulosa*	10	Y	UPL
3.			
4.			
Total Cover:	30		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	35	Y	FACW
2. *Tamarix ramosissima* (=*T. chinensis*)	5		FAC
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	35	×2 =	70
FAC species	25	×3 =	75
FACU species		×4 =	
UPL species	10	×5 =	50
Column Totals:	70 (A)		195 (B)

Prevalence Index = B/A = 2.79*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No X

Remarks: Both *Tamarix* and *Pluchea sericea* are phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-26	10 YR 6/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>36
Saturation Present? (includes capillary fringe)		X	>36

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-29

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 34 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.721081 Long: -114.485903 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-1 percernt slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		XX
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks: Low terrace along the east side of the Colorado River,, north of the Topock Marina.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	20	Y	FAC
2.			
3.			
4.			
Total Cover:	20		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	15	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	15		
Herb Stratum			
1. *Cryptantha angustifolia*	5	Y	NL
2. *Tiquilia plicata*	5	Y	NL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	10		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	50%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	15	×2 =	30
FAC species	20	×3 =	60
FACU species		×4 =	
UPL species	10	×5 =	50
Column Totals:	45 (A)		140 (B)

Prevalence Index = B/A = 3.11

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X X

Remarks: Both *Tamarix* and *Pluchea sericea* are phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
0-26	10 YR 5/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>24
Saturation Present? (includes capillary fringe)		X	>24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point is located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-30

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 34 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.723277 Long: -114.488108 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks: Low terrace along the east side of the Colorado River,, north of the Topock Marina

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix ramosissima* (=*T. chinensis*)	25	Y	FAC
2.			
3.			
4.			
Total Cover:	25		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	30	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	30		
Herb Stratum			
1. *Cryptantha angustifolia*.	5	.	NL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	<5		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species	30	×2 = 60
FAC species	25	×3 = 75
FACU species		×4 =
UPL species	5	×5 = 25
Column Totals:	60 (A)	160 (B)

Prevalence Index = B/A = 2.67*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: Many dead *Pluchea* stems in this area. Both *Tamarix* and *Pluchea sericea* are phreatophytes that are likely exploiting shallow ground water and soil moisture and are not considered to be present due to prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were evident at this location; therefore the prevalence index criteria are not met. *Tamarix ramosissima* is considered a synonym of *T. chinensis* by the North America Digital Flora: National Wetland Plant List

SOIL

Sampling Point SP-30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-28	10 YR 6/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	>28
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	>28

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point is located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave County Date: 2/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-31

Investigator(s): Russell Huddleston and Kim Steiner Section, Township, Range: 34 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2 %

Subregion (LRR): D-Western Range and Irrigated Region Lat: 34.725209 Long: -114.489746 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		X

Remarks: Low terrace along the east side of the Colorado River, across the river from the outlet of Bat Cave Wash.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Pluchea sericea*	20	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. *Cryptantha angustifolia*	5	Y	NL
2. *Tiquilia plicata*	5	Y	NL
3. *Schismus barbatus*	5	Y	NL
4.			
5.			
6.			
7.			
8.			
Total Cover:	15		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ~75% % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	25%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species		×1 =	
FACW species	20	×2 =	40
FAC species		×3 =	
FACU species		×4 =	
UPL species	15	×5 =	75
Column Totals:	35 (A)		85 (B)

Prevalence Index = B/A = 3.28*

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: *Pluchea sericea* is a ruderal phreatophyte that is likely exploiting shallow ground water and soil moisture and is not considered to be present due to prolonged surface saturation or inundation. *Herbaceous understory consists entirely of upland species in this area.
.

SOIL

Sampling Point SP-31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
0-28	10 YR 6/4	100	--	--	--	--	S	

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are derived from dredged river sand – no evidence to suggest that hydric conditions are present at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):	>28	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>28	**Wetland Hydrology Present?** **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: UUSGS River Gauge (09423550) - Colorado River Topock Marsh inlet near Needles, CA

Remarks: Sample point is located above the ordinary high water elevation of the Colorado River; no evidence of prolonged saturation or inundation in this area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave Date: 7/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-32

Investigator(s): Russell Huddleston and Melissa Fowler Section, Township, Range: 35 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2%

Subregion (LRR): D- Western Range and Irrigated Lat: 34.732306 Long: -114.480818 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-1 percent slopes NWI classification: PSS2Ah

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____ , Soil X , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Remarks: This area was formerly a dense tamarisk thicket that burned in an October 2008 wildfire. Dead trees and woody debris have been cleared from this area by the US Fish and Wildlife Service as part of the habitat improvement and revegetation program for this part of the Havasu National Wildlife Refuge. Significant summer rainfall occurred in the region resulting in over an inch of precipitation immediately prior to the survey. Summer thunderstorms are common and considered typical for this time of year.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species that are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species		×3 =
FACU species		×4 =
UPL species		×5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: All of the dead *Tamarix* trees and most of the woody debris has been removed from this area, but there are a few scattered piles of woody debris remaining in this area. No vegetation was present at the time of the survey.

SOIL

Sampling Point SP-32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[a]	Loc[b]	Texture	Remarks
0-18	10YR 4/3	100	--	--	--	--	S	Soil pH = 8.2
18-24	10 YR 4/3	99	7.5 YR 3/4	1	C	M	LS	Soil pH = 8.4

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are moderately alkaline and are considered to be problematic; however, there is no evidence to suggest that the soils in this location are subject to prolonged saturation or inundation that would result in anaerobic conditions in the upper part.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Some evidence of short duration surface flooding in this area as a result of recent, high intensity rainstorms (over an inch of precipitation immediately preceding the survey). No surface ponding, or saturated soils were evident at this location three days after significant rainfall and high flows in the Sacramento Wash.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave Date: 7/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-33

Investigator(s): Russell Huddleston and Melissa Fowler Section, Township, Range: 35 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2%

Subregion (LRR): D- Western Range and Irrigated Lat: 34.729312 Long: -114.478384 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-1 percent slopes NWI classification: PSS2Ah

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil X , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks: Area was formerly a dense tamarisk thicket that was burned in an October 2008 wildfire. Dead trees and woody debris were cleared by the US Fish and Wildlife Service as part of the habitat improvement and revegetation program in this area of the Havasu National Wildlife Refuge. Significant summer rainfall occurred in the region resulting in over an inch of precipitation immediately prior to the survey.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: ___ (A)

Total Number of Dominant Species Across All Strata: ___ (B)

Percent of Dominant Species that are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species		×3 =
FACU species		×4 =
UPL species		×5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: The burned tamarisk has been removed from this area and wood chips have been spread across the surface of the soils in this area. No vegetation present at the sample location. Most of the burn area has been cleared and is devoid of vegetation with the exception of sparsely scattered *Tamarix aphylla* seedlings and scattered *Salsola tragus.*

SOIL

Sampling Point SP-33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10YR 4/3	100	--	--	--	--	LFS	Soil pH = 8.2

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ____ No X

Remarks: Soils in this area are moderately alkaline and are considered problematic; however, there is no evidence to suggest that the soils in this location are subject to prolonged saturation or inundation that would result in anaerobic conditions in the upper part.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>24
Saturation Present? (includes capillary fringe)		X	>24

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Some evidence of short duration surface flooding in this area as a result of recent, high intensity rainstorms (over an inch of precipitation immediately preceding the survey). However, no surface ponding or saturated soils evident in the upper 24 inches at this location three days after significant rainfall and high flows in the Sacramento Wash.
Summer thunderstorms are common and considered typical for this time of year.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave Date: 7/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-34

Investigator(s): Russell Huddleston and Melissa Fowler Section, Township, Range: 35 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2%

Subregion (LRR): D- Western Range and Irrigated Lat: 34.725211 Long: -114.478169 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil X , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X		
Wetland Hydrology Present?	Yes ___ No X		

Remarks: Area was formerly a dense tamarisk thicket that was burned in an October 2008 wildfire. Dead trees and woody debris have been cleared by the US Fish and Wildlife Service (Havasu National Wildlife Refuge). This sample location is in an area that has been planted with native vegetation and regularly irrigated. Significant summer rainfall occurred in the region resulting in over an inch of precipitation immediately prior to the survey. Summer thunderstorms are common and considered typical for this time of year.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Atriplex canescens*	25	Y	NL
2. *Prosopis pubescens*	15	Y	FAC
3.			
4.			
5.			
Total Cover:	40		
Herb Stratum			
1. *Dysphania ambrosioides* (= *Chenopodium*)	15	Y	NL
2. *Sporobolus airoides*	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	20		
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

	Total % Cover Of:		Multiply By:
OBL species		×1 =	
FACW species		×2 =	
FAC species	20	×3 =	60
FACU species		×4 =	
UPL species	40	×5 =	200
Column Totals:	60	(A)	260 (B)

Prevalence Index = B/A = 4.33

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: Most of the vegetation in this area was planted by the US Fish and Wildlife Service in the Spring of 2011.

SOIL

Sampling Point SP-34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10YR 5/3	100	--	--	--	--	S	Soil pH = 8.3 to 8.4

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ___ **No** X

Remarks: Soils in this area are moderately alkaline and are considered problematic; however, there is no evidence to suggest that the soils in this location are subject to prolonged saturation or inundation that would result in anaerobic conditions in the upper part. Slight increase in soil pH with depth in this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >24

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No evidence of flooding or saturation in this area despite recent, high intensity rainstorms (over an inch of precipitation immediately preceding the survey). No wet or saturated soils evident in the upper 24 inches at this location three days following significant rainfall and high flows in the Sacramento Wash.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave Date: 7/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-35

Investigator(s): Russell Huddleston and Melissa Fowler Section, Township, Range: 35 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2%

Subregion (LRR): D- Western Range and Irrigated Lat: 34.725272 Long: -114.477274 Datum: WGS 1984

Soil Map Unit Name: Lagunita sand 0-1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil X, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks: Sample point taken in bush seepweed community at the edge of dense tamarisk thicket between Highway 95 and the BNSF railroad tracks. There was a significant amount of summer rainfall (over an inch of precipitation) immediately prior to the survey. Summer thunderstorms are common and considered typical for this time of year.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix aphylla*	10	Y	FAC
2. *Tamarix ramosissima* (=*T. chinensis*)	5	Y	FAC
3.			
4.			
Total Cover:	15		
Sapling/Shrub Stratum			
1. *Suaeda nigra* (=*S. moquinii*)	15	Y	OBL
2. *Ambrosia dumosa*	1		NL
3.			
4.			
5.			
Total Cover:	16		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ~70 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:	
OBL species	15	×1 =	15
FACW species		×2 =	
FAC species	15	×3 =	45
FACU species		×4 =	
UPL species	1	×5 =	5
Column Totals:	31 (A)		65 (B)

Prevalence Index = B/A = 2.10*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: Relatively sparse vegetation in this area; sample point taken at edge of tamarisk thicket. *Tamarix aphylla* and *T. ramosissima* are both phreatophytes as well as salt tolerant species. *Suaeda nigra* is commonly associated with alkaline soils and its presence may have more to do with edaphic rather than hydrologic conditions in this area. *No hydric soil or wetland hydrology indicators were observed at this location.

Tamarix ramosissima is considered a synonym of T. chinensis by the North America Digital Flora: National Wetland Plant List.

SOIL

Sampling Point SP-35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10YR 4/4	100	--	--	--	--	S	Soil pH = 8.3 to 9.6

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ____

Hydric Soil Present? Yes ____ No X

Remarks: Soils in this area range from moderately alkaline near the surface to very strong alkaline in the lower part. Alkaline soils are considered problematic; however, there is no evidence to suggest that the soils in this location are subject to prolonged saturation or inundation that would result in anaerobic conditions in the upper part.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1) (**Nonriverine**)
____ Sediment Deposits (B2) (**Nonriverine**)
____ Drift Deposits (B3) (**Nonriverine**)
____ Surface Soil Cracks (B6)
____ Inundation Visible on Aerial Imagery (B7)
____ Water-Stained Leaves (B9)
____ Salt Crust (B11)
____ Biotic Crust (B12)
____ Aquatic Invertebrates (B13)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres along Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Plowed Soils (C6)
____ Other (Explain in Remarks)

Secondary Indicators (two or more required)

____ Water Marks (B1) (**Riverine**)
____ Sediment Deposits (B2) (**Riverine**)
____ Drift Deposits (B3) (**Riverine**)
____ Drainage Patterns (B10)
____ Dry-Season Water Table (C2)
____ Thin Muck Surface (C7)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Shallow Aquitard (D3)
____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): >24
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): >24

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No evidence of flooding or saturation in this area despite recent, high intensity rainstorms (over an inch of precipitation immediately preceding the survey). No surface ponding, wet or saturated soils were evident in the upper 24 inches at this location three days after significant rainfall and high flows in the Sacramento Wash.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave Date: 7/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-36

Investigator(s): Russell Huddleston and Melissa Fowler Section, Township, Range: 35 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2%

Subregion (LRR): D- Western Range and Irrigated Lat: 34.729458 Long: -114.473959 Datum: WGS 1984

Soil Map Unit Name: Rositas Family, superstition and torriorthents soils 1-3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil X, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks: Sample point taken at the edge of dense athel tamarisk thicket, west of the BNSF railroad near large culvert and discontinuous drainage channel. A significant amount of summer rainfall occurred in the region (over an inch of precipitation) immediately prior to the survey. Summer thunderstorms are common and considered typical for this time of year.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix aphylla*	40	Y	FAC
2.			
3.			
4.			
Total Cover:	40		
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species	40	×3 = 120
FACU species		×4 =
UPL species		×5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = 3.0*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0*

___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Dense athel tamarisk thicket – *Tamarix aphylla* is a phreatophyte capable of extracting deep groundwater and its presence and abundance at this location were not considered indicative of prolonged surface saturation or inundation. * No hydric soil or wetland hydrology indicators were observed at this location.

SOIL

Sampling Point SP-36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
0-24	10YR 5/3+	100	--	--	--	--	S	Soil pH = 8.0 – 8.2
		1						

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** X

Remarks: Soils in this area are moderately alkaline and were considered problematic; however, there is no evidence to suggest that the soils in this location are subject to prolonged saturation or inundation that would result in anaerobic conditions in the upper part.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>24
Saturation Present? (includes capillary fringe)		X	>24

Wetland Hydrology Present? Yes ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No evidence of flooding or saturation in this area despite recent, high intensity rainstorms (over an inch of precipitation immediately preceding the survey). No wet or saturated soils evident in the upper 24 inches at this location three days after significant rainfall and high flows in the Sacramento Wash.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Topock Compressor Station City/County: Mojave Date: 7/17/2012

Applicant/Owner: Pacific Gas and Electric Company State: AZ Sampling Point: SP-37

Investigator(s): Russell Huddleston and Melissa Fowler Section, Township, Range: 35 16N 21W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0-2%

Subregion (LRR): D- Western Range and Irrigated Lat: 34.733517 Long: -114.475477 Datum: WGS 1984

Soil Map Unit Name: Carrizo Family very gravelly loamy sand 1-3 percent slopes NWI classification: PSS2Jh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil X, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Remarks: Sample point taken at the edge of dense athel tamarisk thicket north of the Sacramento Wash. Significant summer rainfall occurred in the region resulting in over an inch of precipitation immediately prior to the survey. Summer thunderstorms are common and considered typical for this time of year.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix aphylla*	50	Y	FAC
2.			
3.			
4.			
Total Cover:	50		
Sapling/Shrub Stratum			
1. None			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1. None			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust N/A

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	100%	(A/B)

Prevalence Index Worksheet:

Total % Cover Of:		Multiply By:
OBL species		×1 =
FACW species		×2 =
FAC species	50	×3 = 150
FACU species		×4 =
UPL species		×5 =
Column Totals:	50 (A)	150 (B)

Prevalence Index = B/A = 3.0*

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0*

____ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Dense athel tamarisk thicket – *Tamarix aphylla* is a phreatophyte capable of extracting deep groundwater and its presence and abundance at this location were not considered to be indicative of prolonged surface saturation or inundation. *No hydric soil or wetland hydrology indicators were observed at this location.

SOIL

Sampling Point SP-36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-13	10YR 5/4	100	--	--	--	--	S	Soil pH = 9.2
13-24	10 YR 5/3	100	--	--	--	--	S	Soil pH = 9.2
		1						

[a] Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [b] Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[c]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[c] Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: None

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soils in this area are strongly alkaline and are considered problematic; however, there is no evidence to suggest that the soils in this location are subject to prolonged saturation or inundation that would result in anaerobic conditions in the upper part.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (two or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): >24
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >24

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No evidence of flooding or saturation in this area despite recent, high intensity rainstorms (over an inch of precipitation immediately preceding the survey). No wet or saturated soils were evident in the upper 24 inches at this location three days after significant rainfall and high flows in the nearby drainage channel and the Sacramento Wash.

Appendix K
Representative Site Photographs

Colorado River (R2UB2), looking north

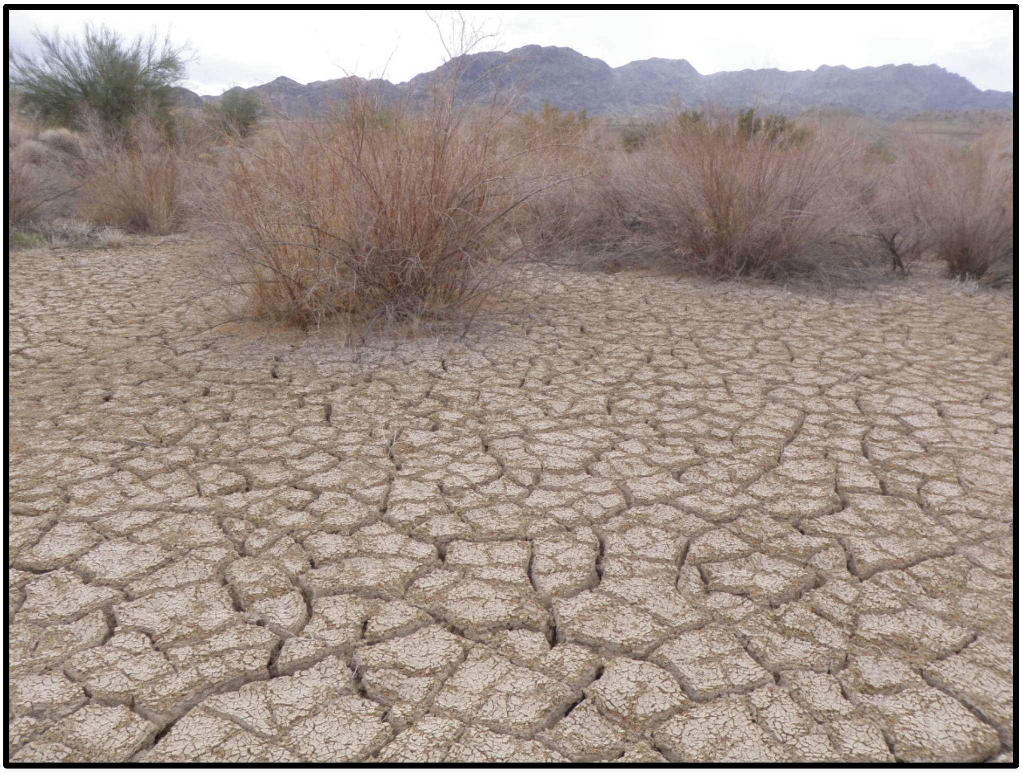
Park Moabi Slough (R2UB2x), Looking west from the confluence with the Colorado River

Bat Cave Wash (R4SB3A)

Unnamed Wash to the west of Bat Cave Wash (R4SB3A)

Typical Small Tributary Drainage (R4SB3A)

Representative Wash south of Park Moabi (R4SB3A)



Soil Cracks in Detention Basin area South of Park Moabi (PSSA)

Shore Zone Wetland (PEMH)

Adjacent Wetland (PEMC)

Topock Marsh (PEMH)

Pond (PEMH)

Earthen dam on south side of the pond

Saltcedar and Honey Mesquite at north end of ephemeral wash (PSSA)

Park Moabi Pond (PUBHx)

Scattered (poor condition) arrow weed on low terrace along the Colorado River

Arrow weed, salt cedar and honey mesquite – low terrace along the Colorado River

Sacramento Wash (R4SB3A) after significant rainfall in July 2012

Former athel tamarisk area on the Havasu National Wildlife Refuge south of the Sacramento Wash, burned in 2008 wildfire and cleared by the US Fish and Wildlife Service

Appendix L
Plant Species List

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
GYMNOSPERMS			
EPHEDRACEAE	**ephedra family**		
Ephedra nevadensis	Nevada ephedra	Shrub	NL
ANGIOSPERMS-DICOTS			
AIZOACEAE	**iceplant family**		
Sesuvium verrucosum	western sea-purslane	Herb	FACW
Trianthema portulacastrum	horse-purslane	Herb	FAC
AMARANTHACEAE	**amaranth family**		
Amaranthus fimbriatus	fringed amaranth	Herb	NL
Tidestromia suffruticosa var. oblongifolia (=*Tidestromia oblongifolia*)	honeysweet	Herb	NL
APOCYNACEAE	**dogbane family**		
Asclepias albicans	white-stemmed milkweed	Shrub	NL
Asclepias subulata	rush milkweed	Shrub	NL
Funastrum hirtellum	trailing townula	Vine	NL
Nerium oleander[3]	common oleander	Shrub	NL
ARALIACEAE	**ginseng family**		
Hydrocotyle verticillata	marsh pennywort	Herb	OBL
ASTERACEAE	**sunflower family**		
Adenophyllum porophylloides	San Felipe dyssodia	Shrub	NL
Ambrosia dumosa	white bur-sage	Shrub	NL
Ambrosia salsola (=*Hymenoclea salsola*)	cheesebush	Shrub	NL
Atrichoseris platyphylla	gravel-ghost	Herb	NL
Baccharis sarothroides	broom baccharis	Shrub	FACU
Bebbia juncea var. *aspera*	sweetbush	Shrub	NL
Calycoseris wrightii	white tackstem	Herb	NL
Chaenactis carphoclinia	pebble pincushion	Herb	NL
Chaenactis stevioides	desert pincushion	Herb	NL
Encelia farinosa	brittlebush	Shrub	NL
Encelia farinosa x frutescens	brittlebush hybrid	Shrub	NL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Encelia frutescens	button brittlebush	Shrub	NL
Eriophyllum lanosum (=*Antheropeas lanosum*)	white woolly sunflower	Herb	NL
Geraea canescens	desert-sunflower	Herb	NL
Lactuca serriola	prickly lettuce	Herb	FACU
Malacothrix glabrata	desert dandelion	Herb	NL
Monoptilon bellioides	desert star	Herb	NL
Palafoxia arida	Spanish needle	Herb	NL
Pectis papposa var. *papposa*	chinch-weed	Herb	NL
Perityle emoryi	Emory's rock daisy	Herb	NL
Peucephyllum schottii	pygmy-cedar	Shrub	NL
Pluchea odorata var. *odorata*	saltmarsh fleabane	Herb	FACW
Pluchea sericea	arrow-weed	Shrub	FACW
Porophyllum gracile	slender poreleaf	Shrub	NL
Pseudognaphalium luteoalbum	cudweed	Herb	FAC
Pulicaria paludosa	false-fleabane	Herb	FAC
Rafinesquia neomexicana	desert chicory	Herb	NL
Senecio mohavensis	Mojave ragwort	Herb	NL
Sonchus asper	prickly sowthistle	Herb	FAC
Stephanomeria pauciflora	wire-lettuce	Shrub	NL
Stylocline micropoides	desert neststraw	Herb	NL
Trichoptilium incisum	yellowdome	Herb	NL
Xanthisma spinulosum var. *gooddingii* (=*Machaeranthera pinnatifida*)	spiny goldenweed	Shrub	NL
Xanthium strumarium	common cocklebur	Herb	FAC
BORAGINACEAE	**borage family**		
Amsinckia tessellata	desert fiddleneck	Herb	NL
Cryptantha angustifolia	narrow-leaved cryptantha	Herb	NL
Cryptantha barbigera var. *barbigera*	bearded cryptantha	Herb	NL
Cryptantha inaequata	Panamint cryptantha	Herb	NL
Cryptantha maritima	Guadalupe cryptantha	Herb	NL
Cryptantha micrantha var. *micrantha*	red-root cryptantha	Herb	NL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Cryptantha nevadensis var. *rigida*	rigid cryptantha	Herb	NL
Cryptantha pterocarya var. *pterocarya*	winged-nut cryptantha	Herb	NL
Heliotropium curassavicum var. *oculatum*	alkali heliotrope	Herb	FACU
Pectocarya heterocarpa	mixed-nut pectocarya	Herb	NL
Pectocarya platycarpa	wide-toothed pectocarya	Herb	NL
Pectocarya recurvata	arched-nut pectocarya	Herb	NL
Phacelia crenulata ssp. *ambigua*	notch-leaved phacelia	Herb	NL
Phacelia distans	distant phacelia	Herb	OBL
Phacelia pedicellata	pedicellate phacelia	Herb	NL
Tiquilia plicata	fan-leaved tiquilia	Herb	NL
BRASSICACEAE	**mustard family**		
Brassica tournefortii	Saharan mustard	Herb	NL
Caulanthus lasiophyllus (=*Guillenia lasiophylla*)	California mustard	Herb	NL
Descurainia pinnata	pinnate tansy mustard	Herb	NL
Dithyrea californica	California spectacle pod	Herb	NL
Draba cuneifolia	wedge-leaved draba	Herb	NL
Lepidium lasiocarpum ssp. *lasiocarpum*	shaggyfruit pepperweed	Herb	NL
Sisymbrium orientale	oriental hedge-mustard	Herb	NL
CACTACEAE	**cactus family**		
Cylindropuntia acanthocarpa var. *coloradensis*	buckhorn cholla	Shrub	NL
Cylindropuntia bigelovii	teddy-bear cholla	Shrub	NL
Cylindropuntia echinocarpa	silver cholla	Shrub	NL
Ferocactus cylindraceus	California barrel cactus	Shrub	NL
Mammillaria tetrancistra	corkseed mammillaria	Shrub	NL
Opuntia basilaris var. *basilaris*	beavertail	Shrub	NL
CARYOPHYLLACEAE	**pink family**		
Achyronychia cooperi	onyx flower	Herb	NL
CHENOPODIACEAE	**goosefoot family**		
Atriplex canescens[4]	four-wing saltbush	Shrub	UPL
Atriplex elegans var. *elegans*	wheelscale	Herb	UPL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Atriplex fruticulosa	ballscale	Herb	FACW
Atriplex hymenelytra	desert-holly	Shrub	NL
Atriplex lentiformis	big saltbush, quailbush	Shrub	FAC
Atriplex polycarpa	allscale saltbush, cattle saltbush	Shrub	FACU
Chenopodium album	lamb's quarters	Herb	FACU
Dysphania ambrosioides (=*Chenopodium ambrosioides*)	Mexican tea	Herb	NL
Salsola tragus	Russian thistle	Herb	FACU
Suaeda nigra (=*Suaeda moquinii*)	bush seepweed	Shrub	OBL
CUCURBITACEAE	**gourd family**		
Cucurbita palmata	coyote melon	Vine	NL
EUPHORBIACEAE	**spurge family**		
Chamaesyce micromera	desert spurge	Herb	NL
Chamaesyce polycarpa	small-seeded spurge	Herb	NL
Chamaesyce setiloba	Yuma spurge	Herb	NL
Ditaxis neomexicana (=*Argythamnia neomexicana*)	common ditaxis	Herb	NL
Stillingia paucidentata	Mojave toothleaf	Herb	NL
FABACEAE	**legume family**		
Acmispon maritimus var. *maritimus* (=*Lotus salsuginosus* var. *salsuginosus*)	coastal bird's foot trefoil	Herb	NL
Acmispon strigosus (=*Lotus strigosus*)	strigose bird's foot trefoil	Herb	NL
Dalea mollis	hairy indigo-pea	Herb	NL
Dalea mollissima	downy dalea	Herb	NL
Lupinus arizonicus	Arizona lupine	Herb	NL
Marina parryi	Parry's marina	Herb	NL
Parkinsonia aculeata	Mexican palo verde	Tree / Shrub	FAC
Parkinsonia florida	blue palo verde	Tree / Shrub	UPL
Parkinsonia microphylla	little-leaved palo verde, hillside palo verde	Tree / Shrub	NL
Prosopis glandulosa var. *torreyana*	honey mesquite	Tree / Shrub	UPL
Prosopis pubescens	screw bean	Tree / Shrub	FAC

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Psorothamnus spinosus	smoke tree	Tree / Shrub	NL
Senegalia greggii (=*Acacia greggii*)	catclaw	Tree / Shrub	FACU
FOUQUIERIACEAE	**ocotillo family**		
Fouquieria splendens ssp. *splendens*	ocotillo	Shrub	NL
GENTIANACEAE	**gentian family**		
Eustoma exaltatum ssp. *exaltatum*	catchfly gentian	Herb	OBL
GERANIACEAE	**geranium family**		
Erodium cicutarium	redstem filaree	Herb	NL
Erodium texanum	Texas filaree	Herb	NL
KRAMERIACEAE	**rhatany family**		
Krameria bicolor	white rhatany	Shrub	NL
Krameria erecta	Pima rhatany	Shrub	NL
LAMIACEAE	**mint family**		
Hyptis emoryi	desert lavender	Shrub	NL
Salvia columbariae	chia	Herb	NL
Scutellaria mexicana (=*Salazaria mexicana*)	bladder-sage	Shrub	NL
LOASACEAE	**loasa family**		
Eucnide urens	rock-nettle	Shrub	NL
Mentzelia albicaulis	white-stemmed blazing star	Herb	NL
Mentzelia involucrata	white-bracted mentzelia	Herb	NL
Mentzelia tricuspis	spiny-hair blazing star	Herb	NL
MALVACEAE	**mallow family**		
Hibiscus denudatus	pale face	Shrub	NL
Malva parviflora	cheeseweed	Herb	NL
Sphaeralcea ambigua var. *ambigua*	apricot mallow	Herb	NL
Sphaeralcea emoryi	Emory’s globemallow	Herb	NL
MYRTACEAE	**myrtle family**		
Eucalyptus sp.[3]	eucalyptus	Tree	---
NYCTAGINACEAE	**four o’clock family**		
Abronia villosa	sand verbena	Herb	NL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Allionia incarnata var. *incarnata*	trailing windmills	Herb	NL
Boerhavia coccinea	scarlet spiderling	Herb	NL
Boerhavia wrightii	Wright's spiderling	Herb	NL
Mirabilis laevis var. *retrorsa* (=*Mirabilis bigelovii* var. *retrorsa*)	retrorse desert four-o'clock	Herb	NL
ONAGRACEAE	**evening-primrose family**		
Chylismia arenaria (=*Camissonia arenaria*)	mousetail suncup	Herb	NL
Chylismia brevipes (=*Camissonia brevipes*)	golden suncup	Herb	NL
Chylismia multijuga[5] (=*Oenothera multijuga*)	multi-paired suncup	Herb	NL
Eremothera boothii ssp. *condensata* (=*Camissonia boothii* ssp. *condensata*)	Booth's shreading suncup	Herb	NL
Eremothera refracta (=*Camissonia refracta*)	narrow-leaf suncup	Herb	NL
Oenothera deltoides ssp. *deltoides*	devil's lantern	Herb	NL
PAPAVERACEAE	**poppy family**		
Eschscholzia minutiflora	small-flowered California poppy	Herb	NL
PHRYMACEAE	**lopseed family**		
Mimulus bigelovii	Bigelow's monkeyflower	Herb	NL
PLANTAGINACEAE	**plantain family**		
Mohavea confertiflora	ghost flower	Herb	NL
Plantago ovata	ovate plantain	Herb	FACU
POLEMONIACEAE	**phlox family**		
Gilia scopulorum	rock gilia	Herb	NL
Langloisia setosissima ssp. *setosissima*	bristly langloisia	Herb	NL
POLYGONACEAE	**buckwheat family**		
Chorizanthe brevicornu var. *brevicornu*	brittle spineflower	Herb	NL
Chorizanthe corrugata	wrinkled spineflower	Herb	NL
Chorizanthe rigida	devil's spineflower	Herb	NL
Eriogonum deflexum var. *deflexum*	flat-topped skeletonweed	Herb	NL
Eriogonum inflatum	desert trumpet	Herb	NL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Eriogonum thomasii	Thomas' wild buckwheat	Herb	NL
Eriogonum trichopes	little desert trumpet	Herb	NL
Polygonum argyrocoleon	Persian knotweed	Herb	FAC
RESEDACEAE	**mignonette family**		
Oligomeris linifolia	linear-leaved oligomeris	Herb	NL
RUBIACEAE	**madder family**		
Galium angustifolium	narrowly leaved bedstraw	Herb	NL
SALICACEAE	**willow family**		
Salix exigua	narrow-leaved willow	Shrub	FACW
Salix gooddingii	Goodding's black willow	Tree	FACW
Populus fremontii ssp. *fremontii* (=*Populus deltoides* ssp. *fremontii*)[6]	Fremont cottonwood	Tree	FAC
SOLANACEAE	**nightshade family**		
Datura wrightii	jimson weed	Herb	UPL
Lycium andersonii	Anderson's box-thorn	Shrub	NL
Nicotiana obtusifolia	desert tobacco	Herb	FACU
Physalis crassifolia	thick-leaf ground-cherry	Herb	NL
TAMARICACEAE	**tamarisk family**		
Tamarix ramosissima (=*Tamarix chinensis*)[6]	saltcedar	Tree / Shrub	FAC
Tamarix aphylla	athel	Tree	FAC
URTICACEAE	**nettle family**		
Parietaria hespera var. *hespera*	western pellitory	Herb	FACU
VERBENACEAE	**vervain family**		
Phyla nodiflora	turkey-tangle frog-fruit	Herb	FACW
VISCACEAE	**mistletoe family**		
Phoradendron californicum	desert mistletoe	Shrub	NL
ZYGOPHYLLACEAE	**caltrop family**		
Fagonia laevis	smooth-stemmed fagonia	Shrub	NL
Kallstroemia californica	California kallstroemia	Herb	NL
Larrea tridentata	creosote bush	Shrub	NL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	Common name	Stratum	Indicator Status[2]
Tribulus terrestris	puncture vine	Herb	NL
MONOCOTS			
AGAVACEAE	**century plant family**		
Hesperocallis undulata	desert lily	Herb	NL
ARECACEAE	**palm family**		
Washingtonia filifera[3]	California fan palm	Tree	FACW
Washingtonia robusta[3]	Mexican fan palm	Tree	NL
CYPERACEAE	**sedge family**		
Cyperus eragrostis	tall flat sedge	Herb	FACW
Eleocharis geniculata	geniculate spikerush	Herb	OBL
Schoenoplectus californicus	southern bulrush	Herb	OBL
JUNCACEAE	**rush family**		
Juncus xiphioides	iris-leaved rush	Herb	OBL
Juncus torreyi	Torrey's rush	Herb	FACW
POACEAE	**grass family**		
Andropogon glomeratus ssp. *scabriglumis*	southwestern bushy bluestem	Herb	FACW
Aristida adscensionis	sixweeks three-awn	Herb	NL
Aristida purpurea var. *wrightii*	Wright three-awn	Herb	NL
Arundo donax	giant reed	Shrub	FACW
Bouteloua aristidoides var. *aristidoides*	needle grama	Herb	NL
Bouteloua barbata var. *barbata*	sixweeks grama	Herb	NL
Bromus arizonicus	Arizona brome	Herb	NL
Bromus catharticus var. *catharticus*	rescue grass	Herb	NL
Bromus madritensis ssp. *rubens*	red brome	Herb	NL
Cynodon dactylon	Bermuda grass	Herb	FACU
Distichlis spicata	salt grass	Herb	FAC
Dasyochloa pulchella (=*Erioneuron pulchellum*)	fluff grass	Herb	NL
Festuca myuros (=*Vulpia myuros*)[6]	rattail sixweeks grass	Herb	FACU
Festuca octoflora (=*Vulpia octoflora*)[6]	sixweeks grass	Herb	UPL

APPENDIX K
Vascular Plant Species Observed at the Topock Compressor Station

Scientific name[1]	**Common name**	**Stratum**	**Indicator Status**[2]
Hilaria jamesii[4] (=*Pleuraphis jamesii*)	galleta	Herb	NL
Hilaria rigida (=*Pleuraphis rigida*)	big galleta	Herb	NL
Hordeum murinum ssp. *glaucum*	smooth barley	Herb	FACU
Muhlenbergia microsperma	littleseed muhly	Herb	NL
Paspalum dilatatum	dallis grass	Herb	FAC
Pennisetum setaceum	crimson fountain grass	Herb	NL
Phalaris minor	little-seeded canary grass	Herb	NL
Phragmites australis	common reed	Shrub	FACW
Schismus barbatus	Mediterranean grass	Herb	NL
Setaria parviflora (=*Setaria gracilis*)	knotroot bristle grass	Herb	NL
Sporobolus airoides[4]	alkali sacaton	Herb	FAC
Triticum aestivum	wheat	Herb	NL
TYPHACEAE	**cattail family**		
Typha latifolia	broad-leaved cattail	Herb	OBL
Typha domingensis	southern cattail	Herb	OBL

Notes:
[1] Scientific names follow *The Jepson Manual: Vascular Plants of California* (Baldwin et al., 2012).
[2] Wetland indicator status determined using: *North American Digital Flora: National Wetland Plant List, version 2.4.0* (Lichvar, Robert W. and John T. Kartesz. 2009).
[3] Cultivated landscape tree or shrub
[4] Plant species is included in the Lake Havasu National Wildlife Refuge revegetation area but was not observed anywhere else within the project area.
[5] Species not known to occur in California – Taxonomy from *Flora of Arizona, 2nd Edition* (Kearney and Peebles, 1960).
[6] Nomenclature used in the *North American Digital Flora: National Wetland Plant List, version 2.4.0* differs from nomenclature of *The Jepson Manual.*

Status Codes:
NL Not Listed (assumed to be a non-wetland species)
FACU Facultative Upland (67 to 99 percent probability of occurrence in non-wetlands)
FAC Facultative (equally likely to occur in wetlands and non-wetlands)
FACW Facultative Wetland (67 to 99 percent probability of occurrence in wetlands)
OBL Obligate (99 percent probability of occurrence in wetlands)
UPL Upland ((99 percent probability of occurrence in non-wetlands)

Appendix M
Ephemeral and Intermittent Stream Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** BAT CAVE WASH T-1 **Investigator(s):** R. HUDDLESTON, K STEINER	**Date:** 2/13/2012 **Time:** 9:44 AM **Town:** NEEDLES **State:** CA **Photo begin file#:** 349 **Photo end file#:** 350
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-1
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.712847 -114.495345

Potential anthropogenic influences on the channel system: DOWN STREAM CULVERTS - THIS TRANSECT NO UPSTREAM INFLUENCES

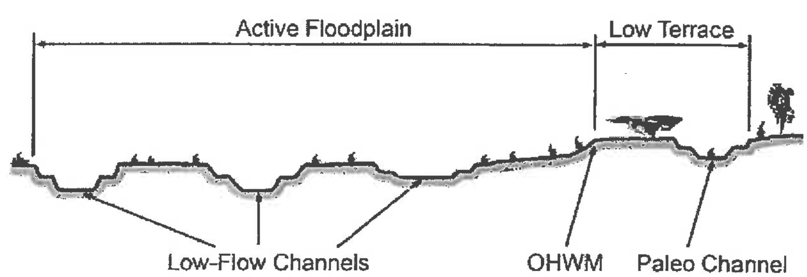
Brief site description: CONFINED CHANNEL - STEEP ROCKY SIDE SLOPES - SPARSE VEGETATION WITHIN CHANNEL ROCKY SUBSTRATE

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



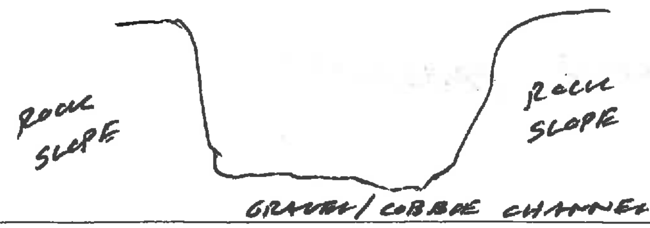
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

☐ Mapping on aerial photograph ☑ GPS 2005
☐ Digitized on computer ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-1 **Date:** 2/13/2012 **Time:** 9:44 AM

Cross section drawing:



STEEP VERTICAL BANKS ALONG SIDES OF THE CHANNEL - NO LOW TERRACE

OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: ROCKY CHANNEL - VERY SPARSE VEGETATION
NO CLEARLY DEFINED LOW FLOW CHANNELS PRESENT AT THIS LOCATION; NO LOW TERRACE - STEEP SIDE SLOPES - TRANSECT 29.3 FT

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 5 % Herb: 10 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: SPARSE SHRUBS IN THIS AREA INCLUDE LYCIUM ANDERSONII, ACACIA GREGGII AND HYPTIS EMORYI
HERBS INCLUDE: ESCHSCHOLZIA MINUTIFLORA, PERITYLE EMORYI, CRYPTANTHA SP., ERIOGONUM SP.

Project ID: Topock **Cross section ID:** T-1 **Date:** 2/13/2012 **Time:** 9:44AM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

NONE PRESENT

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

NONE PRESENT

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream: BAT CAVE WASH T-2
Investigator(s): R. HUDDLESTON, K. STEINER

Date: 2/13/2012 **Time:** 10:27
Town: NEEDLES **State:** CA
Photo begin file#: 355 **Photo end file#:** 356

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-2

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 34.715214 -114.494446

Potential anthropogenic influences on the channel system: UNPAVED ROADS IN ADJACENT AREAS

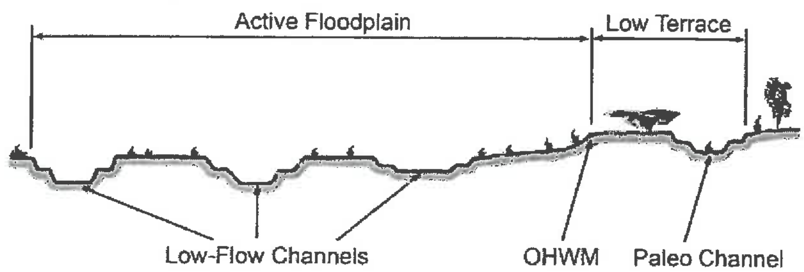
Brief site description: BROAD CHANNEL WITH MULTIPLE LOW FLOW CHANNELS STEEP SIDE SLOPES - SPARSE VEGETATION WITHIN THE ACTIVE FLOODPLAIN AREA

Checklist of resources (if available):

☑ Aerial photography
Dates:
☑ Topographic maps
☑ Geologic maps
☑ Vegetation maps
☐ Soils maps
☐ Rainfall/precipitation maps
☑ Existing delineation(s) for site
☑ Global positioning system (GPS)
☐ Other studies

☐ Stream gage data
Gage number:
Period of record:
☐ History of recent effective discharges
☐ Results of flood frequency analysis
☐ Most recent shift-adjusted rating
☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



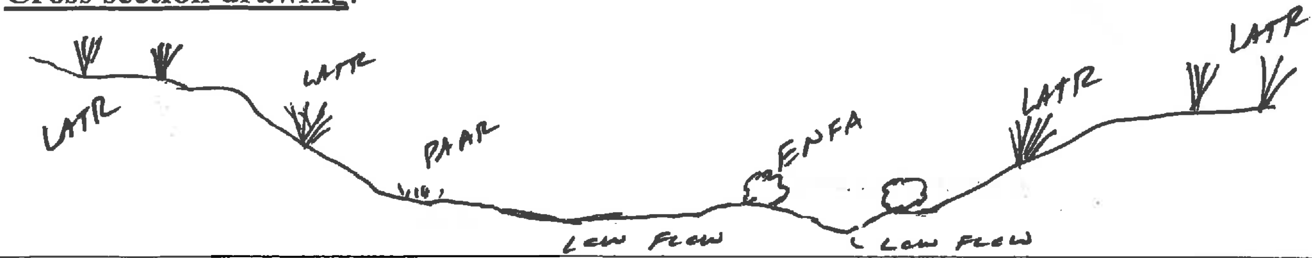
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

☐ Mapping on aerial photograph ☑ GPS 2005
☐ Digitized on computer ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-2 **Date:** 2/13/2012 **Time:** 10:27

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: ROCKY CHANNEL – PEBBLE – COBBLE – SOMEWHAT STEEP SLOPES; MULTIPLE LOW FLOW CHANNELS

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: 15 % Tree: ____ % Shrub: 5 % Herb: 10 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: SPARSE SHRUBS MOSTLY ENCELIA FARINOSA
SMALL ACACIA GREGGII

HERBS: PALAFOXIA ARIDA, PERITYLE EMORYI
LUPINUS ARIZONICUS, CHAMAESYCE SP.

Project ID: TOPOCK **Cross section ID:** T-2 **Date:** 2/13/2012 **Time:** 10:27

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: SAND-PEBBLE

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: <2 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☒ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: - SPARSE PALAFOXIA ARIDA - FINER SUBSTRATE IN THIS AREA - MORE SAND RELATIVE TO ACTIVE FLOODPLAIN

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE-COBBLE

Total veg cover: 10 % Tree: ____ % Shrub: 8 % Herb: 2 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: VEGETATION MOSTLY LARREA TRIDENTA WITH SPARSE CHAMAESYCE SP.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream: BAT CAVE WASH T-3
Investigator(s):
Date: 2/13/2012 **Time:** 11:30 AM
Town: NEEDLES **State:** CA
Photo begin file#: 368US **Photo end file#:** 369 DS

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-3

Projection: NAD83 **Datum:** WGS 84
Coordinates: 34.719864 -114.494431

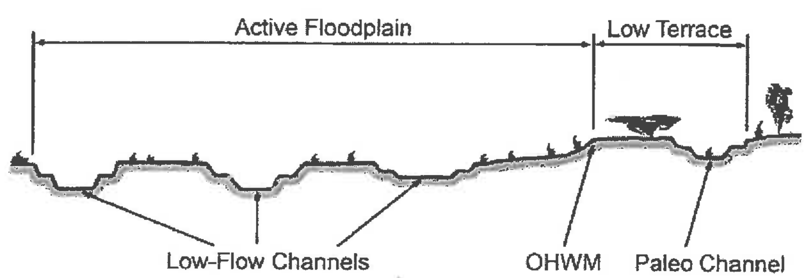
Potential anthropogenic influences on the channel system: UPSTREAM CULVERTS - THIS PORTION OF THE WASH USED AS AN ACCESS ROAD

Brief site description: BROAD WASH WITH STEEP SIDE SLOPES - SPARSE VEGETATION WITHIN THE CHANNEL - GENERALLY FLAT UNIFORM BED IN THIS AREA

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

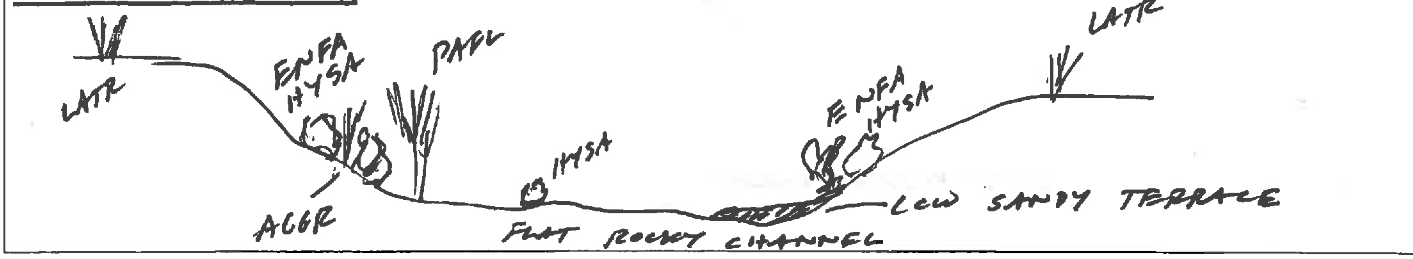


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☑ GPS 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-3 **Date:** 2/13/2012 **Time:** 11:30 AM

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: DRIFT DEPOSITS
- [ ] Other: ____________

Comments: - SPARSE VEGETATION IN ACTIVE FLOODPLAIN DEFINED BANKS, DRIFT DEPOSITS - SOME SANDY DEPOSITS ALONG EDGES OF THE CHANNEL

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [x] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE -COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 5 % Herb: ____ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: SPARSE SHRUBS - LARREA TRIDENTATA WITH SCATTERED CHAMAESYCE

Project ID: TOPOCK **Cross section ID:** T- 3 **Date:** 2/13/2012 **Time:** 11:30AM

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: SAND - PEBBLE - COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 10 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: - SPARSE SHRUBS - EDGES OF THE CHANNEL
ENCELIA FARINOSA, HYMENOCLEA SALSOLA
- YOUNG ACACIA GREGGII

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 2 % Herb: 5 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: SPARSE ANNUALS : LUPINUS ARIZONICUS, PALAFOXIA ARIDA,
CHAMAESYCE SP. AND PHACELIA CRENULATA
SHRUBS - VERY SPARSE - HYMENOCLEA SALSOLA

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream: BAT CAVE WASH T-4
Investigator(s): R. HUDDLESTON, K STEINER
Date: 2/13/2012 **Time:** 1:00 PM
Town: NEEDLES **State:** CA
Photo begin file#: 377 US **Photo end file#:** 378 DS

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-4

Projection: NAD83 **Datum:** WGS 84
Coordinates: 34. 722826 -114.495210

Potential anthropogenic influences on the channel system: CULVERTS UPSTREAM OF THIS TRANSECT, TERRACE ON WEST SIDE - POSSIBLE GRAVEL EXCAVATION? - SEVERAL LOW MOUNDS / LOW AREAS

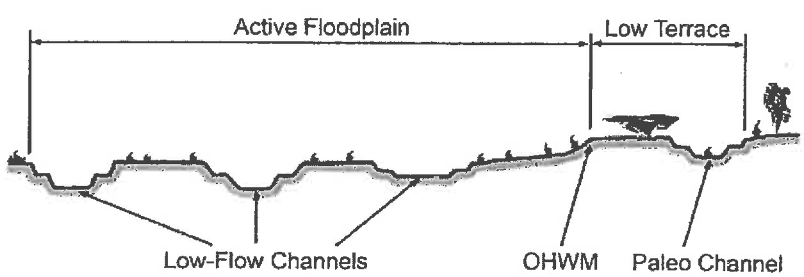
Brief site description: BROAD WASH WITH MULTIPLE LOW FLOW CHANNELS INTERMIXED WITH IN CHANNEL BARS - SCATTERED VEGETATION THROUGHOUT THE ACTIVE FLOODPLAIN

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

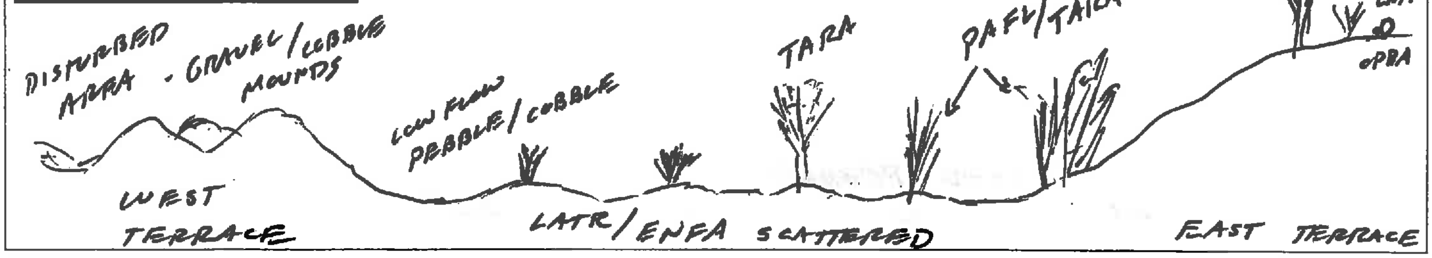


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS 2005 DATA
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-4 **Date:** 2/13/2012 **Time:** 1:00 PM

Cross section drawing:



OHWM

GPS point: ______________

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: DEBRIS/DRIFT DEPOSITS
- [ ] Other: ______________

Comments: TRANSECT 191.7 FT -
PEBBLE/COBBLE CHANNEL WITH SCATTERED VEGETATION
MULTIPLE LOW FLOW CHANNELS THROUGHOUT THE ACTIVE FLOODPLAIN

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: ______________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: 30 % Tree: 15 % Shrub: 15 % Herb: <1 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: SCOURING
- [x] Other: SEDIMENT DEPOSITS
- [ ] Other: ______________

Comments:
MULTIPLE LOW FLOW SCOUR CHANNELS PRESENT THROUGHOUT THIS AREA - SCATTERED VEGETATION ON LOW TERRACES WITHIN THE ACTIVE FLOODPLAIN INCLUDING SHRUBS AND MATURE TREES

Project ID: TOPOCK **Cross section ID:** T-4 **Date:** 2/13/2012 **Time:** 1:00PM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: SAND - PEBBLE

Total veg cover: <5 % Tree: 0 % Shrub: 0 % Herb: <5 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: SCOURING
- ☒ Other: ABSENCE OF VEGETATION
- ☐ Other: ____________

Comments:

SPARSE PALAFOXIA ARIDA

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: 30 % Tree: 10 % Shrub: 20 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments:

PARKINSONIA FLORIDA
LARREA TRIDENTATA
OPUNTIA BASILARIS

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E Topock **Project Number:** **Stream:** **Investigator(s):** R. Huddleston, K Steiner	**Date:** 2/14/2012 **Time:** 9:00 AM **Town:** Needles **State:** CA **Photo begin file#:** 359 , 360 US **Photo end file#:** 361 DS
Y ☒ / N ☐ Do normal circumstances exist on the site? Y ☐ / N ☒ Is the site significantly disturbed?	**Location Details:** T-5 **Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.722014 -114.501232

Potential anthropogenic influences on the channel system: - BNSF RR tracks upstream roadway and 6 48"-diameter culverts downstream

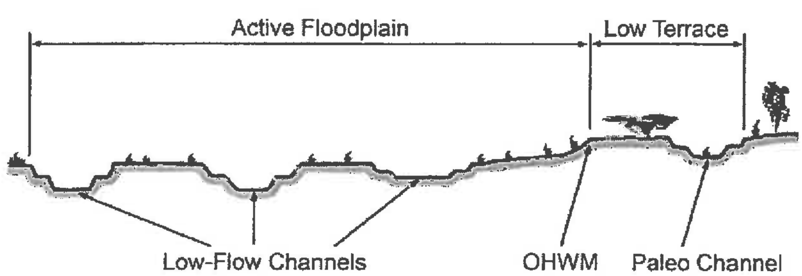
Brief site description: Broad channel with multiple low flow channels, scattered vegetation throughout the floodplain

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS 2005
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-5 **Date:** 2/14/2012 **Time:** 9:00AM

Cross section drawing:

OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: WIDE, GENERALLY FLAT ROCKY FLOODPLAIN WITH MULTIPLE LOW FLOW CHANNELS, SCATTERED WASH AND UPLAND VEGETATION PRESENT.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE-COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 10 % Herb: <5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: SCOUR CHANNELS
- [ ] Other: ____________
- [ ] Other: ____________

Comments: SHRUBS WITHIN THE ACTIVE FLOODPLAIN INCLUDE LARREA TRIDENTATA, AMBROSIA DUMOSA, KRAMERIA GRAYI, BEBBIA JUNCEA AND ACACIA GREGGII.
HERBS - MOSTLY CHAMAESYCE SP.

Project ID: TOPOCK **Cross section ID:** T-5 **Date:** 2/14/2012 **Time:** 9:00 AM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND-PEBBLE

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: <5 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: · SCOUR CHANNELS WITH SOME SAND - MUCH LESS VEGETATION - SPARSE ANNUALS AND SOME CHAMAESYCE.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE -COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 5 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: PEBBLE -COBBLE SUBSTRATE, SLIGHTLY HIGHER TOPOGRAPHY - SPARSE SHRUBS - LARREA TRIDENTATA AND KRAMERIA GRAYI

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream:
Investigator(s): R. HUDDLESTON, K. STEINER

Date: 2/14/2012 **Time:** 9:22 AM
Town: NEEDLES **State:** CA
Photo begin file#: 362-US **Photo end file#:** 363-DS

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-6

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 34.720675 -114.501088

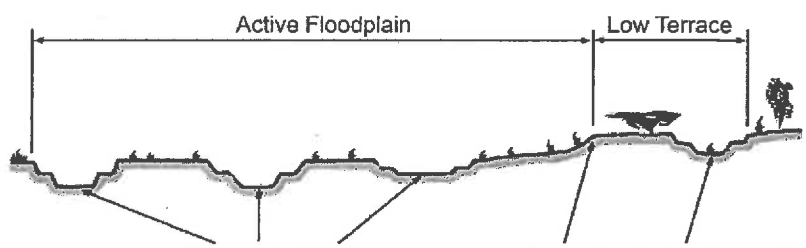
Potential anthropogenic influences on the channel system: LOW WASH IN THIS AREA HAS AN UNIMPROVED ROADWAY PRESENT, CULVERTS PRESENT UPSTREAM OF THIS TRANSECT

Brief site description: - SOMEWHAT OF A CONFINED FLOODPLAIN - STEEP ADJACENT HILL SLOPES - MULTIPLE LOW FLOW CHANNELS SCATTERED MATURE UPLAND SHRUBS PRESENT

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☑ GPS 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-6 **Date:** 2/14/2012 **Time:** 9:22AM

Cross section drawing:

OHWM

GPS point: ____________________

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: ____________
- ☐ Other: ____________

Comments: ROCKY - GRAVEL-COBBLE CHANNEL WITH SCATTERED VEGETATION, MULTIPLE LOW FLOW CHANNELS, ROADWAY THROUGH THE WASH IN THIS AREA
SOME DRIFT / DEBRIS AND SANDY DEPOSITS ~45' WIDE

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE -COBBLE
Total veg cover: ~15 % Tree: 5 % Shrub: 10 % Herb: <5 %
Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: SAND DEPOSITS
- ☐ Other: ____________
- ☐ Other: ____________

Comments: SOME LARGE LARREA TRIDENTATA PRESENT WITHIN THE ACTIVE FLOODPLAIN - OTHER SHRUBS INCLUDE: HYMENOCLEA SALSOLA AND BEBBIA JUNCEA - SCATTERED ACACIA GREGGII AND PARKINSONIA FLORIDA. HERBS - LUPINUS ARIZONICUS AND PALAFOXIA ARIDA AND CHAMAESYCE

Project ID: Topock **Cross section ID:** T-6 **Date:** 2/14/2012 **Time:** 9:22AM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND-PEBBLE

Total veg cover: <1 % Tree: ____% Shrub: ____% Herb: <1 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: SCOUR CHANNELS
- ☐ Other: ____________
- ☐ Other: ____________

Comments: VERY SPARSE ANNUALS - LUPINUS ARIZONICUS AND PALAFOXIA ARIDA. - SUBSTRATE INCLUDES MORE FINE MATERIALS, SOME DRIFT DEPOSITS ON SHRUBS IMMEDIATELY ADJACENT TO LOW FLOW CHANNELS

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE -COBBLE

Total veg cover: 5 % Tree: ____% Shrub: ~5 % Herb: ____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: VEGETATION MOSTLY SPARSE LARREA TRIDENTATA AND AMBROSIA DUMOSA

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** **Investigator(s):** R. HUDDLESTON, K. STEINER	**Date:** 2/14/2012 **Town:** NEEDLES **Photo begin file#:** 383	**Time:** 11:10 **State:** CA **Photo end file#:** 390
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** 7-7	
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD83 **Datum:** WGS 84 **Coordinates:** 34.724877 -114.497954	

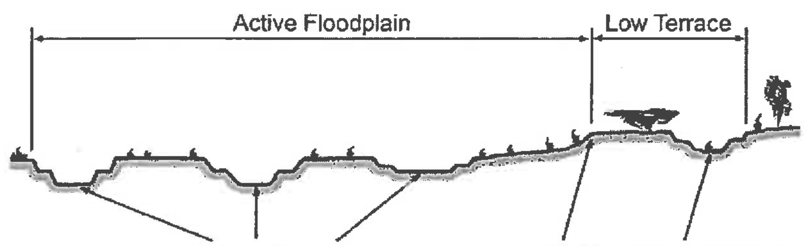
Potential anthropogenic influences on the channel system: EARTHEN DAM UPSTREAM OF THIS TRANSECT

Brief site description: -BROAD CHANNEL IN CONFINED BED - STEEP SLOPES ADJACENT TO THE ACTIVE FLOODPLAIN - MULTIPLE LOW FLOW CHANNELS AMONG VEGETATION

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☑ GPS 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-7 **Date:** 2/14/2012 **Time:** 11:10AM

Cross section drawing:

OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: DRIFT / DEBRIS
- [x] Other: SOIL CRACKS

Comments: BROAD CHANNEL ~260 FT WIDE WITHIN STEEP CONFINED WASH – RELATIVELY DENSE VEGETATION THROUGHOUT W/ MULTIPLE LOW FLOW CHANNELS PRESENT

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND - PEBBLE W/ SOME COBBLE

Total veg cover: ~35 % Tree: 15 % Shrub: 20 % Herb: <5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [x] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: SILT DEPOSITS
- [x] Other: SCOURING
- [ ] Other: ____________

Comments: SEVERAL LARGE PARKINSONIA FLORIDA TREES IN THIS AREA – SHRUBS INCLUDE – LARREA TRIDENTATA, LYCIUM ANDERSONII, ATRIPLEX POLYCARPA AND HYMENOCLEA SALSOLA – SPARSE HERBS – MOSTLY CHAMAESYCE SP.

Project ID: TOPOCK **Cross section ID:** T-7 **Date:** 2/14/2012 **Time:** 11:10

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: MOSTLY SAND

Total veg cover: 0 % Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

☒ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☒ Mudcracks
☐ Ripples
☒ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☒ Other: SCOURING
☒ Other: SILT DEPOSITS
☐ Other: ____________

Comments: - LOW FLOW CHANNELS THROUGHOUT THE ACTIVE FLOODPLAIN - DEVOID OF VEGETATION SANDY WITH SOME COBBLE/PEBBLES - IN SOME AREAS LOW FLOW CHANNELS MORE ROCKY WITH SAND DEPOSITS ON ADJACENT FLOODPLAIN

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: ____% Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

☐ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☐ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☐ Other: ____________
☐ Other: ____________
☐ Other: ____________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream:
Investigator(s): R. HUDDLESTON, K. STEINER

Date: 2/14/2012 **Time:** 11:50 AM
Town: NEEDLES **State:** CA
Photo begin file#: 392 **Photo end file#:** - 398

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-8

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 34.724004 -114.499416

Potential anthropogenic influences on the channel system: - EARTHEN DAM AT DOWNSTREAM PART OF THE WASH - SOUTH OF NATIONAL TRAILS HWY

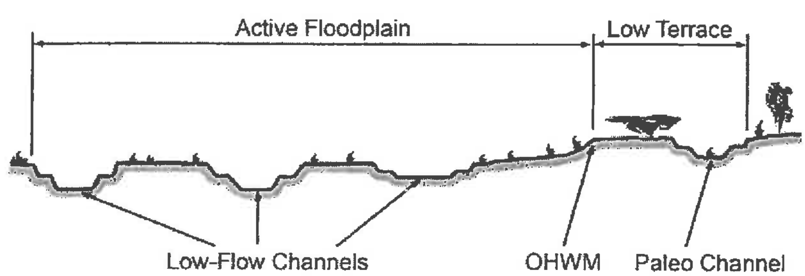
Brief site description: BROAD ACTIVE FLOOD PLAIN WITH SCATTERED VEGETATION THROUGHOUT - SANDY - GRAVEL - COBBLE SUBSTRATE MULTIPLE LOW FLOW CHANNELS

Checklist of resources (if available):

☑ Aerial photography
Dates:
☑ Topographic maps
☑ Geologic maps
☑ Vegetation maps
☐ Soils maps
☐ Rainfall/precipitation maps
☑ Existing delineation(s) for site
☐ Global positioning system (GPS)
☐ Other studies

☐ Stream gage data
Gage number:
Period of record:
☐ History of recent effective discharges
☐ Results of flood frequency analysis
☐ Most recent shift-adjusted rating
☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



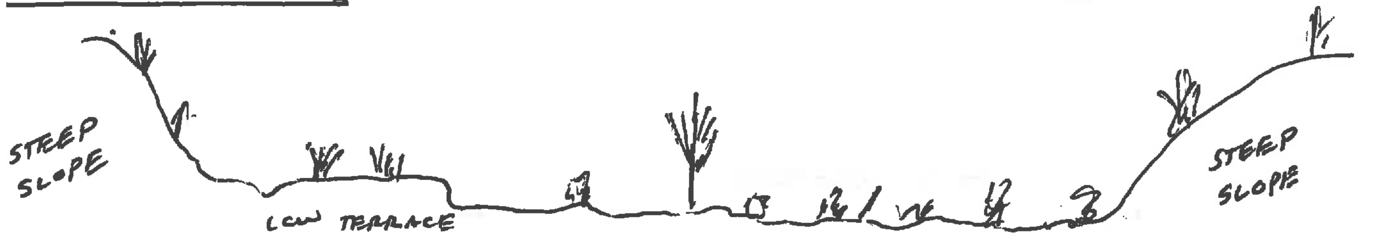
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

☐ Mapping on aerial photograph ☑ GPS -2005
☐ Digitized on computer ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-8 **Date:** 2/ 14/ 2012 **Time:** 11:50AM

Cross section drawing:



OHWM

GPS point: ______________________

HIGHER VEGETATION DENSITY AND DIVERSITY ON ACTIVE FLOOD PLAIN RELATIVE TO LOW TERRACE AND HILL SLOPES

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ______________
- [ ] Other: ______________

Comments: BROAD FLAT CHANNEL WITH SANDY-GRAVEL COBBLE SUBSTRATE - SCATTERED VEGETATION THROUGHOUT THE CHANNEL, LOW FLAT TERRACE ON EAST SIDE - CHANNEL BOUNDED BY STEEP ROCKY SLOPES

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE-COBBLE

Total veg cover: 20 % Tree: 5 % Shrub: 15 % Herb: <5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: SHELVING
- [x] Other: SCOURING
- [ ] Other: ______________

Comments: VEGETATION IN CHANNEL INCLUDES PARKINSONIA FLORIDA, ACACIA GREGGII, HYPTIS EMORYI, LYCIUM ANDERSONII, BEBBIA JUNCEA HYMENOCLEA SALSOLA, LARREA TRIDENTATA, AND KRAMERIA GRAYI

- SPARSE HERBS - CHAMAESYCE, ARISTIDA, CRYPTANTHA

Project ID: TOPOCK **Cross section ID:** T - 8 **Date:** 2/14/2012 **Time:** 11:50AM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND - PEBBLE

Total veg cover: <5 % Tree: ____ % Shrub: ____ % Herb: <5 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: SCOURING
- ☐ Other: ____________
- ☐ Other: ____________

Comments: SPARSE ANNUALS - BUT MOSTLY UNVEGETATED GENERALLY FINER SUBSTRATES RELATIVE TO ADJACENT AREAS ON THE ACTIVE FLOODPLAIN

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 10 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: SCATTERED LARREA TRIDENTATA ON LOW TERRACE AND ADJACENT ROCKY SLOPES - LOWER DIVERSITY / COVER THAN ON THE ACTIVE FLOODPLAIN

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream:
Investigator(s): R. HUDDLESTON, K. STEINER

Date: 2/14/2012 **Time:** 12:15 PM
Town: NEEDLES, CA **State:** CA
Photo begin file#: 401 **Photo end file#:** ~~405~~ 408

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-9

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 34. 723215 -114. 501475

Potential anthropogenic influences on the channel system: DOWN STREAM EARTHEN DAM SOUTH OF THE NATIONAL TRAILS HIGHWAY

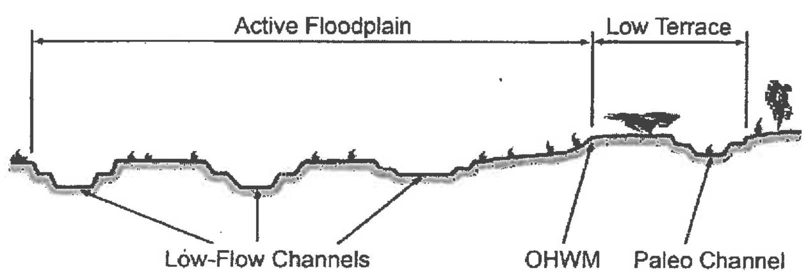
Brief site description: BROAD SANDY-COBBLE-GRAVEL CHANNEL WITH SCATTERED TREES AND SHRUBS, MULTIPLE LOW FLOW CHANNELS GENERALLY BOUNDED BY STEEP SLOPES

Checklist of resources (if available):

☑ Aerial photography
Dates:
☑ Topographic maps
☑ Geologic maps
☑ Vegetation maps
☐ Soils maps
☐ Rainfall/precipitation maps
☑ Existing delineation(s) for site
☐ Global positioning system (GPS)
☐ Other studies

☐ Stream gage data
Gage number:
Period of record:
☐ History of recent effective discharges
☐ Results of flood frequency analysis
☐ Most recent shift-adjusted rating
☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



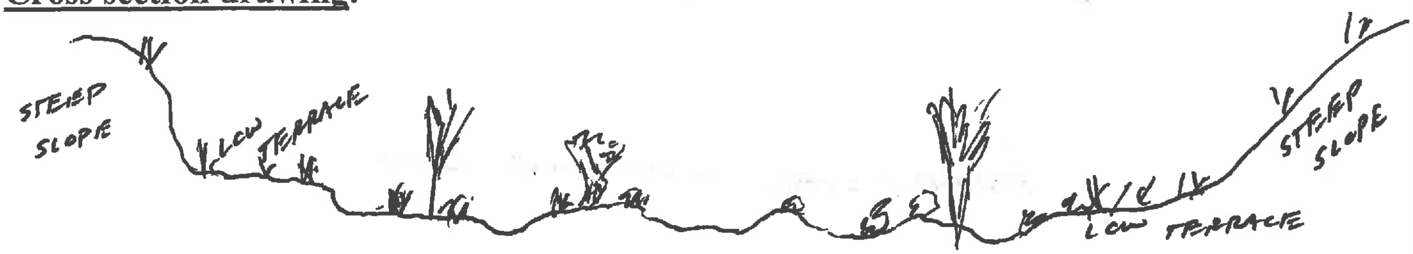
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

☐ Mapping on aerial photograph ☑ GPS 2005
☐ Digitized on computer ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-9 **Date:** 2/14/2012 **Time:** 12:15 PM

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: BROAD LOW CHANNEL - SANDY - GRAVEL - COBBLE SUBSTRATE, MULTIPLE LOW FLOW CHANNELS - HIGHER DENSITY AND DIVERSITY OF VEGETATION IN THE CHANNEL RELATIVE TO LOW TERRACES/HILL SLOPES

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - GRAVEL

Total veg cover: 15 % Tree: 5 % Shrub: 10 % Herb: <5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: SCOURING
- [ ] Other: ____________
- [ ] Other: ____________

Comments: VEGETATION THROUGHOUT THE CHANNEL IN THIS AREA INCLUDES MATURE PARKINSONIA FLORIDA, WITH SHRUBS SUCH AS HYMENOCLEA SALSOLA, HYPTIS GRAYI, LYCIUM ANDERSONII AND SCATTERED LARREA TRIDENTATA

Project ID: TOPOCK **Cross section ID:** T-9 **Date:** 2/14/2012 **Time:** 12:15 PM

Floodplain unit: [X] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE / SAND - SOME MORE COBBLE

Total veg cover: <5 % Tree: ____% Shrub: ____% Herb: <5 %

Community successional stage:

- [ ] NA
- [X] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [X] Drift and/or debris
- [X] Presence of bed and bank
- [X] Benches
- [ ] Soil development
- [ ] Surface relief
- [X] Other: SCOURING
- [ ] Other: ____________
- [ ] Other: ____________

Comments: MOST LOW FLOW CHANNELS DEVOID OF VEGETATION - OCCASSIONAL HERBACEOUS SPECIES
SOME LOW FLOW CHANNELS W/ DEFINED BANKS
OTHERS MORE SWALE-LIKE

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [X] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE -COBBLE

Total veg cover: ____% Tree: ____% Shrub: 5 % Herb: ____%

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [X] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: SCATTERED LARREA TRIDENTATA
OVERALL LOWER VEGETATION COVER / DIVERSITY RELATIVE TO ACTIVE FLOODPLAIN

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PGE TOPOCK
Date: 2/14/2012
Time: 2:15 PM
Project Number:
Town: NEEDLES
State: CA
Stream:
Photo begin file#: 424
Photo end file#: 432
Investigator(s): R. HUDDLESTON, K. STEINER

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-10

Projection: NAD 83
Datum: WGS 84
Coordinates: 34. 721640 -114. 504236

Potential anthropogenic influences on the channel system:

4- 48" CULVERTS UPSTREAM OF TRANSECT
EARTHEN DAM AT DOWNSTREAM TERMINIS

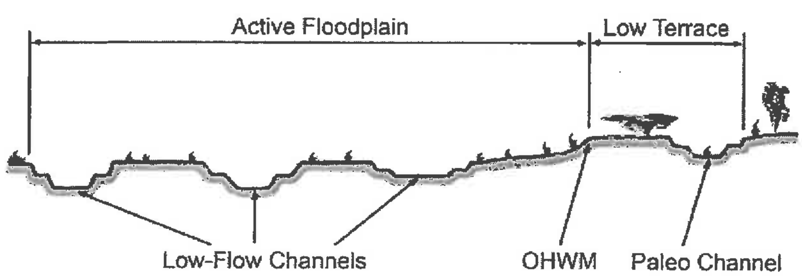
Brief site description: BROAD CHANNEL WITHIN DEFINED BANKS - MULTIPLE LOW FLOW CHANNELS, SCATTERED VEGETATION IS PRESENT THROUGHOUT THE ACTIVE FLOODPLAIN

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

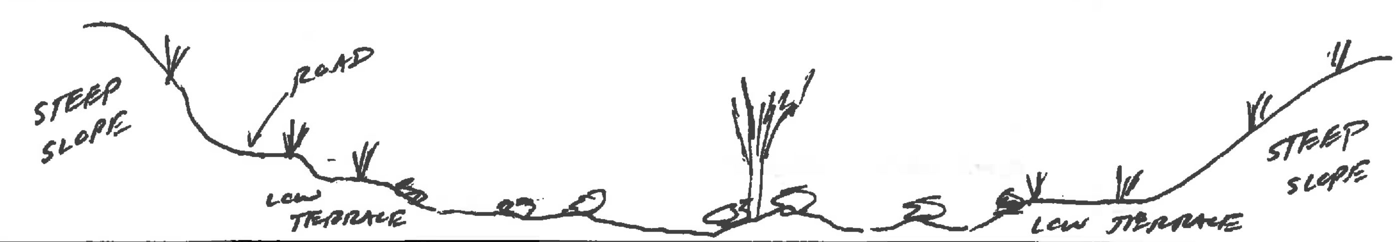


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☑ GPS 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-10 **Date:** 2/14/2012 **Time:** 2:15 PM

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments: BROAD LOW CHANNEL WITH GRAVEL - COBBLE SUBSTRATE SCATTERED TREES AND SHRUBS PRESENT THROUGHOUT, MULTIPLE LOW FLOW CHANNELS - HIGHER DENSITY / DIVERSITY OF VEGETATION IN THE CHANNEL

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE-GRAVEL

Total veg cover: 10 % Tree: 3 % Shrub: 7 % Herb: < 2 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: SCOURING
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments: BROAD FLOODPLAIN W/ SCATTERED PARKINSONIA FLORIDA, ACACIA GREGGII, HYMENOCLEA SALSOLA, BEBBIA JUNCEA STREPHANOMERIA PAUCIFLORA, SARCOSTEMMA HIRTELLUM

HERBS: MOSTLY CHAMAESYCE SP.

Project ID: TCPOCK **Cross section ID:** T-10 **Date:** 2/14/2012 **Time:** 2:15 PM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______

Characteristics of the floodplain unit:

Average sediment texture: FINE-MED PEBBLE

Total veg cover: <1 % Tree: ____ % Shrub: ____ % Herb: <1 %

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: SCOURING
- ☐ Other: ______
- ☐ Other: ______

Comments: LOW SCOUR CHANNELS, GENERALLY DEVOID OF VEGETATION - OCCASSIONAL CHAMAESYCE SP. - MOST HAVE CHANGE IN SUBSTRATE TO MORE FINES RELATIVE TO ACTIVE FLOODPLAIN

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ______

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE-COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 5 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______
- ☐ Other: ______
- ☐ Other: ______

Comments: LOW TERRACE AND ADJACENT STEEP SLOPES HAVE ROCKY - COBBLE SUBSTRATE WITH SPARSE SCATTERED LARREA TRIDENTA - LOWER COVER AND DIVERSITY OF PLANTS THAN ON ACTIVE FLOODPLAIN

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PGE TOPOCK **Project Number:** **Stream:** **Investigator(s):** R. HUDDLESTON, K. STEINER	**Date:** 2/14/2012 **Town:** NEEDLES **Photo begin file#:** 434	**Time:** 2:35 PM **State:** CA **Photo end file#:** 443
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-11	
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Coordinates:** 34.723188 -114.503157	**Datum:** WGS 84

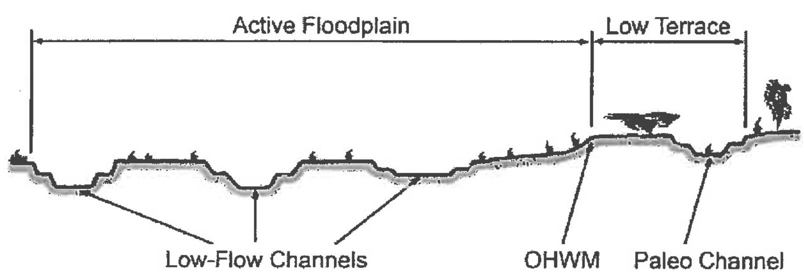
Potential anthropogenic influences on the channel system:
4 - 48"-DIAMETER CULVERTS UPSTREAM
EARTHEN DAM AT DOWNSTREAM END OF THE WASH

Brief site description: BROAD FLOODPLAIN WITH MULTIPLE LOW FLOW CHANNELS, SCATTERED TREES AND SHRUBS PRESENT
FINE PEBBLE TO COBBLE SUBSTRATE

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☒ Geologic maps
- ☒ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



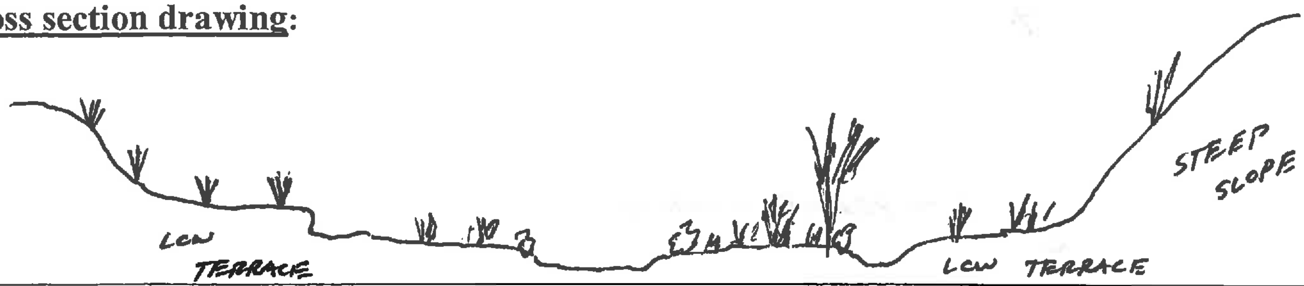
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

☐ Mapping on aerial photograph ☒ GPS 2005
☐ Digitized on computer ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-11 **Date:** 2/14/2012 **Time:** 2:35 PM

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: SAND DEPOSITION
- [ ] Other: ____________

Comments: BROAD ACTIVE FLOOD PLAIN - DEFINED CUT BANKS ALONG EDGE OF LOW TERRACE, MULTIPLE LOW FLOW CHANNELS. HIGHER VEGETATION DENSITY AND DIVERSITY IN ACTIVE FLOODPLAIN RELATIVE TO LOW TERRACES

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE - COBBLE

Total veg cover: 15 % Tree: 5 % Shrub: 10 % Herb: <2%

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: SCOURING
- [x] Other: SAND DEPOSITION
- [ ] Other: ____________

Comments: SCATTERED VEGETATION THROUGHOUT THE ACTIVE FLOODPLAIN INCLUDES PARKINSONIA FLORIDA, LARREA TRIDENTATA, LYCIUM ANDERSONII, AND HYMENOCLEA SALSOLA

HERBACEOUS - CHAMAESYCE, CRYPTANTHA, ESCHSCHOLZIA.

Project ID: TOPOCK **Cross section ID:** T-11 **Date:** 2/14/2012 **Time:** 2:35PM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: FINE PEBBLE - COBBLE

Total veg cover: 0 % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: SCOUR
- ☐ Other: ____________
- ☐ Other: ____________

Comments: LOW FLOW CHANNELS DEVOID OF VEGETATION GENERALLY FINER SUBSTRATE THAN THE ADJACENT FLOODPLAIN; SOME WITH STEEP CUT BANKS OTHERS MORE SWALE-LIKE

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: ____ % Tree: ____ % Shrub: 10 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: VEGETATION ON THE LOW TERRACE IS MOSTLY LARREA TRIDENTATA - LOWER DIVERSITY THAN WITHIN THE FLOODPLAIN

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Project Number:
Stream:
Investigator(s): R. HUDDLESTON, K. STEINER

Date: 2/14/2012 **Time:** 4:00 pm
Town: NEEDLES **State:** CA
Photo begin file#: 452 **Photo end file#:** 453

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-12

Projection: NAD83 **Datum:** WGS 84
Coordinates: 34.715490 -114.495808

Potential anthropogenic influences on the channel system: 4 - 10' DIAMETER CULVERTS DOWNSTREAM UNDER HWY 40, LARGE BOX CULVERT UNDER BNSF RR TRACKS

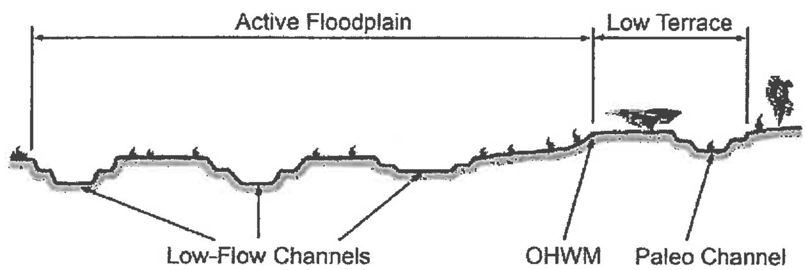
Brief site description: CONFINED CHANNEL - STEEP SIDE SLOPES RELATIVELY DENSE VEGETATION AT BASE OF SLOPES - OUTER EDGE OF ACTIVE FLOODPLAIN - SANDY - PEBBLE SUBSTRATE

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

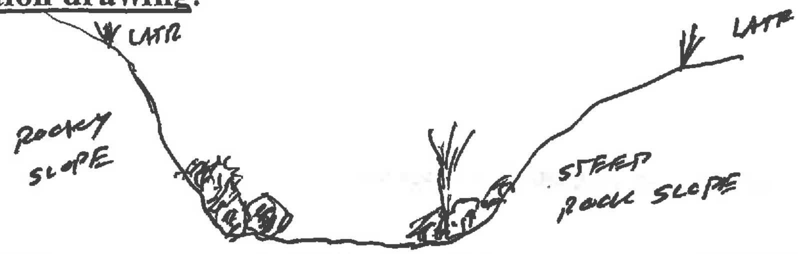


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS 2005
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-12 **Date:** 2/14/2012 **Time:** 4:00 PM

Cross section drawing:



OHWM

GPS point: ______________________

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: ______________
- [ ] Other: ______________

Comments: CONFINED CHANNEL BETWEEN ROCKY SLOPES. LOW FLOW CHANNEL SANDY W/ PEBBLES AND SOME COBBLE IS GENERALLY DEVOID OF VEGETATION - BUT RELATIVELY DENSE SHRUB GROWTH ALONG OUTER EDGES

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: SAND-PEBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 25 % Herb: <5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: FINER SUBSTRATE
- [x] Other: ABSNENCE OF VEG - LOW FLOW
- [ ] Other: ______________

Comments: - CENTER OF CHANNEL DEVOID OF VEGETATION

EDGES WITH LARREA TRIDENTATA, ENCELIA FARINOSA, HYPTIS EMORYI, BEBBIA JUNCEA AND ACACIA GREGGII

SPARSE ANNUALS/HERBS - CHAMAESYCE SP., ARISTIDA SP. AND SCHISMUS SP.

Project ID: TOPOCK **Cross section ID:** T-12 **Date:** 2/14/2012 **Time:** 4:00PM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND W/ SOME PEBBLE / COBBLE

Total veg cover: 0 % Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: ABSENCE OF VEGETATION
- ☐ Other: ____________
- ☐ Other: ____________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: ____% Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** **Investigator(s):** R. HUDDLESTON, K. STEINER	**Date:** 2/15/2012 **Time:** 1:40PM **Town:** NEEDLES **State:** CA **Photo begin file#:** 372 - **Photo end file#:** 376
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-13
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD83 **Datum:** WGS 84 **Coordinates:** 34.724855 -114.576657

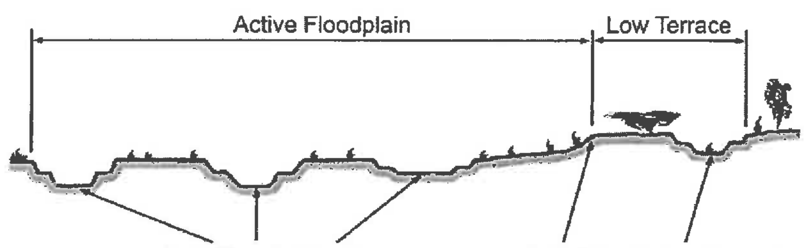
Potential anthropogenic influences on the channel system: - ROAD ON NORTH SIDE OF THE CHANNEL - DOWNSTREAM INTO LARGE BASIN AREA WITH 6 - 48" DIAM CULVERTS

Brief site description: GRAVEL - COBBLE CHANNEL - SPARSE VEGETATION PRESENT - MOST OCCURS ON LOW RIDGE WITHIN ACTIVE FLOODPLAIN STEEP CUT BANKS ALONG THE SIDES OF THE CHANNEL

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☒ Geologic maps
- ☒ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☒ GPS - 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-13 **Date:** 2/15/2012 **Time:** 1:40PM

Cross section drawing:

OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: GRAVEL - COBBLE CHANNEL - DEFINED CUT BANK ALONG EDGES OF LOW FLOW CHANNELS - SCATTERED TREES AND SHRUBS - DIFFERENT SPECIES IN WASH THAN SURROUNDING AREAS

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: 8 % Tree: 2 % Shrub: 5 % Herb: 1 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: SCOURING
- [ ] Other: ____________
- [ ] Other: ____________

Comments: OCCASSIONAL PARKINSONIA FLORIDA ALONG THE EDGES OF THE CHANNEL, LARREA TRIDENTA ON UPPER BARS AND HYMENOCLEA SALSOLA SCATTERED THROUGHOUT

Project ID: Topock **Cross section ID:** T-13 **Date:** 3/15/2012 **Time:** 1:40PM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE-COBBLE

Total veg cover: ____ % Tree: ____ % Shrub: 2 % Herb: 2 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: SCATTERED HYMENOCLEA SALSOLA WITHIN THE LOW FLOW CHANNEL - LARGELY DEVOID OF VEGETATION SCATTERED HERBS - CHAMAESYCE

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: COBBLE

Total veg cover: 10 % Tree: 5 % Shrub: 5 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: SOME PARKINSONIA FLORIDA ON NORTH SIDE, SOUTH SIDE LARREA TRIDENTATA, AMBROSIA DUMOSA AND OPUNTIA BASILARIS

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** **Investigator(s):** R. HUDDLESTON, K. STEINER	**Date:** 2/15/2012 **Time:** 2:00PM **Town:** NEEDLES **State:** CA **Photo begin file#:** 379 **Photo end file#:** 383
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-14
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.725371 -114.515550

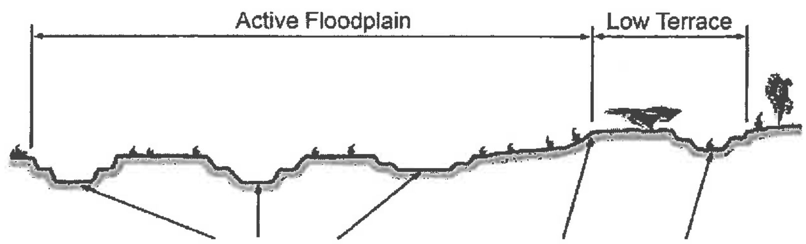
Potential anthropogenic influences on the channel system: ROAD ON NORTH SIDE OF THE CHANNEL - DOWN STREAM 48" CULVERTS UNDER THE ROAD

Brief site description: DEFINED PEBBLE - COBBLE SUBSTRATE / CHANNEL SCATTERED TREES AND SHRUBS PRESENT WITHIN THE ACTIVE FLOODPLAIN

Checklist of resources (if available):

- ☑ Aerial photography
  - Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  - Gage number:
  - Period of record:
    - ☐ History of recent effective discharges
    - ☐ Results of flood frequency analysis
    - ☐ Most recent shift-adjusted rating
    - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

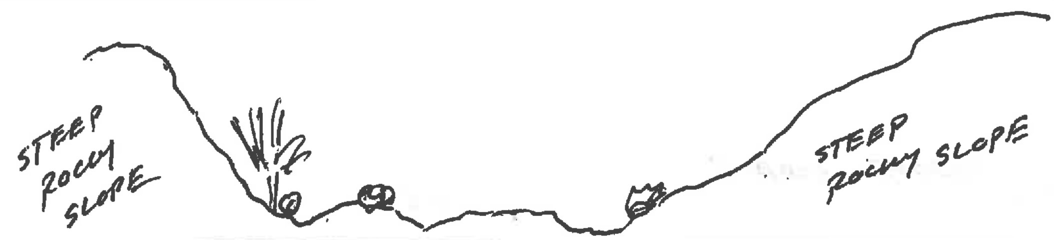


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS -2005
   - ☐ Other:

Project ID: Topock **Cross section ID:** T-14 **Date:** 2/15/2012 **Time:** 2:00PM

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: TOPOGRAPHIC CHANNEL WITH DEFINED CUT BANKS SOIL CRACKS IN SILTY DEPOSITS, DRIFT AND DEBRIS DEPOSITS

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: 15 % Tree: 5 % Shrub: 10 % Herb: ____ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [x] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: SPARSE PARKINSONIA FLORIDA ALONG THE EDGES OF THE CHANNEL, HYMENOCLEA SALSOLA SCATTERED THROUGHOUT THE CHANNEL

HERBS INCLUDE SCATTERED - CHAMAESYCE SP.

Project ID: TOPOCK **Cross section ID:** T-14 **Date:** 2/15/2012 **Time:** 2:00 PM

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: PEBBLE – COBBLE

Total veg cover: <5 % Tree: ____% Shrub: ____% Herb: <5 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments: COBBLY SUBSTRATE GENERALLY DEVOID OF VEGETATION WITH THE EXCEPTION OF SCATTERED CHAMAESYCE

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: COBBLE PEBBLE

Total veg cover: ____% Tree: ____% Shrub: 10 % Herb: ____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments: VEGETATION INCLUDES SPARSE LARREA TRIDENTATA AND ENCELIA FARINOSA

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Date: 2/15/2012
Time: 2:20PM
Project Number:
Town: NEEDLES
State: CA
Stream:
Photo begin file#: 390
Photo end file#: 394
Investigator(s): R. HUDDLESTON, K STEINER

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-15

Projection: NAD83
Datum: WGS 84
Coordinates: 34.725144 -114.573413

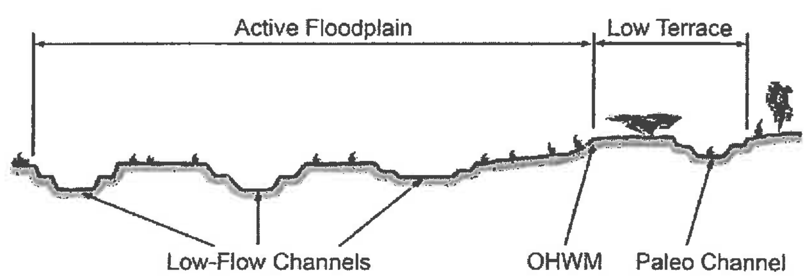
Potential anthropogenic influences on the channel system: - IMPOUNDMENT OF TWO NATURAL DRAINAGES - UPSTREAM HYDROLOGY ALTERED BY RAILROAD AND HIGHWAY CONSTRUCTION. DOWN STREAM CULVERTS UNDER ROADWAY

Brief site description: - BROAD, LOW TOPOGRAPHIC IMPOUNDMENT TO CAPTURE AND HOLD STORMWATER RUN-OFF. MORE OF A BASIN THAN A CHANNEL IN THIS LOCATION

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☒ Geologic maps
- ☒ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

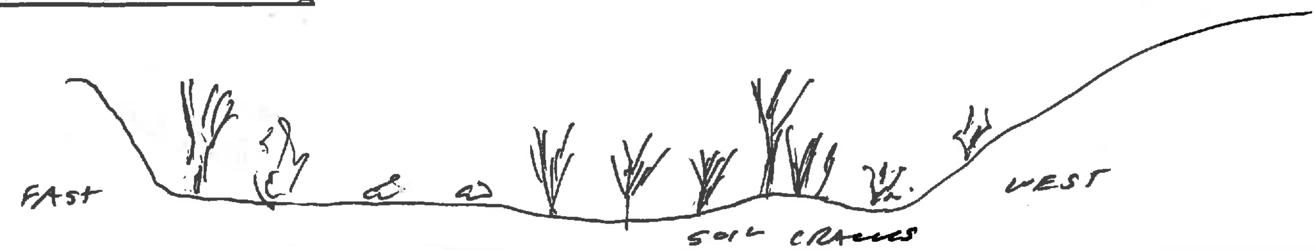


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☒ GPS 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-15 **Date:** 2/15/2012 **Time:** 2:20PM

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: SOIL CRACKS
- [x] Other: DRIFT DEPOSITS

Comments: THIS AREA IS A BROAD, LOW BASIN LIKE FEATURE THAT APPEARS TO HAVE BEEN CONSTRUCTED TO HOLD STORMWATER FLOWS - SCATTERED VEGETATION THROUGHOUT THIS AREA.

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: 30 % Tree: 20 % Shrub: 8 % Herb: 2 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [x] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments: AREAS WITH RELATIVELY DENSE TAMARIX THICKETS WITHIN THIS BASIN - OTHER PARTS MORE OPEN WITH SCATTERED SHRUBS -

Project ID: Topock Cross section ID: T-15 Date: 2/15/2012 Time: 2:20PM

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

NONE PRESENT

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________ NONE PRESENT

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK
Date: 2/15/2012
Time: 2:48
Project Number:
Town: NEEDLES
State: CA
Stream:
Photo begin file#:
Photo end file#: 395-396
Investigator(s): R. HUDDLESTON, K. STEINER

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-16

Projection: NAD83 **Datum:** WGS 84
Coordinates: 34.723832 -114.574149

Potential anthropogenic influences on the channel system:

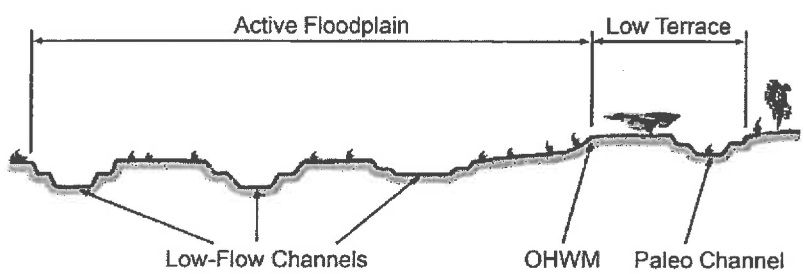
FLOWS INTO LARGE IMPOUNDMENT SOUTH OF PARK MOABI

Brief site description: - STEEP SIDE SLOPES ALONG CHANNEL SANDY-SILTY-GRAVEL CHANNEL - SPARSE VEGETATION ALONG THE CHANNEL

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☑ GPS 2005
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-16 **Date:** 2/15/2012 **Time:** 2:48

Cross section drawing:

OHWM

GPS point: ____________________

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: SCOUR CHANNEL
- [ ] Other: ____________________

Comments: WELL DEFINED CHANNEL WITH SILTY-SANDY LOW FLOW CHANNEL, SPARSE SCATTERED SHRUBS ALONG THE EDGES OF THE CHANNEL

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SILT-SAND

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: FLOW LINES
- [x] Other: ABSENCE OF VEG
- [ ] Other: ____________________

Comments:

Project ID: TOPOCK Cross section ID: T-16 Date: 2/15/2012 Time: 2:48

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: SAND-GRAVEL/SOME PEBBLES

Total veg cover: 5 % Tree: ____% Shrub: 5 % Herb: ____%

Community successional stage:

☐ NA
☐ Early (herbaceous & seedlings)
☒ Mid (herbaceous, shrubs, saplings)
☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☐ Drift and/or debris
☒ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☐ Other: ______________
☐ Other: ______________
☐ Other: ______________

Comments: - SPARSE SHRUBS ALONG EDGES OF CHANNEL INCLUDING ENCELIA FARINOSA, HYMENOCLEA SALSOLA AND BEBBIA JUNCEA.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: COBBLE - GRAVEL

Total veg cover: 10 % Tree: <5 % Shrub: 5 % Herb: <2 %

Community successional stage:

☐ NA
☐ Early (herbaceous & seedlings)
☐ Mid (herbaceous, shrubs, saplings)
☒ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks
☐ Ripples
☐ Drift and/or debris
☐ Presence of bed and bank
☐ Benches
☐ Soil development
☐ Surface relief
☐ Other: ______________
☐ Other: ______________
☐ Other: ______________

Comments:

SOME PARKINSONIA FLORIDA ALONG THE EDGES OF THE CHANNEL - TO THE SOUTH SCATTERED LARREA TRIDENTA

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** **Investigator(s):** R. HUDDLESTON, K. STEINERT	**Date:** 4/15/2012 **Town:** NEEDLES **Photo begin file#:**	**Time:** 3:03pm **State:** CA **Photo end file#:** 399-400
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-17	
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD83 **Coordinates:** 34.724106 -114.513444	**Datum:** WGS 84

Potential anthropogenic influences on the channel system: -FLOWS INTO LARGE RETENTION BASIN SOUTH OF PARK MOABI

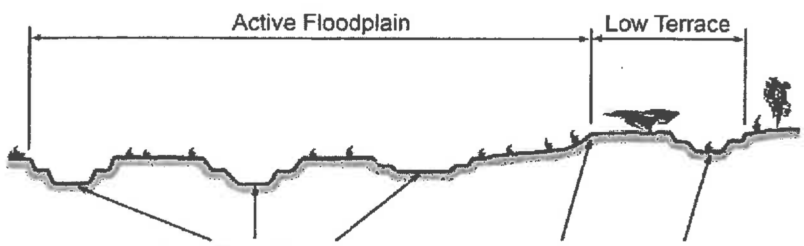
-RR TRACKS / HIGHWAY TO SOUTH

Brief site description: BROAD CHANNEL WITHIN STEEP SLOPES NO LOW TERRACE PRESENT

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

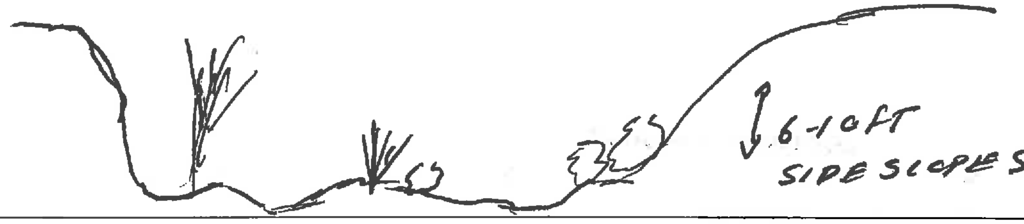


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS 2005
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-17 **Date:** 2/15/2012 **Time:** 3:03

Cross section drawing:



OHWM

GPS point: ______________________

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☐ Break in bank slope
- ☐ Other: ______________________
- ☐ Other: ______________________

Comments:

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: 0 % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☒ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: ABSENCE OF VEGETATION
- ☒ Other: SCOURING / FLOW LINES
- ☒ Other: FINE SEDIMENT RELATIVE TO COBBLE/GRAVEL IN ACTIVE FLOOD PLAIN

Comments:

- MULTIPLE LOW FLOW CHANNELS PRESENT WITHIN LARGER CHANNEL

Project ID: TOPOCK **Cross section ID:** T-17 **Date:** 2/15/2012 **Time:** 3:03

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: GRAVEL-COBBLE

Total veg cover: 5 % Tree: ____ % Shrub: 5 % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☒ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments:

- SCATTERED TREES AND SHRUBS IN THE CHANNEL INCLUDE - LARREA TRIDENTATA, HYMENOCLEA SALSOLA, ENCELIA FARINOSA, AND PARKINSONIA FLORIDA

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

NONE PRESENT

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** **Investigator(s):** R. HUDDLESTON, K. STEINER	**Date:** 2/15/2012 **Town:** NEEDLES **Photo begin file#:**	**Time:** 3:30 **State:** CA **Photo end file#:** 402-403

Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-18
Y ☒ / N ☐ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.726451 -114.512272

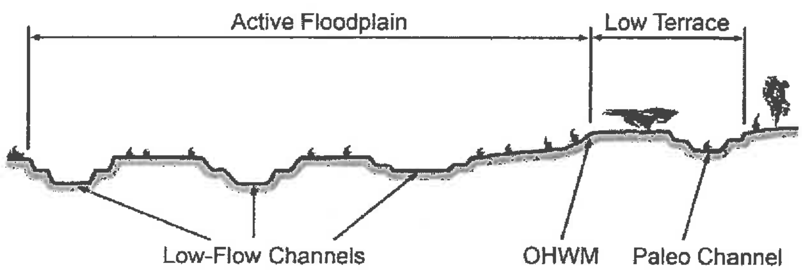
Potential anthropogenic influences on the channel system: - ROUTINELY MAINTAINED STORM WATER CHANNEL / BASIN IN PARK MOABI
APPEARS VEGETATION HAS RECENTLY BEEN CLEARED

Brief site description: BROAD -U-SHAPED CHANNEL, SIX 48-INCH DIAMETER CULVERTS AT SOUTH END, ONE SMALL 24-INCH DIAM. CULVERT AT NORTH END

Checklist of resources (if available):

- ☒ Aerial photography
  - Dates:
- ☒ Topographic maps
- ☒ Geologic maps
- ☒ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  - Gage number:
  - Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



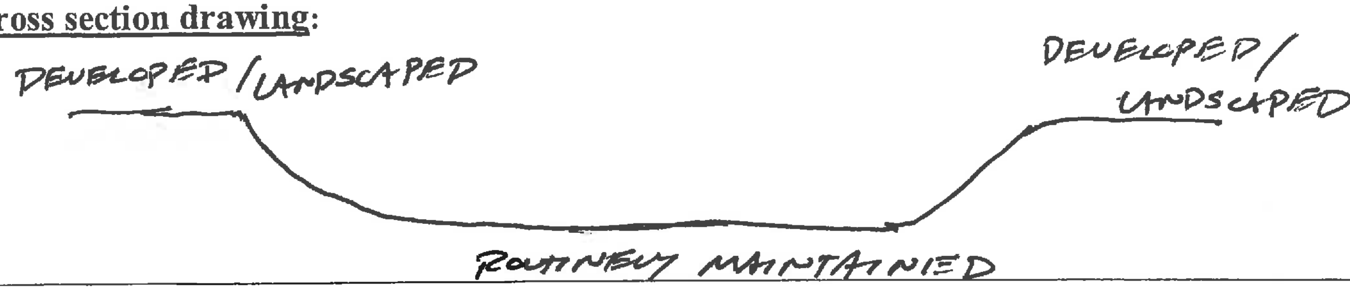
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

   ☐ Mapping on aerial photograph ☒ GPS 2005
   ☐ Digitized on computer ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-18 **Date:** 2/15/2012 **Time:** 3:30

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [ ] Break in bank slope
- [ ] Other: ____________
- [ ] Other: ____________

Comments: - ROUTINELY MAINTAINED STORM WATER CHANNEL AND BASIN WITHIN PARK MOABI - CLEARED OF VEGETATION

Floodplain unit: [ ] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND - SOME GRAVEL

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________
- [ ] Other: ____________
- [ ] Other: ____________

Comments:

Project ID: Topock **Cross section ID:** T-18 **Date:** 2/15/2012 **Time:** 3:30

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ______________ NONE PRESENT

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________ NONE PRESENT

Characteristics of the floodplain unit:

Average sediment texture: ______________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________
- ☐ Other: ______________
- ☐ Other: ______________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** SACRAMENTO WASH **Investigator(s):** R. HUDDLESTON, M. FOWLER	**Date:** 7/16/2012 **Time:** 10:36 **Town:** NEEDLES **State:** CA **Photo begin file#:** 36 **Photo end file#:** 37
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-19
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.733734 -114.474737

Potential anthropogenic influences on the channel system: SOME VEHICLE TRACKS IN CHANNEL - BUT NO SIGNIFICANT INFLUENCES EVIDENT IN THIS AREA. - POSSIBLE SOME SOIL BERMS CONSTRUCTED ALONG DRAINAGE

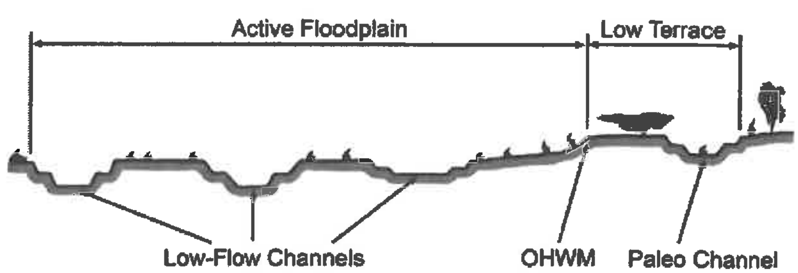
Brief site description: MAJOR TRIBUTARY CHANNEL TO THE SACRAMENTO WASH - LOW, BROAD CHANNEL THROUGH DENSE TAMARIX THICKET CHANNEL IS DEVOID OF VEGETATION - SANDY - COBBLE - GRAVEL

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☒ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

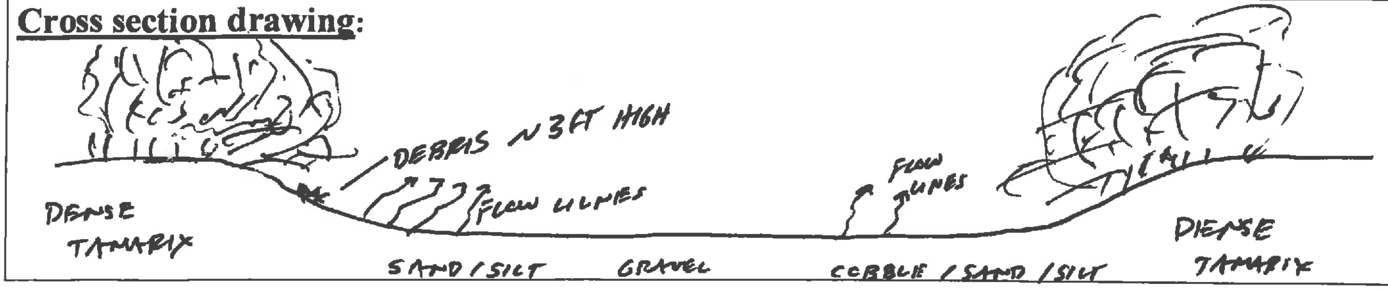


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ GPS - AT TRANSECT
   - ☒ Digitized on computer
   - ☐ Other:

Project ID: Topock **Cross section ID:** T-19 **Date:** 7/16/2012 **Time:** 10:36

Cross section drawing:



OHWM

GPS point: T-19

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: FLOW LINES
- [x] Other: DEBRIS

Comments: RECENT SIGNIFICANT FLOWS IN THIS PART OF THE CHANNEL - SOILS STILL MOIST TO WET IN SOME AREAS - FLOW LINES, DEBRIS EVIDENT SOME SHELVING

Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

GPS point: T-19

Characteristics of the floodplain unit:

Average sediment texture: SAND w/ SOME GRAVEL / COBBLE

Total veg cover: 0 % Tree: ___ % Shrub: ___ % Herb: ___ %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: FLOW LINES
- [ ] Other: ___
- [ ] Other: ___

Comments: WIDE CHANNEL - BASED ON WATER MARKS (MOIST SOILS) FLOW LINES AND DEBRIS THE ENTIRE CHANNEL IS INUNDATED DURING FLOW EVENTS - POSSIBLE BERMS CONSTRUCTED ALONG EDGES OF CHANNEL TO CONTAIN FLOW IN THIS AREA - NO ACTIVE FLOOD PLAIN

Project ID: TOPOCK **Cross section ID:** T-19 **Date:** 7/16/2012 **Time:** 10:36

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

NONE PRESENT

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: ____________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments:

NO ACTIVE FLOODPLAIN OUTSIDE OF LOW FLOW CHANNEL IN THIS AREA.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: ____ % Tree: 100 % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

Comments: LOW TERRACE ADJACENT TO THE CHANNEL IS CHARACTERIZED BY DENSE TAMARIX APHYLLA – NO EVIDENCE THAT THIS AREA IS SUBJECT TO REGULAR OR OCCASIONAL FLOODING.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** SACRAMENTO WASH **Investigator(s):** R. HUDDLESTON, M. FOWLER	**Date:** 7/16/2012 **Time:** 10:45 **Town:** NEEDLES **State:** CA **Photo begin file#:** 43 **Photo end file#:** 44
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-20
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.732944 -114.475596

Potential anthropogenic influences on the channel system: - LEVEES HAVE BEEN CONSTRUCTED ALONG THE EDGES OF THE CHANNEL TO CONTAIN FLOW IN THIS AREA, SOME VEHICLE TRACKS

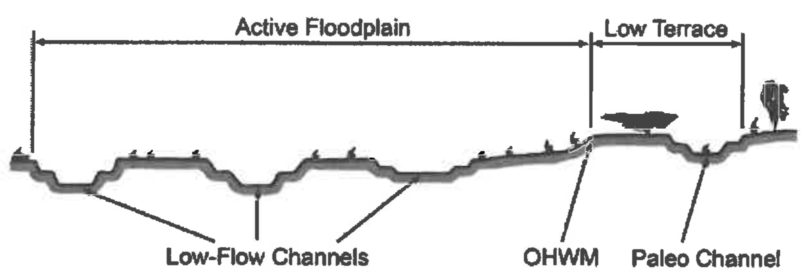
Brief site description: BROAD OPEN CHANNEL - DEVOID OF VEGETATION W/EXCEPTION OF SCATTERED TAMARIX ALONG LEVEES
SANDY SUBSTRATE W/ SOME GRAVEL AND COBBLE

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☒ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

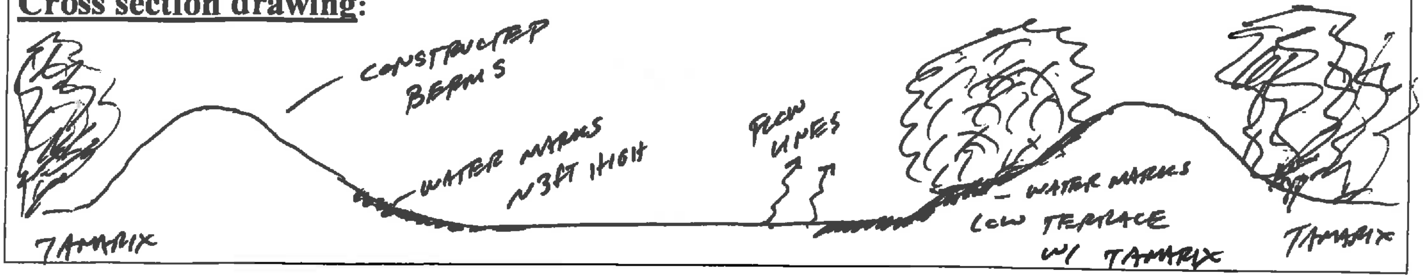


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS TRANSECT
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-20 **Date:** 7/6/2012 **Time:** 10:45

Cross section drawing:



OHWM

GPS point: T-20

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: WATER MARKS (MOIST SOIL)
- [x] Other: DRIFT + FLOW LINES

Comments: THE ENTIRE CHANNEL WITHIN THE CONFINES OF THE LEVEES APPEARS TO BE INUNDATED DURING FLOWS BASED ON WATER MARKS, FLOW LINES, AND DEBRIS OBSERVED IN THIS AREA.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND W/ SOME GRAVEL / COBBLE

Total veg cover: 0 % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: FLOW LINES
- [x] Other: MOIST / WET SOILS
- [ ] Other: ____________________

Comments: ENTIRE CHANNEL APPEARS TO BE INUNDATED DURING FLOWS - NO DISTINCT LOW FLOW CHANNELS OBSERVED AT THE TIME OF THE SURVEY

Project ID: Topock **Cross section ID:** T-20 **Date:** 7/16/2012 **Time:** 10:45

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______ NONE

Characteristics of the floodplain unit:

Average sediment texture: ______

Total veg cover: ____% Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☐ Other: ______

☐ Presence of bed and bank ☐ Other: ______

☐ Benches ☐ Other: ______

Comments: NO SEPERATE ACTIVE FLOOD PLAIN EVIDENT BROAD LOW CHANNEL IS CONTAINED BY LEVEES ON BOTH SIDES.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ______

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: ____% Tree: 20 % Shrub: ____% Herb: ____%

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☒ Other: WATER MARKS-MOIST SOIL

☐ Presence of bed and bank ☐ Other: ______

☐ Benches ☐ Other: ______

Comments: LOW TERRACE ON NORTH SIDE - BUT WITHIN THE CONSTRUCTED LEVEE / CREEK (WASH) CHANNEL SCATTERED TAMARIX APHYLA ON LOW TERRACE - OUTSIDE LEVEE'S DENSE TAMARIX APHYLA - SANDY SUBSTRATE

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PG&E TOPOCK **Project Number:** **Stream:** SACRAMENTO WASH **Investigator(s):** R. HUDDLESTON, M. FOWLER	**Date:** 7/16/2012 **Time:** 10:52 **Town:** NEEDLES **State:** CA **Photo begin file#:** 52 **Photo end file#:** 53
Y [x] / N [ ] Do normal circumstances exist on the site?	**Location Details:** T-21
Y [ ] / N [x] Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.733297 -114.474322

Potential anthropogenic influences on the channel system: - CONSTRUCTED LEVEES ALONG THE SIDES OF THE WASH

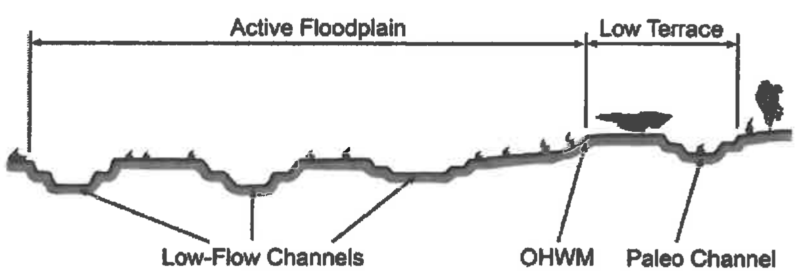
Brief site description: BROAD, OPEN CHANNEL - DEVOID OF VEGETATION W/ EXCEPTION OF SPARSE TAMARIX, SANDY SUBSTRATE W/ SOME GRAVEL DENSE TAMARIX THICKET OUTSIDE OF THE LEVEE

Checklist of resources (if available):

- [x] Aerial photography
  Dates:
- [x] Topographic maps
- [ ] Geologic maps
- [x] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [x] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

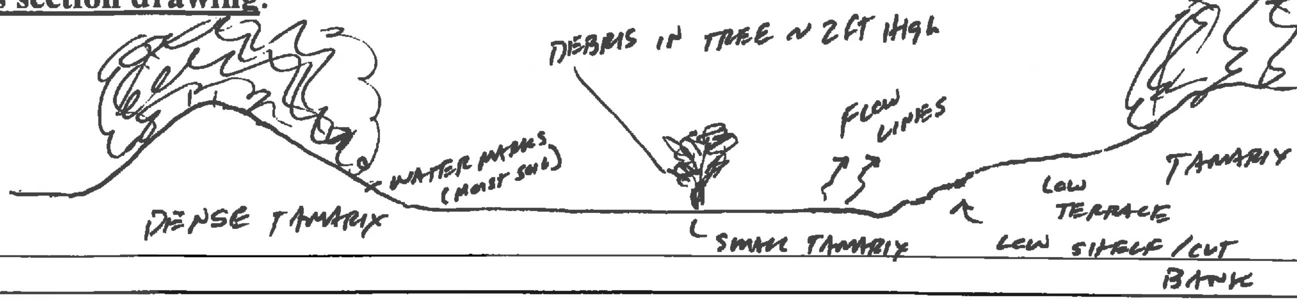


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [x] Mapping on aerial photograph
   - [x] Digitized on computer
   - [x] GPS TRANSECT
   - [ ] Other:

Project ID: TOPOCK **Cross section ID:** T-21 **Date:** 7/16/2012 **Time:** 10:52

Cross section drawing:



OHWM

GPS point: T-21

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: FLOW LINES
- [x] Other: MOIST SOIL - WATER MARK

DEBRIS DEPOSITS
SOIL CRACKS

Comments:

BROAD OPEN CHANNEL
GENERALLY DEVOID OF VEGETATION - EVIDENCE OF RECENT BANK - BANK FLOWS IN THIS AREA.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: T-21

Characteristics of the floodplain unit:

Average sediment texture: SAND W/SOME GRAVEL
Total veg cover: ____ % Tree: 1 % Shrub: ____ % Herb: ____ %
Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [x] Mudcracks
- [x] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: FLOW LINES
- [x] Other: MOIST SOILS
- [ ] Other: ____

Comments: NO DISTINCT LOW FLOW CHANNEL - IN THIS SECTION FLOWS INCLUDE THE ENTIRE CHANNEL FROM BANK TO BANK

Project ID: TOPOCK **Cross section ID:** T-21 **Date:** 7/16/2012 **Time:** 10:52

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

NONE APPARENT

GPS point: T-21

Characteristics of the floodplain unit:

Average sedient texture: ____

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments:

NO ACTIVE FLOODPLAIN EVIDENT - ALL FLOWS SEEM CONTAINED BY LEVEES AND CUT BANKS ALONG LOW TERRACE

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: ____ % Tree: 20 % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

LARGE TAMARIX APHYLA

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments: SMALL TERRACE IS PRESENT ON THE NORTH SIDE OF THE CHANNEL - SOME LARGE TAMARIX APHYLA TREES - NO EVIDENCE OF FLOWS ABOVE CUT BANKS - MINOR FLOODING AT LOW POINTS ONLY

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: 763E TOPOCK **Project Number:** **Stream:** SACRAMENTO WASH **Investigator(s):** R. HUDDLESTON, M. FOWLER	**Date:** 7/17/2012 **Time:** 7:42 **Town:** NEEDLES **State:** CA **Photo begin file#:** 137 **Photo end file#:** 140
Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-22
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.731461 -114.479273

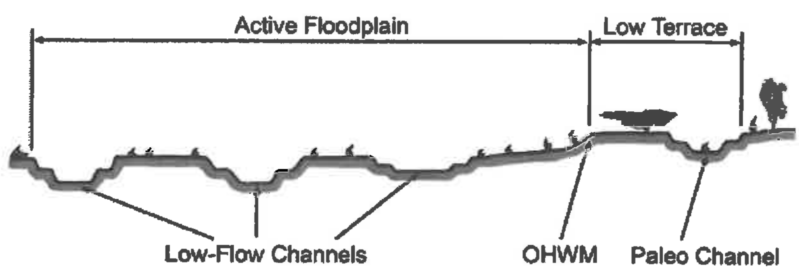
Potential anthropogenic influences on the channel system: THIS SECTION OF THE WASH IS CONTAINED BY CONSTRUCTED LEVEE ON BOTH SIDES OF THE CHANNEL - LOTS OF WOODY DEBRIS ALONG EDGES

Brief site description: BROAD SANDY CHANNEL W/ SPARSE VEGETATION LARGE SAND LEVEES ALONG THE SIDE OF THE WASH IN THIS AREA

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☒ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☒ Mapping on aerial photograph
   - ☒ Digitized on computer
   - ☒ GPS TRANSECT
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-22 **Date:** 7/17/2012 **Time:** 7:42

Cross section drawing:

OHWM

GPS point: T-22

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] Other: DRIFT LINES
- [x] Other: FLOW LINES
  SOIL CRACKS
  MOIST SOIL

Comments:

- EVIDENCE OF RECENT FLOW THROUGHOUT ENTIRE CHANNEL BED - SOME WATER STAINING AT BASE OF LEVEE SLOPES, EXTENSIVE SOIL CRACKS, DEBRIS ETC.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: T-22

Characteristics of the floodplain unit:

Average sediment texture: SAND W/ SOME SILT

Total veg cover: 3-5% Tree: ___% Shrub: <1% Herb: ___%

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [x] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: WATER MARKS
- [x] Other: MOIST SOIL
- [x] Other: FLOW LINES

Comments:

IN THIS SECTION OF THE WASH THE LOW FLOW CHANNEL INCLUDES THE ENTIRE BED WITHIN THE LEVEES - NO DISTINCTLY DIFFERENT FLOODPLAIN - EVIDENCE OF SIGNIFICANT RECENT FLOWS THROUGHOUT

Project ID: Topaz **Cross section ID:** T-22 **Date:** 7/17/2012 **Time:** 7:42

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

NOT PRESENT

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

NOT PRESENT

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: PGE TOPOCK
Project Number:
Stream:
Investigator(s): R. HUDDLESTON, M. FOWLER

Date: 7/17/2012 **Time:** 11:41
Town: NEEDLES **State:** CA
Photo begin file#: 197 **Photo end file#:** 199

Y [x] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [x] Is the site significantly disturbed?

Location Details: T-23

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 34.729183 -114.473621

Potential anthropogenic influences on the channel system: CULVERT AT RR TRACKS - DEBRIS PILED ALONG THE SOUTH SIDE OF THE SWALE - POSSIBLY TO DIVERT WATER

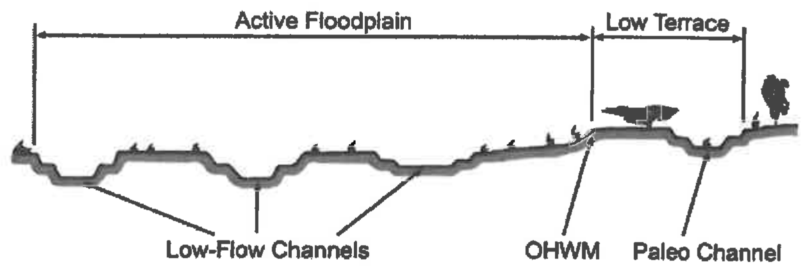
Brief site description: BROAD LOW CHANNEL DEVOID OF VEGETATION - LACKS DEFINED BANKS - MORE OF LOW FLOWING SWALE -

Checklist of resources (if available):

- [x] Aerial photography
  Dates:
- [x] Topographic maps
- [ ] Geologic maps
- [x] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [x] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

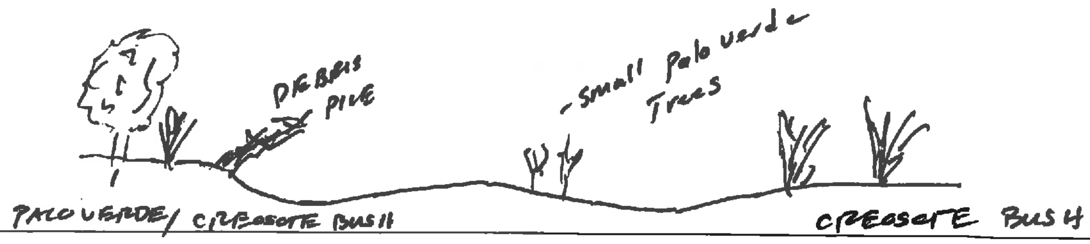


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [x] Mapping on aerial photograph
   - [x] Digitized on computer
   - [x] GPS
   - [ ] Other:

Project ID: Topock **Cross section ID:** T- 23 **Date:** 7/17/2012 **Time:** 11:41

Cross section drawing:



OHWM

GPS point: T-23

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☒ Change in vegetation cover
- ☐ Break in bank slope
- ☒ Other: FLOW LINES
- ☐ Other: ______

Comments: - ENTIRE SWALE APPEARS TO BE LOW FLOW CHANNEL SOMEWHAT DEFINED IN AREA JUST DOWN STREAM FROM RR CULVERT BUT QUICKLY DISSIPATES INTO OVERLAND SHEET FLOW THROUGH DENSE TAMARIX THICKET

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: T-23

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: <5 % Tree: 1-2 % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: ~~DRI~~ FLOW LINES
- ☐ Other: ______
- ☐ Other: ______

Comments: WEAKLY EXPRESSED - MORE SWALE LIKE - EVIDENCE OF FLOW ACCROSS ENTIRE FEATURE NO DEFINED OR APPARANT ACTIVE FLOOD PLAIN

Project ID: Topock **Cross section ID:** T-23 **Date:** 7/17/2012 **Time:** 11:41

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

NONE

GPS point: ____________________

Characteristics of the floodplain unit:

Average sedient texture: ____________________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: SAND

Total veg cover: _____ % Tree: 20 % Shrub: 10 % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments: NO EVIDENCE OF FLOWS OR FLOODING OUTSIDE OF LOW FLOW CHANNEL

Appendix N
Ephemeral Drainage Sample Point Data Sheets

Project: PG&E Topock Compressor Station	Date: 2/13/2012 Time: 10:15 AM
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-1 Photos: 353-354
Y [ ] N [X] Significantly Disturbed	GPS: 34.713079 Datum: WGS84
Geomorphic Feature: DRAINAGE	-114.495374 Width: 4 FT

Flow Regime: EPHEMERAL

Substrate: PEBBLE-COBBLE

Indicators: DEFINED BED/BANK, ABSENCE OF VEGETATION

Cross-Section:

Vegetation in Channel: SPARSE CHAMAESYCE

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA

ENCELIA FARINOSA

Notes: TRIBUTARY TO BAT CAVE WASH

Project: PG&E Topock Compressor Station | Date: 2/13/2012 | Time: 10:46 AM

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: 7B-2 | Photos: 358, ~~360~~ 359

Y [ ] N [X] Significantly Disturbed | GPS: 34.715529 -114.494982 | Datum: WGS 84

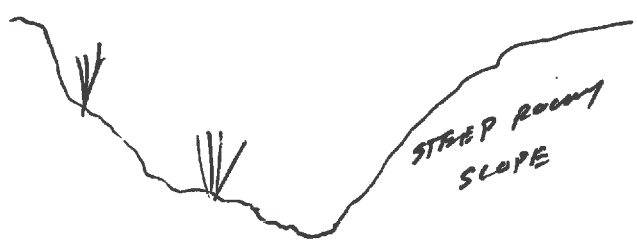
Geomorphic Feature: DRAINAGE | Width: 7.8 FT

Flow Regime: EPHEMERAL

Substrate: PEBBLE - COBBLE ; SOME BOULDER - DS MORE SAND

Indicators: ERODED CHANNEL DEVOID OF VEGETATION

Cross-Section:



Vegetation in Channel: NONE

Low Terrace and Adjacent Vegetation: SCATTERED LARREA TRIDENTATA
ENCELIA FARINOSA

Notes: TRIBUTARY TO BAT CAVE WASH - ERODED / DISSECTED ROCKY SLOPE ABOVE THIS POINT

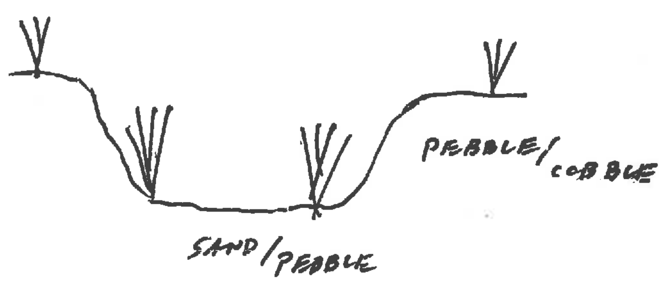
Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 11:02 AM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-3	Photos: 362, 363
Y [ ] N [X] Significantly Disturbed	GPS: 34.716823	Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.493729	Width: 8.3FT

Flow Regime: EPHEMERAL

Substrate: SAND - PEBBLE

Indicators: GENERAL ABSENCE OF VEGETATION, DEFINED BED / BANK LOW FLOW SCOUR CHANNELS

Cross-Section:



- POSSIBLE CONSTRUCTED STORM WATER DRAINAGE

Vegetation in Channel: LARREA TRIDENTA IN SCATTERED LOCATIONS - MOST OF THE CHANNEL IS DEVOID OF VEGETATION - SPARSE PALOFOXIA ARIDA PRESENT

Low Terrace and Adjacent Vegetation: LARREA TRIDENTA

Notes: - DOWN STREAM OF THIS LOCATION THIS CHANNEL BECOMES SMALLER 2-3 FT WIDE EROSIONAL FEATURE THAT DRAINS INTO BAT CAVE WASH

Project: PG&E Topock Compressor Station | Date: 2/13/2012 | Time: 11:49 AM

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB-4 | Photos: 372

Y [ ] N [X] Significantly Disturbed | GPS: 34.720019 -114.495183 | Datum: WGS 84

Geomorphic Feature: DRAINAGE | Width: 3'-10'

Flow Regime: EPHEMERAL

Substrate: SAND - PEBBLE W/ SOME COBBLE

Indicators: CHANGE IN SUBSTRATE, ABSENCE OF VEGETATION, BENCHES, SCOURING

Cross-Section:

Vegetation in Channel: ALONG LOW BENCHES NEXT TO LOW FLOW CHANNEL SCATTERED LARREA TRIDENTATA, ENCELIA FARINOSA AND HYPTIS EMORI

SCATTERED HERBS: PALAFOXIA ARIDA, CHAMAESYCE

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA

Notes: MULTIPLE EROSIONAL CHANNELS ON ADJACENT HILL SIDES DRAIN INTO THIS CHANNEL. THIS DRAINAGE HAS MULTIPLE LOW FLOW CHANNELS IN SOME AREAS

Project: PG&E Topock Compressor Station	Date: 2/13/2012 Time: 1:18 PM
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-5 Photos: 380 · 381
Y [ ] N [X] Significantly Disturbed	GPS: 34.721629 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.495485 Width: 5'

Flow Regime: EPHEMERAL

Substrate: SAND-PEBBLE, SOME COBBLE / BOULDER

Indicators: DEFINED BED / BANK, SCOURING
ABSENCE OF VEGETATION

Cross-Section:

Vegetation in Channel: NONE

Low Terrace and Adjacent Vegetation: SPARSE LARREA TRIDENTATA

Notes: HISTORIC ROUTE 66 DRAINAGE - FLOWS INTO SMALL CHANNEL / CULVERT UPSLOPE OF IM-3
PHOTOS 382, 383 - RIP-RAP AT US EDGE CULVERT

Project: PG&E Topock Compressor Station | Date: 2/13/2012 | Time: 1:45 PM

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB-6 | Photos: 384

Y [ ] N [X] Significantly Disturbed | GPS: 34.720180 -114.496215 | Datum: WGS 84

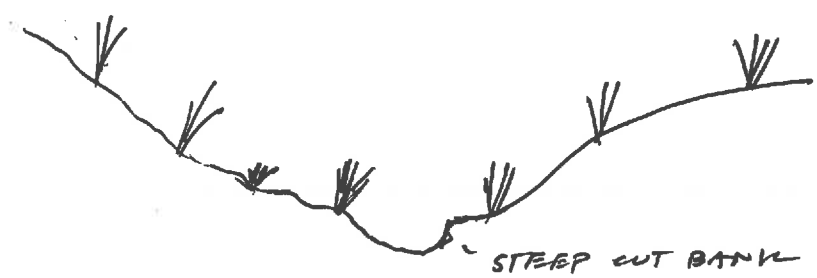
Geomorphic Feature: DRAINAGE | Width: 3.3 FT

Flow Regime: EPHEMERAL

Substrate: SAND - PEBBLE W/ FEW COBBLES

Indicators: EROSIONAL CHANNEL - CUT BANKS (+) ABSENCE OF VEGETATION, SCOURING

Cross-Section:



Vegetation in Channel: ~~NONE~~ SPARSE CHAMAESYCE SP. PLANTAGO ~~ERECTA~~ OVATA, ARISTIDA SP.

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, KRAMERIA GRAYI, OPUNTIA BASILARIS

Notes: NO EVIDENCE OF FLOW ABOVE EROSIONAL CHANNEL

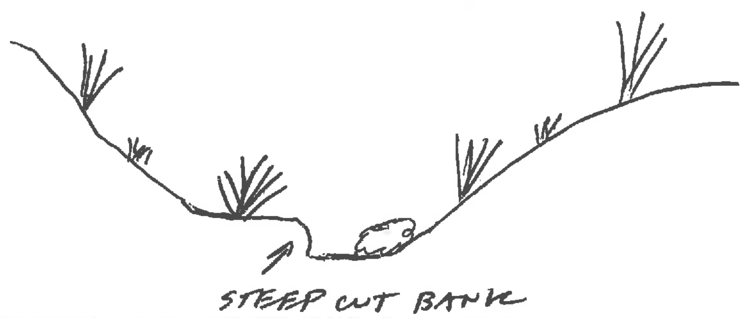
Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 2:00PM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-7	Photos: 385
Y [ ] N [X] Significantly Disturbed	GPS: 34.721099	Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.495173	Width: 19.2 FT

Flow Regime: EPHEMERAL

Substrate: PEBBLE - COBBLE

Indicators: STEEP CUT BANK, SCOUR CHANNEL

Cross-Section:



Vegetation in Channel: AMBROSIA DUMOSA ALONG EDGES, SPARSE PLANTAGO OVATA, ARISTIDA SP. AND CHAMAESYCE

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, KRAMERIA GRAYI AND BEBBIA JUNCEA

Notes: EROSIONAL FEATURE

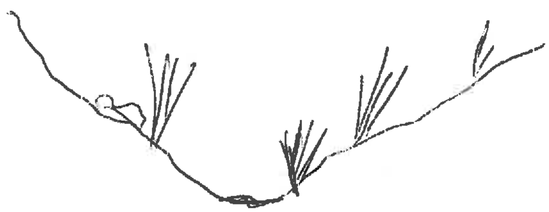
Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 2:28 PM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-8	Photos: 388-389
Y [ ] N [X] Significantly Disturbed	GPS: 34.720611	Datum: WGS84
Geomorphic Feature: DRAINAGE	-114.498822	Width: 5.3 FT

Flow Regime: EPHEMERAL

Substrate: SAND - PEBBLE W/ SOME COBBLE, BOULDER

Indicators: CHANGE IN SUBSTRATE, GENERALLY ABSENT VEGETATION

Cross-Section:



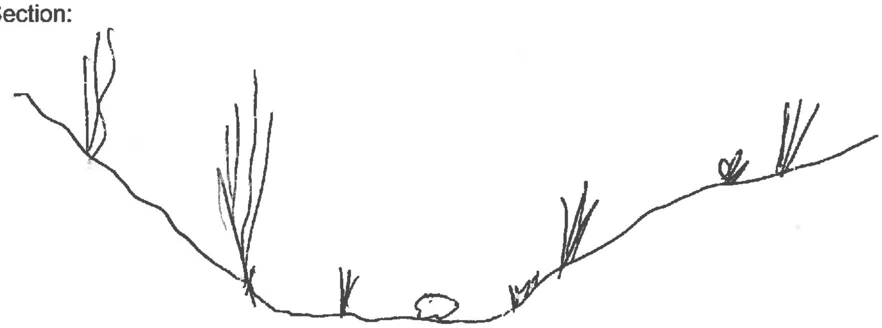
Vegetation in Channel: GENERALLY ABSENT - SPARSE CHAMAESYCE

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, AMBROSIA DUMOSA, KRAMERIA GRAYI, BEBBIA JUNCEA, HYPTIS EMORYI ALONG THE EDGES OF THE EROSIONAL CHANNEL AND ON SIDE SLOPES

Notes:

Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 2:33 PM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y ☒ N ☐ Normal Circumstances	Sample Point: TB-9	Photos: 390-391
Y ☐ N ☒ Significantly Disturbed	GPS: 34.721169	Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.498257	Width: 16 FT
Flow Regime: EPHEMERAL		
Substrate: SAND-PEBBLE, SOME COBBLE		
Indicators: MULTIPLE LOW FLOW SANDY-PEBBLE SCOUR CHANNELS		

Cross-Section:



Vegetation in Channel: AMBROSIA DUMOSA, BEBBIA JUNCEA
LARREA TRIDENTATA, KRAMERIA GRAYI

Low Terrace and Adjacent Vegetation:

FOUQUIERIA SPLENDENS, LARREA TRIDENTATA,
KRAMERIA GRAYI, OPUNTIA BASILARIS, ARISTIDA SP.
CHAMAESYCE SP.

Notes: LOW BROAD FLOODPLAIN WITHIN STEEP SIDE SLOPES
MULTIPLE LOW FLOW CHANNELS

Project: PG&E Topock Compressor Station | Date: 2/13/2012 Time: 2:48PM

Investigators: R. Huddleston, K Steiner | City: Needles State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB-10 Photos: 392, 393

Y [ ] N [X] Significantly Disturbed | GPS: 34.722453 -114.497948 Datum: WGS 84

Geomorphic Feature: DRAINAGE | Width: 18.6 FT

Flow Regime: EPHEMERAL

Substrate: SAND - PEBBLE

Indicators: CHANGE IN SUBSTRATE - SPARSE VEGETATION SCOURING - SAND DEPOSITS

Cross-Section:

Vegetation in Channel: SPARSE PLANTAGO OVATA, ARISTIDA AND CHAMAESYCE SP.

AMBROSIA DUMOSA, BEBBIA JUNCIA AND ACACIA GREGGII ALONG EDGES OF THE CHANNEL

Low Terrace and Adjacent Vegetation: LARREA TRIDENTA, KRAMERIA GRAYI

Notes: HIGHER PLANT COVER AND DIVERSITY ASSOCIATED WITH DRAINAGE FEATURE COMPARED TO ADJACENT ROCKY SLOPES

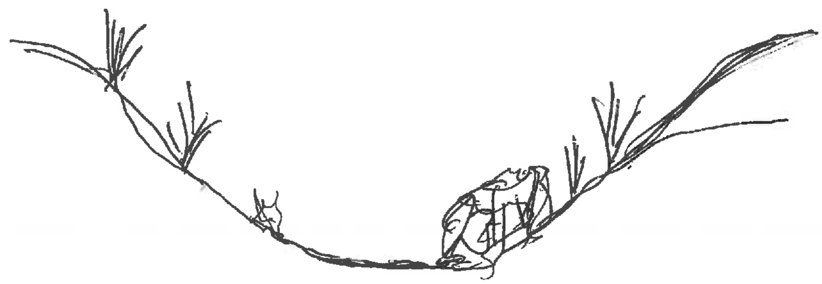
Project: PG&E Topock Compressor Station	Date: 2/13/2012 Time: 2:55PM
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-11 Photos: 394-395
Y [ ] N [X] Significantly Disturbed	GPS: 34.723050 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.497618 Width: 16.1 FT

Flow Regime: EPHEMERAL

Substrate: FINE PEBBLES, SAND SOME COBBLE

Indicators: CHANGE IN SUBSTRATE, SAND DEPOSITS CHANGE IN VEGETATION

Cross-Section:



Vegetation in Channel: -SPARSE BEBBIA JUNCEA, CHAMAESYCE SP. LARREA TRIDENTATA, ONE LARGE PARKINSONIA FLORIDA TREE DOWN STREAM OF THIS POINT LYCIUM ANDERSONII

Low Terrace and Adjacent Vegetation: - ADJACENT TO CHANNEL - LARREA TRIDENTATA, KRAMERIA GRAYI, AMBROSIA DUMOSA OPUNTIA,

Notes: - SIDE SLOPES ROCKY W/ SPARSE VEGETATION

ARID WEST EPHEMERAL AND INTERMITTENT STREAM SAMPLE POINT DATA SHEET

Project: PG&E Topock Compressor Station	Date: 2/13/2012 Time: 3:14 pm
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: T-B 12 Photos: 402-403
Y [ ] N [X] Significantly Disturbed	GPS: 34.721803 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.496667 Width: 7 FT
Flow Regime: EPHEMERAL	
Substrate: FINE -MIED PEBBLE	
Indicators: FLOW LINES, SCOURING ABSENCE OF VEGETATION	

Cross-Section:

Vegetation in Channel: - SCATTERED VEGETATION ALONG THE EDGES OF CHANNEL - LARREA TRIDENTATA, AMBROSIA DUMOSA, KRAMERIA GRAYI AND BEBBIA JUNCEA

-SPARSE ; CHAMAESYCE, PALAFOXIA ARIDA

Low Terrace and Adjacent Vegetation: - VEGETATION IN AREAS ALONG CHANNEL SIMILAR - LARREA, AMBROSIA AND KRAMERIA

Notes:

Project: PG&E Topock Compressor Station | Date: 2/13/2012 | Time: 3:25 PM

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB-13 | Photos: 404-405

Y [ ] N [X] Significantly Disturbed | GPS: 34.720953 -114.497479 | Datum: WGS 84

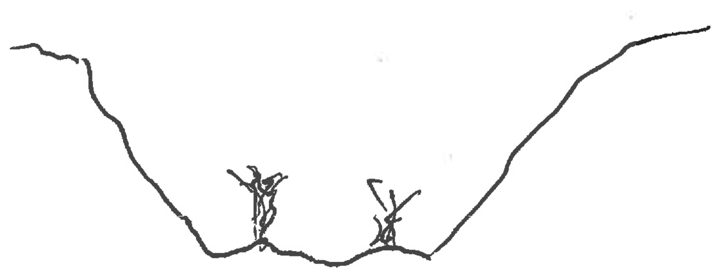
Geomorphic Feature: DRAINAGE | Width: 23 FT

Flow Regime: EPHEMERAL

Substrate: FINE GRAVEL / COBBLE

Indicators: ABSENCE OF VEGETATION / SCOURING

Cross-Section:



ACACIA GREGGII

Vegetation in Channel: - SCATTERED ACACIA GREGGII - ALSO PRESENT ALONG FLOODPLAIN - LARREA TRIDENTATA, AMBROSIA DUMOSA AND BEBBI JUNCEA - SPARSE HERBS INCLUDE CHAMAESYCE, ERIOGONUM INFLATUM, LUPINUS ARIZONICUS, AND BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation:

LARREA TRIDENTATA, KRAMAMERI GRAYI

Notes:

Project: PG&E Topock Compressor Station — Date: 2/13/2012 — Time: 3:41 PM

Investigators: R. Huddleston, K Steiner — City: Needles — State: CA

Y [X] N [X] Normal Circumstances — Sample Point: TB-14 — Photos: 410-411

Y [ ] N [X] Significantly Disturbed — GPS: 34.719043 -114.497465 — Datum: WGS 84

Geomorphic Feature: DRAINAGE - SWALE — Width: 11 FT

Flow Regime: EPHEMERAL

Substrate: FINE GRAVEL

Indicators: CHANGE IN SUBSTRATE - MORE FINES IN THIS AREA

Cross-Section:

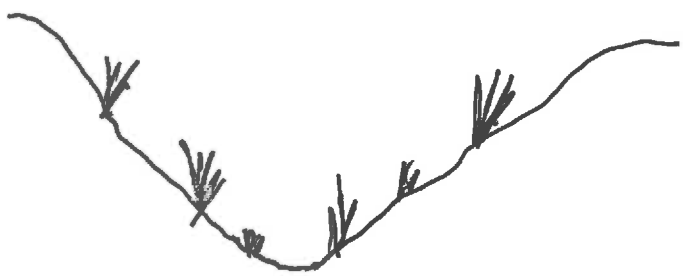
Vegetation in Channel: - SPARSE ~~CHAF~~ CHAMAESYCE IN LOW FLOW CHANNEL - ALONG EDGES ENCELIA FARINOSA, LARREA TRIDENTATA, AMBROSIA DUMOSA

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA

Notes: FEATURE TERMINATES UP SLOPE AT RR TRACKS

Project: PG&E Topock Compressor Station	Date: 2/13/2012 Time: 3:52pm
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-15 Photos: 414-415
Y [ ] N [X] Significantly Disturbed	GPS: 34.719425 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.499032 Width: 8FT
Flow Regime: EPHEMERAL	
Substrate: GRAVEL-COBBLE	
Indicators: SCOURING, LOW FLOW CHANNEL	

Cross-Section:



Vegetation in Channel: · SOME BEBBIA JUNCEA ALONG EDGES

SPARSE CHAMAESYCE, PALAFOXIA ARIDA AND SCHISMUS BARBATUS

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, AMBROSIA DUMOSA, KRAMERIA GRAYI, AND OPUNTIA BASILARIS

Notes:

Project: PG&E Topock Compressor Station		Date: 2/14/2012	Time: 7:56 AM
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-16	Photos: 345 - 346
Y [ ] N [X] Significantly Disturbed		GPS: 34.721399 -114.499603	Datum: WGS 84
Geomorphic Feature: DRAINAGE / EROSIONAL CHANNEL			Width: 3 - 6 FT
Flow Regime: EPHEMERAL			
Substrate: SAND / COBBLE			
Indicators: SCOURING, SAND DEPOSITS			

Cross-Section:

Vegetation in Channel: LARREA TRIDENTATA, AMBROSIA DUMOSA, OPUNTIA BASILARIS, CHAMAESYCE SP., CRYPTANTHA SP., PLANTAGO OVATA, AND BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, KRAMERIA GRAYI, CYLINDROPUNTIA SP.

Notes:

Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 8:08 am
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-17 Photos: 347-348
Y [ ] N [X] Significantly Disturbed	GPS: 34.722031 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.499021 Width: 5 1/2 FT

Flow Regime: EPHEMERAL

Substrate: FINE GRAVEL W/ COBBLE - ROCK

Indicators: LOW EROSIONAL CHANNEL -

Cross-Section:

Vegetation in Channel: BEBBIA JUNCEA, HYPTIS EMORYI, POROPHYLUM GRACILE, AND CHAMAESYCE SP.

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, KRAMERIA GRAYI, AMBROSIA DUMOSA, AND CYLINDROPUNTIA SP.

Notes:

Project: PG&E Topock Compressor Station | Date: 2/14/2012 | Time: 8:20AM

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB18 | Photos: 349-350

Y [ ] N [X] Significantly Disturbed | GPS: 34.723239 -114.498031 | Datum: WGS 84

Geomorphic Feature: DRAINAGE | Width: 3½ FT

Flow Regime: EPHEMERAL

Substrate: SAND / GRAVEL / COBBLE

Indicators: LOW FLOW EROSIONAL CHANNEL

Cross-Section:

Vegetation in Channel: MOSTLY UNVEGETATED - SPARSE BOUTELOUA ARISTIDOIDES - UPSLOPE OF THIS POINT SOME ACACIA GREGGII

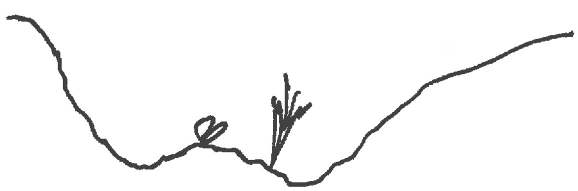
Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, AMBROSIA DUMOSA, KRAMERIA GRAYI

Notes:

ARID WEST EPHEMERAL AND INTERMITTENT STREAM SAMPLE POINT DATA SHEET

Project: PG&E Topock Compressor Station		Date: 2/14/2012	Time: 8:29 am
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y ☒ N ☐ Normal Circumstances		Sample Point: TB-19	Photos: 351-352
Y ☐ N ☒ Significantly Disturbed		GPS: 34.723622	Datum: WGS 84
Geomorphic Feature: DRAINAGE		-114.497889	Width: 26 FT
Flow Regime: EPHEMERAL			
Substrate: SAND - FINE GRAVEL, SOME COBBLE			
Indicators: MULTIPLE LOW FLOW EROSIONAL CHANNELS			

Cross-Section:



Vegetation in Channel: ACACIA GREGGII, AMBROSIA DUMOSA AND OPUNTIA BASILARIS

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, KRAMATRIA GRAYI

Notes:

Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 8:38am
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-20 Photos: 353-354
Y [ ] N [X] Significantly Disturbed	GPS: 34.723302 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.498879 Width: 7½ FT
Flow Regime: EPHEMERAL	
Substrate: GRAVEL - COBBLE	
Indicators: SCOUR CHANNEL, SAND DEPOSITS	

Cross-Section:

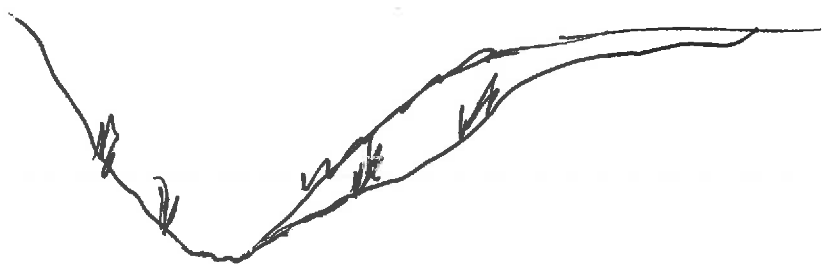
Vegetation in Channel:
SPARSE HERBACEOUS VEG. ONLY: CHAMAESYCE SP.
BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation:
LARREA TRIDENTATA, AMBROSIA DUMOSA,
KRAMERIA GRAYI

Notes:

Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 8:42AM
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-21 Photos: 355-356
Y [ ] N [X] Significantly Disturbed	GPS: 34.722749 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.499586 Width: 4 FT
Flow Regime: EPHEMERAL	
Substrate: GRAVEL-COBBLE	
Indicators: LOW FLOW EROSIONAL CHANNEL	

Cross-Section:



Vegetation in Channel: SPARSE HERBACEOUS PLANTS ONLY - CHAMAESYCE SP., PLANTAGO OVATA, BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA AND KRAMERIA GRAYI

Notes:

Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 8:50 AM
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-22 Photos: 357, 358
Y [ ] N [X] Significantly Disturbed	GPS: 34.722292 -114.500327 Datum: WGS 84
Geomorphic Feature: DRAINAGE / EROSIONAL CHANNEL	Width: 1 FT
Flow Regime: EPHEMERAL	
Substrate: COBBLE - GRAVEL	
Indicators: LOW FLOW EROSIONAL CHANNEL - ABSENCE OF VEGETATION	

Cross-Section:

Vegetation in Channel: NONE

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, OPUNTIA BASILARIS

Notes:

Project: PG&E Topock Compressor Station		Date: 2/14/2012	Time: 9:41 am
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-23	Photos: 368-369
Y [ ] N [X] Significantly Disturbed		GPS: 34.721222 -114.502552	Datum: WGS 84
Geomorphic Feature: EROSIONAL CHANNEL			Width: 5 FT
Flow Regime: EPHEMERAL			
Substrate: GRAVEL-COBBLE (ROCKY)			
Indicators: LOW FLOW EROSIONAL CHANNEL			

Cross-Section:

Vegetation in Channel: SPARSE CHAMAESYSE SP., PHACELIA SP. PLANTAGO OVATA, ERIOGONUM INFLATUM, BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, AMBROSIA DUMOSA, BEBBIA JUNCEA, KRAMERIA GRAYI, CYLINDROPUNTIA SP.

Notes:

Project: PG&E Topock Compressor Station		Date: 2/14/2012	Time: 9:55 am
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-24	Photos: 370-371
Y [ ] N [X] Significantly Disturbed		GPS: 34.722094 -114.501961	Datum: WGS 84

Geomorphic Feature: EROSIONAL CHANNEL — Width: ~~25 FT~~ 30FT

Flow Regime: EPHEMERAL

Substrate: GRAVEL-COBBLE — LOW FLOW - 2-3 FT WIDE

Indicators: MULTIPLE LOW FLOW CHANNELS, SCOUR - CHANGE TO FINER SUBSTRATES

Cross-Section:

Vegetation in Channel: SPARSE CHAMAESYCE ALONG LOW FLOW CHANNELS

Low Terrace and Adjacent Vegetation: - LARREA TRIDENTATA, AMBROSIA DUMOSA, BEBBIA JUNCEA, KRAMERIA GRAYI

Notes:

Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 3:17 pm
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-25 Photos: 444 - 445
Y [ ] N [X] Significantly Disturbed	GPS: 34.710182 Datum: WGS 84

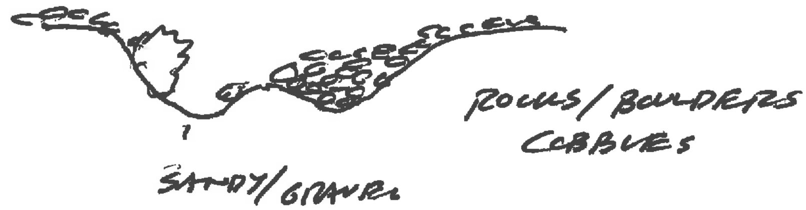
Geomorphic Feature: EROSIONAL FEATURE -114.498143 Width: ~3 FT

Flow Regime: EPHEMERAL

Substrate: ROCKY - COBBLES

Indicators: SMALL BED / BANK FEATURE - SOME DRIFT AND SEDIMENT DEPOSITS

Cross-Section:



Vegetation in Channel: STEPHANOMERIA PAUCIFLORA, HYMENOCLEA SALSOLA, HYPTIS EMORYI AND ACACIA GREGGII

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA

Notes: FORMER QUARRY IN THIS AREA

Project: PG&E Topock Compressor Station		Date: 2/14/2012	Time: 3:43pm
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-26	Photos: 448
Y [ ] N [X] Significantly Disturbed		GPS: 34.715115 -114.497522	Datum: WGS 84

Geomorphic Feature: EROSIONAL DRAINAGE   Width: 5FT

Flow Regime: EPHEMERAL

Substrate: ROCK - COBBLE

Indicators:
NO CLEAR EVIDENCE OF OHWM - TOPO LOW

Cross-Section:

ROCKY LOW AREA

Vegetation in Channel: LARREA TRIDENTATA, ENCELIA FARINOSA, KRAMERIA GRAYI

Low Terrace and Adjacent Vegetation: -SAME AS IN CHANNEL

Notes:

Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 3:46
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y ☒ N ☐ Normal Circumstances	Sample Point: TB-27 Photos: 449
Y ☐ N ☒ Significantly Disturbed	GPS: 34.715286 -114.497535 Datum: WGS 84

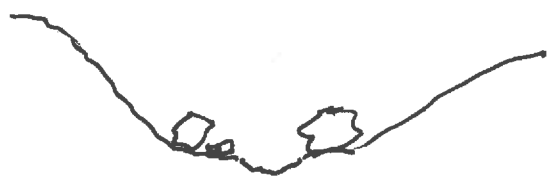
Geomorphic Feature: EROSIONAL CHANNEL Width: 3.5FT

Flow Regime: EPHEMERAL

Substrate: COBBLE-GRAVEL

Indicators: LOW SCOUR CHANNEL - GENERAL ABSENCE OF VEGETATION

Cross-Section:



Vegetation in Channel: SOME BEBBIA JUNCEA ALONG SIDES OF LOW FLOW CHANNEL - SPARSE CHAMAESYCE, BOUTELOUA ARISTIDOIDES, AND CRYPTANTHA.

Low Terrace and Adjacent Vegetation:

LARREA TRIDENTATA, KRAMERIA GRAYI, AMBROSIA DUMOSA

Notes:

Project: PG&E Topock Compressor Station | Date: 2/14/2012 | Time: 3:53pm

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB-28 | Photos: 450-451

Y [ ] N [X] Significantly Disturbed | GPS: 34.715172 -114.496829 | Datum: WGS 84

Geomorphic Feature: EROSIONAL CHANNEL | Width: 4 FT + 5½ FT

Flow Regime: EPHEMERAL

Substrate: COBBLE-GRAVEL

Indicators: ABSENCE OF VEGETATION, SCOURING

Cross-Section:

Vegetation in Channel: SPARSE CHAMAESYCE SP. AND BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation: BEBBIA JUNCEA, AMBROSIA DUMOSA, LARREA TRIDENTATA, KRAMERIA GRAYI

Notes:

Project: PG&E Topock Compressor Station		Date: 2/14/2012	Time: 4:09pm
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-29	Photos: 454 - 456
Y [ ] N [X] Significantly Disturbed		GPS: 34.714866	Datum: WGS 84
Geomorphic Feature: DRAINAGE / SWALE		-114.496452	Width: 8.5FT
Flow Regime: EPHEMERAL			
Substrate: COARSE SAND, GRAVEL, COBBLE			
Indicators: SCOURING, SOME CUT BANKS			

Cross-Section:

Vegetation in Channel: LARREA TRIDENTATA, STEPHANOMERIA PAUCIFLORA, BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, AMBROSIA DUMOSA, OPUNTIA BASILARIS, KRAMERIA GRAYI

Notes:

Project: PG&E Topock Compressor Station | Date: 2/15/2012 | Time: 1:30PM

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [X] N [ ] Normal Circumstances | Sample Point: TB-30 | Photos: 369-370

Y [ ] N [X] Significantly Disturbed | GPS: 34.724560 -114.517322 | Datum: WGS 84

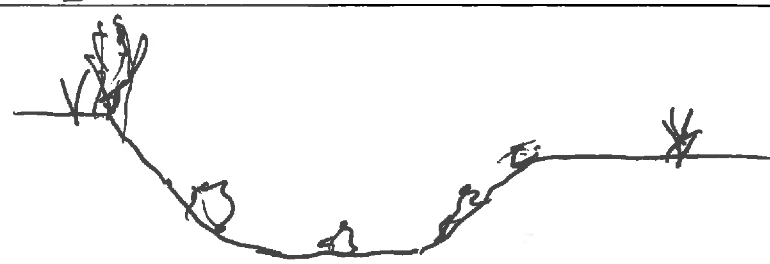
Geomorphic Feature: STREAM | Width: 19 FT

Flow Regime: EPHEMERAL

Substrate: SAND-GRAVEL

Indicators: - SCOURING / DEFINED BED AND BANK
SOIL CRACKS

Cross-Section:



Vegetation in Channel: CHAMAESYCE SP., CRYPTANTHA SP.
PALAFOXIA ARIDA, PHACELIA SP. HYMENOCLEA SALSOLA,
BEBBIA JUNCEA. ENCELIA FARINOSA

Low Terrace and Adjacent Vegetation: LARREA TRIDENTA,
PARKINSONIA FLORIDA, OPUNTIA BASILARIS,
CYLINDROPUNTIA SP.

Notes:

Project: PG&E Topock Compressor Station		Date: 2/16/2012	Time:
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: 7B-31	Photos: ~~358-359~~, 360,
Y [ ] N [X] Significantly Disturbed		GPS: 34.715290	Datum: 361
Geomorphic Feature: DRAINAGE		-114.488677	Width: 3-5 FT

Flow Regime: EPHEMERAL

Substrate: FINE GRAVEL TO ROCK

Indicators: SCOURING, GRAVELY SUBSTRATE -

Cross-Section:

NARROW ROCKY CHANNEL

Vegetation in Channel: SPARSE LARREA TRIDENTATA, ENCELIA FARINOSA AND BOUTELOUA ARISTIDOIDES

Low Terrace and Adjacent Vegetation: LARREA TRIDENTATA, KRAMERIA GRAYI OPUNTIA BASALARIS

Notes:

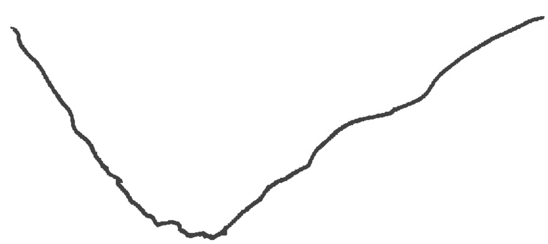
Project: PG&E Topock Compressor Station	Date: 2/16/2012 Time: 9:08am
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-32 Photos: 378-381
Y [ ] N [X] Significantly Disturbed	GPS: 34.713524 -114.484515 Datum: WGS84
Geomorphic Feature: DRAINAGE	Width: 10 FT

Flow Regime: EPHEMERAL

Substrate: BEDROCK - COBBLE

Indicators: CULVERT, DEFINED BED-BANK CHANNEL

Cross-Section:



Vegetation in Channel: PERITYLE EMORYI, GERAEA CANSESCENS

Low Terrace and Adjacent Vegetation: ENCELIA FARINOSA, HYPTIS EMORYI
LARREA TRIDENTATA

Notes:

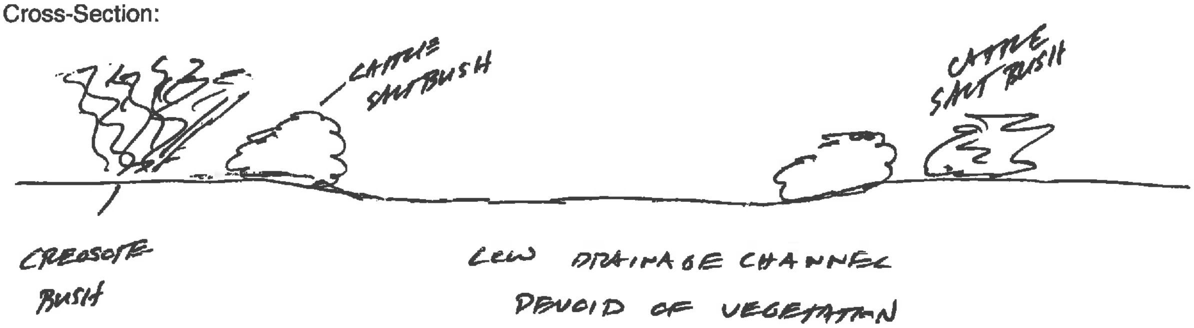
Project: PG&E Topock Compressor Station		Date: 7/17/2012	Time: 11:18 AM
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-33	Photos: 194-196
Y [ ] N [X] Significantly Disturbed		GPS: 34.714114	Datum: WGS 1984
Geomorphic Feature: DRAINAGE		-114.483223	Width: ~8 ft

Flow Regime: EPHEMERAL

Substrate: SAND - SOME COBBLE NEAR CULVERT

Indicators: ABSENCE OF VEGETATION, FLOW LINES, DEBRIS DEPOSITS

Cross-Section:

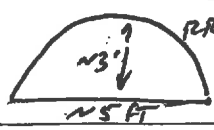


Vegetation in Channel: NONE

Low Terrace and Adjacent Vegetation: - LARREA TRIDENTA, ATRIPLEX POLYCARPA
SOME PARKINSONIA FLORIDA NEAR RR TRACKS

Notes:

CULVERT UNDER RR TRACKS



- DEFINED FLOW/DRAINAGE CHANNEL TO THE WEST OF THE CULVERT BUT DISSIPATES INTO SHEET FLOW BY TIME VEGETION BECOMES TAMARIX

Topock Project Executive Abstract

Document Title: *Riparian Vegetation and CDFW Jurisdiction* Submitting Agency: DTSC, RWQCB Final Document? ☒ Yes ☐ No	Date of Document: May 9, 2014 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 ☒ 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 addendum complies with the EIR mitigation measures AES-1a and AES-2b. 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 wetlands and waters under the jurisdiction of USACE or CDFW, as well as potential disturbance or removal of riparian vegetation along the Colorado River. Mitigation measures for Biological Resources include BIO-1, which addresses 'Potential Fill of Wetlands and Other Waters of the United States and Disturbance or Removal of Riparian Habitat - Areas of sensitive habitat in the project area have been identified during project surveys. These areas include floodplain and riparian areas, wetlands, and waters of the United States. Habitats designated by DFG as sensitive, including desert washes and desert riparian, are also included. To the extent feasible, elements of the project shall be designed to avoid direct effects on these sensitive areas.'

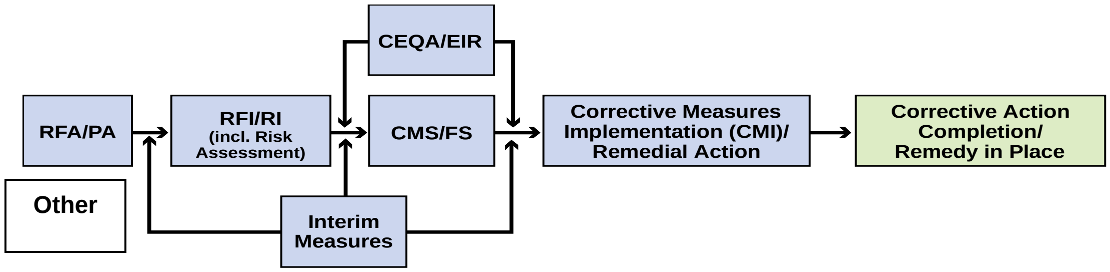
This memorandum satisfies the BIO-1 requirement by documenting the nature and extent of CDFW jurisdictional areas within the Project Area and summarizes the relevant information that was gathered in plant surveys and the wetlands/waters delineation survey that were completed in 2012. The information presented in this memorandum will be used to help guide the final project design to minimize impacts within CDFW jurisdictional areas.

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. This memorandum and the 2013 Delineation of Wetlands and Waters Report were prepared to comply with EIR mitigation measures BIO-1.
.

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

Yvonne J. Meeks
Manager

Environmental Remediation

Mailing Address
4325 South Higuera Street
San Luis Obispo, CA 93401

Location
6588 Ontario Road
San Luis Obispo, CA 93405

805.234.2257
E-Mail: yjm1@pge.com

May 9, 2014

Chris Hayes
Deputy Regional Manager
California Department of Fish and Wildlife
Inland Deserts Region
Blythe Field Office
17041 South Lovekin
P.O. Box 2160
Blythe, California 92226

Subject: *California Department of Fish and Wildlife Jurisdictional Areas Report, Topock Groundwater Remediation Project*

Dear Mr. Hayes:

Attached please find a copy of the report and maps showing the extent of areas within the Topock Compressor Station Groundwater Remediation Project Final Environmental Impact Report Project Boundary that are considered to fall under the Jurisdiction of the California Department of Fish and Wildlife (CDFW). These areas include the Colorado River, Park Moabi Slough and the ephemeral desert washes found throughout the dissected terraces within the Project Boundary. Jurisdictional areas also include adjacent wetlands and riparian vegetation along the Colorado River and Park Moabi Slough.

In accordance with the March 6, 2013 letter from Chris Hayes, CDFW Deputy Regional Manager, Inland Deserts Region, response actions conducted onsite at the Pacific Gas and Electricity (PG&E) Topock site, specifically soil and groundwater investigations and remediation activities, are exempted from obtaining a lake and streambed agreement under Section 121(e)(1) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). However, the project must comply with the substantive elements of such an agreement, including the 34 avoidance and minimization measures included in the letter. A copy of the letter as well as the 34 avoidance and minimization measures is provided in Appendix A of the enclosed document.

On February 21, 2014 CDFW environmental scientists, Victoria Chau and Austin Smith, met with Curt Russell from Pacific Gas and Electric Company and consulting biologist, Russell Huddleston, for a field review of the proposed final groundwater remedy project. During the site visit Mr. Russell provided an overview of the project including access routes, general well locations, soil stockpile areas and primary staging areas. In particular to CDFW jurisdiction are the two locations where pipelines will span Bat Cave wash. Mr. Russell noted that at the upstream location to the west of the compressor station the pipeline will parallel an existing natural gas pipeline located high on the adjacent slopes above the active wash channel. At the downstream crossing near the IM-3 treatment facility, Mr. Russell explained that a pipeline bridge structure would be installed in this area with the bridge supports located outside of the channel banks. In this area the pipeline would span the active floodplain of the wash approximately 8 to 10 feet above the top of the banks. The pipeline bridge in this location would be designed to avoid and minimize impacts to adjacent vegetation to the maximum extent possible.

The other area of primary interest was the low terrace adjacent to the Colorado River. During the site visit it was noted that majority of the remedy infrastructure (including access roads and well locations) would be located on the dredge sands that were deposited in this area during the dredging of the Colorado River between 1944 and 1968. It was also noted that the natural hydrology of the Colorado River in this area has been significantly altered as a result of upstream dams and highly regulated flows. It was noted that due to both the changes in the natural elevation by deposition of dredge materials and the managed flows of the Colorado River, the vegetation along the low terrace was not considered to be riparian habitat. Mr. Russell noted that limited activity including a new access road and a few wells would be located at the outer edge of the natural flood plain elevation south of the railroad bridge over the Colorado River, but vegetation impacts in this area would be limited to saltcedar (*Tamarix ramosissima*).

As noted during the February 21, 2014 site visit, the project has been designed to avoid direct effects on native vegetation and sensitive habitats. In an effort to ensure that construction related activities avoid and minimize impacts to areas under CDFW jurisdiction we have drafted the attached technical memorandum to delineate the jurisdictional areas based on feedback from the February 21, 2014 field review and our studies of the waters, streams and riparian areas. We would appreciate any feedback you may have on the technical memorandum and proposed CDFW jurisdictional areas.

Please feel free to contact Virginia Strohl (PG&E Senior Terrestrial Biologist) at 559-263-7417 or v1s4@pge.com if you have any questions or concerns.

Sincerely,

Yvonne Meeks

Yvonne Meeks
Topock Project Manager

Enclosure

Riparian Vegetation and California Department of Fish and Wildlife Jurisdiction for the Topock Compressor Station Groundwater Remediation Project San Bernardino County, California

cc: Victoria Chau/CDFW
Aaron Yue/DTSC

Riparian Vegetation and California Department of Fish and Wildlife Jurisdiction for the Topock Compressor Station Groundwater Remediation Project San Bernardino County, California

Prepared for

Pacific Gas and Electric Company

May 2014

Contents

Acronyms and Abbreviations

amsl	above mean sea level
BLM	U.S. Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CWA	Clean Water Act
DTSC	California Department of Toxic Substances Control
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
HNWR	Havasu National Wildlife Refuge
I-40	Interstate 40
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
OHWM	ordinary high water mark
PG&E	Pacific Gas and Electric Company
U.S.	United States
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SECTION 1

Introduction

This report is intended to address areas within the Pacific Gas and Electric Company's (PG&E) Topock Compressor Station Final Environmental Impact Report (FEIR) Study Area (study area) that may to be subject to regulation by the California Department of Fish and Wildlife (CDFW). It includes sensitive habitats such as desert washes, floodplains, and riparian areas that are mentioned in the FEIR issued by the California Department of Toxic Substances (DTSC) in January 2011. Detailed information on wetlands and other waters of the United States as regulated under section 404 of the federal Clean Water Act (CWA) are addressed separately in the *Wetlands and Waters of the United States, Delineation for the Topock Compressor Station Groundwater Remediation Project*, *San Bernardino County, California* (CH2M HILL, 2013).

In December 1951, the Topock Compressor Station began operations to compress natural gas collected from the southwestern U.S. for transport through pipelines to PG&E's service territory in central and northern California. The compressor station is still active and is anticipated to remain active into the foreseeable future. The operations at the compressor station consist of six major activities: water conditioning, compressing natural gas, cooling compressed natural gas and compressor lubricating oil, wastewater treatment, facility and equipment maintenance, and miscellaneous operations.

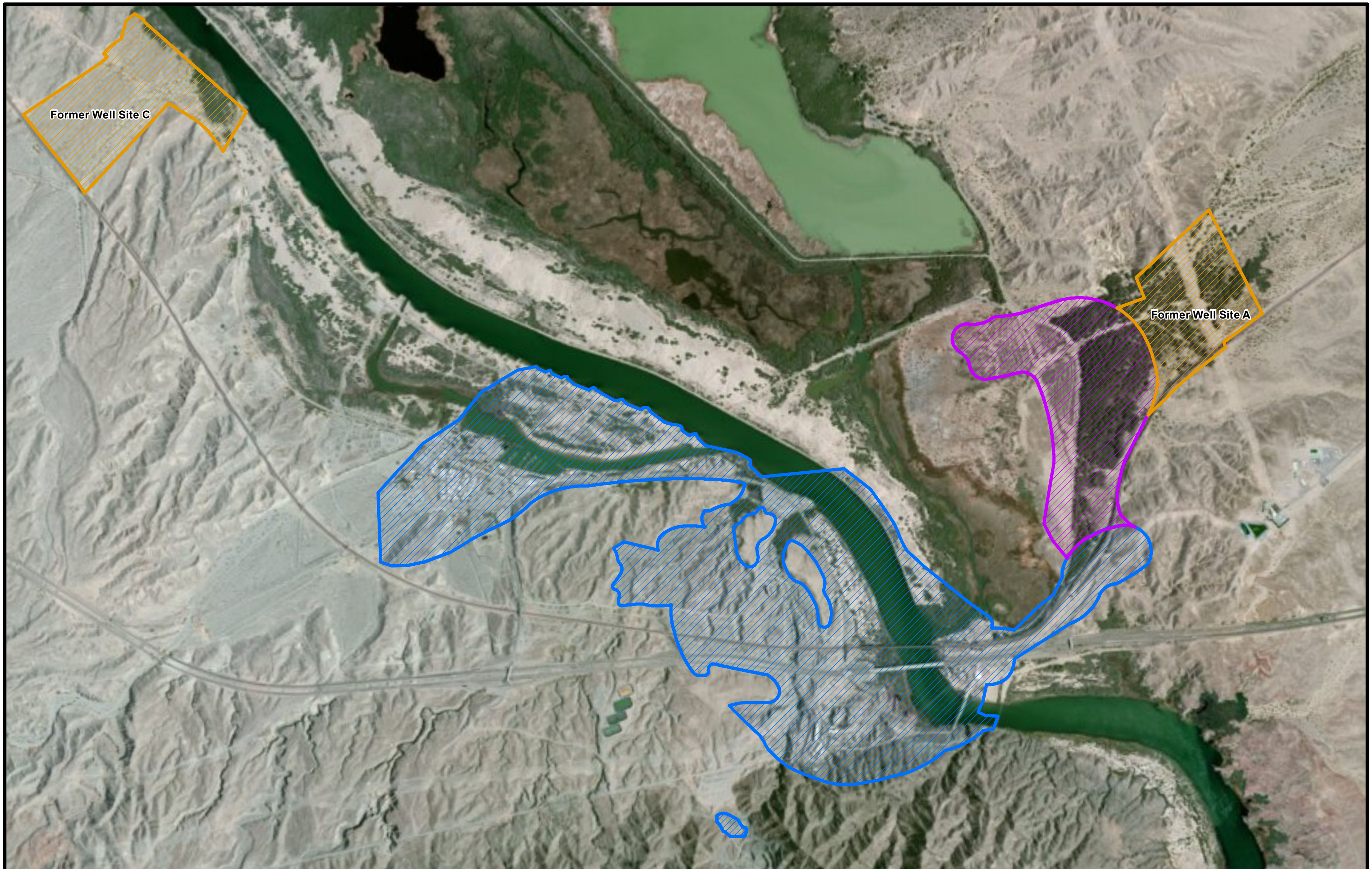
In 1996, PG&E entered into a Corrective Action Consent Agreement with the DTSC to oversee the investigation and remediation of the Topock Compressor Station site in accordance with California state law. DTSC is the California state lead agency charged with directing contaminant investigation activities in the action area in accordance with the Resource Conservation and Recovery Act. The Department of the Interior is the lead federal agency overseeing response actions for land under its jurisdiction, custody or control near the Topock Compressor Station pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In July 2005, PG&E and the Federal Agencies entered into an Administrative Consent Agreement. In addition, PG&E and the United States have also entered into a Remedial Design/Remedial Action Consent Decree under CERCLA governing the groundwater remedy, which was entered by the U.S. District Court for the Central District of California in November 2013.

The purpose of this document is to identify and map the extent of rivers, streams, and riparian habitat within the study area under jurisdiction of the CDFW and as required by FEIR mitigation measure BIO-1 (AECOM, 2011). Because mitigation measures AES-1 and AES-2 involve revegetation in riparian habitats if disturbed by the project, which could require a permit from CDFW absent an exemption, these mitigation measures also are outlined in this report.

The 1,169-acre study area (Figure 1-1) includes the following sites:

- The 780-acre project area covered in the FEIR
- 182.7-acre area along Highway 95 in Arizona associated with an existing Havasu National Wildlife Refuge (HNWR) well site and potential new freshwater well site B
- 93.5 acres associated with former potential new freshwater well site A
- 112.8 acres associated with former potential new freshwater well site C

The freshwater well sites are part of the groundwater remediation strategy that require additional nearby groundwater supplies that are uncontaminated by hexavalent chromium.



LEGEND

- EIR Project Area and Wetlands Delineation Area (780 Acres)
- Additional Wetlands Delineation Area - Well Site B (183 Acres)
- Former Potential Freshwater Well Sites (206 Acres)

N

0 1,500 3,000 Feet

FIGURE 1-1
STUDY AREA
PG&E Topock Compressor Station
Needles, California

CH2MHILL

SECTION 2

Regulations and FEIR Requirements

2.1 California Department of Fish and Wildlife

CDFW regulates activities that may "substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of, any river, stream or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream or lake…" (California Fish and Game Code Section 1602). If CDFW determines that any of the above activities may substantially adversely affect an existing fish or wildlife resource, a Lake and Streambed Alteration Agreement is required that includes reasonable measures necessary to protect such resources. This requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water (CDFW, 2013).

2.2 FEIR Requirements

The following mitigation measures are cited from the FEIR (AECOM, 2011).

AES-1(b) and AES-2(c)

Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.

Mitigation Measure BIO-1

Areas of sensitive habitat in the project area have been identified during project surveys. These areas include floodplain and riparian areas, wetlands, and waters of the United States. Habitats designated by DFG as sensitive, including desert washes and desert riparian, are also included. To the extent feasible, elements of the project shall be designed to avoid direct effects on these sensitive areas. During the design process and before ground disturbing activities, a qualified biologist shall coordinate with PG&E to ensure that the footprints of construction zones, drill pads, staging areas, and access routes are designed to avoid disturbance of sensitive habitats to the extent feasible. DTSC shall be responsible for enforcing compliance with design and all preconstruction measures.

If during the design process it is shown that complete avoidance of habitats under DFG jurisdiction (such as changes to the natural flow and/or bed and bank of a waterway) is infeasible, a Section 1602 streambed alteration agreement shall be obtained from DFG and affected habitats shall be replaced and/or rehabilitated. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a no-net-loss basis in accordance with DFG regulations and, if applicable, as specified in the streambed alteration agreement, if needed. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to DFG and consistent with the purpose and intent of applicable county policies and codes, as well as those policies outlined under the respective federal agency guidance documents. Minimization and compensation measures adopted through the permitting process shall also be implemented.

Restoration of any disturbed areas shall include measures to achieve "no-net-loss" of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a habitat restoration plan submitted to DFG, U.S. Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service (USFWS) that is agreeable to these agencies, or, alternately, through the implementation of a habitat restoration plan consistent with the substantive policies of DFG, BLM, and USFWS. The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan. Alternately, if DFG declines to assert jurisdiction because it determines that CERCLA Section 121(e)(1) applies, and during the design process it is shown that complete avoidance of habitats under DFG jurisdiction (such as changes to the natural flow and/or bed and bank of a waterway) is infeasible, the substantive mandates of a streambed alteration agreement shall be implemented, and affected habitats shall be replaced and/or rehabilitated. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a "no-net-loss" basis in accordance with DFG regulations and, if applicable. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to DFG and consistent with the purpose and intent of applicable county policies and codes, as well as those policies outlined under the respective federal agency guidance documents. Minimization and compensation measures adopted through the permitting process shall also be implemented. Restoration of any disturbed areas shall include measures to achieve "no-net-loss" of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a habitat restoration plan developed consistent with the substantive policies of DFG, BLM and USFWS. The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan.

Mitigation Measure BIO-3

If selected as part of the final remedy, construction of the freshwater intake structure element of the proposed project could prevent fish from accessing spawning habitat or interfere with preferred habitat. In addition, operation of the water intake structure within the Colorado River could cause mortality to fish, including special-status species. Increased sedimentation and turbidity, the release of contaminants, and standing during construction activities could also adversely affect fish habitat and movement in the Colorado River.

The final remedy will not include any intake structures; therefore this mitigation measure does not apply.

2.3 CERCLA Exemption

On March 6, 2013, Chris Hayes, Deputy Regional Manager for CDFW's Inland Desert Region, confirmed in a letter that response actions conducted at the Topock site, specifically soil and groundwater investigations and remediation activities, are exempted from obtaining a Lake and Streambed Alteration Agreement under Section 121(e)(1) of CERCLA. However, to comply with mitigation measure BIO-1, PG&E must comply with the substantive elements that would be required in an Agreement for the project. The letter from CDFW included a list of 34 avoidance and minimization measures required for all work in areas subject to CDFW jurisdiction. The letter and required avoidance and minimization measures are provided in Appendix A.

SECTION 3

Definitions

3.1 Rivers and Streams

CDFW issued legal guidance on certain terms used in Section 1600 of the Fish and Game Code to clarify the definitions of things such as rivers and streams (Toffolt, 1990). The legal definition of a river was given as: "A natural stream of water, of greater volume than a creek or rivulet, flowing in a more or less permanent bed or channel, between defined banks or walls, with a current which may either be continuous in one direction or affected by the ebb and flow of the tide." Such a definition is straightforward and consistent with the general understanding of what is considered to be a river. The definition of a stream is somewhat more complex.

A basic definition of a stream as given by the Merriam-Webster dictionary is "a body of running water flowing on the earth." The legal definition of a stream, as provided by Toffolt (1990) is "a watercourse having a source and terminus, banks, and a channel, through which waters flow, at least periodically. Streams usually empty into other streams, lakes or the ocean, but a stream does not lose its character as a watercourse even though it may break up and disappear." This definition includes two important distinctions: 1) only periodic flows are necessary and 2) watercourses that lose their bed and bank (such as a stream that meanders through a floodplain or a larger water body such as a lake or a marsh) are still a considered part of the stream. This legal definition is particularly relevant to the numerous ephemeral washes that occur throughout the dissected alluvial terraces in the vicinity of the compressor station. While these features are dry most of the time and only carry short-duration flows in response to heavy rain events, they are still considered streams under Section 1600 of the Fish and Game Code.

3.2 Floodplains

A floodplain is defined as "a strip of relatively smooth land bordering a stream and overflowed at time of high water." (Leopold et al., 1964). The Natural Resources Conservation Service [NRCS] (2008) has a similar definition: "The nearly level plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of streams."

The U.S. Army Corps of Engineers (USACE) defines the floodplain as "That portion of a drainage basin (watershed), adjacent to the channel, that is covered by sediments deposited during overbank flood flows" (USACE, 2008).

The Federal Emergency Management Agency (FEMA) uses the term "flood zones" to define geographic areas with various types of flooding and levels of flood risk. These zones are depicted on the published Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map (FHBM). Portions of the project area, including the natural historical floodplain south of the Burlington Northern-Santa Fe railroad bridge over the Colorado River, have been mapped by FEMA as special flood hazard areas that are subject to inundation by the 1 percent annual chance of flood in any given year (100-year flood). However, because of upstream dams and flow regulation, the river no longer floods and no structures or new infrastructure is planned for the special flood hazard areas that would impede or redirect flood flows.

3.3 Riparian Habitat

It is commonly accepted that riparian vegetation occurs along the edges of streams, rivers and lakes. In other words, riparian habitats are associated with some type of persistent aquatic feature. However, such broad definition is oversimplified and fails to distinguish riparian vegetation from upland communities that may also occur in proximity to water (Fischer et al., 2001). The term riparian is not included in the California Fish and Game Code (Sec. 1600-1616) and, as such, no definition is provided. Section 1602 broadly covers any activities that may “substantially adversely affect an existing fish or wildlife resource.” While not specifically stated as such, this language has generally been interpreted to include impacts to riparian vegetation. While the term riparian is not included in any part of Section 1600 of the Fish and Game Code, impacts to riparian vegetation are required to be addressed under Section 11 of the Lake and Streambed Notification Form. Additionally, the FEIR identifies riparian areas as sensitive habitat, but provides no definition of such areas. In order to adequately address impacts to riparian vegetation it is critical to have a scientifically-based definition of riparian habitat.

One such definition is provided by Johnson et al. (1984), who defined riparian as “pertaining to the banks and other adjacent terrestrial (as opposed to aquatic) environs of freshwater bodies, water courses, estuaries, and surface emergent aquifers (springs, seeps, oases), whose transported freshwaters provide soil moisture sufficiently in excess of that otherwise available through local precipitation to potentially support the growth of mesic vegetation.” Another, more complete definition, was developed by the National Research Council (2002): “Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas are adjacent to perennial, intermittent and ephemeral streams, lakes and estuarine- marine shorelines.” Both of these definitions indicate that proximity of vegetation to a water feature alone does not constitute riparian habitat. There must also be some degree of hydrologic influence on the vegetation by the adjacent water feature.

SECTION 4

Description of Rivers, Streams and Riparian Habitat in the Study Area

Water features including rivers and streams in the study area were identified and mapped as part of the wetlands delineation survey (CH2M HILL, 2013). The purpose of the wetland delineation was to identify and map the extent of jurisdictional waters of the U.S. as defined under Section 404 of the CWA and regulated by USACE. Waters of the U.S. include such features as rivers, streams, lakes, and ponds. In the absence of adjacent wetlands, USACE jurisdiction extends to the limits of the ordinary high-water mark, which is defined as "the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (33 Code of Federal Regulations 328.3 [e]).

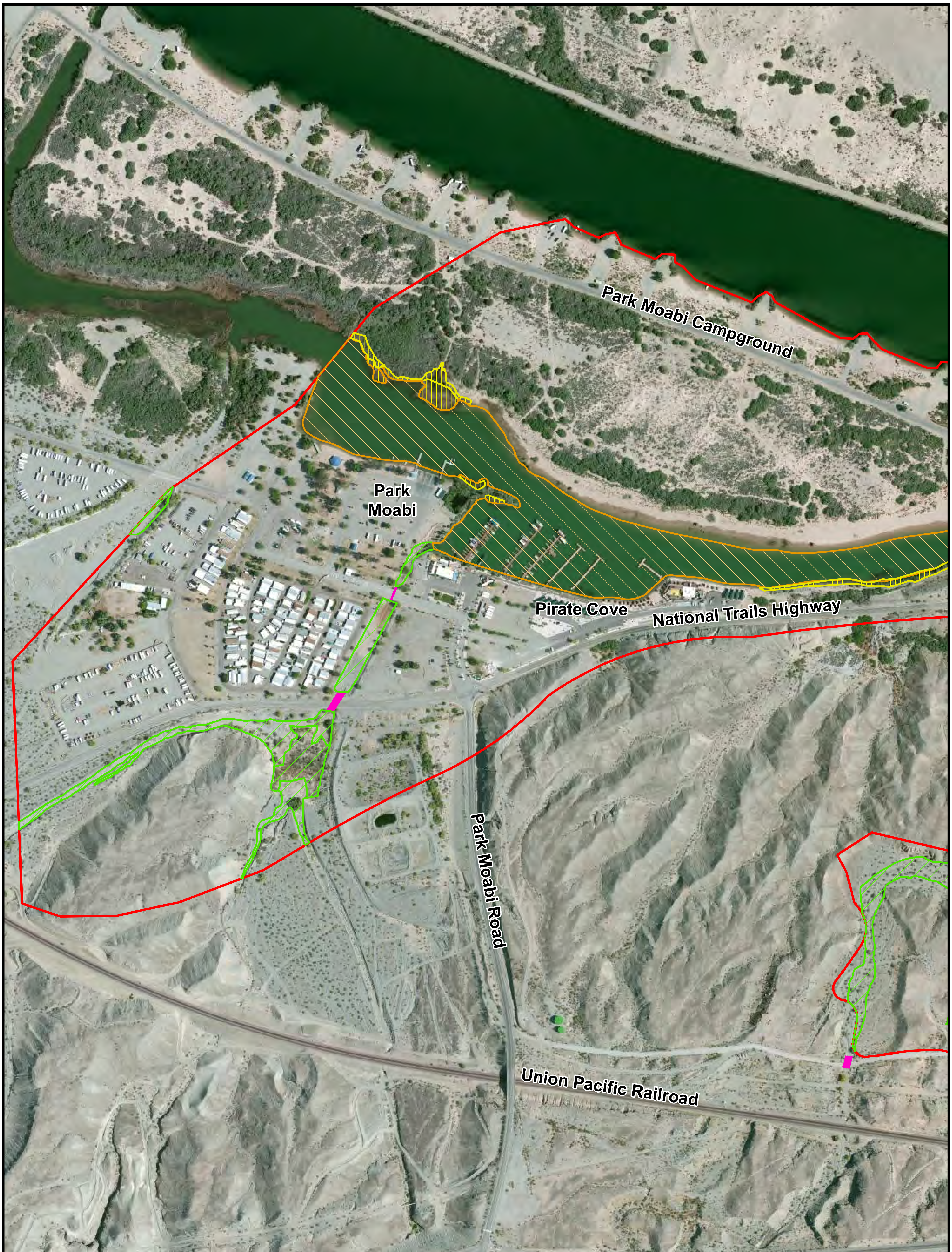
In contrast, the regulatory jurisdiction of CDFW includes the full extent of the bed, channel, and slopes of any river or stream, as well as any existing fish or wildlife resources (e.g., riparian habitat) associated with such features. As a result, the extent of jurisdictional areas regulated under Section 1600 of the Fish and Game Code are often greater than the areas that are subject to regulation under the CWA.

The following sections provide a description of rivers and streams as well as associated riparian habitat that are considered to be subject to regulation by CDFW. The distribution of these features is shown in Figure 4-1 and representative photographs are provided in Appendix B.

4.1 Colorado River

The Colorado River is the primary surface water feature in the study area. The river flows approximately 6,400 feet through the central part of the study area. Significant changes to the Colorado River hydraulic regime in the vicinity of the project area occurred after construction of Hoover Dam and Parker Dam. With the completion of Hoover Dam in 1936, annual spring floods and associated scouring events ended. With the closure of Parker Dam in 1938, and subsequent filling of Lake Havasu, the Colorado River channel between Needles and Topock rapidly aggraded (Metzger and Loeltz, 1973). By 1944, the aggradation of the river channel caused elevated groundwater levels and flooding in low-lying areas. In response to this condition, the U.S. Bureau of Reclamation (USBR) conducted extensive dredging of the river channel to maintain channel geometry and reduce flooding. All of these changes have had a significant impact on the natural floodplain processes and associated riparian vegetation in the project area.

The flows in this section of the Colorado River are dynamic, fluctuating seasonally and daily as a result of upstream flow regulation from the Davis Dam, located approximately 41 river miles upstream of the project area. Data from the U.S. Geological Survey (USGS) river gauge at the Topock Marsh inlet shows that average flow rate ranges from a low of 14 cubic feet per second (cfs) in January to a high of 99 cfs in June (Figure 4-2). Daily surface water elevation data for the Colorado River has been measured near the Interstate 40 Bridge since the middle of June 2003 as part of the ongoing monitoring program at the compressor station. The average water level elevation recorded for this period was 454.9 feet above mean sea level (amsl), with a minimum of 450.6 feet amsl and a maximum of 458.7 feet amsl. Average monthly flow rates measured at the Topock Marsh inlet between January 1967 and September 2012 show a fluctuating, but controlled, rate of discharge that did not exceed a mean of 193 cfs (Figure 4-3).



LEGEND

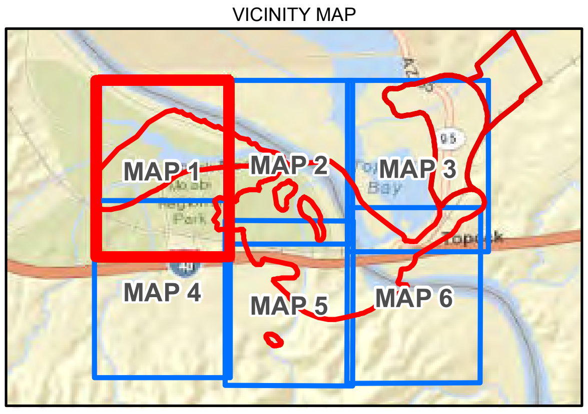
- Wetland Delineation Boundary
- Culvert

CDFW Jurisdiction Areas

- CDFW Ephemeral Stream
- CDFW Riparian
- Colorado River
- Park Moabi Slough

Note:
CDFW = California Department of Fish and Wildlife

VICINITY MAP

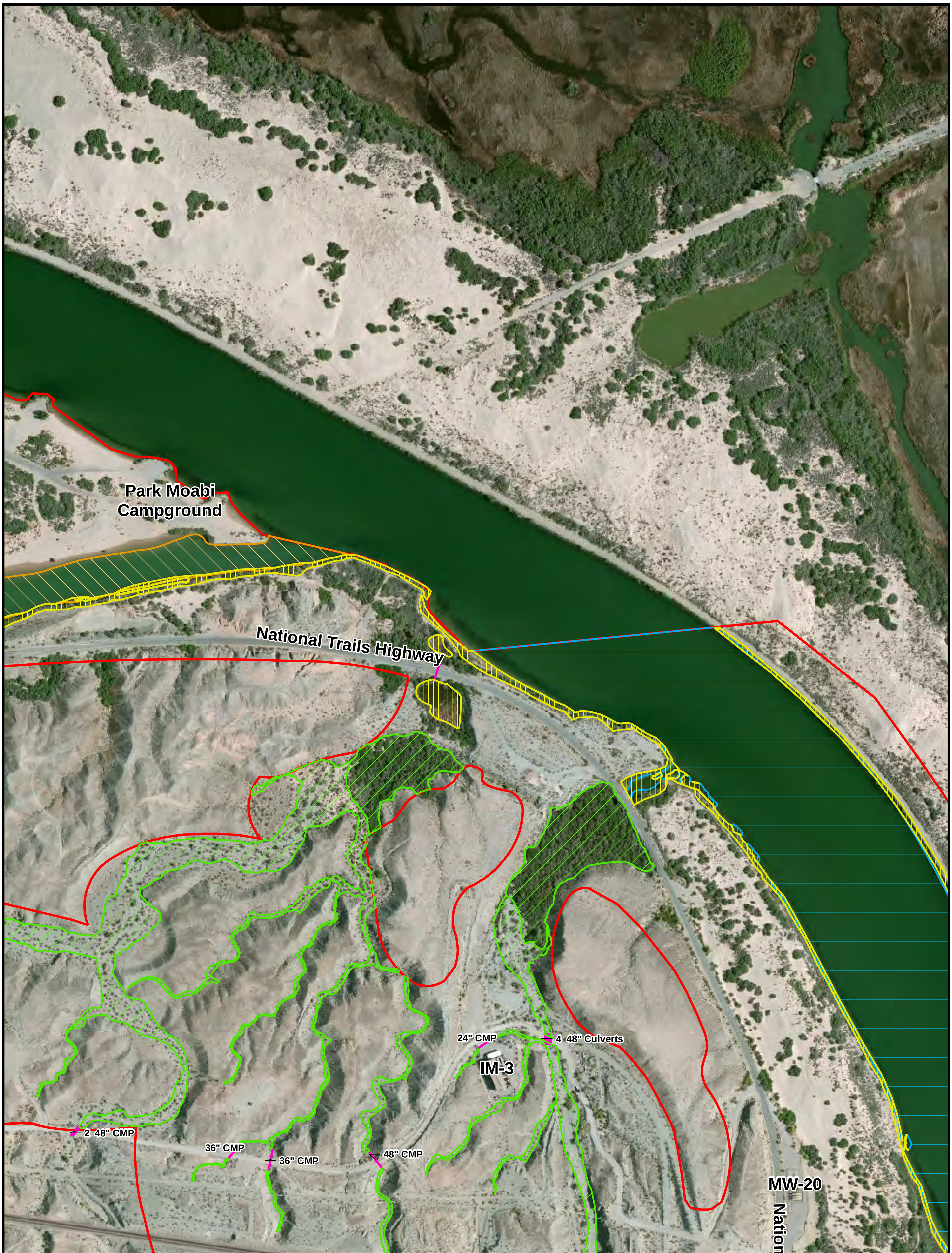


N

0 620 Feet

Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.

FIGURE 4-1
Rivers, Streams and Riparian Areas
Map 1 of 6
PG&E Topock Compressor Station
Needles, California



LEGEND

Wetland Delineation Boundary

Culvert

CDFW Jurisdiction Areas

CDFW Ephemeral Stream

CDFW Riparian

Colorado River

Park Moabi Slough

Note:
CDFW = California Department of Fish and Wildlife

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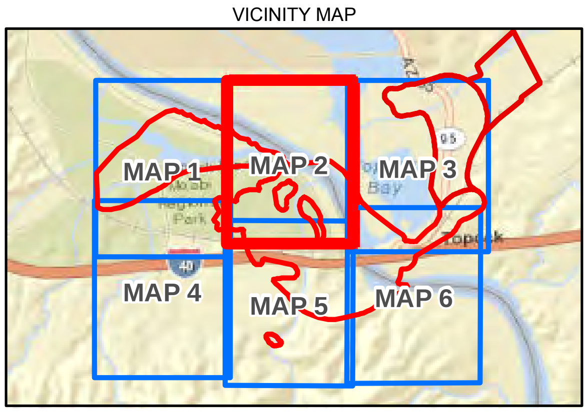
VICINITY MAP



Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.

FIGURE 4-1
Rivers, Streams and Riparian Areas
Map 2 of 6
PG&E Topock Compressor Station
Needles, California

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CH2MHILL

LEGEND

- Wetland Delineation Boundary
- Culvert

CDFW Jurisdiction Areas

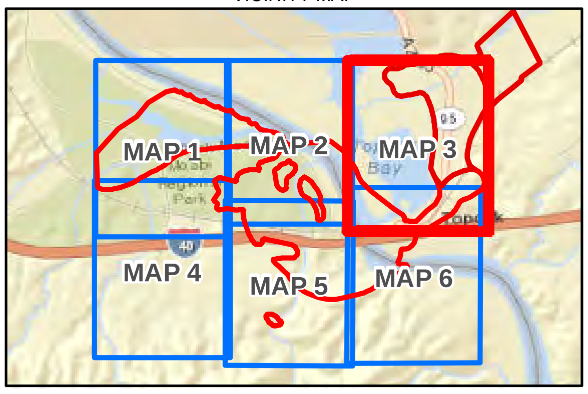
- CDFW Ephemeral Stream
- CDFW Riparian
- Colorado River
- Park Moabi Slough

Note:
CDFW = California Department of Fish and Wildlife

N

0 660 Feet

VICINITY MAP



Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.

FIGURE 4-1
Rivers, Streams and Riparian Areas
Map 3 of 6
PG&E Topock Compressor Station
Needles, California

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CH2MHILL

LEGEND

- Wetland Delineation Boundary
- Culvert

CDFW Jurisdiction Areas

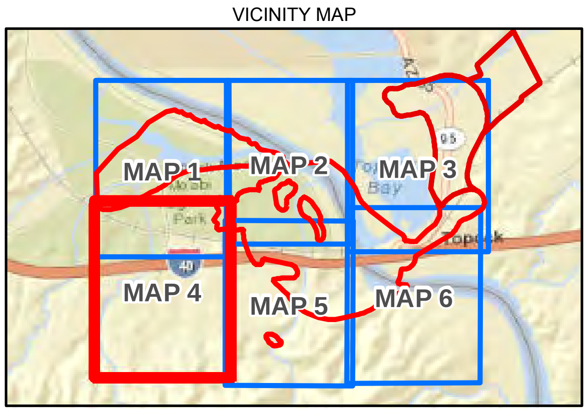
- CDFW Ephemeral Stream
- CDFW Riparian
- Colorado River
- Park Moabi Slough

Note:
CDFW = California Department of Fish and Wildlife

N

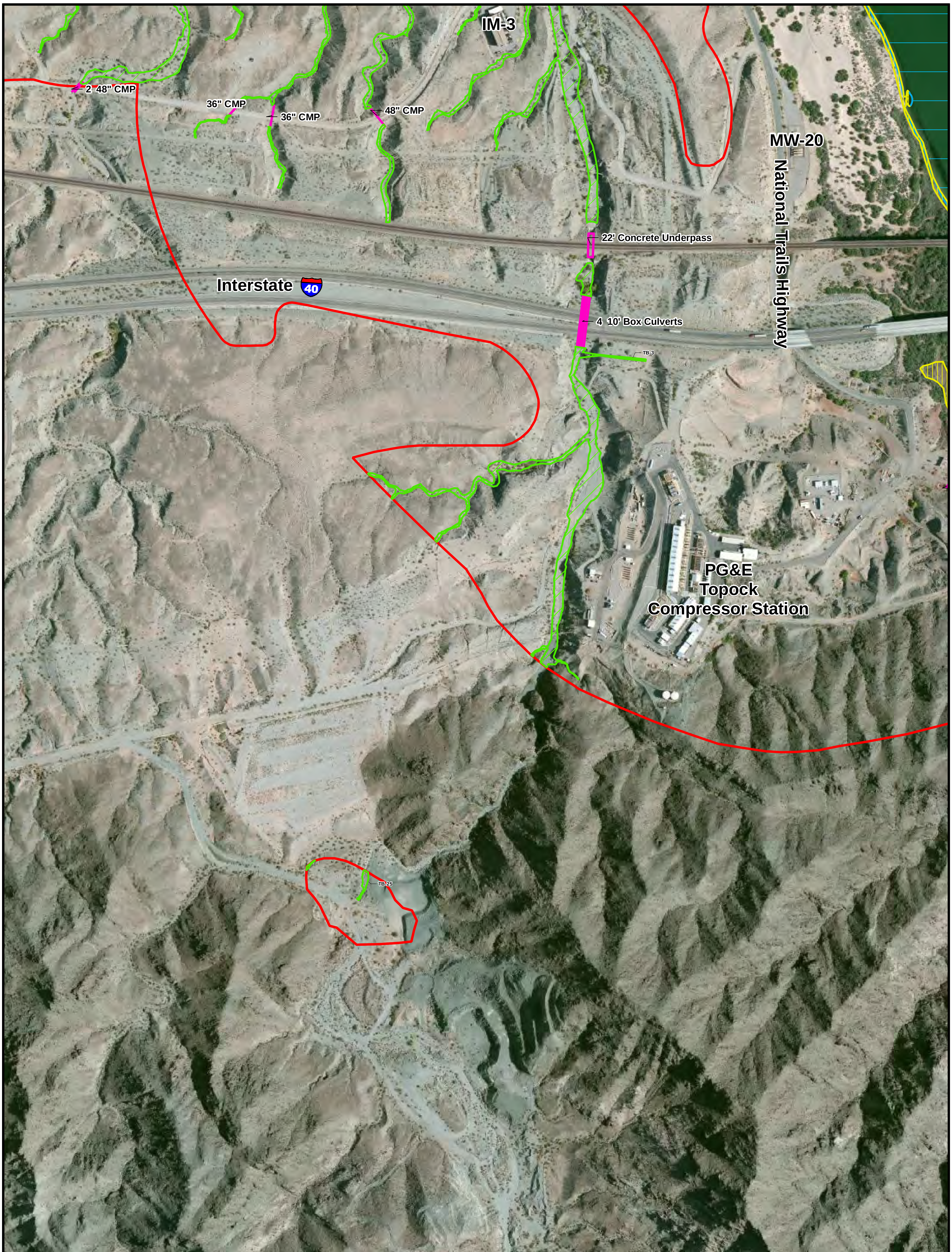
0 620 Feet

VICINITY MAP



Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.

FIGURE 4-1
Rivers, Streams and Riparian Areas
Map 4 of 6
PG&E Topock Compressor Station
Needles, California



LEGEND

Wetland Delineation Boundary

Culvert

CDFW Jurisdiction Areas

CDFW Ephemeral Stream

CDFW Riparian

Colorado River

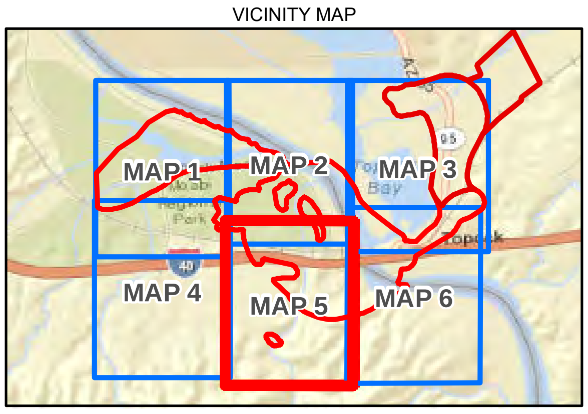
Park Moabi Slough

Note:
CDFW = California Department of Fish and Wildlife

N

0 600 Feet

VICINITY MAP

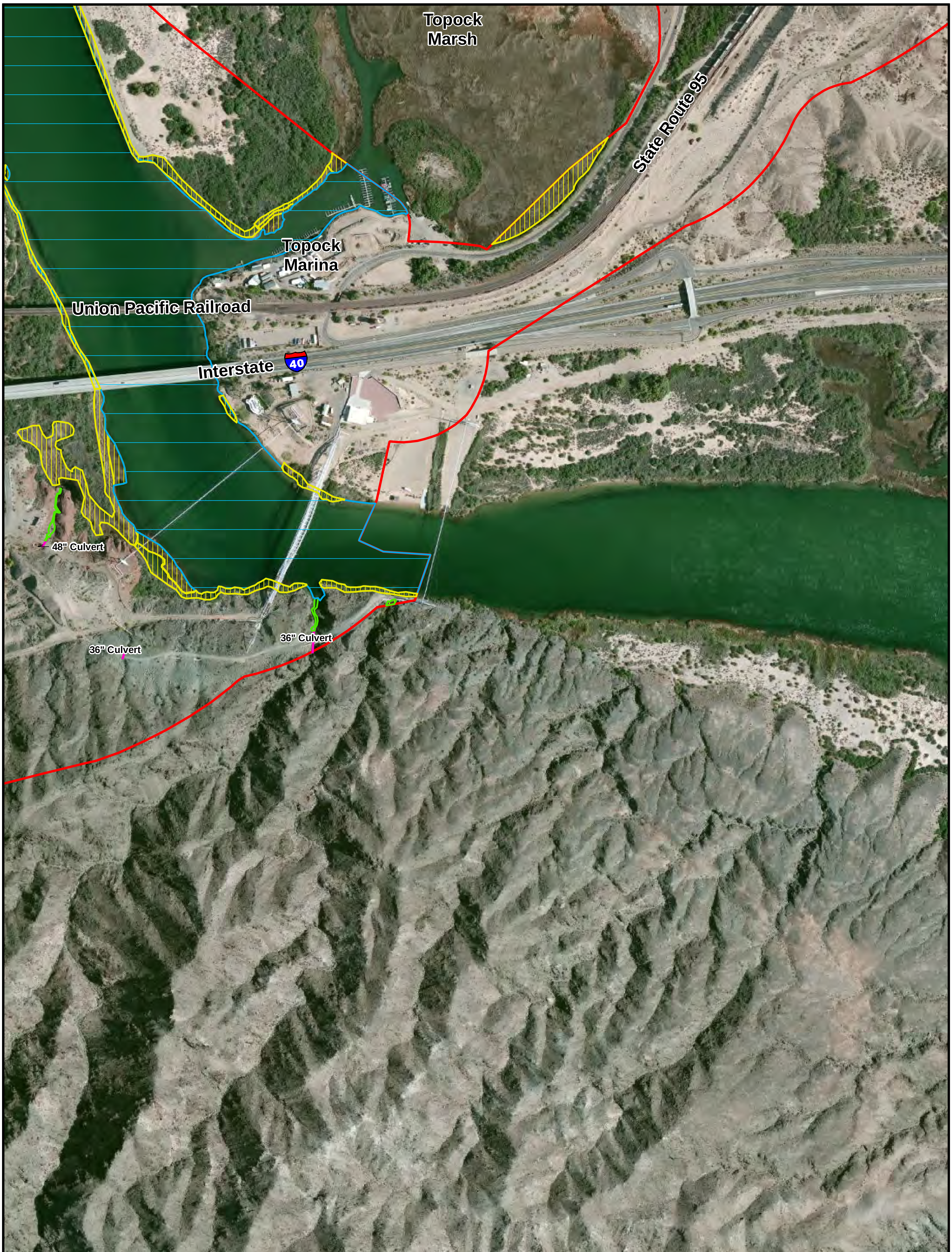


Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.

FIGURE 4-1
Rivers, Streams and Riparian Areas
Map 5 of 6
PG&E Topock Compressor Station
Needles, California

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2013\EC_WORKING\CDFW_JURIS_WETLAND.MXD ECLARK1 9/12/2013 1:15:03 PM

CH2MHILL



LEGEND

Wetland Delineation Boundary

Culvert

CDFW Jurisdiction Areas

CDFW Ephemeral Stream

CDFW Riparian

Colorado River

Park Moabi Slough

Note:
CDFW = California Department of Fish and Wildlife

N

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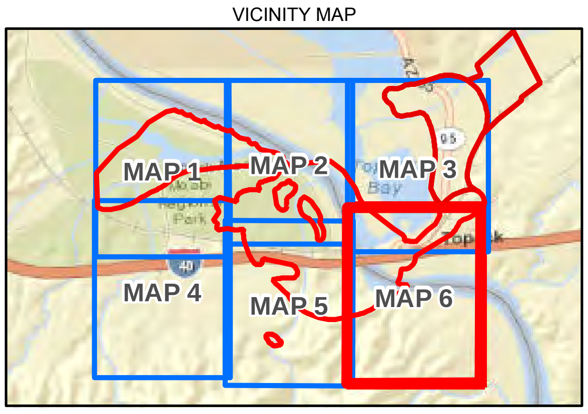
VICINITY MAP



Source:
Wetland Delineation Completed March 13-17, 2012
R. Huddleston and K. Steiner.
Update Completed July16-17, 2012
R. Huddleston and M. Fowler.
Update Completed December 12-13, 2012
R. Huddleston.

FIGURE 4-1
Rivers, Streams and Riparian Areas
Map 6 of 6
PG&E Topock Compressor Station
Needles, California

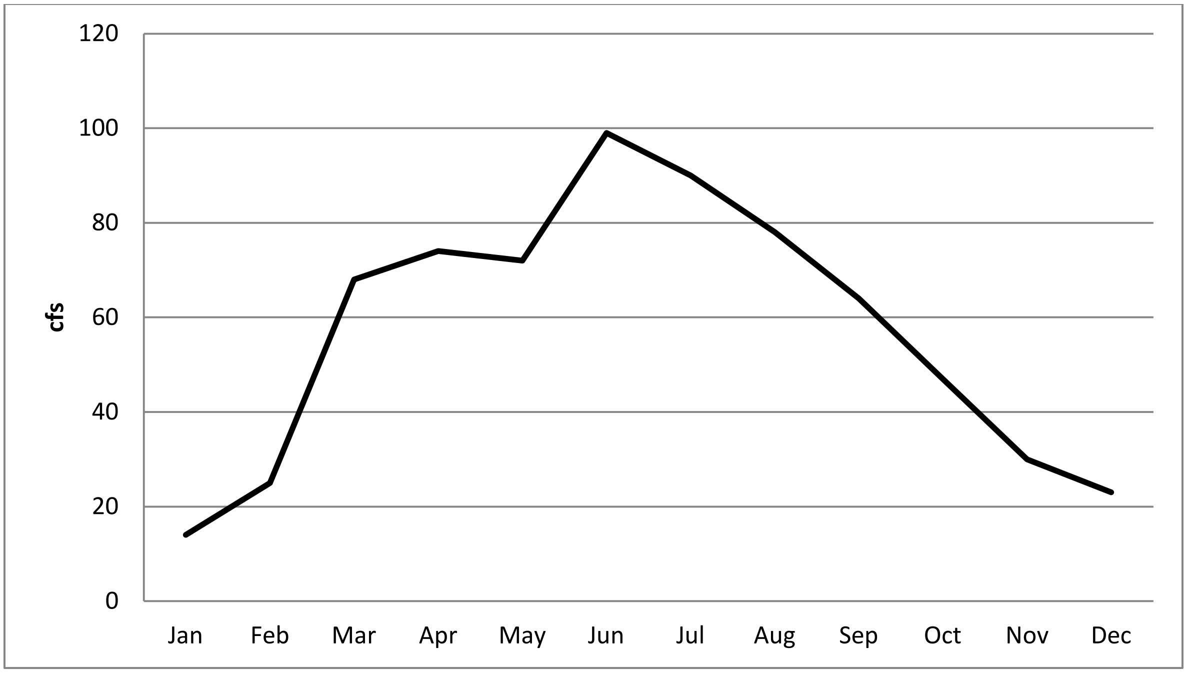


FIGURE 4-2
Overall monthly average flow rate (cfs) for the Colorado River as measured at the USGS River Gauge (09423550) at the Topock Marsh Inlet near Needles, California between January 1967 and September 2012.

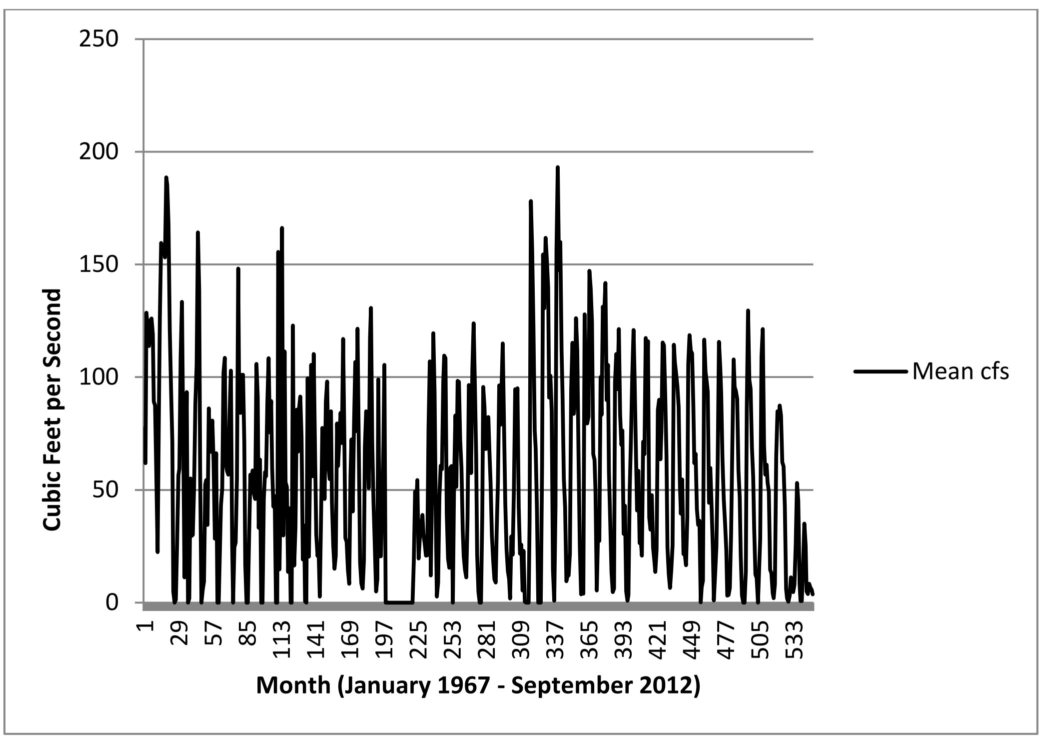


FIGURE 4-3
Monthly Average flow rate (cfs) for the Colorado River as measured at the USGS River Gauge (09423550) at the Topock Marsh Inlet near Needles, California between January 1967 and September 2012. The data gap circa 1983-4 (or circa month 200) corresponds to the Colorado River flood after which the Topock gauge was replaced.

Upstream of the Interstate 40 Bridge, the river channel ranges from approximately 600 to 740 feet wide. Downstream of the bridge, the river traverses the exposed bedrock of the Chemehuevi Mountains, and the channel width narrows to approximately 435 feet. Throughout much of the study area the channel banks are primarily characterized by steep slopes that have been armored with large boulders. The elevation at the top of the banks is approximately 466 feet above amsl; over 7 feet above the maximum flow level recorded in this area since 2003. Further to the south along the Arizona side of the river, near the inlet to the Topock Marina, the banks are slightly lower and have narrow sandy beaches and eroded sandy banks at elevations ranging from around 460 to 463 feet above amsl.

Due to controlled discharges regulated by upstream dams as well as past dredging and channelization along this reach of the Colorado River there is no longer an active floodplain in the study area and, as described below, the riparian habitat is limited to a narrow band immediately along the channel banks of the river.

4.2 Park Moabi Slough

Park Moabi Slough was created by major dredging activities by USBR. Historical photographs indicate that much of the present shoreline, bank stabilization, and sand dune area features in the Park Moabi area were completed during in the mid 1960s. Within the project area, most of the areas along the channel are characterized by developed beaches, vacation cabins, boat docks, and boat ramps associated with the Pirates Cove Resort and Park Moabi. East of the developed areas, the south shore of the slough is characterized by relatively steep sandy and rocky banks with dense vegetation. As with the Colorado River there is no active floodplain associated with the slough and riparian vegetation, where present, is limited to a narrow band along the edges of the channel.

4.3 Ephemeral Washes West and North of the Compressor Station

Arid region ephemeral washes are a unique type of stream feature, which has required that USACE publish a number of guidance documents regarding the determination of jurisdictional limits in these areas including *A Field Guide to Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley, 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar, 2010). Unlike perennial or seasonal streams in wetter environments where the extent of federal jurisdiction is determined by the ordinary high water flows, the extent of jurisdiction of arid-region ephemeral washes includes all of the hydrogeomorphic floodplain units such as low flow channels, active floodplain, and low terraces. In these areas, the federal jurisdictional limits are defined by the lateral extent of the active floodplain, which is also generally the extent of desert wash (riparian) vegetation. Therefore, the areas of ephemeral washes included in the wetlands delineation for federal waters of the U.S. were considered representative of area that would be regulated under state regulations by CDFW or similar requirements as stated in the FEIR.

The alluvial terraces located along the south side of the Colorado River and north of the Chemehuevi Mountains are characterized by numerous incised drainage channels and ephemeral washes. One of the largest ephemeral washes in the project area is Bat Cave Wash, a north-south-trending channel that is immediately west of the Topock Compressor Station. Bat Cave Wash is shown as an intermittent blue line stream on the USGS Topock topographic quadrangle map, and is also included as an intermittent stream in the National Hydrographic Dataset (NHD). Bat Cave Wash is a tributary of the Colorado River. Large volume surface flows are generally infrequent and occur only briefly in response to high-intensity rainfall events. Storm water flows are conveyed directly into the river under a bridge along the National Trails Highway. Within the project area the upper part of Bat Cave Wash is confined by steep rocky slopes and has an approximately 30-foot-wide gravel-cobble floodplain. Vegetation in the upper reaches of the wash is sparse, consisting of scattered shrubs such as Anderson's box-thorn (*Lycium andersonii*), catclaw (*Senegalia greggii*), and desert lavender (*Hyptis emoryi*). As the wash continues downslope, the channel broadens to over 190 feet wide in some areas. In this reach, it has multiple low flow channels that are present throughout the active floodplain. Vegetation cover also increases downslope with blue palo verde (*Parkinsonia florida*) and saltcedar (*Tamarix ramosissima*) trees scattered throughout the active floodplain. Other common shrubs on, or immediately adjacent to, the active floodplain include brittlebush (*Encelia farinosa*), creosote bush (*Larrea tridentata*), white bur-sage (*Ambrosia dumosa*), sweetbush (*Bebbia juncea*), and white rhatany (*Krameria bicolor*). Total vegetative cover throughout most of the wash is less than 30 percent, with the exception of a dense stand of saltcedar present at the northern end of the wash, just south of the National Trails Highway.

A second large ephemeral wash is present to the west of Bat Cave Wash. There is no blue line stream indicated on the USGS Topock quadrangle map in this area, nor is there any mapped feature in the NHD at this location. The active floodplain of this channel ranges from approximately 100 feet to 240 feet wide and is characterized by a sandy-pebble-cobble substrate with multiple low-flow channels. Scattered perennial vegetation throughout the channel includes blue palo verde, catclaw, Anderson’s box-thorn, sweetbush, creosote bush, white rhatany, and cheesebush (*Ambrosia salsola*). Similar to Bat Cave Wash, there is a dense thicket of saltcedar and honey mesquite (*Prosopis glandulosa*) at the northern (downslope) end of the wash feature. A large earthen dam has been constructed at the downstream terminus of this feature and there is no longer a direct hydrologic connection to the Colorado River. A perennial pond is located immediately north of the dam that is connected to a small wetland adjacent to the Colorado River via a large culvert that passes under the National Trails Highway.

There are several small, incised tributary drainages that flow directly into either Bat Cave Wash or the western wash system within the project area. These channels are characterized by a single low-flow channel and generally have sandy-gravel, cobbly, or rocky substrates. Most of the low-flow channels are devoid of vegetation or have only sparse, scattered herbaceous species such as spurge (*Chamaesyce* spp.), Spanish needle (*Palafoxia arida*), ovate plantain (*Plantago ovata*), and needle grama (*Bouteloua aristidoides* var. *aristidoides*). Common trees and shrubs along the lower slopes and channel edges in these areas include blue palo verde, catclaw, Anderson's box-thorn, creosote bush, white bur-sage, white rhatany, and sweetbush.

4.4 Park Moabi Drainages

Three ephemeral drainages are present in the western part of the project area, originating south of the developed portion of Moabi Regional Park. Two of these drainages are shown as un-named blue line streams of the USGS Whale Mountain Topographic quadrangle map and are include as intermittent streams in the NHD. These ephemeral channels are characterized by relatively steep vertical side banks and sand-pebble-cobble beds that are largely devoid of vegetation. Scattered blue palo verde trees and occasional shrubs such as cheesebush, brittlebush, and creosote bush are present along the edges and side slopes of the channels. All three channels flow into a broad retention basin located on the south side of the National Trails Highway, west of Park Moabi Road. There are six 48-inch diameter culverts in the northeast corner of the retention basin that convey flows under the National Trails Highway into a broad U-shaped, routinely maintained, stormwater channel in the developed area of the park. At the time of the survey the sandy-gravel substrate of the stormwater channel was devoid of vegetation and due to recent maintenance activities. At the north end of the U-shaped channel there is a 24-inch-diameter culvert under a paved road that drains into a low topographic swale characterized by upland vegetation. The swale feature continues to the north where stormwater flows are discharged into Park Moabi Slough near the southwest corner of the Pirate Cove Marina.

4.5 Sacramento Wash and Discontinuous Ephemeral Drainages

The Sacramento Wash is located at near the northern end of the project area east of the Topock Marsh. Within the project area, Highway 95 bisects the wash with an at-grade crossing. The Sacramento Wash is shown as a blue line stream on the Topock USGS 7.5-minute quadrangle and as an intermittent stream in the NHD. Within the project area the Sacramento Wash is a broad, open sandy channel that is largely confined within constructed levees. The channel ranges from approximately 50 to 70 feet wide and has a flat, generally uniform bed that lacks well-defined low flow channels. There are minor benches and terraces along the channel in a few locations, but there is no active floodplain outside of the channel as a result of the constructed levees along this section of the wash. On the east side of Highway 95, the channel is devoid of vegetation with extensive athel tamarisk thickets present along both sides of the wash. On the west side of the road, the wash continues to flow through a channel confined by levees for approximately 950 feet where it then broadens out along the floodplain adjacent to the Topock Marsh just west of the project area. Some blue palo verde trees are present along the levees on the west side of the road and a few small trees and shrubs including saltcedar, smoke tree (*Psorothamnus spinosus*), bush seepweed (*Suaeda nigra*), and creosote bush occur within the wash channel. Prior to a large wildfire in October 2008, dense tamarisk thickets were also present along both sides of the wash in this area.

Two low, open sandy ephemeral drainages are present in the area east of Highway 95. Both of the drainages flow through semi-circular culverts under the Burlington Northern-Santa Fe railroad just east of the project area. These two drainages are characterized by low sandy substrates that lack defined channel banks. Both of the drainages are devoid of vegetation and exhibited evidence of recent flows including sediment deposits, debris lines, and scouring at the time of the July 2012 survey. Unlike the Sacramento Wash, these smaller drainages dissipate into sheet flow on the east side of the highway and have no apparent hydrologic connection to the Topock Marsh.

4.6 Riparian Vegetation

Riparian vegetation includes areas of emergent vegetation along the edges of the Colorado River and Park Moabi slough, trees and shrubs growing immediately adjacent to the Colorado River and undeveloped areas of Park Moabi slough and adjacent wetlands that have a direct hydrologic connection with the Colorado River. Vegetated areas along the low terraces located above the high water limit of the Colorado River, that are not subject to occasional flooding were not considered to be riparian habitat.

Riparian habitat associated with the Colorado River and Park Moabi slough include scattered patches of southern cattail (*Typha domingensis*), California bulrush (*Schoenoplectus californicus*), common reed (*Phragmites* australis) and giant reed (*Arundo donax*) growing along the edges of the Colorado River and Park Moabi Slough. Most of these areas occur below the ordinary high water line or on low terraces that are likely subject to regular flooding. Patches of emergent vegetation are most common along the southern banks of the Park Moabi Slough, but are also found along the north banks of the slough in the western most part of the project area. Patches of emergent vegetation are less common along the Colorado River and occur in scattered locations along the south/west bank as well as in the vicinity of the Topock Marina. Also included are areas with California bulrush along the outlet of Bat Cave Wash and areas with broad-leaved cattail (*Typha latifolia*) in the outlet of the East Ravine near the southern boundary of the study area.

Much of the riparian vegetation associated with the rocky banks adjacent to the water's edge is characterized by scattered patches of saltcedar and arrow weed (*Pluchea sericea*), with some locally dense areas of honey mesquite. Species such as broom baccharis (*Baccharis sarothroides*) and occasional sand bar willow (*Salix exigua*) are present along some of the sandy banks on the south side of Park Moabi Slough.

Riparian habitat also includes adjacent wetlands that are immediately adjacent to the Colorado River or Park Moabi Slough. The largest such wetland is located on the south side of the Interstate 40 Bridge on the west side of the Colorado River. This wetland is characterized by a dense monoculture of common reed. At the time of the survey saturated soils and groundwater were present at a depth of 8 inches. Based on the location and elevation of this wetland surface water is likely present in the summer months (May to July) during higher flow levels of the Colorado River.

Another adjacent wetland is located on the east side of the Colorado River, north of the Topock Marina. This wetland is characterized by a strip of emergent wetland immediately above the shore line and also includes a narrow band of low trees and shrubs further inland. Emergent vegetation is characterized by iris-leaved rush (*Juncus xiphioides*), dallis grass (*Paspalum dilatatum*), and marsh pennywort (*Hydrocotyle verticillata*) with scattered common reed and California bulrush. A shallow water table and saturated soils were present at 12 inches below ground surface at the time of the February 2012 survey. This area appears subject to some flooding during higher flows and appears to have saturated conditions in the upper part of the soil for most of the year. Immediately inland the riparian vegetation is characterized by small saltcedar trees and shrubs, arrow-weed, broom baccharis and scattered narrow-leaved willow (*Salix exigua*). Herbaceous vegetation in this area is limited to sparse common reed. A shallow water table was encountered at a depth of 15 inches below the ground surface during the February 2012 survey.

The third adjacent wetland is on the south bank of the Colorado River, approximately 600 feet downstream of the confluences of the Park Moabi Slough and the Colorado River. This low, depressional area is filled with dense growth of southern cattail. At the time of the February 2012 survey, shallow groundwater and saturated soils were present at a depth of 10 inches below the ground surface. A culvert connects this area to a pond on the south side of the National Trails Highway. Given the low topographic position, hydrologic connection to the pond south of the road, and shallow groundwater noted at the time of the survey, it is likely that this area is subject to shallow seasonal flooding for part of the year.

The fourth adjacent wetland occurs on the north side of Park Moabi Slough to the northwest of the Moabi Regional Park parking area and boat ramp. This wetland is located on the landward side of shore zone and is characterized by iris-leaved rush, marsh pennywort, and dallis grass with scattered southern cattail. Shallow groundwater and saturated soils were encountered at 11 inches below the ground surface in this area during the February 2012 survey. This wetland area appears to be located in a topographic low area where some flooding likely occurs during periods of higher flows.

There is a pond on the south side of the National Trails Highway approximately 800 feet southeast of the confluence of Park Moabi Slough and the Colorado River. An earthen dam separates the pond from the ephemeral wash system that extends to the south. The pond is connected to the adjacent emergent wetland described above via a large culvert. The southern half of the pond is characterized by dense growth of southern cattail, while the northern part is open water. Several feet of water was observed in the pond during both the February and July 2012 surveys. A beaver lodge is present near the center of the pond at the edge of the cattails. It appears that this was at one time part of the larger wash system that has been cut off by the earthen dam. This area was considered to be riparian habitat as it is now functionally a small backwater area of the Colorado River (via culvert connections). The history of the dam is not well known, but it was likely built to protect the then-existing railroad bed from flood damage. It is also possible that it is associated with development of a “roadhouse” with buildings and campground that operated west of this feature when Historic Route 66 and the later National Trails Highway were in use as primary travel routes, before Interstate 40 construction.

The portion of the Topock Marsh included in the study area was also considered riparian habitat. The section of the marsh in the project area is characterized by dense growth of southern bulrush (*Schoenoplectus californicus*). Surface water to a depth of 7 inches was present at the sample location at the time of the February 2012 survey.

SECTION 5

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Appendix A
CDFW CERCLA Exemption Letter and list of Avoidance and Minimization Measures

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
Blythe Field Office
P.O. Box 2160
Blythe, California 92226
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

March 6, 2013

Yvonne Meeks
Manager, Environmental Remediation
Pacific Gas and Electric Company
4325 South Higuera Street
San Luis Obispo, CA 93401

Subject: Confirmation of Application of the CERCLA 121(e)(1) Permit Exemption to Pacific Gas and Electric Company's Soil and Groundwater Investigation and Remediation Project

Dear Ms. Meeks:

You asked the California Department of Fish and Wildlife (CDFW) to determine whether or not the permit exemption in Section 121(e)(1) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) applies to response actions conducted onsite at the Pacific Gas and Electricity (PG&E) Topock CERCLA site, specifically soil and groundwater investigations and remediation activities at the site (Project). CDFW has determined that the permit exemption applies to the Project. As a result, PG&E is relieved from obtaining a Lake or Streambed Alteration Agreement (Agreement). However, PG&E must still comply with any substantive elements CDFW would require in an Agreement for the Project. In this case, the substantive elements are the avoidance and mitigation measures (AMMs) attached hereto which PG&E previously agreed to follow. PG&E must comply with the AMMs for the duration of the Project unless they are modifed later.

Please note in particular the five day notification procedure specified in AMM 34. The notification required under AMM 34 must include: a written description of any Project-related construction activities; a location map; biological clearance; and additional AMMs PG&E's biologist determines are necessary.

If you have any questions regarding this matter, please contact Victoria Chau, Environmental Scientist at (760) 922-6783 or Victoria.Chau@wildlife.ca.gov.

Sincerely,

Chris Hayes

Chris Hayes
Deputy Regional Manager
Inland Deserts Region

Attachment: CDFW Topock Remediation AMMs

2/5/13

Avoidance and Mitigation Measures for Topock Remediation Project (Project)

The California Department of Fish and Wildlife (Department) recommends the following avoidance and mitigation measures (AMMs 1-34) for all work conducted in CDFW Jurisdictional Washes. Additional AMMs will be developed for the Project, as needed, by the qualified Biologist or Cultural Specialist. The following AMMs will be implemented in a manner consistent with the mitigation measures set forth in the Mitigation Monitoring and Reporting Program (MMRP) for the Topock Compressor Station Final Remedy FEIR approved by DTSC on January 31, 2011.

1. Formal environmental training will be provided for all onsite personnel prior to construction. This training will include biological, environmental laws, and guidelines.

2. If required for species or habitat protection, a biological site monitor will be on site during all ground disturbing activities.

3. No direct or indirect impacts shall occur to any State or federally listed threatened, endangered, or candidate species. Any and all impacts to these species are strictly prohibited and are punishable by Federal and State laws. If threatened, endangered, or candidate species occur within the proposed work area or could be impacted by the proposed project, Pacific Gas and Electric Company (hereinafter called the Operator) shall obtain the required State and Federal threatened and endangered species permits or comply with the substantive requirements of such laws, pursuant to CERCLA Section 121(e)(1).

4. No discharges to the CDFW Jurisdictional Washes or Colorado River shall occur without permits or compliance with the substantive requirements of applicable Federal and state laws, pursuant to CERCLA Section 121(e)(1).

5. Spoil sites shall not be located within the bed, bank, and channel of any watercourse, where spoil could be washed back into a stream, or where it will cover aquatic or riparian vegetation. Any materials placed in seasonally dry portions of a stream that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.

6. Structures and associated materials, including construction debris, not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.

7. All debris, bark, slash, sawdust, rubbish, silt, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances resulting from project related activities that could be hazardous to aquatic life or waters of the State, shall be prevented from

contaminating the soil and/or entering the waters of the State and shall not be deposited within 150 feet of the high water mark, unless containerized. None of these materials shall be allowed to enter into or be placed within or where they may enter or be washed by rainfall or runoff into waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area.

8. Erosion control measures shall be implemented where necessary to reduce erosion and sedimentation in wetlands, waters of the United States, waters of the state, and habitat occupied by covered species and plant species when activities are the source of potential erosion impacts.

9. During construction, the contractor shall not dump any litter or construction debris within the riparian/stream zone. All such debris and waste shall be removed daily and properly disposed of at an appropriate site.

10. The Operator shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Operator to ensure compliance. The clean-up of all pollution spills shall begin immediately. The Operator shall notify the Department immediately of any spills and shall consult with the Department regarding clean-up procedures and requirements.

11. Spills and releases of materials shall be cleaned up immediately and thoroughly. Appropriate spill response equipment, including spill kits preloaded with absorbents in an over-pack drum (where feasible), will be provided at convenient locations throughout the site. Spent absorbent material will be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean up spills of hazardous materials or waste will be managed as hazardous waste unless characterized as nonhazardous.

12. Trash and scrap receptacles shall be located throughout work areas, as necessary, to promote proper disposal of solid wastes. Receptacles shall be provided with lids or covers to prevent windblown litter.

13. Proper receptacles to dispose of hazardous wastes shall be provided at each work area.

14. Excess concrete will be collected and disposed of in designated concrete washout facilities.

15. Any sanitary and septic waste facilities provided during project work will be located away from drainage courses and traffic areas. These facilities will be maintained regularly.

16. Staging/storage areas for equipment and materials shall be located outside of the

Colorado River's bed, bank, and channel. No equipment maintenance shall be done within 150 feet of the Colorado River channel where petroleum products or other pollutants from the equipment may enter these areas under any flow.

17. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the Colorado River, shall be positioned over drip pans.

18. Vehicles shall not be driven or equipment operated in water covered portions of the Colorado River or in wetted areas (including but not limited to ponded, flowing, or wetland areas), or where riparian vegetation may be destroyed, except as necessary to complete authorized work as described under the plan.

19. Any equipment or vehicles driven and/or operated within or adjacent to the Colorado River shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian and wetland habitat.

20. Project-related vehicle traffic, construction activity, and equipment storage shall be restricted to established roads, designated access roads, the working strip, storage areas, staging and parking areas, and other designated project areas. All of these areas shall be clearly marked by posting signs.

21. All vehicles and equipment regularly entering and leaving work areas shall be cleaned to reduce material track-out.

22. Vehicles shall not exceed a speed limit of 15 mph in the ROWs or on unpaved roads within sensitive land-cover types.

23. All disturbed portions of the Colorado River shall be restored to as near original condition as possible, except as otherwise indicated to the Department.

24. No vehicles shall be refueled within 100 feet of a wetland, stream, or other water-body unless done within a constructed secondary containment area that includes, at a minimum, a perimeter berm and leak-proof liner.

25. All equipment and vehicles will have federal or state approved spark arrestors. All vehicles will carry an approved fire extinguisher (or backpack pump filled with water) and a shovel.

26. The development of new access and ROW roads by PG&E and vegetation clearing and blading for temporary vehicle access shall be minimized.

27. Covered storage for materials, especially toxic or hazardous materials, shall be provided to prevent exposure of these materials to storm water. Toxic or hazardous materials will be stored or transferred on impervious surfaces that will provide secondary containment for spills. Vehicles and equipment used for

material delivery and storage, as well as all contractor vehicles, shall be parked in designated areas.

28. Trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets will be prohibited in O&M work activity sites.

29. The perimeter of the work site shall be adequately flagged to prevent damage to adjacent riparian and wetland habitats. The upstream and downstream limits of the work area, including all areas of impact to existing desert riparian habitat and "Environmentally Sensitive Areas (ESA)", shall be identified with flagging or brightly colored mesh fencing or some other means readily conveyed to the equipment operators. These limits will be identified by a supervisor familiar with the terms of these AMMs, prior to the beginning of activities, and will be confined to the minimal area needed to accomplish the proposed work.

30. If disturbance or removal of riparian habitat is unavoidable the operator shall implement measures outlined in MMRP BIO-1 regarding restoration, rehabilitation and/or replacement of such habitat. Measures to implement MMRP BIO-1 shall be outlined in the notification listed below in measure #33.

31. No herbicides shall be used on vegetation unless specifically authorized, in writing, by the Department.

32. The Operator assumes responsibility for the restoration of any wildlife habitat which may be impaired or damaged, either directly or incidental, to the project, as a result of failure to properly implement or complete the listed mitigative features or from activities which were not included in the Operator's Notification.

33. All project resident engineers, project engineers, project inspectors, and contractors and sub-contractors shall be provided with a copy of the AMMs, and shall abide by the terms and conditions of the AMMs.

34. The Operator shall notify the Department, in writing, at least five (5) days prior to initiation of construction (project) activities and at least five (5) days prior to completion of construction (project) activities. Notification shall be sent to: Department of Fish and Wildlife, Colorado River Program, P.O. 2160, Blythe, California 92226; FAX No. (760) 922-5638.

Appendix B
Representative Photographs

The Colorado River

Park Moabi Slough

Bat Cave Wash

Ephemeral Drainage West of Bat Cave Wash

Ephemeral Tributary

Park Moabi Drainage

Emergent vegetation and narrow band of riparian trees and shrubs along the shore of the Colorado River

Wetlands Adjacent to the Colorado River, south of the Interstate 40 Bridge

Backwater pond – connected to the Colorado River via culverts under the National Trails Highway

Topock Marsh

Appendix A4
Technical Memoranda on Methodologies of Mature Plant Surveys and Floristic Surveys and the Mature Plants Survey Report and Addendum (*on CD-ROM only*)

Prepared for Pacific Gas and Electric Company

Prepared by CH2M HILL and Garcia and Associates (GANDA)

Technical Memorandum

Date: October 31, 2011

To: Melanie Day and Curt Russell, PG&E

From: Kim Steiner and Jay Piper

cc: Morgan King, Gary Santolo, Marjorie Eisert, Christina Hong

Re: Topock Compressor Station Groundwater Remediation Project, Mature Plants Survey Methodology

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Introduction

The purpose of this technical memorandum (memo) is to describe the methodology used for surveying, mapping, and documenting the Mature Plants that occur in the PG&E Topock Compressor Station Groundwater Remediation Project (project) area. A Mature Plants survey was conducted to comply with the January 2011 Final Environmental Impact Report (EIR) requirements as set forth in Mitigation Measures AES-1a and AES-2b. These Mitigation Measures are from the Aesthetics (AES) portion of the mitigation plan presented in the EIR and are intended to ensure the protection of views from specific vantage points, as discussed in greater detail below.

On August 18, 2011 the methodology described in this memo was presented by PG&E and CH2M HILL at a plant survey kickoff meeting to stakeholder representatives from the Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hualapai Tribe, and the PG&E cultural/archeological resources contractor, Applied Earthworks. During the kickoff meeting, the Tribes requested that the entire Project Area, as defined by the EIR, be the subject of the Mature Plants survey, instead of only the eastern portion of the site on and near the Colorado River Floodplain as is identified in the EIR Mitigation Measures AES-1a and AES-2b. The stated purpose of this request was to ensure the protection of other vantage points of cultural significance that may be present within the Project Area. The Tribes also requested a written copy of the survey methodology, and this technical memo was prepared to meet this request and as part of a Mature Plants survey report that will be prepared to document the survey effort.

At the request of PG&E, Garcia and Associates (GANDA) Senior Botanist Kim Steiner and assisting CH2M HILL Biologist Morgan King conducted botanical field surveys on August 18-26, 2011 in the Project Area. The surveys included data collection in preparation for the following four deliverables:

1) A Mature Plants Map and Species List for the Project Area. Mature Plants were defined as living: trees, large or prominent shrubs, and tall predominantly herbaceous plants (a more detailed description of Mature Plants is included in the Methodology section below). A list of Mature Plant species will accompany the Mature Plants Map in addition to a report documenting the survey effort.

2) An updated Vegetation Communities Map. The 2007 Programmatic Biological Assessment (PBA) for the project included a Vegetation Communities Map for the Area of Potential Effect, prepared from 2004-2005 field mapping. The Project Area largely, though not completely, overlaps with the Area of Potential Effect previously mapped under the PBA. Figure 1 depicts the extent of the Project Area. To facilitate survey logistics and track daily survey progress, the Project Area was divided into twelve segments which are labeled A through L.

3) A map of the ethnobotanically significant plants, which are identified in the EIR Appendix PLA: Ethnobotany Plant List. This survey is also being conducted to facilitate compliance with the EIR requirements described in Mitigation Measure CUL-1a-5, which requires the protection of culturally significant plants. Similarly to the Mature Plants survey described above, the extent of this survey area was increased at stakeholder request to include the Project Area. Future floristic surveys, for purposes other than Mature Plant mapping (as described in item 4 below) will collect additional data about ethnobotanically significant plants in the Project Area.

4) A preliminary species checklist in support of upcoming comprehensive floristic surveys. This checklist was developed using the Mature Plants survey as an opportunity to perform reconnaissance for upcoming fall, winter and/or spring Floristic and Rare Plant surveys. The checklist will serve as the starting point for these future surveys and will be updated and augmented with each upcoming survey. The checklist and botanical surveying and mapping efforts will ultimately result in a master plant list that can be sorted into subset lists including rare species or culturally significant species. This master plant list will be an important tool that will support plant protection during construction and design planning for the project.

Survey Area Description

The survey area encompasses the Project Area, totals approximately 780 acres, and varies in elevation from approximately 400 to 700 feet above sea level.[1] The survey team arbitrarily divided the Project Area into twelve sections (A—L) as described above. Nine of the sections (A, B, C, D, E, H, I, K, and L) are located in San Bernardino County, California. The remaining three sections (F, J, and G) are located in Mohave County, Arizona. Sections of the survey area within California are primarily on land managed by the Bureau of Land Management (BLM) or U.S. Fish and Wildlife Service (USFWS); with the exception of a portion of sections C and D, which is owned by the Fort Mojave Indian Tribe; and a portion of section H, which is owned by PG&E. On the Arizona side of the Colorado River, sections F and most of G are also part of the

[1] The Burlington Northern Santa Fe railroad and Interstate 40 rights-of-way are within the boundaries of the Project Area; however, they were not included in the Floristic Survey because the project is not anticipated to impact these areas.

USFWS Havasu National Wildlife Refuge, and land in section J and a portion of section G is privately owned.

The most common and widespread plant community in the Project Area is Creosote Bush Scrub. As the name implies, this plant community is dominated by creosote bush (*Larrea tridentata*) and is one of the most extensive plant communities found within the California Deserts (Sawyer et al. 2009). Creosote Bush Scrub is present in all upland areas of the Project Area. In the valleys and dry washes that dissect the upland areas, the most common plant community is the Palo Verde/Ironwood alliance that is dominated by blue palo verde (*Parkinsonia florida*) and various associates including catclaw acacia (*Acacia greggii*) (Sawyer et al. 2009). This alliance takes many forms and in the Project Area it is form that lacks ironwood (*Olneya tesota*). Along the floodplain of the Colorado River, the primary vegetation type is salt cedar (*Tamarix* ssp. semi-natural shrubland) which often forms impenetrable thickets (e.g. under the railroad and Interstate I-40 bridges) of single species, *Tamarix ramosissima*, or mixtures with other species; for example honey mesquite (*Prosopis glandulosa* var. *torreyana*) (Sawyer et al. 2009). Salt cedar often interdigitates with arrow weed (*Pluchea sericea*) thickets and Mesquite Bosque on the flood plain as well. Scattered throughout the project area on the flood plain or in broad washes near the flood plain are smaller patches of shadscale and all scale scrub (*Atriplex* spp.) which grow on alkaline or saline soils (Sawyer et al. 2009). Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming associations in the water such as cattail (*Typha latifolia*) and California bulrush (*Scirpus californicus*) marshes, whereas on the adjacent shores and flood plain common reed (*Phragmites australis*) marshes and occasionally great reed (*Arundo donax*) breaks are present.

Methodology

Field Survey Preparation

Pursuant to Mitigation Measure AES-1a and AES-2b,

> *"The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation."*

In order to identify potential Mature Plants that occur in the Project Area, Botanist Steiner, Biologist King, and PG&E Biologist Melanie Day reviewed existing documentation of vegetation types that occur in the Project Area; for example: the EIR, previous biological surveys in preparation for the PBA, incidental species lists from Protocol Desert Tortoise and Southwest Willow Flycatcher surveys, and the PBA Vegetation Communities Map. In addition, a brief pre-survey reconnaissance of the Project Area was conducted by Botanist Steiner, Biologist King, and Biologist Day on August 18, 2011. A Mature Plant was defined as a living:

- tree,
- large or prominent shrub, or
- tall predominately herbaceous plant

that could add to the aesthetic value of the Project Area from Key Views 5 and 11, and other potential culturally significant views in the Project Area.

A “Key View”, according to the EIR, is a vantage point offering a view of some or all of the Project Area from one of eleven specified points. Each Key View vantage point is located and described in Section 4, volume II, of the EIR. Two of the Key Views specified in the EIR are incorporated in the Aesthetic Mitigation Measures related to botanical surveys. Based on interpreting the PBA Plant Communities Map, these two Key Views 5 and 11 are described as follows: The “view corridor” from Key View 11 looking west from boats on the Colorado River consists of several overlapping areas of plant growth including: wetlands along the river, riparian vegetation on the banks and floodplain, and upland shrubs and trees on the slopes up to the next plateau and beyond (i.e. the edge of National Trails Highway and farther west). Key View 5 looks in the opposite direction (i.e. eastward) from a higher vantage point at the eastern edge of Maze Locus B outwards over the vegetated flood plain of the Colorado River.

Also included as Mature Plants were those used for landscaping around Park Moabi and the Topock Compressor Station; for example: eucalyptus (*Eucalyptus* sp.), fan palm (*Washingtonia* sp.), athel tamarisk (*Tamarix aphylla*), Fremont’s cottonwood (*Populus fremontii*), and oleander (*Nerium oleander.*). Shrubs were included if they occurred in a large or prominent form; for example, the widespread creosote bush was included where it was observed in a large or prominent form; however, it was not included where it more typically occurred as a small shrub.

Twenty-one species were considered appropriate to categorize and map as Mature Plants (Table 1). More than half of these (N=12) are trees, with the remainder split between shrubs (N= 5) and herbaceous perennials (N= 4).

Current high-resolution aerial photographs of the Project Area were prepared as base maps for Global Positioning System (GPS) and field notation to be used during the surveys. Although the aerial photographs are of sufficient quality and resolution that some Mature Plants can be identified, it is not feasible to identify all Mature Plants through the use of the photographs alone. The aerial photographs have been incorporated into project Geographic Information System data files and may also be used as a base map for the deliverables described in the *Introduction* section of this memo.

Field Survey

The field survey was conducted on August 18-26, 2011 in clear, calm, and hot summer weather. The list of Mature Plants described in Table 1, aerial photographs, and the Vegetation Communities Map were used as reference documents. Though surveyors were prepared to identify and record all observed species that may be considered to be a Mature Plant, and not just those listed is Table 1, no other species that would meet these criteria were observed. The field mapping was conducted using GPS data collection and surveyor notations were recorded on the aforementioned aerial photographs.

The protocol for the survey was developed expressly for Mitigation Measures AES-1a and AES-2b and designed to ensure that all Mature Plants were identified and recorded. The protocol was a mix of focused and transect-based surveys for Mature Plants based on terrain and the inherent visibility of Mature Plants. Surveyors were able to walk or scan the entire Project Area at a distance that guaranteed complete coverage for Mature Plants; therefore, surveyors were able to identify all of the Mature Plants in the Project Area. Trees and shrubs of interest were not distributed evenly across the Project Area; therefore, survey efforts were concentrated in dry riverbeds and washes in the upland areas, and along river banks and floodplains in the lower areas on both sides of the Colorado River. To ensure that surveyors did not overlook any Mature Plants in the Project Area, hilltops and ridges were used as vantage points to locate all Mature Plants in the washes and ravines below.

Vegetative sampling of individual plants was minimized during the survey in response to a request from the Tribes and because it was not necessary for accurate identification of the majority of the Mature Plants. In some cases, identifications were facilitated by taking photographs in the field.

GPS data was collected for each Mature Plant encountered during the survey using a Trimble GeoXH 6000 with decimeter accuracy. In areas where individual plants were numerous and closely clustered together, it was not feasible to GPS each plant individually (e.g. salt cedar and mesquite in sections C and D near National Trails Highway, see Fig. 1). This was especially true along the Colorado River floodplain where salt cedar often formed impenetrable thickets with other shrubs and trees (e.g. honey mesquite and arrow weed). In such situations, the clusters of mature plants were represented as polygon centroids.

For each Mature Plant or cluster of Mature Plants, surveyors recorded the height and health of the plant with the GPS device. Four height categories were used as follows:

- short (< 6 feet),
- medium (≥ 6 and < 12 feet),
- tall (≥ 12 and < 20 feet), or
- very tall (≥ 20 feet).

Plant health was also assessed using three categories as follows:

- good (plants with no dead or damaged branches or other signs of branch senescence),
- fair (plants with a few dead or senescent branches), or
- poor (plants with more than half of the branches dead or damaged).

All of the Mature Plants recorded and mapped on the flood plain of the Colorado River, with the exception of eucalyptus, fan palms, and athel tamarisk, were assumed to have established themselves naturally (i.e. not planted); however, not all naturally established plants were indigenous. For example, salt cedar and giant reed are native to eastern Asia and Europe, respectively; and the common reed, at least under the railroad bridge, is the invasive form from the eastern U.S. and not the native form from California (J. Andre, personal communication). Salt cedar and giant reed are also considered highly invasive in many parts of the arid Southwest, including California and Arizona (California Invasive Plant Council, 2011). In some landscaped areas, plants had clearly been planted; however, these occasionally impacted the view corridor of the Colorado River and were therefore included.

Deliverables

The primary deliverable resulting from the Mature Plant survey will be a detailed Mature Plants Map that depicts the location and distribution of all Mature Plants that occur within the Project Area. This map will also provide information on the height and general health of each Mature Plant (or cluster). These data will also be presented in a tabular/list form that will enable any user to find, for example, the largest concentration of honey mesquite trees, the tallest blue palo verde trees, the largest desert smoke tree, all clusters of arrow weed, or the only known locations for Goodding's willow and Fremont's cottonwood in the Project Area. A report summarizing the survey effort, including the methodology described herein, will also be prepared. The target completion date of these deliverables is December 30, 2011.

Table 1. List of Mature Plants in the Project Area

Species	Common name	Plant habit
TREES		
Athel tamarisk	*Tamarix aphylla*	Tall to very tall tree
Blue palo verde	*Parkinsonia florida*	Shrub to tree
California fan palm	*Washingtonia filifera*	Medium to tall tree
Catclaw acacia	*Acacia greggii*	Shrub to small tree
Desert smoke tree	*Psorothamnus spinosus*	Medium to tall tree
Eucalyptus[1]	*Eucalyptus* sp.	Tall tree
Fremont's cottonwood	*Populus fremontii*	Tall tree
Goodding's willow	*Salix gooddingii*	Medium to tall tree
Honey mesquite	*Prosopis glandulosa* var. *torreyana*	Medium to tall tree
Narrow-leaved willow	*Salix exigua*	Medium tree
Salt cedar	*Tamarix ramosissima*	Shrub to large tree
Screwbean mesquite	*Prosopis pubescens*	Medium to tall tree
SHRUBS		
Arrow weed	*Pluchea sericea*	Medium to tall shrub
Creosote bush	*Larrea tridentata*	Shrub
Ocotillo	*Fouquieria splendens*	Tall shrub
Oleander[2]	*Nerium oleander*	Medium to tall shrub
Shadscale saltbush	*Atriplex confertifolia*	Shrub
HERBACEOUS PLANTS		
Broad-leaved cattail	*Typha latifolia*	Tall herb
California bulrush	*Scirpus californicus*	Tall sedge
Common reed	*Phragmites australis*	Tall perennial grass
Giant reed	*Arundo donax*	Tall perennial grass

[1]Cultivated trees used in landscaping in Moabi Park
[2]Cultivated horticultural plants around the Compressor Station

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LEGEND

Survey Segments

N

0 500 1,000 2,000 Feet

FIGURE 1
EIR PROJECT AREA WITH VEGETATION SURVEY SEGMENTS

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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

Pacific Gas and Electric Company®

Prepared for Pacific Gas and Electric Company

Prepared by CH2M HILL and Garcia and Associates (GANDA)

Technical Memorandum

Date:	October 31, 2011
To:	Melanie Day and Curt Russell, PG&E
From:	Kim Steiner and Jay Piper
cc:	Morgan King, Gary Santolo, Marjorie Eisert, Christina Hong
Re:	Topock Compressor Station Groundwater Remediation Project, Floristic Survey Methodology

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Introduction

The purpose of this technical memorandum (memo) is to describe the methodology that will be used for surveying, mapping, and documenting the plant species that occur in the PG&E Topock Compressor Station Groundwater Remediation Project (project) area. A Floristic survey will be conducted to establish a comprehensive inventory of plant species that occur in the Project Area, identify any plants species that are considered to be sensitive as defined in the *Methodology* section below, and to comply with the requirements of the January 2011 Final Environmental Impact Report (EIR) Mitigation Measure CUL-1a-5, which requires PG&E to avoid, protect, and encourage the regeneration of ethnobotanically significant plants listed in Appendix PLA of the EIR. The Project Area is defined in the EIR and depicted in Figure 1.

On August 18, 2011 the methodology for plant surveys in the Project Area was presented by PG&E and CH2M HILL at a plant survey kickoff meeting to stakeholder representatives from the Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hualapai Tribe, and the PG&E cultural/archeological resources contractor, Applied Earthworks. During the kickoff meeting, The Tribes requested a written copy of the survey methodology for the Mature Plants survey and the Floristic survey, and this technical memo was prepared to meet this request and as part of a Floristic survey report that will be prepared to document the survey effort. The Mature Plants survey methodology was separately prepared.

At the request of PG&E, Garcia and Associates (GANDA) Senior Botanist Kim Steiner and assisting CH2M HILL Biologist Morgan King conducted botanical field surveys on August 18-26, 2011 in the Project Area. The primary purpose of the survey was the identification and mapping of Mature Plants, as required by EIR Mitigation Measures AES-1a and AES-2b. The Mature Plants survey was extended to cover the entire Project Area at the request of the Tribes during plant survey kickoff meeting. This survey also included incidental data collection in support of the Floristic survey as follows:

1) A preliminary plant species checklist was developed using the Mature Plants survey as an opportunity to perform reconnaissance for fall, winter and/or spring Floristic surveys. The checklist will serve as the starting point for the Floristic surveys and will be updated and augmented with each seasonal survey. The checklist and botanical surveying and mapping efforts will ultimately result in a comprehensive inventory of plant species (or master plant list) that can be sorted into subset lists including rare species or ethnobotanically significant species. This master plant list will be an important tool that will support plant protection during construction and design planning for the project.

2) Information to prepare a map and list of the ethnobotanically significant plants was collected. The Floristic survey will collect additional data about ethnobotanically significant plants in the Project Area.

In addition, information to prepare an updated Vegetation Communities Map was collected. The 2007 Programmatic Biological Assessment (PBA) for the project included a Vegetation Communities Map for the Area of Potential Effect, prepared from 2004-2005 field mapping. The Project Area largely, though not completely, overlaps with the Area of Potential Effect previously mapped under the PBA. To facilitate botanical survey logistics and track daily survey progress, the Project Area was divided into twelve sections which are labeled A through L (Figure 1).

Survey Area Description

The survey area encompasses the Project Area, totals approximately 780 acres, and varies in elevation from approximately 400 to 700 feet above sea level.[1] The survey team arbitrarily divided the Project Area into twelve sections (A—L) as described above. Nine of the sections (A, B, C, D, E, H, I, K, and L) are located in San Bernardino County, California. The remaining three sections (F, J, and G) are located in Mohave County, Arizona. Sections of the survey area within California are primarily on land managed by the Bureau of Land Management (BLM) or U.S. Fish and Wildlife Service (USFWS); with the exception of a portion of sections C and D, which is owned by the Fort Mojave Indian Tribe; and a portion of section H, which is owned by PG&E. On the Arizona side of the Colorado River, sections F and most of G are also part of the USFWS Havasu National Wildlife Refuge, and land in section J and a portion of section G is privately owned.

The most common and widespread plant community in the Project Area is Creosote Bush Scrub. As the name implies, this plant community is dominated by creosote bush (*Larrea tridentata*) and is one of the most extensive plant communities found within the California Deserts (Sawyer et al. 2009). Creosote Bush Scrub is present in all upland areas of the Project Area. In the valleys and dry washes that dissect the upland areas, the most common plant community is the Palo Verde/Ironwood alliance that is dominated by blue palo verde (*Parkinsonia florida*) and

[1] The Burlington Northern Santa Fe railroad and Interstate 40 rights-of-way are within the boundaries of the Project Area; however, they were not included in the Floristic Survey because the project is not anticipated to impact these areas.

various associates including catclaw acacia (*Acacia greggii*) (Sawyer et al. 2009). This alliance takes many forms and in the Project Area it is form that lacks ironwood (*Olneya tesota*). Along the floodplain of the Colorado River, the primary vegetation type is salt cedar (*Tamarix* ssp. semi-natural shrubland) which often forms impenetrable thickets (e.g. under the railroad and Interstate I-40 bridges) of single species, *Tamarix ramosissima*, or mixtures with other species; for example honey mesquite (*Prosopis glandulosa* var. *torreyana*) (Sawyer et al. 2009). Salt cedar often interdigitates with arrow weed (*Pluchea sericea*) thickets and Mesquite Bosque on the flood plain as well. Scattered throughout the project area on the flood plain or in broad washes near the flood plain are smaller patches of shadscale and all scale scrub (*Atriplex* spp.) which grow on alkaline or saline soils (Sawyer et al. 2009). Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming associations in the water such as cattail (*Typha latifolia*) and California bulrush (*Scirpus californicus*) marshes, whereas on the adjacent shores and flood plain common reed (*Phragmites australis*) marshes and occasionally great reed (*Arundo donax*) breaks are present. The common reed is likely a non-indigenous and invasive species (this will be verified during the Floristic survey).

Methodology

Research and Literature Review

Pursuant to Mitigation Measure CUL-1a-5,

> *"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 is to comply with Mitigation Measure CUL-1a-5, obtain a comprehensive inventory of plant species that occur in the Topock Project survey area, and to ensure that sensitive plants (i.e. special-status and ethnobotanically significant plant species as described below) are detected and mapped or recorded. Therefore, prior to conducting the survey, research was conducted to: 1) determine the appropriate times to conduct surveys to maximize the potential for identifying plants that occur in the East Mojave Desert, and 2) identify special-status and ethnobotanically significant plant species with a potential to occur in the survey area.

Research included consideration of rain patterns in the East Mojave Desert, and specifically, timing of a fall survey to ensure fall blooming species are identified. Rainfall in the East 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 (Brooks et al. 2001). Rains in September and October 2011 produced a fall bloom in wash floors, where runoff concentrates, and may have triggered a bloom in upland and floodplain areas. Therefore, an early November survey is currently planned that will allow for identification of plants emerging from late-summer rains. To further refine survey plans, a regional botanical expert and curator of the University of California Riverside, Granite Mountains Research Center, Jim Andre, Ph.D., was contracted to review survey planning to optimize timing, check target plant lists, and join the field survey team for a pre-survey reconnaissance and orientation towards locally occurring sensitive plants. Dr. Andre related that surveys from mid-November to mid-January are typically non-productive. The timing for a spring survey might advance if winter weather is wetter and milder than normal; however, the typically most productive timing for a spring survey is mid- to late- March. A follow-up survey may occur in late spring 2012 in wetlands or other areas as needed. Unusual weather might trigger surveys at other times of the year; for example, in late winter. Accordingly, the survey timing will maximize the number of plants detected and identified.

Sensitive Plants

Sensitive plants are defined as special-status plants and ethnobotanically significant plants. 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 California Native Plant Protection Act (USFWS 1996b, 2006, 2011; CNDDB 2011a)
- Special Plant as defined by the California Natural Diversity Database (CNDDB 2011b)
- 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 (CNPS 2011)
- Listed by the BLM as a Special Status Plant (BLM 2011)
- Listed by the Arizona Rare Plant Committee (2001)
- Listed under the California Desert Native Plants Act (CDNPA)

A preliminary list of potentially occurring special-status plants (target list) was derived from several sources. Quadrangle-based searches of the CNPS Inventory and the CNDDB RareFind3 database (2011a) were conducted to identify potentially occurring special-status plants. The 7.5-minute United States Geological Survey (USGS) quadrangles containing the Project Area (i.e. Whale Mountain and Topock Quadrangles) and 11 surrounding USGS 7.5-minute quadrangles (i.e. 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 the CNPS and CNDDB RareFine3 database searches. The CNDDB Quickviewer online database (CNDDB 2011c) was searched to identify potentially occurring plant species (CRPR 3 or 4) that are not recorded on a quadrangle basis in other databases. Since part of the project area occurs in Arizona and special-status plants in that state are not available in a database that can be queried by USGS quadrangle, each rare plant species listed for Mohave County (Arizona Rare Plant Committee 2001) was individually checked against data in the Southwest Environmental Information Network (SEI Net) to determine the likelihood of any of these plants occurring in the survey area. Special status plants not found in any of the aforementioned sources; however, known to have the potential to occur in the Project Area based on a list produced by Dr. Andre, were also included in the target list.

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 or vicinity, and if its known or expected habitat was found within or adjacent to the Project Area during the August 2011 botanical survey.

Based on the pre-survey research and literature review, 50 special-status plants have the potential to our in the Project Area. Thirty-four CRPR (CNPS) plants occur or were determined to have the potential to occur in the survey area, and 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 Table 1. Also included in this table are 20 special-status plants that are protected under the CNDPA.

Table 1. Target list of special-status plant species with the potential to occur in the Project Area

Common Name	Scientific Name	Status[1] Fed/State/CRPR/ CDNPA	Flowering Period	Habitat	Potential to Occur[2]
TREES					
Blue palo verde	*Parkinsonia florida*	--/--/--/CDNPA	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	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	*Acacia greggii*	--/--/--/CDNPA	Apr–Jun	Creosote Bush Scrub; Pinyon-Juniper Woodland, uncommon on dry slopes, chapparal, washes, flats, disturbed areas.	**Present.** This shrub to small tree is common in the Project Area, particularly in the upland washes
Desert ironwood	*Olneya tesota*	--/--/--/CDNPA	Apr–May	Creosote Bush Scrub; desert washes.	**Unlikely.** Suitable habitat for this tree occurs in the Project Area; however, it was not detected during the Mature Plants Survey in August 2011 and therefore is not anticipated to occur in the Project Area.
Desert smoke tree	*Psorothamnus spinosus*	--/--/--/CDNPA	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 not common overall.
Honey mesquite	*Prosopis glandulosa* var. *torreyana*	--/--/--/CDNPA	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 the Project Area especially on the flood plain and nearby areas.

Little-leaved palo verde	*Parkinsonia microphylla*	--/--/4.3/CDNPA	Apr–May	Creosote Bush Scrub; rocky or gravelly areas	**Unlikely**. This woody shrub or small tree is not known from the project area, but suitable habitat occurs there. It is known from 25 miles SW of the project area in the Whipple Mts. near Copper Basin and Lake Havasu; however, it was not detected during the Mature Plants Survey in August 2011 and therefore is not anticipated to occur in the Project Area.
Screwbean mesquite	*Prosopis pubescens*	--/--/--/CDNPA	Apr–Sep	Creosote Bush Scrub; creek, river bottoms, sandy or gravelly washes, ravines.	**Present.** This medium to large tree is common under the highway and RR bridges that cross the Colorado River, and on the Arizona side of the river opposite the Topock Marina.
Velvet mesquite	*Prosopis velutina*	--/--/--/CDNPA	Apr–Jun	Mojavean Desert Scrub; sandy, rocky soils in canyons, washes; only naturalized in CA, not native.	**Unlikely**. A single occurrence of this tree is known from the Topock Marsh; however, it was not detected during the Mature Plants Survey in August 2011 and therefore is not anticipated to occur in the Project Area.
SHRUBS					
Beaver tail	*Opuntia basilaris* ssp. *basilaris*	--/--/--/CDNPA	Mar–Jun.	Mojavean Desert Scrubto Pinyon-Juniper Woodland.	**Present.** This succulent shrub is scattered throughout the upland portion of the Project Area.
Buckhorn cholla	*Cylindropuntia acanthocarpa* var. *coloradensis*	--/--/--/CDNPA	May–Jun	Creosote Bush Scrub and Joshua Tree Woodland; gravelly or rocky places.	**Present.** This succulent shrub is scattered throughout the upland portion of the Project Area.
California Barrel Cactus	*Ferocactus cylindraceus* var. *cylindraceus*	--/--/--/CDNPA	Apr–May	Creosote Bush Scrub and Joshua Tree Woodland; gravelly or rocky places.	**Present.** This succulent shrub is locally scattered in the southern portion of the Project Area near the Colorado River.

Crucifixtion thorn	*Castela emoryi*	--/--/2.3/CDNPA	Apr, Jun–Jul*	Mojavean or Sonoran desert scrub; gravelly soils, sometimes in alkali playas or washes.	**Possible.** Suitable habitat is present, for this shrub; however, there are no occurrence records in the immediate vicinity of the Project Area. It has been collected near Chemehuevi Wash 19 miles southeast of Topock.
Corkseed mammillaria	*Mammillaria tetrancistra*	--/--/--/CDNPA	Apr	Creosote Bush Scrub; sandy hills.	**Present**. This small succulent shrub is uncommon on rocky slopes in upland parts of the Project Area.
Graham's fishhook cactus	*Mammillaria grahamii* var. *grahamii*	--/--/2.2/CDNPA	Apr–Jun	Creosote Bush Scrub; gravelly alluvial fans and rocky slopes.	**Unlikely**. Small succulent shrub with nearest known occurrences in the Whipple Mtns. 25 miles south of the Project Area; however typically occurs above 900 feet elevation.
Hall's tetracoccus	*Tetracoccus hallii*	--/--/4.3/--	Jan–May	Creosote Bush Scrub; rocky slopes and washes.	**Possible**. This woody shrub is not known from the Project Area. The closest known population is 14 miles southwest of Project Area.
Howe's hedgehog cactus	*Echinocereus engelmannii* var. *howei*	--/--/1B.1/CDNPA	May–Jun	Creosote Bush Scrub; hills and flats on well-drained rocky ledges and steep gravelly slopes.	**Unlikely**. Suitable habitat for this stem succulent cactus occurs in the project area; however, there are no occurrence records there. It is known to occur 35 miles northwest of the Project Area on rocky ledges.
Kofa Mountain barberry	*Berberis harrisoniana*	--/--/1B.2/--	Jan–Mar	Mojavean Desert Scrub, usually north-facing talus slopes, sometimes volcanic.	**Possible.** Known to occur near Colorado River in Whipple Mtns.
Mojave yucca	*Yucca schidigera*	--/--/--/CDNPA	Apr–May	Creosote Bush Scrub.	**Possible**. Shrub or tree-like; occurrence known from 10 miles south of Needles.

Narrow-leaved dalea)	*Psorothamnus fremontii* var. *attenuatus*	--/--/2.2/--	Mar–May	Desert Scrub; granitic or volcanic rocky slopes and canyons.	**Possible**. Known only from the Whipple Mtns approx. 30 miles south of project area.
Ocotillo	*Fouquieria splendens*	--/--/--/CDNPA	Mar–Jul	Creosote Bush Scrub; dry, generally rocky soils.	**Present.** This large shrub is known to occur as a few individuals on slopes above the National Trails Hwy
Pencil cholla	*Cylindropuntia ramosissima*	--/--/--/CDNPA	Apr–Aug	Creosote Bush Scrub and other Mojavean Desert Scrub.	**Present.** This small succulent shrub is uncommon on rocky slopes in the Project Area.
Silver cholla	*Cylindropuntia echinocarpa*	--/--/--/CDNPA	May–Jun	Mojavean Desert Scrub.	**Present.** This succulent shrub is common on rocky slopes in upland parts of the Project Area.
Utah cynanchum	*Cynanchum* (syn. *Funastrum) utahense*	--/--/4.2/--	Apr–Jun, Sep	Mojavean desert scrub; dry, sandy or gravelly areas	**Likely**. This perennial shrub is not known from the Project Area; however, suitable habitat is present and it occurs 12 miles northwest of the Project Area.
HERBACEOUS PLANTS					
Abram's spurge	*Chamaesyce abramsiana*	--/--/2.2/--	Aug–Nov	Creosote Bush Scrub; open or vegetated sandy flats.	**Possible**. Annual herb known sporadically from Imperial to eastern Riverside and San Bernardino Counties. Nearest known occurrences are 35 miles west of the Project Area.
Arizona pholistoma	*Pholistoma auritum* var. *arizonicum*	--/--/2.3/--	Feb–Apr	Creosote Bush Scrub; rocky canyons, north-facing slopes.	**Possible**. Annual herb with nearest known occurrence from Dead Mtns. 15 miles northwest of Project Area (Andre # 18324).

Bare-stem larkspur	*Delphinium scaposum*	--/--/2.3/--	Mar–May	Creosote Bush Scrub; rocky granitic slopes and canyons.	**Unlikely**. Project Area is under species elevation range of 886 to 3,641 feet. Nearest occurrence in Whipple Mtns. 30 miles to the south of the Project Area.
Bitter hymenoxys	*Hymenoxys odorata*	--/--/2.2/--	Apr–Jun, Sep–Oct	Seasonally moist silty soils, sandy flats near the Colorado River.	**Possible**. Annual herb rediscovered in 2009 in CA 40 miles south of the Project Area along the flood plain of Colorado River (Andre #10531).
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**. Annual herb that is known from the Colorado River 45 miles south of the Project Area.
Cooper's rush	*Juncus cooperi*	--/--/4.3/--	Apr–May	Alkali Sink Scrub; meadows and seeps; often alkaline or saline.	**Possible**. This perennial herb is not known from the Project Area; however, suitable habitat is present and it is known from the Chemehuevi Mountains10 miles SW of the Project Area.
Cove's cassia	*Senna covesii*	--/--/2.2/--	Mar–Jun, Sep	Creosote Bush Scrub; washes, alluvial slopes, and sandy disturbed areas.	**Possible**. Perennial herb with nearest occurrences from the Whipple Mtns. to the south of the Project Area, and recently discovered in the Piute Range to the NW (Andre #12410).
Darlington's blazing star	*Mentzelia puberula*	--/--/2.2/--	April–May, Sept–Oct	Rocky slopes and canyons; sandy washes.	**Possible**. Perennial herb with nearest known occurrences 10 miles SE of the Project Area in the Needles area, AZ.
Desert germander	*Teucrium glandulosum*	--/--/2.3/--	Mar–May	Desert Scrub; dry rocky slopes.	**Possible**. Stoloniferous herb with closest occurrences from Whipple Mtns. to the south of the Project Area.

Desert portulaca	*Portulaca halimoides*	--/--/4.2/--	Aug–Oct	Desert Scrub; sandy washes, alluvial fans and flats. Emerges after summer rains.	**Possible.** Annual herb that is known from Little San Bernardino Mtns. to eastern San Bernardino County Mtns. Occurs in Piute Valley.
Desert unicorn-plant	*Proboscidea althaeifolia*	--/--/4.3/--	May–Oct	Creosote Bush Scrub; sandy soil.	**Possible**. The closest known site for this annual species is Chemehuevi Wash 19 miles southeast of the Project Area.
Glandular ditaxis	*Ditaxis claryana*	--/--/2.2/--	Oct–Mar	Mojavean and Sonoran Desert Scrub; dry washes and on rocky hillsides, sandy soils.	**Likely.** This annual herb has been collected in the vicinity of the Topock Compressor Station near the Colorado River.
Harwood's woolystar	*Eriastrum harwoodii*	--/--/1B.2/--	Apr–May	Know only from sandy areas (dunes and wind-blown ramps) of the Eastern San Bernardino and Riverside Counties.	**Possible**. Perennial herb with nearest known occurrence 40 miles southwest of the Project Area.
Lobed ground-cherry	*Physalis lobata*	--/--/2.3/--	Apr–Jun	Mojavean Desert Scrub; seasonally moist depressions, dry lake margins, and washes, and is active following summer rains.	**Possible.** Perennial herb known to occur along the Colorado River near Las Vegas, occurs in Piute Valley 13 miles from Needles.
Playa milkvetch	*Astragalus allochrous* var. *playanus*	--/--/2.2/--	March–May	Creosote Bush Scrub; sandy saline flats.	**Possible.** Known in CA only from Goffs area, 30 miles west of the Project Area. Occurs around playas near Buckeye, Arizona.
Pointed dodder	*Cuscuta californica* var. *apiculata*	--/--/3/--	Feb–Aug	Mojavean Desert Scrub; sandy soils.	**Possible.** Suitable habitat is present and it is known to occur near Parker Dam road, 38 miles southwest of Project Area.

Reveal's buckwheat	*Eriogonum contiguum*	--/--/2.3/--	May–Jul, Sept–Oct	Creosote Bush Scrub; sandy, clay or gypsum soils.	**Possible.** Annual herb with nearest known occurrence along Needles Hwy., 12 miles north of Needles (Andre #17823)
Ribbed cryptantha	*Cryptantha costata*	--/--/4.3/--	Feb–May	Mojavean and Sonoran Desert Scrub; sandy soil, dunes.	**Likely**. This small annual herb normally occurs in desert sand dunes. Nearest known occurrence is along the Colorado River just north of Topock. It has also been collected 30 miles northwest of the Project Area.
Sand evening primrose	*Camissonia arenaria*	--/--/2.2/--	Jan–May	Mojavean Desert Scrub; rocky slopes and canyon walls, may also be found in washes.	**Possible**. Annual or perennial herb with nearest known occurrence in the Needles area in Arizona 10 miles southeast of the Project Area.
Slender cottonheads	*Nemacaulis denudata* var. *gracilis*	--/--/2.2/--	Mar–May	Creosote Bush Scrub; sandy soils on stabilized dunes and sand ramps.	**Possible**. Annual herb with nearest known occurrence along the Colorado River in Arizona 15 miles south of Project Area.
Small-flowered androstephium	*Androstephium breviflorum*	--/--/2.2/--	Mar–Apr	Mojavean Desert Scrub; widely scattered in stabilized to semi-stabilized sandy areas in valleys.	**Possible.** Perennial herb (bulb) with nearest occurrence from sandy banks of Colorado River (Arizona) just north of Topock.
Spearleaf	*Matelea parvifolia*	--/--/2.3/--	Mar–May	Mojavean Desert Scrub; dry rocky areas, especially granitic rock.	**Possible.** Perennial herb with scattered populations to the south and west, nearest occurrence 15 miles west of the Project Area in the S. Sacramento Mtns. (Andre #14219).
Spiny-hair blazing star	*Mentzelia tricuspis*	--/--/2.1/--	Apr–Jun, Sept–Oct	Mojavean Desert Scrub; sandy or gravelly slopes and washes.	**Likely**. This annual species is not known from the project area, but suitable habitat is present and it has been recorded from 4 miles southeast of the Project Area.

Three-awned gramma	*Bouteloua trifida*	--/--/2.3/--	Apr–Nov	Creosote Bush Scrub; Rocky slopes, usually on limestone.	**Possible**. Perennial herb with nearest occurrence in Whipple Mtns. 30 miles to the south of the Project Area.
Wand-like fleabane daisy	*Erigeron oxyphyllus*	--/--/2.3/--	Apr–Jun	Desert Scrub, rocky slopes and canyons.	**Possible**. Perennial herb with nearest occurrence in Whipple Mtns. 30 miles to the south of the Project Area.
Winged cryptantha	*Cryptantha holoptera*	--/--/4.3/--	Mar–Apr	Mojavean Desert Scrub; sandy to rocky soils.	**Possible**. Suitable habitat is present and occurs 33 miles southwest of project area.

Sources:
California Native Plant Society 2011; California Natural Diversity Database 2011; Consortium of California Herbaria 2011; Jepson Online Interchange 2011

[1] **Conservation status abbreviations:**

U.S. Fish and Wildlife Service designations:
- FE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
- FT Threatened: Any species likely to become endangered within the foreseeable future.

California Department of Fish and Game designations:
- SE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
- ST Threatened: Any species likely to become endangered within the foreseeable future.
- SR Rare: Any species not currently threatened with extinction; however, in such small numbers that it may become endangered.

Department of Food and Agriculture designations:
- CDNPA Plants that are protected by the California Desert Native Plants At

BLM designations:
The California State Director has also conferred sensitive status on California State Endangered, Threatened, and Rare species, or species on List 1B (plants rare and endangered in California and elsewhere) of the CNPS' Inventory of Rare and Endangered Plants of California

California Rare Plant Ranks (formerly CNPS Lists)
- 1B Plants rare, threatened or endangered in California and elsewhere.
- 2 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 Ranks
- .1 Seriously endangered in California.
- .2 Fairly endangered in California.
- .3 Not very endangered in California.

[2] **Potential to occur definitions:**

- Present: Species observed on the site.
- Likely: Species not observed on the site, however reasonably certain to occur 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.

A separate target list derived from the ethnobotanically significant plants from the Colorado River Culture Ethnobotany document (Appendix PLA in the EIR) is presented in Table 2.

As with special-status plants, if an ethnobotanically significant plant 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 or vicinity, and if its known or expected habitat was found within or adjacent to the Project Area during the August 2011 botanical survey.

Each species in this list was cross checked against special-status plant species listed in the CNPS CRPR Inventory, the CNDDB RareFind3 database, the list of protected desert plants in the CDNPA, the Arizona rare plant field guide (Arizona Rare Plant Committee 2001), the BLM special status plant list (BLM 2011), and the Federal list of endangered plants (USFWS 2011), in order to identify ethnobotanically significant plants that are also special-status species. Additionally, each plant species was searched in the Jepson Online Interchange (2011), the database of the Consortium of California Herbaria (CCH 2011), and in the SEI Net to determine its distribution, habitat, and potential to occur in the Project Area.

Of the 49 ethnobotanically significant plants listed in Appendix PLA, 30 occur or have the potential to occur in the Project Area. Ten are known to occur in the Project Area and the occurrence of an additional seven species is likely or possible. Seven plants (highlighted in bold type-face in Table 2) are special-status species and; therefore, also listed in Table 1 (i.e. they are listed in the CDNPA).

Table 2. Target list of ethnobotanically significant plant species with the potential to occur in the Project Area

Common Name	Scientific Name	Status[1] Fed/State/CRPR/ CDNPA	Flowering Period	Habitat	Potential to Occur[2]
TREES					
Blue palo verde	***Parkinsonia florida***	**--/--/--/CDNPA**	**Apr–May**	**Creosote Bush Scrub; washes and floodplains.**	**Present. This tree is the most abundant tree in the Project Area.**
Desert ironwood	***Olneya tesota***	**--/--/--/CDNPA**	**Apr–May**	**Creosote Bush Scrub; desert washes.**	**Unlikely. Suitable habitat for this tree occurs in the Project Area; however, it was not detected during the Mature Plants Survey in August 2011 and therefore is not anticipated to occur in the Project Area.**
Honey mesquite	***Prosopis glandulosa* var. *torreyana***	**--/--/--/CDNPA**	**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 the Project Area especially on the flood plain and nearby areas.**
Goodding's willow	*Salix gooddingii*	--/--/--/--	Mar–Apr	Desert Scrub; streamsides, marshes, seepage areas, washes, meadows.	**Present.** Uncommon large tree in the Project Area, section B.
Mojave yucca	***Yucca schidigera***	**--/--/--/CDNPA**	**Apr–May**	**Creosote Bush Scrub**	**Possible. Shrub or tree-like, occurrence known from 10 miles south of Needles.**
Screwbean mesquite	***Prosopis pubescens***	**--/--/--/CDNPA**	**Apr–Sep**	**Creosote Bush Scrub; creek, river bottoms, sandy or gravelly washes, ravines.**	**Present. This medium to large tree is common under the highway and RR bridges that cross the Colorado River, and on the Arizona side of the river opposite the Topock Marina.**

Velvet mesquite	***Prosopis velutina***	**--/--/--/CDNPA**	**Apr–Jun**	**Mojavean Desert Scrub; sandy, rocky soils in canyons, washes; only naturalized in CA, not native.**	**Unlikely. A single occurrence of this tree is known from the Topock Marsh; however, it was not detected during the Mature Plants Survey in August 2011 and therefore is not anticipated to occur in the Project Area.**
SHRUBS					
American agave	*Agave americana*	--/--/--/--	Jun–Aug	Original habitat unknown; grows wild in Mexico on cultivated lands and pine woodlands.	**Unlikely**. Leaf succulent shrub, long cultivated by indigenous tribes, commonly occurs on agricultural lands. Not native to California or Arizona.
Cattle saltbush	*Atriplex polycarpa*	--/--/--/--	Jul–Oct	Creosote Bush Scrub, Shadscale Scrub, Sagebrush Scrub, and Alkali Sink Scrub; dry lakes.	**Present**. Locally common in flood plain of Colorado River, sections A and J of the Project Area.
Desert tobacco	*Nicotiana obtusifolia* var. *obtusifolia*	--/--/--/--	Mar–Jun	Creosote Bush Scrub and Joshua Tree Woodland; gravelly or rocky washes, slopes	**Present.** Known to occur in Sections I and L of the Project Area.
Jojoba	*Simmondsia chinensis*	--/--/--/--	Mar–May	Creosote Bush Scrub, Joshua Tree Woodland, Chaparral.	**Unlikely**. Suitable habitat; however, no occurrences within 75 miles of the Project Area.
Iodine bush	*Allenrolfea occidentalis*	--/--/--/--	Jun–Aug	Alkali Sink Scrub; saline soils, flats, bluffs.	**Possible**. Suitable habitat; however, not known from Project Area, known from Earp 40 miles south of Topock.
Mule's fat	*Baccharis salicifolia*	--/--/--/--	All year	Coastal Sage Scrub, Foothill Woodland, Valley Grassland; moist streamsides, canyon bottoms, irrigation ditches.	**Likely.** Occurrence known from Topock Marsh.

Spiny chloracantha	*Chloracantha spinosa*	--/--/--/--	Jun–Dec	Creosote Bush Scrub and Alkali Sink Scrub; seeps, moist streamsides, ditches, sometimes saline or drier areas.	**Possible.** Habitat suitable**,** could occur in Topock marsh
Staghorn (or bukhorn) cholla	***Opuntia echinocarpa* (or *Cylindropuntia acanthocarpa* var. *coloradensi*)**	**--/--/--/CDNPA**	**May–Jun**	**Creosote Bush Scrub; gravelly or rocky places.**	**Present. This succulent shrub is scattered throughout the upland portion of the Project Area.**
HERBACEOUS PLANTS					
Awned cupgrass	*Eriochloa aristata*	--/--/--/--	Jun–Nov	Wetlands; seasonal streams, riverbanks.	**Unlikely**. Annual grass, suitable habitat; however, no known occurrence within 100 miles of the Project Area.
Broadleaf arrowhead	*Sagittaria latifolia*	--/--/--/--	Jul–Aug	Freshwater Wetlands; ponds, slow streams, ditches.	**Unlikely.** Perennial herb; however, no occurrences known for Western Riverside or San Bernardino Counties.
Broadleaf cattail	*Typha latifolia*	--/--/--/--	Jun–Jul	Freshwater Wetlands and Marshes.	**Present.** Perennial herb, known to occur in sections A, C, E, and I of the Project Area.
Careless weed	*Amaranthus palmeri*	--/--/--/--	Aug–Nov	Creosote Bush Scrub; roadside ditches, fields, arroyos.	**Unlikely.** Short-lived perennial; however, no known occurrences within 90 miles of the Project Area.
Chia	*Salvia columbariae*	--/--/--/--	Mar–Jun	Creosote Bush Scrub Chaparral, Coastal Sage Scrub; dry, disturbed sites.	**Present.** Annual herb that is common in the Project Area in washes and lower slopes; for example, Bat Cave Wash.
Common sunflower	*Helianthus annuus*	--/--/--/--	Jul–Oct	Disturbed areas in Shrublands and many habitats.	**Possible**. Annual herb, known occurrences from Parker Dam Road 18 miles south of the Project Area.

Datura (or Jimson) weed	*Datura wrightii*	--/--/--/--	Apr–Oct	Creosote Bush Scrub, Coastal Sage Scrub, Valley Grassland, Joshua Tree Woodland, Pinyon-Juniper Woodland; sandy or gravelly open areas.	**Likely.** Annual weed, suitable habitat present, known occurrence 13.3 miles northwest of Needles.
Desert lily	*Hesperocallis undulata*	--/--/--/--	Mar–May	Desert Shrublands; sandy flats and washes.	**Present.** Bulbous perennial, known to occur in sandy areas in the Project Area.
Field pumpkin	*Cucurbita pepo*	--/--/--/--	June–Aug	Cultivated lands.	**Unlikely**. Annual herb, known only from cultivated lands; however, no known occurrences in the Project Area.
Fragrant flatsedge	*Cyperus odoratus*	--/--/--/--	Jul–Oct	Wetlands; disturbed soils.	**Possible**. Annual sedge, occurrence known from Needles.
Indian woodoats	*Chasmanthium latifolium*	--/--/--/--	Jun–Aug	Woodlands; moist, fertile soils along creek and river banks.	**Unlikely**. Perennial grass, no known occurrences in California or Mojave County, Arizona.
Mexican lovegrass	*Eragrostis mexicana* ssp. *mexicana*	--/--/--/--	Jul–Oct	Disturbed Areas; generally open sites.	**Unlikely**. Annual grass, suitable habitat present; however, no known occurrences from near Topock.
Mexican panicgrass	*Panicum hirticaule*	--/--/--/--	Jul–Oct	Creosote Bush Scrub; sandy soils, open sites.	**Unlikely**. Annual grass, suitable habitat present; however, no known occurrences near Topock.
Purple ammannia	*Ammannia coccinea*	--/--/--/--	Jun–Aug	Many plant communities; wet places, drying ponds, lake and creek margins.	**Unlikely**. Annual weed; however, no occurrences known within 100 miles of the Project Area.
Sauwi	*Panicum sonorum* (syn. *hirticaule*) ssp. *hirticaule*	--/--/--/--	Jun–Aug	Domesticated, river flood plains.	**Unlikely**. Annual grass, cultivar of *P. hirticaule*; however, no known occurrences near the Project Area.

[1, 2] **See below Table 1 for Sources, Conservation status abbreviations, and Occurrence potential definitions.**

Field Surveys

Transect-based protocol-level Floristic surveys that conform to the guidelines of the California Department of Fish and Game (CDFG 2009), the USFWS (2000), and the CNPS (2001) will commence in November 2011 and continue at the end of March or beginning of April 2012. Other seasonal surveys may occur depending on weather patterns. Note that the November 2011 will be conducted because late-summer rainfall was sufficient to trigger germination and flowering of late-blooming species (J. Andre, personal communication). This late-season 2011 survey will be targeted to areas that exhibit germination and flowering. The appropriate survey areas will be decided, in consultation with Dr. Andre, after an initial reconnaissance at the beginning of the late-season survey. The goal of the floristic surveys is to generate a comprehensive and complete list of all plant species that occur in the survey area and to census, map, photograph, and record habitat data for special-status species listed in Table 1 and ethnobotanically significant species listed in Table 2. Some of these plants are widespread across the Project Area, and in these cases specific location information may not be collected for each plant. It is possible that a special-status plant not known to occur in the Project area or vicinity; and therefore not on the target list, is detected during the Floristic survey, especially given the relatively few survey records in the Needles and Topock area. The surveys will be floristic and comprehensive in nature, meaning that all plants found in identifiable condition will be identified, with the aid of a field guide with plant identification key, to the level necessary to determine their sensitivity (i.e. special-status or ethnobotanically significant).[2]

Trimble GeoXT or GeoXH global positioning systems (GPS) with sub-meter accuracy will be used to collect data on sensitive plant species. The GPS units will be equipped with data files for navigation and with data dictionaries for data collection. Transect lines, spaced at 50 feet, will be programmed into the GPS units and walked by surveyors. Surveyors will walk meandering routes along each transect to ensure coverage of the entire Project Area, unless vegetation density precludes surveyors from accessing certain areas (i.e. dense tamarisk/mesquite forest patches in the flood plain or saturated wetlands). To ensure that inaccessible areas are surveyed to the extent feasible, surveyors will identify species by making observations from the vegetation patch margins or vantage points, and through the use of the high resolution aerial photographs. In such areas, it is unlikely that understory vegetation would be present due to lack of sunlight and high soil salinity. Data dictionaries will be used to record locality information, the actual or estimated number of individuals observed, and habitat information. Point data collected in the field will be later digitized using Geographic Information System software to create map polygons that depict the total extent of each sensitive plant occurrence, where practicable.

A list of all plant species observed will be compiled for the Project Area during the surveys (see preliminary list in Appendix A). Nomenclature for scientific names will follow *The Jepson Online Interchange* (http://ucjeps.berkeley.edu/interchange.html) or Hickman (1993), except where noted. Representative habitat photographs will be taken as will photos of the sensitive plant species observed in the Project Area.

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[2] The primary field guide will be the Jepson Manual: Higher Plants of California (Hickman 1993)

The ability of surveyors to detect and identify plants efficiently and accurately in the field will be enhanced by a field review of the common plant species at the Project Area prior to beginning the surveys. Surveyors will also be provided with a photo guide of several targeted sensitive plants that are less familiar to the Senior Botanist (examples are in Appendix B) and preliminary species lists compiled prior to the Floristic surveys. These materials will supplement the field guide with plant identification key, which will be the primary resource used to identify plants. The services of Dr. Andre, expert on the East Mojave/Sonoran Desert flora, will be consulted regarding the target plant list, timing, and level of intensity of the seasonal (e.g. fall and spring) surveys and overall survey methodology.

Reference Site Visits

Before the Floristic surveys begin, searches of nearby reference populations will be made for spiny-hair blazing star (*Mentzelia tricuspis*), glandular ditaxis, Crucifixion thorn (*Castela emoryi*), Utah cynanchum *(Cynanchum utahense)*, Cooper's rush (*Juncus cooperi*), and Hall's tetracoccus (*Tetracoccus hallii*) based on locality data in the database of the Consortium of California Herbaria (CCH). These represent the special-status species that are closest to the Project Area and are most likely to occur there.

Deliverables

The primary deliverables resulting from the Floristic survey will be a detailed map that depicts the location and distribution of sensitive plants that occur within the Project Area (point or polygon data may not be included if species is widespread) and a master plant list that includes all plant species that occur in the Project Area. Sensitive plant location information data will also be presented in a tabular/list form that will enable any user to find the locations of sensitive plants that occur in the Project Area. A report summarizing the survey effort, including the methodology described herein, will also be prepared. The target completion date of these deliverables is June 1, 2012.

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LEGEND

Survey Segments

N

0 500 1,000 2,000 Feet

FIGURE 1
EIR PROJECT AREA WITH VEGETATION SURVEY SEGMENTS

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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

Appendix A
Vascular Plant Species Observed

GYMNOSPERMS			**Survey Segment Location**
	EPHEDRACEAE	**ephedra family**	
	Ephedra sp.	joint fir	I
DICOTS			
	AIZOACEAE	**ice plant family**	
	Trianthema portulacastrum	horse-purslane	G
	AMARANTHACEAE	**amaranth family**	
	Tidestromia oblongifolia	honeysweet	A, G, K
	APIACEAE	**carrot family**	
	Hydrocotyle verticillata	marsh pennywort	A
	ASCLEPIADACEAE	**milkweed family**	
	Asclepias subulata	rush milkweed	H, C
	Sarcostemma cynanchoides ssp. *hartwegii*	climbing milkweed	A, C, D
	ASTERACEAE	**sunflower family**	
	Ambrosia dumosa	bursage	A, B, C, E
	Baccharis sarathroides	broom bacharis	B, E
	Bebbia juncea	sweetbush	D, H
	Encelia farinosa	brittlebush	B, C, E
	Hymenoclea salsola	cheesebush	B, I
	Palafoxia arida	Spanish needle	B, E, F
	Pectis papposa var. *papposa*	chinch-weed	G
	Peucephyllum schottii	pygmy-cedar	H, I
	Pluchea odorata	marsh fleabane	B
	Pluchea sericea	arrow weed	A, B, E, F, J, I
	Pulicaria paludosa	Spanish false-fleabane	B
	Sonchus asper	prickly sow-thistle	I
	Stephanomeria pauciflora	skeletonweed	I
	BORAGINACEAE	**borage family**	
	Amsinckia tessellata	devil's lettuce	C, D
	Tiquilia plicata	fanleaf crinklemat	B, E, F, B, J

		Survey Segment Location
BRASSICACEAE	**mustard family**	
Brassica tournefortii	African mustard	C, D
Guillenia lasiophylla	California mustard	
Lepidium lasiocarpum	pepperweed	C
CACTACEAE	**cactus family**	
Cylindropuntia acanthocarpa	buckhorn cholla	I
Cylindropuntia echinocarpa	silver cholla	A, C, D, H
Cylindropuntia ramosissima	pencil cholla	D
Ferocactus cylindraceus var cylindraceus	California barrel cactus	I
Opuntia basilaris var basilaris	beavertail	C, D, H
Mammillaria tetrancistra	foxtail cactus	C, D
CHENOPODIACEAE	**goosefoot family**	
Atriplex confertifolia	shadscale	A, J
Atriplex fruticulosa	ball saltbush	A
Atriplex polycarpa	cattle saltbush	A, B, C, J, G
Salsola tragus	Russian thistle	B, E, F
Suaeda moquinii	bush seepweed	A
CUCURBITACEAE	**gourd family**	
Cucurbita palmata	coyote gourd	G
EUPHORBIACEAE	**spurge family**	
Chamaesyce micromera	desert spurge	H, D, C, E, B, A
FABACEAE	**legume family**	
Acacia greggii	catclaw acacia	A, C, C, H, I
Parkinsonia florida	blue palo verde	A, C, D, E, G, H, I, J
Prosopis glandulosa var. *torreyana*	honey mesquite	A, E
Prosopis pubescens	screwbean mesquite	E, F
Psorothamnus spinosus	smoketree	A, D
FOUQUIERIACEAE	**ocotillo family**	
Fouquieria splendens ssp splendens	ocotillo	E
GENTIANACEAE		
Eustoma exaltatum	catchfly gentian	B
GERANIACEAE	**geranium family**	
Erodium cicutarium	redstem filaree	C, D, I

		Survey Segment Location
KRAMERIACEAE	**rhatany family**	
Krameria grayi	white ratany	I, H
LAMIACEAE	**mint family**	
Hyptis emoryi	desert-lavender	A, H
Salvia columbariae	chia	H
MALVACEAE	**mallow family**	
Sphaeralcea ambigua var. *ambigua*	apricot mallow	L
Myrtaceae	**myrtle family**	
Eucalyptus sp.	eucalyptus	A, B
NYCTAGINACEAE	**four-o-clock family**	
Boerhavia coccinea	spiderling	B
PLANTAGINACEAE	**plantain family**	
Plantago ovata	desert indianwheat	C, D, H, I
POLYGONACEAE	**buckwheat family**	
Chorizanthe rigida	spiney rigid herb	K, H
Eriogonum deflexum var deflexum	flatcrown buckwheat	H
Eriogonum inflatum var inflatum	desert trumpet	H
Eriogonum palmerianum	Palmer's buckwheat	H
Eriogonum trichopes	little desert buckwheat	H
SALICACEAE	**willow family**	
Salix exigua	sand-bar willow	E
Salix goodingii	Goodding's willow	B
Populus fremontii	Fremont cottonwood	B
SOLANACEAE	**nightshade family**	
Nicotiana obtusifolia	desert tobacco	I
Nicotiana quadrivalvis	indian tobacco	I
Physalis crassifolia	thick-leaf ground cherry	L
TAMARICACEAE	**tamarisk family**	
Tamarix ramosissima	salt cedar	A, B, C, C, E, F, G, I, J
Tamarix aphylla	athel	B, G,
VISCACEAE	**mistletoe family**	
Phoradendron californicum	desert mistletoe	A, B, E

			Survey Segment Location
	ZYGOPHYLLACEAE	**caltrop family**	
	Larrea tridentata	creosote bush	A-- L
	Kallstroemia californica	California kallstroemia	G
MONOCOTS			
	ARECACEAE	**palm family**	
	Washingtonia filifera	California fan palm	B
	CYPERACEAE	**sedge family**	
	Eleocharis thermalis	beakrush	A, B, E
	Schoenoplectus californicus	common reed	A, I
	JUNCACEAE	**rush family**	
	Juncus xiphioides	iris-leaved rush	A
	POACEAE	**grass family**	
	Arundo donax	giant reed	A, E, I, J
	Bromus madritensis ssp rubens	red brome	C, D
	Cynodon dactylon	Bermuda grass	G
	Distichlis spicata	saltgrass	E
	Paspalum dilatatum	dallis grass	E, B
	Pennisetum villosum	feathertop	A, I
	Phragmites australis	common reed	A, I
	Schismus arabicus	Arabian schismus	C, D
	Setaria gracilis	knotroot bristlegrass	B
	Triticum aestivum	wheat	G
	Vulpia myuros	foxtail fescue	C, D
	Vulpia octoflora	six weeks fescue	C, D
	TYPHACEAE	**cattail family**	
	Typha latifolia	broad-leaved cattail	A, G, I, J

Appendix B
CNPS List 2 species likely to occur at Topock

Mentzelia tricuspis CNPS 2B.1


Ditaxis claryana CNPS 2B.2

Castela emoryi CNPS 2.3

Topock Project Executive Abstract

Document Title: Mature Plants Survey Report Submitting Agency: DTSC, RWQCB Final Document? ☒ Yes ☐ No	Date of Document: January 17, 2012 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 ☐ 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 complies with the EIR mitigation measures AES-1a and AES-2b. 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 cleanup. Mitigation measures for aesthetics included AES-1a and AES-2b requiring a survey of mature vegetation for use in remedy design planning to be protective of views from Key Views 5 and 11, looking east and west over the Colorado River Floodplain area, respectively. At the kickoff for the August 2011 survey, Tribes requested and PG&E agreed to survey Mature Plants across the entire EIR Project Area. The Mature Plants Survey was performed in August 2011 with a field check in November 2011. This report presents the results of the survey and detailed maps of Mature Plant occurrence, as well as other background information such as the definition established for Mature Plants, a list of Mature Plant species mapped in the EIR Project Area, and appendices of photographs and GPS data. A noteworthy finding from the Mature Plant survey is the discovery of the hillside palo verde *(Parkinsonia mycrophylla)* in the EIR Project Area. This is the first reported occurrence of this species in the Chemehuevi Mountains of California, and 5 miles north of the northernmost reported Arizona occurrence. The data presented with this report will be considered in the remedy design.

.

Written by: PG&E

Recommendations:
This report is for your information only.

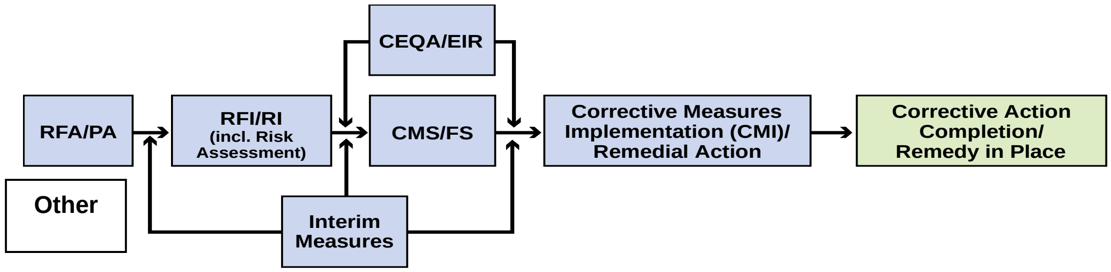
How is this information related to the Final Remedy or Regulatory Requirements:
This report presents data collected for use with the remedy design. The Mature Plants Survey complied with EIR mitigation measures AES-1a and AES-2b.
.

Other requirements of this information?

None.

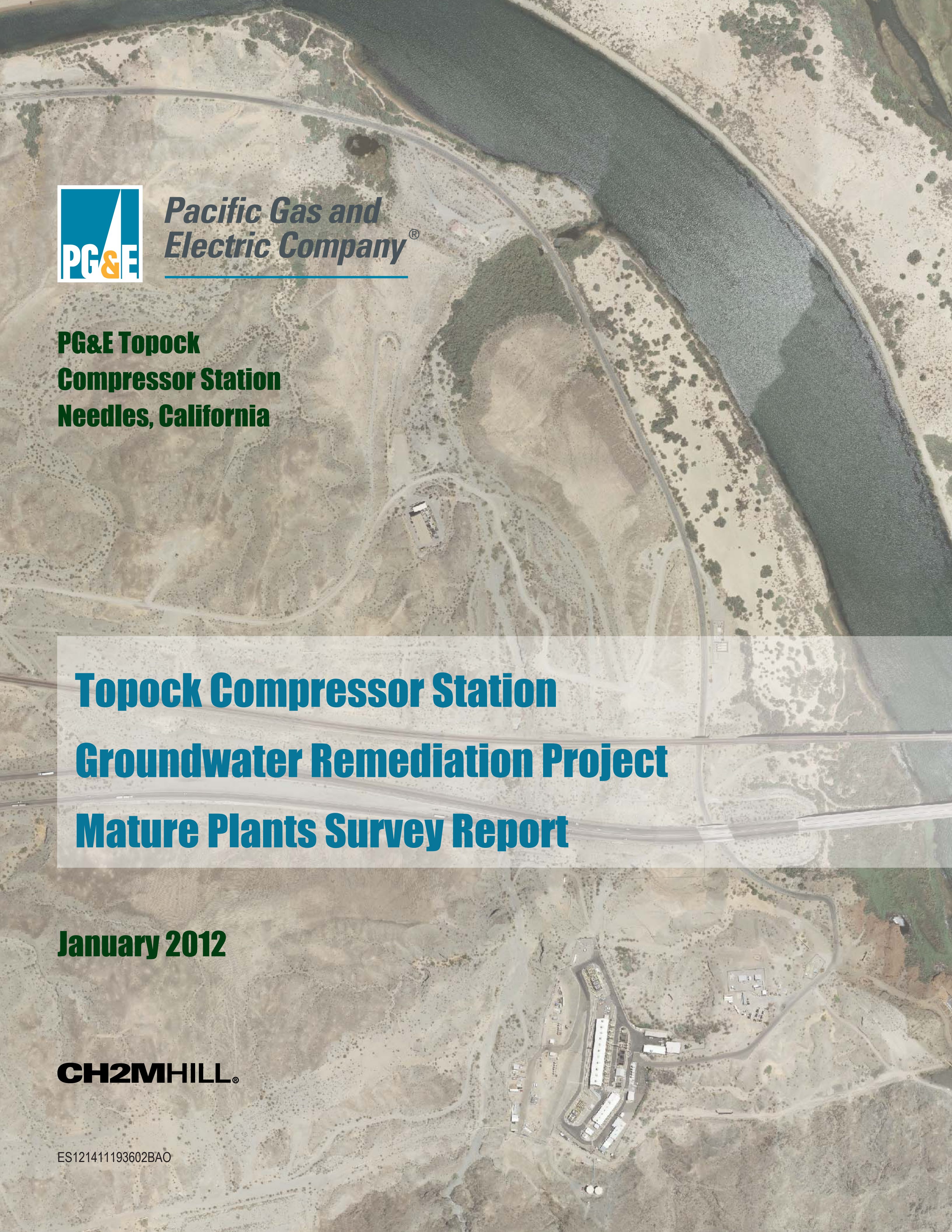
Related Reports and Documents:

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).



Version 9

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



Pacific Gas and Electric Company®

PG&E Topock Compressor Station Needles, California

Topock Compressor Station Groundwater Remediation Project Mature Plants Survey Report

January 2012

CH2MHILL

ES121411193602BAO

Topock Compressor Station Groundwater Remediation Project
Mature Plants Survey Report

Prepared for: Pacific Gas and Electric Company

Prepared by:
Garcia and Associates (GANDA)
and
CH2M HILL, INC.

January 2012

Table of Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

AES	Aesthetics
BLM	Bureau of Land Management
CAL-IPC	California Invasive Plant Council
CDNPA	California Desert Native Plants Act
EIR	Environmental Impact Report
GANDA	Garcia and Associates
GPS	Global Positioning System
PBA	Programmatic Biological Assessment
PG&E	Pacific Gas and Electric Company
Project	Topock Compressor Station Groundwater Remediation Project
USFWS	U.S. Fish and Wildlife Service

Introduction

The purpose of this report is to present the results from a survey of the Mature Plants that occur in the Project Area of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Groundwater Remediation Project (project). The Project Area is defined in the EIR, and includes potential locations for groundwater remediation infrastructure such as wells, pipelines, treatment systems and control buildings. A Mature Plants survey was conducted to comply with the January 2011 Final Environmental Impact Report (EIR) requirements as set forth in Mitigation Measures AES-1a and AES-2b. These Mitigation Measures are from the Aesthetics (AES) portion of the mitigation plan presented in the EIR and are intended to ensure the protection of views from specific vantage points, as discussed in greater detail below.

At the plant survey orientation meeting on August 18, 2011, the methodology for the Mature Plants survey described in this report was presented by PG&E and CH2M HILL to stakeholder representatives from the Colorado River Indian Tribes, Fort Mojave Indian Tribe, and Hualapai Tribe. During the orientation meeting, tribal representatives requested that the entire Project Area, as defined by the EIR, be the subject of the Mature Plants survey, instead of only the eastern portion of the site on and near the Colorado River Floodplain as is identified in the EIR Mitigation Measures AES-1a and AES-2b. The stated purpose of this request was to ensure the protection of other vantage points of cultural significance that may be present within the Project Area. The tribal representatives also requested a written copy of the survey methodology, and a technical memorandum describing the survey methodology was prepared to meet this request and to become a part of this report, which documents the survey effort. The technical memorandum was distributed to the Tribes via email on November 8, 2011 and included as an appendix with the Draft Basis of Design Report/Preliminary (30 percent) Design for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California (PG&E 2011).

At the request of PG&E, Garcia and Associates (GANDA) Senior Botanist Kim Steiner and CH2M HILL Biologist Morgan King conducted botanical field surveys on August 18-26, 2011 in the Project Area. The surveys included data collection in preparation for the following four deliverables:

1. A "Mature Plants" map and associated species list for the Project Area. Mature Plants were defined as living trees, large or prominent shrubs, and tall predominantly herbaceous plants. A more detailed description of Mature Plants is included in the Methodology section below.

2. An updated Vegetation Communities Map. A 2007 Programmatic Biological Assessment (PBA) for the project included a Vegetation Communities Map for the Area of Potential Effect, prepared from 2004-2005 field mapping. The Project Area largely, though not completely, overlaps with the Area of Potential Effect previously mapped under the PBA. To facilitate survey logistics and track daily survey progress, the Project Area was divided into eleven segments, which are labeled A through L (Figure 1). Note that section K is not included because it is outside of the Project Area. The updated Vegetation Communities Map was presented with the aforementioned Draft Basis of Design Report.

3. An "Ethnobotanically Significant Plants" map and associated species list for the Project Area. Ethnobotanically significant plants are identified in the EIR Appendix PLA: Ethnobotany Plant List. The botanical survey was also conducted to facilitate compliance with the EIR requirements described in Mitigation Measure CUL-1a-5,

which requires the protection of culturally significant plants. Future floristic surveys, for purposes other than Mature Plant mapping (as described in item 4 below), will collect additional data about ethnobotanically significant plants in the Project Area to complete this map and species list in 2012.

4. A preliminary species checklist in support of future comprehensive floristic surveys. This checklist was developed using the August 2011 botanical field survey as an opportunity to perform reconnaissance for fall 2011 and spring 2012 Floristic and Rare Plant surveys. The checklist served as the starting point for these surveys and will be updated and augmented with each subsequent survey. The checklist and botanical surveying and mapping efforts will ultimately result in a master plant list that can be sorted into subset lists including rare species or culturally significant species. This master plant list will be an important tool that will support plant protection during construction and design planning for the project.

Survey Area Description

The Survey Area encompasses the Project Area and totals approximately 780 acres. It varies in elevation from approximately 450 to 700 feet above sea level. The survey team divided the Project Area into eleven sections (A—L) as described above (Figure 1). Eight of the sections (A, B, C, D, E, H, I, and L) are located in San Bernardino County, California. The remaining three sections (F, J, and G) are located in Mohave County, Arizona. Sections of the Survey Area within California are primarily on land managed by the Bureau of Land Management (BLM) or U.S. Fish and Wildlife Service (USFWS); with the exception of a portion of sections C and D, which is owned by the Fort Mojave Indian Tribe; and a portion of section H, which is owned by PG&E. On the Arizona side of the Colorado River, sections F and most of G are also part of the USFWS Havasu National Wildlife Refuge, and land in section J and a portion of section G is privately owned. The Burlington Northern Santa Fe railroad property and Interstate 40 highway (Caltrans) right-of-way are within the Project Area.

The most common and widespread plant community in the Survey Area is Creosote Bush Scrub. This plant community is dominated by creosote bush (*Larrea tridentata*) and is one of the most extensive plant communities found within the California Deserts (Sawyer et al. 2009). Creosote Bush Scrub is present in all upland areas of the Survey Area. In the valleys and dry washes that dissect the upland areas, the most common plant community is the Palo Verde/Ironwood Woodland Alliance that is dominated by blue palo verde (*Parkinsonia florida*) and various associates including catclaw acacia (*Senegalia greggii*) (Sawyer et al. 2009). This alliance takes many forms, and in the Survey Area the alliance lacks ironwood (*Olneya tesota*).

Along the floodplain of the Colorado River, the primary vegetation type is *Tamarix* spp. Semi-natural Shrubland Stands which often forms impenetrable thickets (e.g., under the railroad and Interstate I-40 bridges) of salt cedar (*Tamarix ramosissima*) alone, or in mixtures with other species, for example honey mesquite (*Prosopis glandulosa* var. *torreyana*) (Sawyer et al. 2009). Salt cedar often interdigitates with arrow weed (*Pluchea sericea*) thickets and Mesquite Bosque on the floodplain as well. Scattered throughout the Survey Area on the floodplain or in broad washes near the floodplain are smaller patches of big saltbush and all scale scrub (*Atriplex* spp.) which grow on alkaline or saline soils (Sawyer et al. 2009). Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming associations in the water such as cattail (*Typha latifolia*) and California bulrush (*Schoenoplectus californicus*) marshes, whereas on the adjacent shores and floodplain common reed (*Phragmites australis*) marshes and occasionally great reed (*Arundo donax*) breaks are present.

Methodology

Field Survey Preparation

Pursuant to Mitigation Measure AES-1a and AES-2b,

> *"The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation."*

In order to identify potential Mature Plants that occur in the Project Area, Senior Botanist Steiner, Biologist King, and PG&E Biologist Melanie Day reviewed the following existing documentation of vegetation types that occur in the Project Area: the EIR, previous biological surveys in preparation for the PBA, incidental species lists from Protocol Desert Tortoise and Southwest Willow Flycatcher surveys, and the PBA Vegetation Communities Map. In addition, a brief pre-survey reconnaissance of the Project Area was conducted by Senior Botanist Steiner and Biologists King and Day on August 18, 2011. For this survey and report, a Mature Plant was defined as a living

- mature tree,
- large or prominent shrub, or
- tall predominately herbaceous plant

that could add to the aesthetic value of the Project Area from Key Views 5 and 11, and other potential culturally significant views in the Project Area. Trees, shrubs, and herbaceous plants that would not currently add to the aesthetic value of the Project Area due to small stature were not considered to be Mature Plants (e.g., seedlings, immature plants). For example, only portions of some areas with an extensive occurrence of a single species, such as arrow weed or creosote bush, were mapped as Mature Plants, based on height and density of vegetation. This specific definition of Mature Plant was applied to vegetation conditions present at the time of the 2011 surveys. Other important groupings of plants, such as special status or culturally significant plants, will be addressed separately during ongoing floristic surveys of the Project Area. An associated report will be prepared to document the floristic survey effort and results. .

According to the EIR, a "Key View" is a vantage point offering a view of some or all of the Project Area from one of eleven specified points. Each Key View vantage point is located and described in Section 4, volume II, of the EIR. Two of the Key Views specified in the EIR (Key Views 5 and 11) are incorporated in the Aesthetics Mitigation Measures related to Mature Plant protection. Based on interpreting the PBA Plant Communities Map, Key Views 5 and 11 are described as follows: The "view corridor" from Key View 11 looking west from boats on the Colorado River consists of several overlapping areas of plant growth including: wetlands along the river, riparian vegetation on the banks and floodplain, and upland shrubs and trees on the slopes up to the next plateau and beyond (i.e., the edge of National Trails Highway and farther west). Key View 5 looks in the opposite direction (i.e., eastward) from a higher vantage point at the eastern edge of Maze Locus B outwards over the vegetated floodplain of the Colorado River.

Also included as Mature Plants were those used for landscaping around Moabi Regional Park and the Topock Compressor Station; for example: eucalyptus (*Eucalyptus* sp.), Mexican fan palm

(*Washingtonia robusta*), athel tamarisk (*Tamarix aphylla*), Fremont's cottonwood (*Populus fremontii*), and oleander (*Nerium oleander*.).

Prior to the field survey, Twenty-one species were considered appropriate to categorize and map as Mature Plants (Table 1). More than half of these (N=13) are trees, with the remainder split between shrubs (N= 5) and herbaceous perennials (N= 4; Table 1). An additional species, hillside palo verde (*Parkinsonia microphylla*), was added to the list and mapped during the fall 2011 floristic survey after it became identifiable.

High-resolution aerial photographs of the Project Area taken in 2011 were prepared as base maps for Global Positioning System (GPS) and field notation to be used during the surveys. Although the aerial photographs are of sufficient quality and resolution that some Mature Plants can be identified, it is not feasible to identify all Mature Plants through the use of the photographs alone. The aerial photographs have been incorporated into project Geographic Information System data files and may also be used as a base map for the deliverables described in the *Introduction*.

Field Survey

The field survey was conducted on August 18-26, 2011 in clear, calm, and hot summer weather. The list of Mature Plants described in Table 1, aerial photographs, and the Vegetation Communities Map were used as reference documents. Though surveyors were prepared to identify and record all observed species that met the criteria of a Mature Plant, and not just those listed is Table 1, no other species that met these criteria were observed. The field mapping was conducted using a combination of GPS data collection and surveyor notations recorded on the aforementioned aerial photographs.

The protocol for the survey was developed expressly for Mitigation Measures AES-1a and AES-2b and designed to ensure that all Mature Plants were identified and recorded. The protocol was a mix of focused and transect-based surveys for Mature Plants based on terrain and the inherent visibility of Mature Plants. Surveyors were able to walk or scan the entire Survey Area at a distance that guaranteed complete coverage for Mature Plants; therefore, surveyors were able to identify all of the Mature Plants in the Survey Area. However, because trees and shrubs of interest were not distributed evenly across the Survey Area, survey efforts were concentrated in dry riverbeds and washes in the upland areas and along river banks and floodplains in the lower areas on both sides of the Colorado River. To ensure that surveyors did not overlook any Mature Plants in the Survey Area, hilltops and ridges were used as vantage points to locate all Mature Plants in the washes and ravines below.

Vegetative sampling of individual plants was minimized during the survey (as requested by tribal representatives during the orientation meeting on August 18, 2011). In addition, vegetative sampling was not necessary for accurate identification of the majority of the Mature Plants. In some cases, identifications were facilitated by taking photographs in the field. Selected photographs from the field survey are presented in Appendix A.

GPS data was collected for some areas of Mature Plants encountered during the survey using a Trimble GeoXH 6000 and GeoXT with sub-meter accuracy. In other areas, where individual plants were numerous and closely clustered together or in long linear features (e.g. washes), it was not feasible to GPS each plant individually (e.g., salt cedar and mesquite in sections C and D near National Trails Highway, see Figure 1); therefore, GPS data was collected along the perimeter of the clusters forming a polygon of GPS points from which an approximate centroid GPS point could be derived. This was especially true along the Colorado River floodplain where salt cedar often forms impenetrable thickets with other shrubs and trees (e.g., honey mesquite and arrow weed). In such situations, the clusters of Mature Plants were also represented as a polygon drawn on the high resolution aerial photographs.

For each Mature Plant or cluster of Mature Plants, surveyors recorded the height and health of the plant. Four height categories were used as follows:

- short (< 6 feet),
- medium (≥ 6 and < 12 feet),
- tall (≥ 12 and < 20 feet), or
- very tall (≥ 20 feet).

Plant health was also assessed using three categories as follows:

- good (plants with no dead or damaged branches or other signs of branch senescence),
- fair (plants with a few dead or senescent branches), or
- poor (plants with more than half of the branches dead or damaged).

All of the Mature Plants recorded and mapped on the floodplain of the Colorado River, with the exception of eucalyptus, fan palm, and athel tamarisk, were assumed to have established themselves naturally (i.e., not planted); however, not all naturally established plants were indigenous. For example, salt cedar and giant reed are native to eastern Asia and Europe, respectively; and the common reed, at least under the railroad bridge, is the invasive Eurasian form and not the native form from California (J. Andre 2011, personal communication). Salt cedar and giant reed are also considered highly invasive in many parts of the arid Southwest, including California and Arizona (California Invasive Plant Council [CAL-IPC], 2011). Landscape trees and shrubs in the most developed areas within Moabi Regional Park such as the trailer camps were generally excluded from the mapping because they are on private property and not anticipated to be impacted by the project.

Results and Discussion

Approximately 1,250 Mature Plant individuals comprising 16 species were geo-referenced in the Survey Area (Figure 2). Appendix B contains the field survey data for the individually mapped mature plants. Additional species were mapped as part of multiple individual points or polygons. For example, arrow weed is ubiquitous in many parts of the Survey Area (e.g., sections B, E, and F) and forms stands of hundreds of individuals. Therefore, most individuals were mapped as part of large polygons. Four species of tall herbaceous perennials were also mapped as polygons containing multiple individual points constituting thousands of individuals. All of these plants have the potential to affect the key views of the Project Area. Mature Plants included native species as well as exotics, both naturalized (e.g., salt cedar, athel tamarisk) and non-naturalized (e.g., oleander).

Abundance and Distribution of Mature Plants

The most abundant Mature Plant in the Survey Area is the exotic and invasive salt cedar (Appendix A: Plate 1A, B). Thirty-seven salt cedar points were georeferenced within the survey area representing seventy-one individual trees (Appendix B); however, most salt cedars were recorded and mapped as part of multiple individual polygons on the floodplain and nearby areas (Figure 2). This species dominates the floodplain along the Colorado River, especially under the Interstate 40 highway and railroad bridges that span the river. Salt cedar also forms dense thickets at the ends of washes near their confluence with the river. From detailed high-resolution photographs of the floodplain and spot sampling, it is estimated that there are several thousand individuals along the floodplain between the Interstate 40 bridge and Moabi Regional Park, while two dense populations at the ends of dry riverbeds adjacent to the National Trails Highway in section C and D are estimated to contain 1,000 and 500 individuals, respectively.

Salt cedar is an invasive exotic that has been used for erosion control on the banks of the Colorado River since the early 1900s (Barranco 2001). Since that time, however, it has spread dramatically throughout the western states and is currently considered to be highly invasive in California because of its severe ecological impacts on plant and animal communities, high reproductive output (a mature salt cedar tree can produce 600,000 seeds annually, and high dispersal capabilities (Barranco 2001; DiTomaso 1998). The invasion of indigenous riparian communities by salt cedar has also been shown to result in a general decrease in overall diversity of birds, insects, and plants (DeLoach and Tracy 1997). DeLoach et al. (2000) have characterized the invasion by salt cedar as "…one of the worst ecological disasters to impact riparian ecosystems in the United States displacing native plants, degrading wildlife habitat, and causing the decline of threatened and endangered species." DeLoach et al. (2000) also suggested that southwestern willow flycatchers (*Empidonax traillii extimus*), a federal and California listed as endangered species, are not as successful when nesting in salt cedar as they are in native cottonwoods or willows (*Salix* sp.). However, recent studies have found no significant difference in nesting success for the birds when nesting in salt cedar dominated habitat (Barranco 2001, Sogge et al. 2006, 2008).

Athel tamarisk is another exotic tamarisk tree species that occurs in the Survey Area (Figure 2, Appendix A: Plate 1C, D), however it is much less abundant and does not appear to be invasive like salt cedar. This is the tallest tamarisk and one of the tallest trees in the Survey Area. Individuals routinely grow to over 20 feet tall. There are approximately 24 multi-stemmed clumps (Appendix B), comprising 48 individuals, scattered throughout the Survey Area in sections A, B, D, F, G, and L. In most clumps there are at least one or two very large trunks and a number of smaller trunks, which suggests that each clump is a clone that may have originated from the planting of one or two individuals. Like most tamarisks, athel tamarisk can apparently spread vegetatively from branches that are broken off and transported by floods. However, the scattered distribution of this species in the Survey Area is inconsistent with this mode of dispersal. It is also inconsistent with the pattern that would be expected if these plants had arisen from naturally dispersed seed. In California, athel tamarisk is apparently incapable of producing fertile seed (Cal-IPC 2011), however recent evidence indicates that in some areas of the Southwest (e.g., Lake Mead in Nevada) this species is capable of reproducing both by seed and hybridizing with the very invasive salt cedar (Gaskin and Shafroth 2005; Norman et al. 2010).

Blue palo verde is the most abundant indigenous tree species in the Survey Area (Figure 2, Appendix A: Plate 2B, D, F). Six hundred and forty-eight individuals were recorded in the Survey Area and these are represented by 584 georeferenced points (i.e. 6.6% of the points are represented by more than one individual – Appendix B). These trees occur in all except two of the survey sections (Table 1). Most (72 percent) are medium to tall (6 ≥ and < 20 feet) trees that are in good condition (i.e., no damaged or dead branches). This species is considered to be an important Mature Plant because it is a large, aesthetically pleasing tree that is common throughout the Survey Area, especially in the dry washes of sections C and D, and has the potential to screen existing and planned project activities. It is also protected under the California Desert Native Plants Act (CDNPA). Blue palo verde occurs throughout the Survey Area, but it is restricted to areas immediately above the floodplain of the Colorado River (Figure 2). In these areas blue palo verde generally occurs in sandy washes and the lower slopes of surrounding hills. It does not occur on ridge tops, steep rocky slopes, or upland plateaus. Sawyer et al. (2009) considers blue palo verde to be the dominant or co-dominant in the Blue palo verde-Ironwood woodland.

Hillside palo verde, while not as abundant as the related blue palo verde, is also significant. It is a special status plant protected under the CDNPA, a California Native Plant Society Rare Plant Rank 4 species, and its presence at Topock represents a previously unknown northerly range extension. The observed population of 104 individuals, represented by 96 georeferenced points (Appendix B), is restricted to sections H and I with the vast majority occurring in the latter section (Figure 3). The hillside palo verde were observed in rocky areas of quaternary and tertiary conglomerate that cover pre-tertiary bedrock (PG&E 2008). In California, hillside palo verde has been recorded as far north as the Whipple Mountains near Copper Basin and Lake Havasu but not in the Chemehuevi Mountains adjacent to the southern border of the Survey Area (California Consortium of Herbaria 2011). In Arizona, hillside palo verde is known to range as far north as 'the Needles', which is approximately 5 miles southeast of the Project Area (J. Andre, pers. comm. 2011). A few blue palo verde individuals occur within the hillside palo verde population, and there are also a few individuals that may be hybrids between the two species based on intermediate leaf morphology. The spring 2012 floristic survey is anticipated to provide additional evidence for hybridization if the flowers of these intermediate individuals also prove to be intermediate in morphology.

As previously mentioned, hillside palo verde trees were not distinguishable from blue palo verde during the August survey, because at that time of year both species lacked the structures (i.e., leaves and flowers) necessary for identification. The branches and trunks of these two species are remarkably similar when plants are dormant (Appendix A: Plate 2A, B).

Honey mesquite is the second most common abundant indigenous tree in the Survey Area and like blue palo verde, is protected by the CDNPA. It occurs mainly along the river floodplain, but also occurs in the upper reaches of dry inland washes (Figure 2, Appendix A: Plate 3A, B). It commonly forms mixed thickets with salt cedar or salt cedar and blue palo verde. One hundred fourteen honey mesquite points were recorded and mapped in the Survey Area (Appendix B) and these represented 133 individuals with another 24 present in mixed-species polygons with salt cedar and/or blue palo verde.

Screwbean mesquite (*Prosopis pubescens*) is similar vegetatively to its congener honey mesquite, but its fruits are very different (Appendix A: Plate 3C). It is also much less common in the Survey Area (Table 1, Figure 2). Seventy individual points were georeferenced and these represented 119 individuals (Appendix B). Trees were restricted to localized populations on the floodplain of the Colorado River in sections A, F (just opposite the Topock Marina), and I (under the railroad bridge). In sections A and I, these trees occurred in close proximity to honey mesquite, however in section F, honey mesquite individuals were absent. There is also a small population of screwbean mesquite in section I that was planted as part of a restoration project.

Catclaw acacia is the third most common indigenous Mature Plant in the Survey Area (Figure 2, Appendix A: Plate 4A, B) and it is also protected under the CDNPA. Catclaw acacia occurs mainly in dry washes away from the floodplain of the Colorado River and often occurs with blue palo verde. In section C, it is very abundant (Figure 1) and occurs with blue palo verde and Anderson's wolf berry (*Lycium andersonii*). Two hundred nineteen points representing 265 individuals of catclaw acacia were georeferenced and mapped in the Survey Area (Appendix B) and additional individuals were recorded and mapped as part of multiple individual polygons or mixed-species polygons (Figure 2).

Desert smoke tree (*Psorothamnus spinosus*) is an uncommon but distinctive tree in the Survey Area (Appendix A: Plate 5A, B) where it occurs as small populations (< 10 trees) in dry washes in sections D (Bat Cave Wash) and A, and on sandy alluvial soils in the middle of Section B (Moabi Regional Park). Twenty-seven points (Appendix B) were mapped for desert smoke tree, and these represented 47 individuals (Figure 2).

Arrow weed, next to creosote bush, is the most common shrub in the Survey Area, occurring in all but one of the Survey Sections (Table 1). On the floodplain of the Colorado River, this plant is ubiquitous and often forms dense, impenetrable thickets (Figure 2, Appendix A: Plate 5D, 7B, C). The sandy dunes that constitute the floodplain on both sides of the Colorado River and the areas where arrow weed is presently most abundant are of recent and man-made origin. They were created by the placement of dredge spoils from the Colorado River primarily in the 1950s and 1960s (C. Russell 2011, personal communication).

Wetland plants There are four common wetland species in the Survey Area (Figure 2) that, due to their position, height and screening ability, have been considered to meet the criteria of a Mature Plant**.** These include the common reed, giant reed, California bulrush, and broad-leaved cattail. The most common of these is the California bulrush, which forms large populations that are 6 to12 feet tall in the Colorado River, just offshore from sections A, B, E, F, G, I and J (Figure 2, Appendix A: Plate 6A).

The second most abundant wetland plant is common reed, which forms dense populations of hundreds of individuals that are generally 6 to 20 feet tall (Appendix A: Plate 6A, B). There appear to be two forms of the common reed in the Survey Area. The Eurasian genotype (*P. australis* ssp. *australis*) is invasive (Saltonstall 2002). The North American genotype (*P. australis* ssp. *americanus*) is non-invasive (Saltonstall et al. 2004; Swearingen and Saltonstall 2010). The most conspicuous form in the Survey Area is the invasive Eurasian genotype, which is present in a large stand on the floodplain of the Colorado River in section I between the Interstate 40 bridge and the first pipeline bridge to the south and across the Colorado River in section J (Figure 2, Appendix A: Plate 6A). This subspecies is known to colonize disturbed areas. Scattered smaller populations with shorter individuals occur elsewhere along the river shoreline in sections A and F, and these are suspected to be the native subspecies. However, the two subspecies are very similar. Although morphological characters can often be used to distinguish between them, they are best identified using molecular techniques, especially in areas such as California and Arizona where a third subspecies may also be present that complicates morphological determinations (Swearingen and Saltonstall 2010).

Another wetland species that is exotic and invasive is the giant reed. This giant grass is native to eastern Asia (Polunin & Huxley 1987). It can be up to 30 feet tall with rigid bamboo-like stems. In the Survey Area, plants range from tall to very tall. Giant reed was first introduced in California by Spanish colonists in the 1700’s (Newhouser et al. 1999). Giant reed was initially used in the early 1800s for erosion control in drainage canals (Bell 1997). It is now a major threat to riparian areas in California as well as other southwestern states (Cal-IPC 2011). In the Survey Area, this grass forms localized patches ranging in size from ten to several hundred stems along the river’s edge and floodplain in sections A, E, F, and I (Figure 2). The largest population occurs in section F across from the Topock Marina.

The Aesthetic Value of Mature Plants in the Topock Survey Area

The shores and floodplain of Colorado River have been dramatically transformed by river channelization, dredging, and the establishment and spread of exotic plant species such as salt cedar, athel tamarisk, common reed, and giant reed. In the Project Area, some of these same plants, however, provide a valuable aesthetic role in screening the necessary activities of the Topock Project (Appendix A: Plate 7A−C). Fourteen key views are identified in the FEIR, and two of those, key views 5 and 11, include the Colorado River floodplain and are the subject of the specific mitigation measures AES-1a and AES-2b that led to the undertaking of this survey. Therefore, it is important to consider the role that Mature Plants can play in ameliorating or mitigating any aesthetic disturbance caused by project activities. The potential for preventing a deterioration of the key views depends not only on the height and width of the plants, but also on their branching pattern, and their spacing within a population. These latter two characteristics, however, are more difficult to quantify.

The tallest of the trees outside of developed or landscaped areas is athel tamarisk with 88 percent of individuals over 20 feet tall (Appendix A: Plate 1C). Next in height is the blue palo verde with 54 percent of the individuals over 20 feet tall, salt cedar (Appendix A: Plate 1A) with 49 percent over 20 feet tall, honey mesquite with 40 percent over 20 feet tall, and catclaw acacia with no individuals over 12 feet tall. In terms of branching pattern and spacing within a population, salt cedar has the densest branching pattern and closest spacing of all trees in the Survey Area (Appendix A: Plate 1A). Among the shrubs, individuals of arrow weed can be nearly as closely spaced as salt cedar (Appendix A: Plate 7C), and in the herb layer California bulrush, common reed, broad-leaved cattail, and giant reed all form very dense populations (Appendix A: Plate 6A, B).

Level of Detail on Mature Plant Maps and Protection of Mature Plants

For the purpose of the project design and implementation, it is particularly important to know whether the open areas visible on the high resolution images of the Mature Plants Maps are clear of all Mature Plants (Figure 2). On the Colorado River floodplain below the National Trails Highway, this will be crucial for choosing the best routes for pipe installation and vehicle access routes to proposed project sites. During the November 2011 floristic survey, surveyors, led by Senior Botanist Steiner, carefully re-checked these open areas for Mature Plants and found none. However, the presence of seedlings could change on a seasonal basis, and given the long-term nature of the project, new potential Mature Plant species could grow in these previously cleared areas. Therefore, despite the high quality of the images used for the Mature Plants maps, these maps must be viewed as a general guide for the distribution of Mature Plants in the Survey Area. Once an approved access route or project site is established, pre-construction surveys will closely examine the affected areas, using the same methodology and criteria for Mature Plant identification as this survey, at the level of detail necessary to ensure that Mature Plants are documented and protected in accordance with the EIR.

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André, James, Director of Sweeney Granite Mountains Desert Research Center (UCR Natural Reserve System). In discussion of *Phragmites* at Topock. (November 2011).

Russell, Curt, Site Manager of PG&E Topock Compressor Station. In debriefing discussion regarding the history of the Colorado River at Topock (November 2011).

Table 1. List of Mature Plants in the Survey Area

Common name	Scientific name	Plant habit	Sections in which species occurs
TREES			
Athel tamarisk	*Tamarix aphylla*	Tall to very tall tree	A, B, D, F, G, L
Blue palo verde	*Parkinsonia florida*	Shrub to tree	A, C, D, E, F, G, H, I, J, L
Catclaw acacia	*Senegalia greggii* (*Acacia greggii*)	Shrub to small tree	A, B, C, D, E, G, H, I
Desert smoke tree	*Psorothamnus spinosus*	Medium to tall tree	A, B, C, D, J
Eucalyptus	*Eucalyptus* sp.	Tall tree	A, B
Fremont's cottonwood	*Populus fremontii*	Tall tree	B
Goodding's willow	*Salix gooddingii*	Medium to tall tree	B
Hillside palo verde	*Parkinsonia microphylla*	Shrub to tree	H, I
Honey mesquite	*Prosopis glandulosa* var. *torreyana*	Medium to tall tree	A, B, C, D, E, G, H, I, J
Mexican fan palm	*Washingtonia robusta*	Medium to tall tree	A, B, E, H, J
Narrow-leaved willow	*Salix exigua*	Medium tree	A, E, F, G, I
Salt cedar	*Tamarix ramosissima*	Shrub to large tree	A, B, C, D, E, F, G, H, I, J, L
Screwbean mesquite	*Prosopis pubescens*	Medium to tall tree	A, E, F, I
SHRUBS			
Arrow weed	*Pluchea sericea*	Medium to tall shrub	A, B, C, D, E, F, G, H, I, J
Creosote bush	*Larrea tridentata*	Shrub	A, B, C, D, E, F, G, H, I, J, L
Ocotillo	*Fouquieria splendens*	Tall shrub	C, D, I
Oleander	*Nerium oleander*	Medium to tall shrub	A, B, H
Big saltbush	*Atriplex lentiformis*	Shrub	A, G, J
HERBS			
Broad-leaved cattail	*Typha latifolia*	Tall herb	A, B, C, E, I, J
California bulrush	*Schoenoplectus californicus*	Tall sedge	A, B, E, F, G, I, J
Common reed	*Phragmites australis*	Tall perennial grass	A, E, F, G, I, J
Giant reed	*Arundo donax*	Tall perennial grass	A, E, F, G, I

LEGEND

Survey Segments

N

0 500 1,000 2,000 Feet

FIGURE 1
EIR PROJECT AREA WITH BOTANICAL SURVEY SEGMENTS

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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

FIGURE 2
MATURE PLANTS

PG&E Topock Compressor Station
Needles, California

TREES

Common Name	Species	Plant Habit
Athel Tamarisk (2)	*Tamarix aphylla*	Tall to very tall tree
Blue Palo Verde (3)	*Parkinsonia florida*	Shrub to tree
Catclaw Acacia (9)	*Senegalia greggii (Acacia greggii)*	Shrub to small tree
Desert Smoke Tree (13)	*Psorothamnus spinosus*	Medium to tall tree
Hillside Palo Verde (14)	*Parkinsonia microphylla*	Medium to tall tree
Honey Mesquite (16)	*Prosopis glandulosa* var. *torreyana*	Medium to tall tree
Mexican Fan Palm (8)	*Washingtonia robusta*	Medium to tall tree
Narrow-leaved Willow (20)	*Salix exigua*	Shrub or small tree
Salt Cedar (21)	*Tamarix ramosissima*	Shrub to large tree
Screwbean Mesquite (22)	*Prosopis pubescens*	Medium to tall tree
Fremont's Cottonwood	*Populus fremontii*	Tall tree
Goodding's Willow	*Salix gooddingii*	Shrub to small tree
Eucalyptus	*Eucalyptus* sp.	Tall tree

SHRUBS

Common Name	Species	Plant Habit
Arrow Weed (1)	*Pluchea sericea*	Medium to tall shrub
Big Saltbush (25)	*Atriplex lentiformis*	Medium to tall shrub
Creosote Bush Scrub (11)	*Larrea tridentata*	Shrub
Ocotillo (18)	*Fouquieria splendens*	Tall Shrub
Oleander (19)	*Nerium oleander*	Medium to tall shrub

HERBS

Common Name	Species	Plant Habit
Broad-leaved Cattail (6)	*Typha latifolia*	Tall herb
California Bulrush (7)	*Schoenoplectus californicus*	Tall sedge
Common Reed (10)	*Phragmites australis*	Tall perennial grass
Giant Reed (15)	*Arundo donax*	Tall perennial grass

MULTI-SPECIES AREAS

Common Name

- Blue Palo Verde/Catclaw Acacia (4)
- Blue Palo Verde/Salt Cedar/Honey Mesquite (5)
- Salt Cedar/Arrow Weed (22)
- Salt Cedar/Honey Mesquite (23)
- Salt Cedar/Screwbean Mesquite (24)

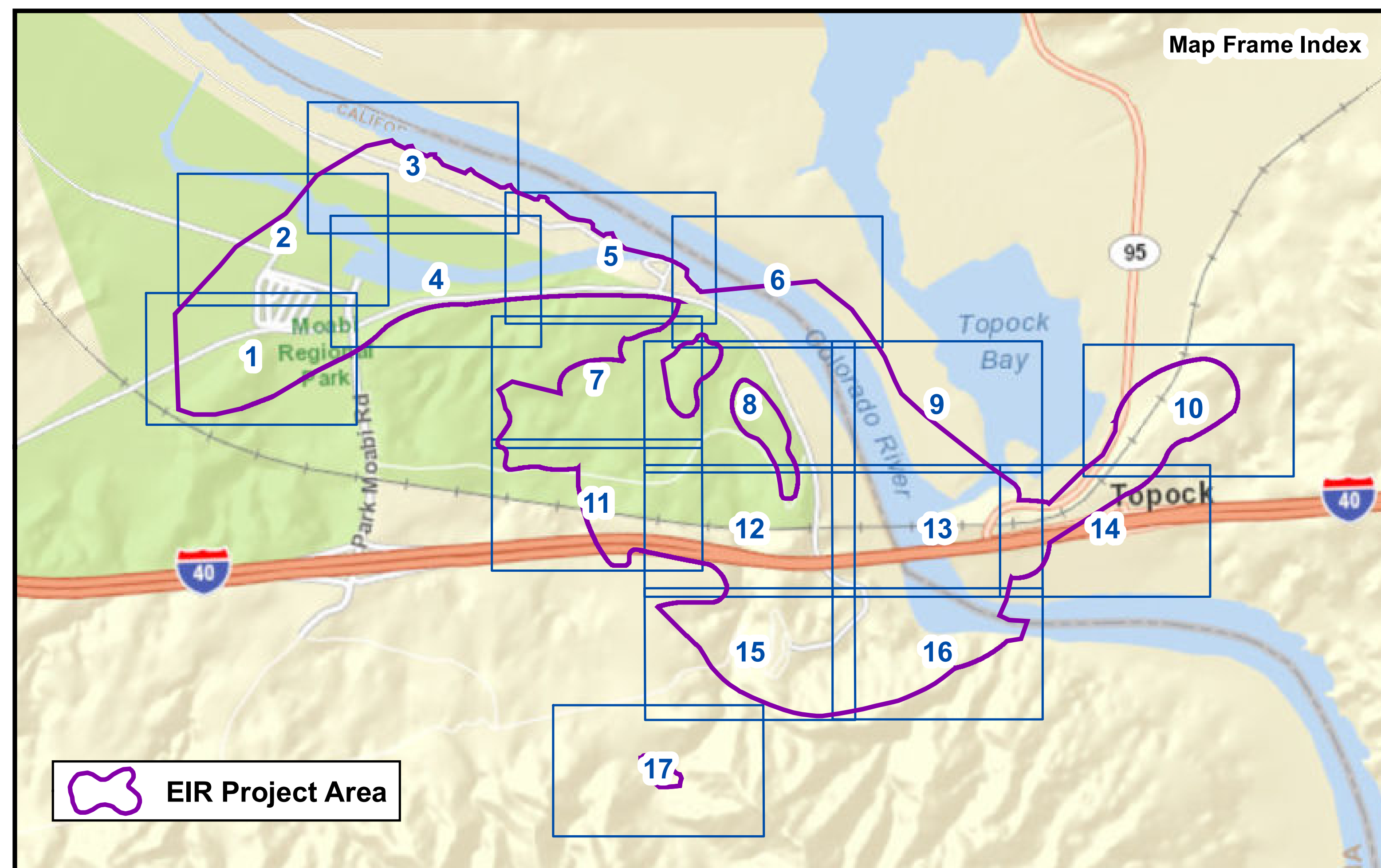
N

0 125 250 500 Feet

Scale bar and north arrow pertain to map frames, not frame index

HEIGHT DESIGNATIONS

- Very Tall features are outlined in PINK
- Tall features are outlined in RED
- Medium features are outlined in ORANGE
- Short features are outlined in BLUE
- Features with multiple height classes are outlined in GREEN



CH2MHILL

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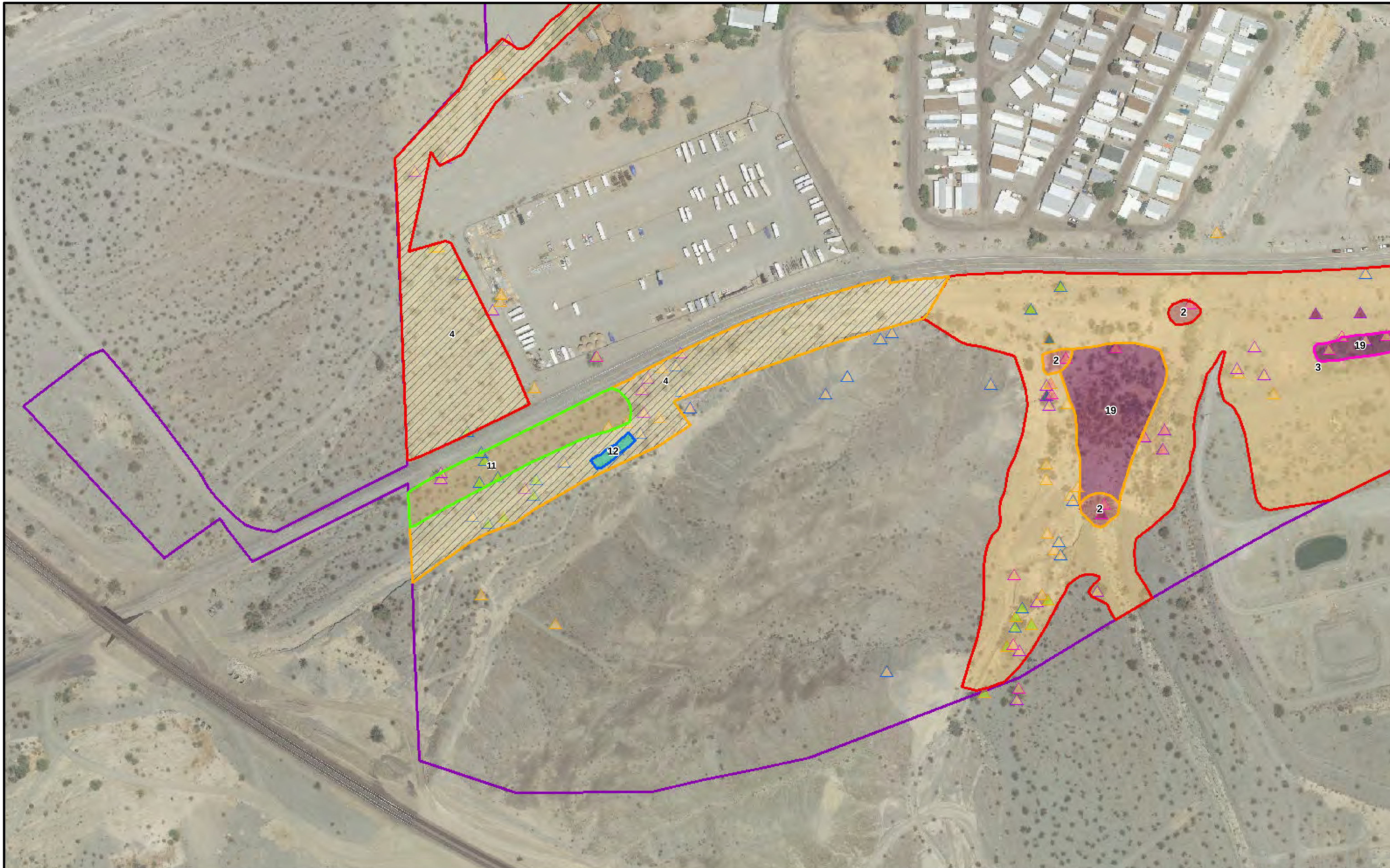

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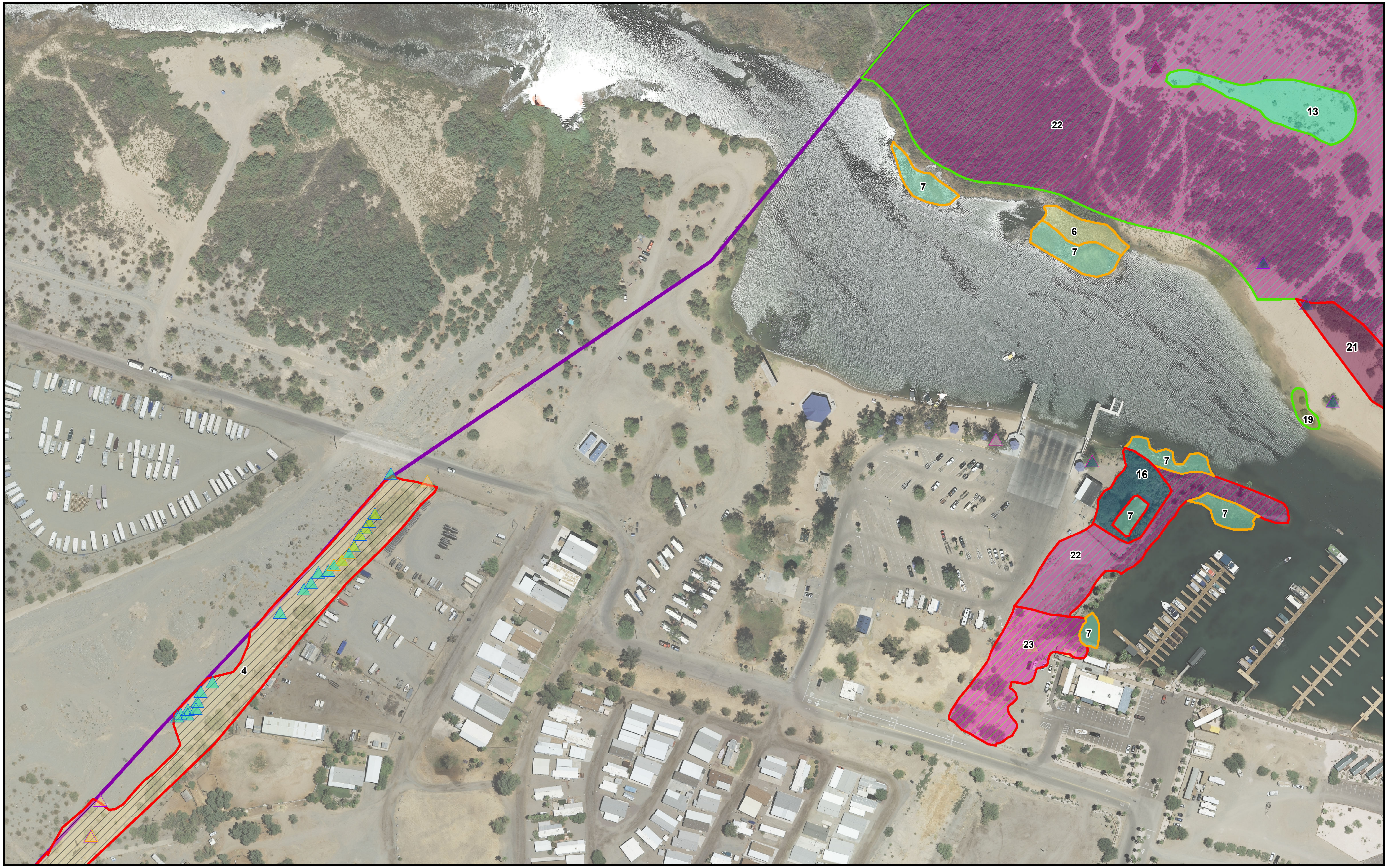

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MAP 2

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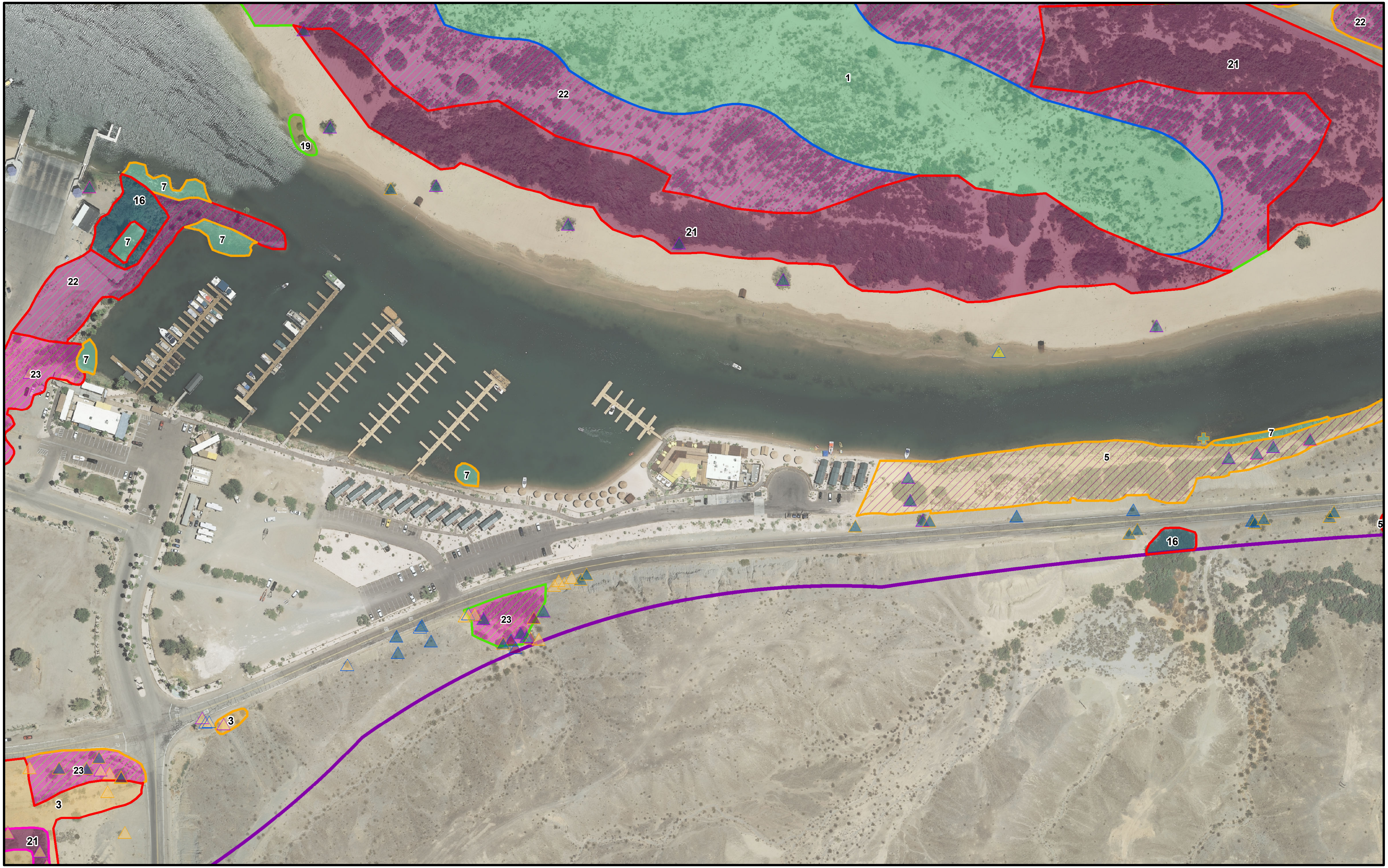
MAP 3



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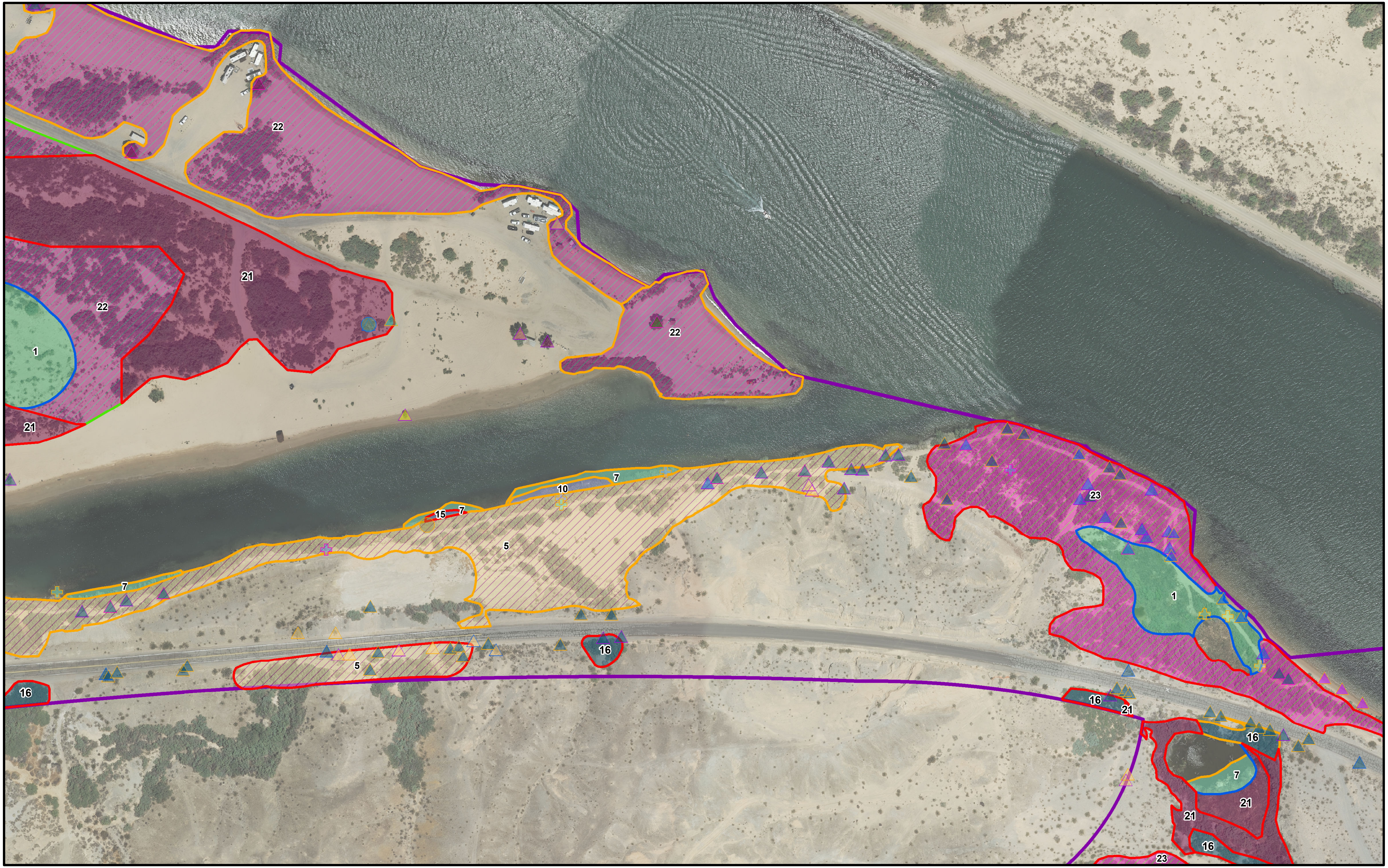

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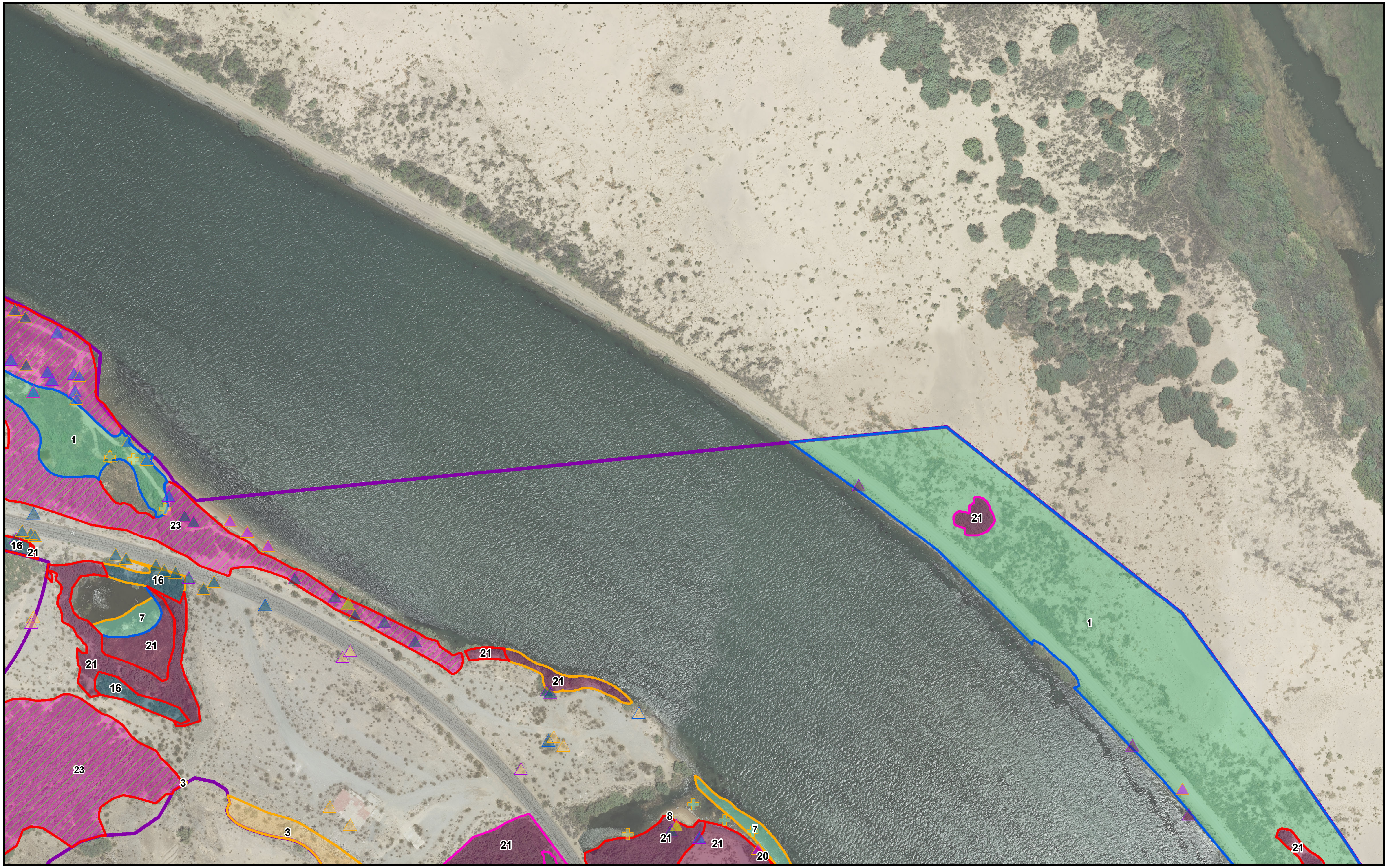

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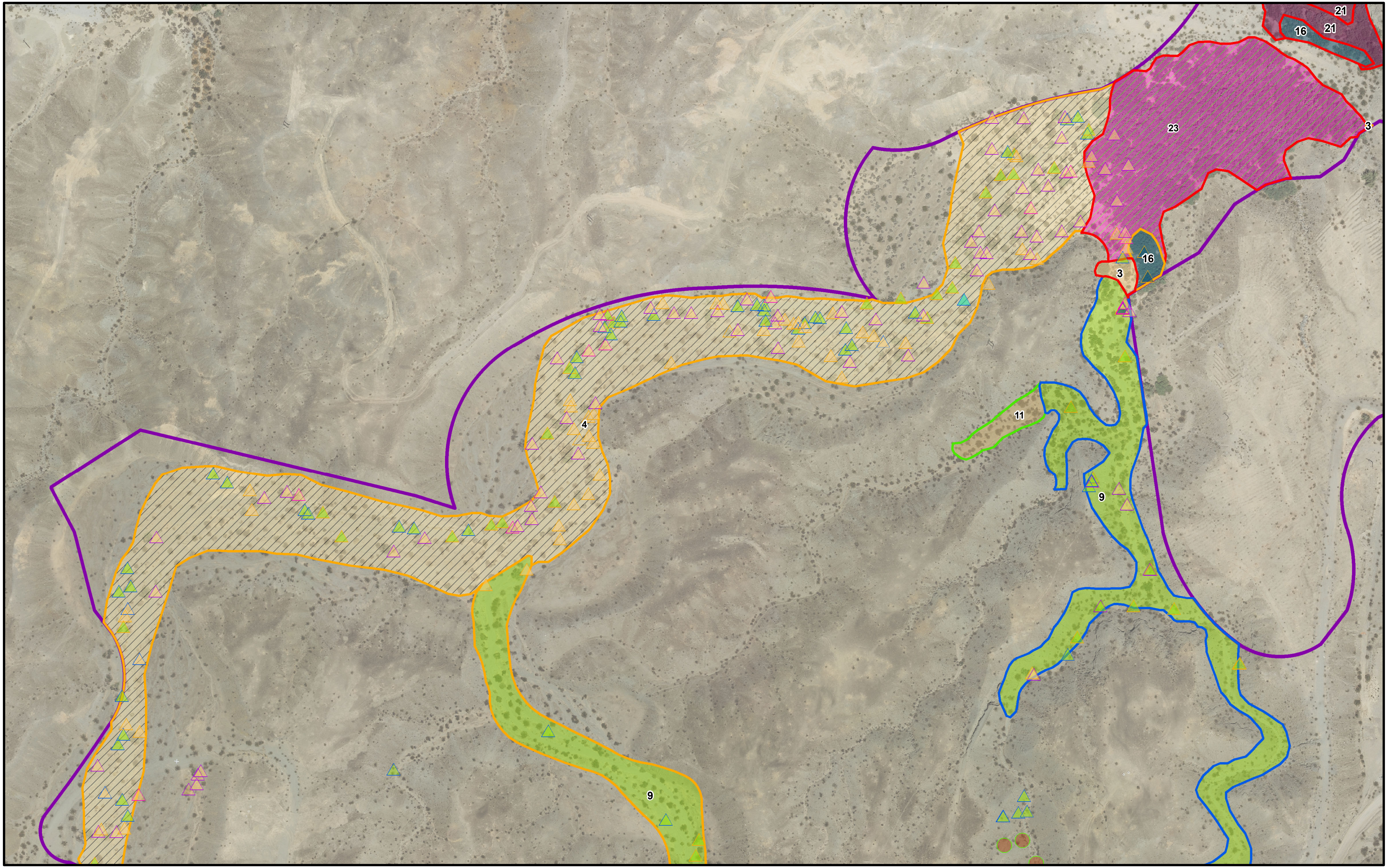

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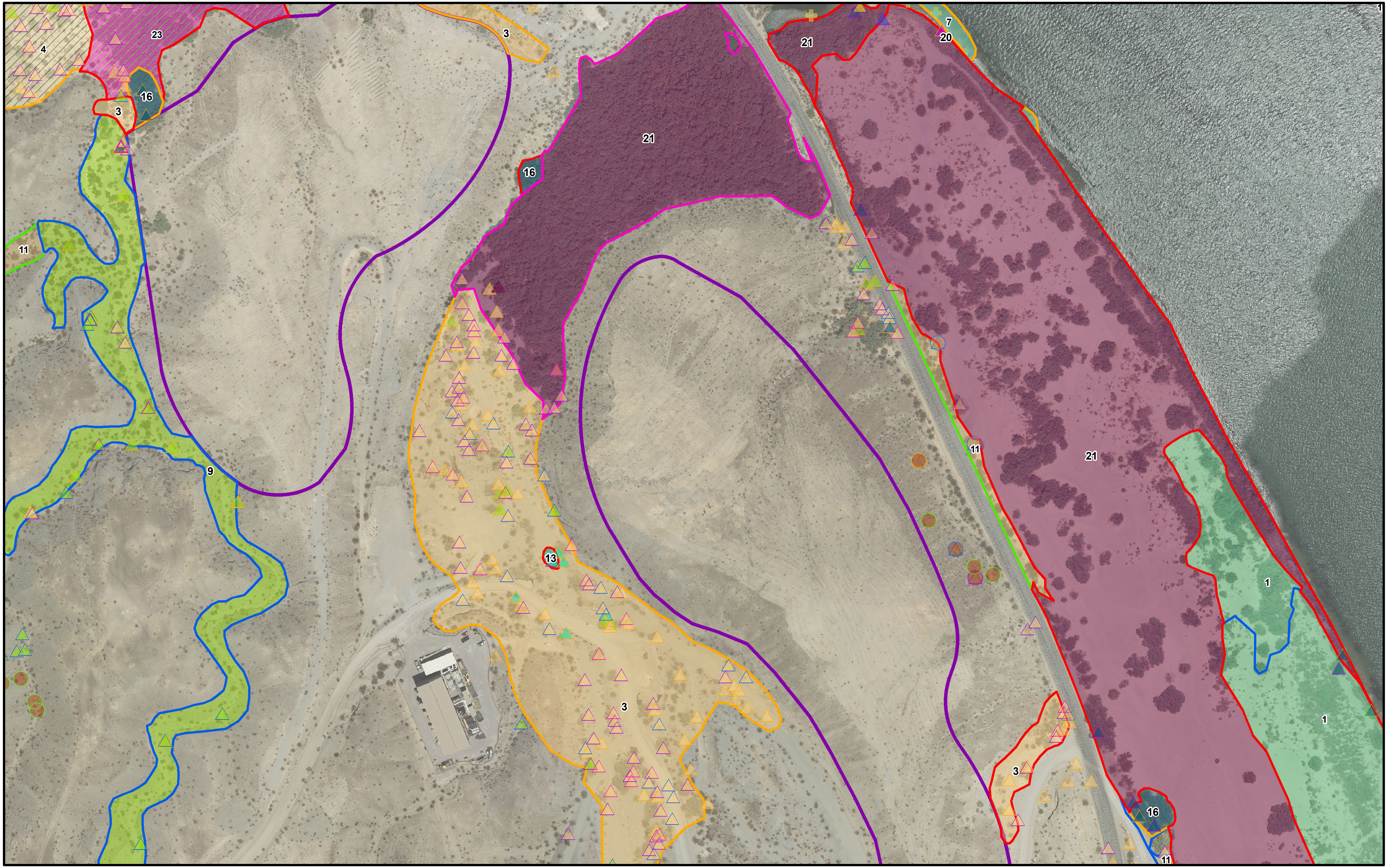

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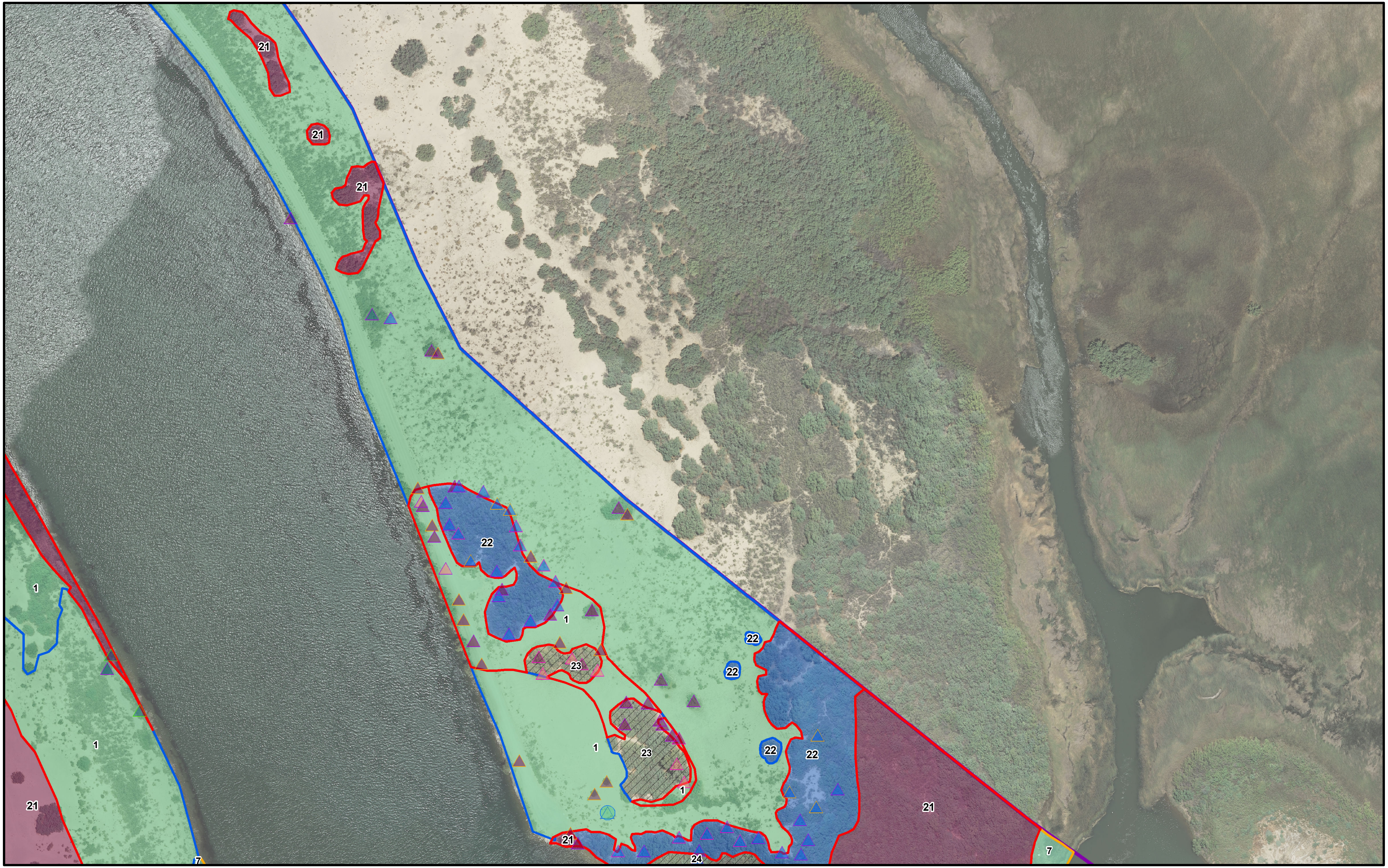

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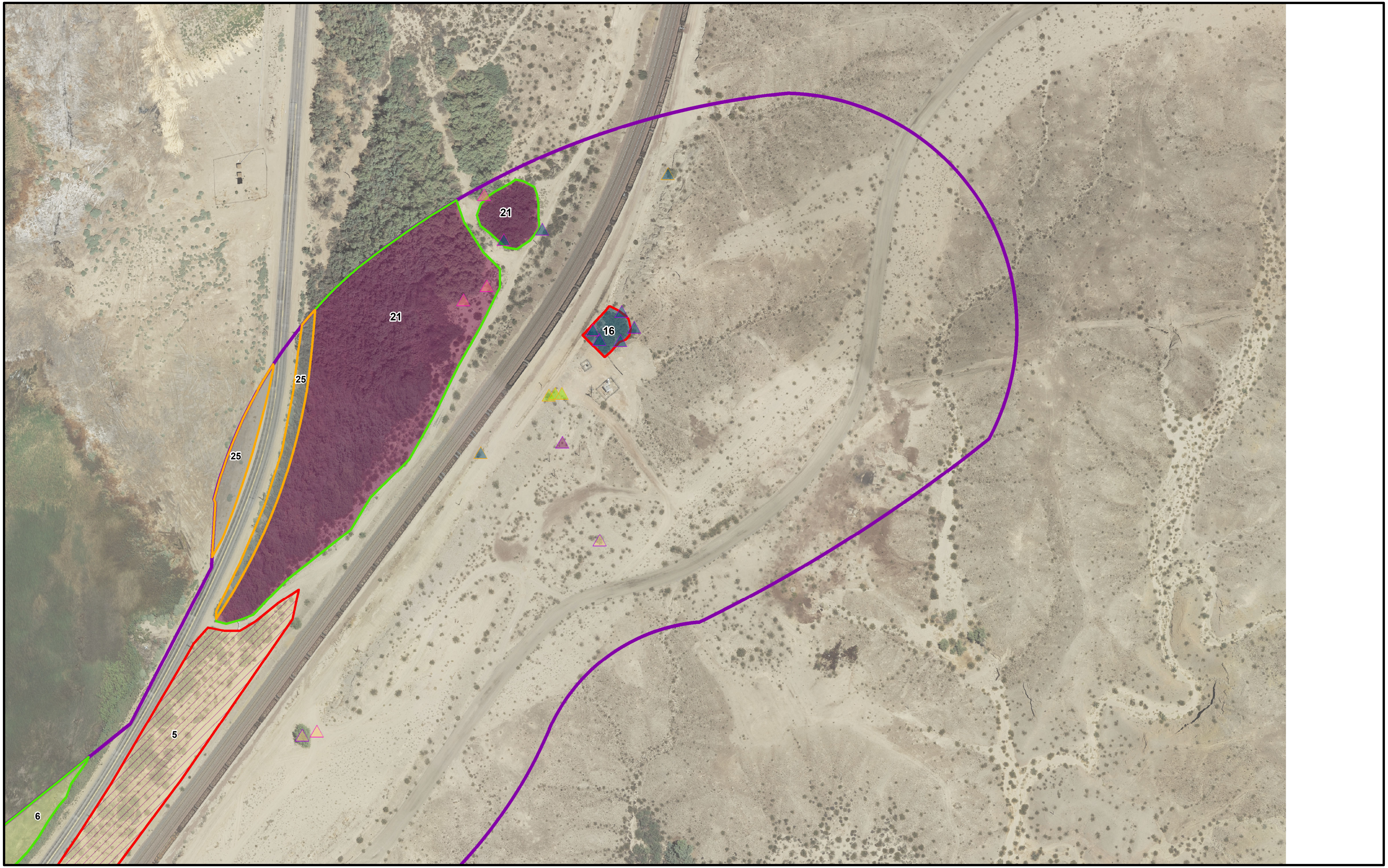

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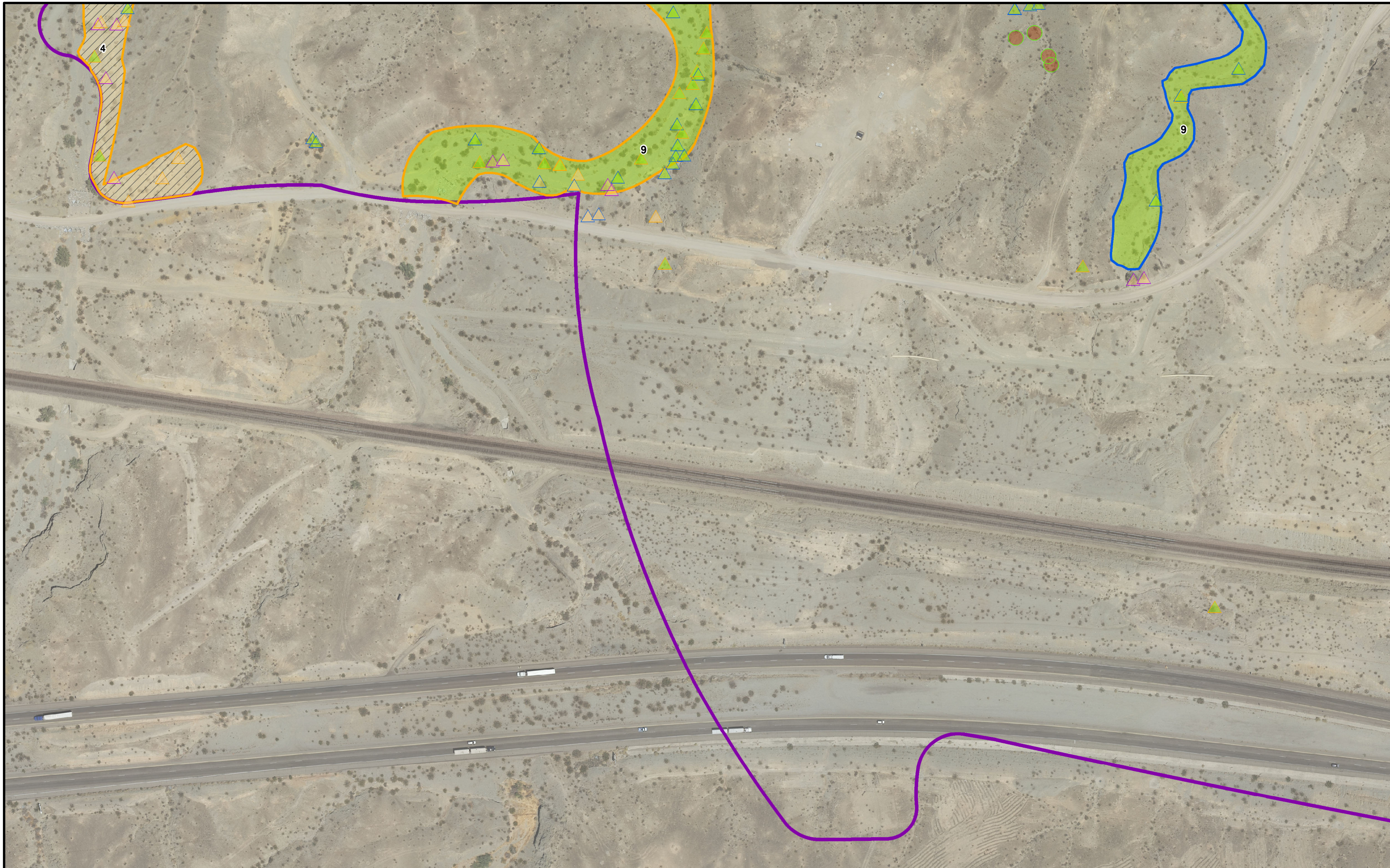

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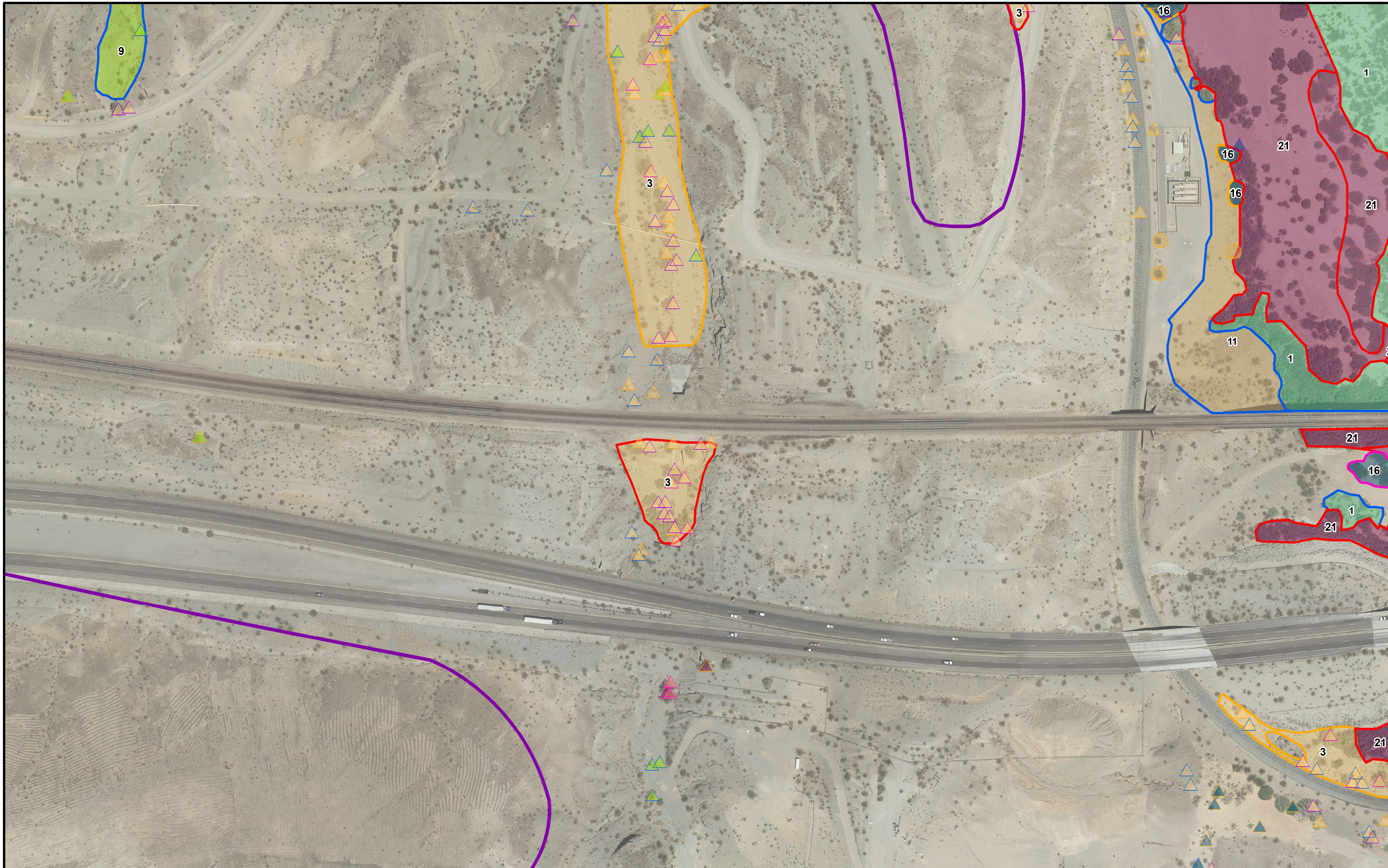

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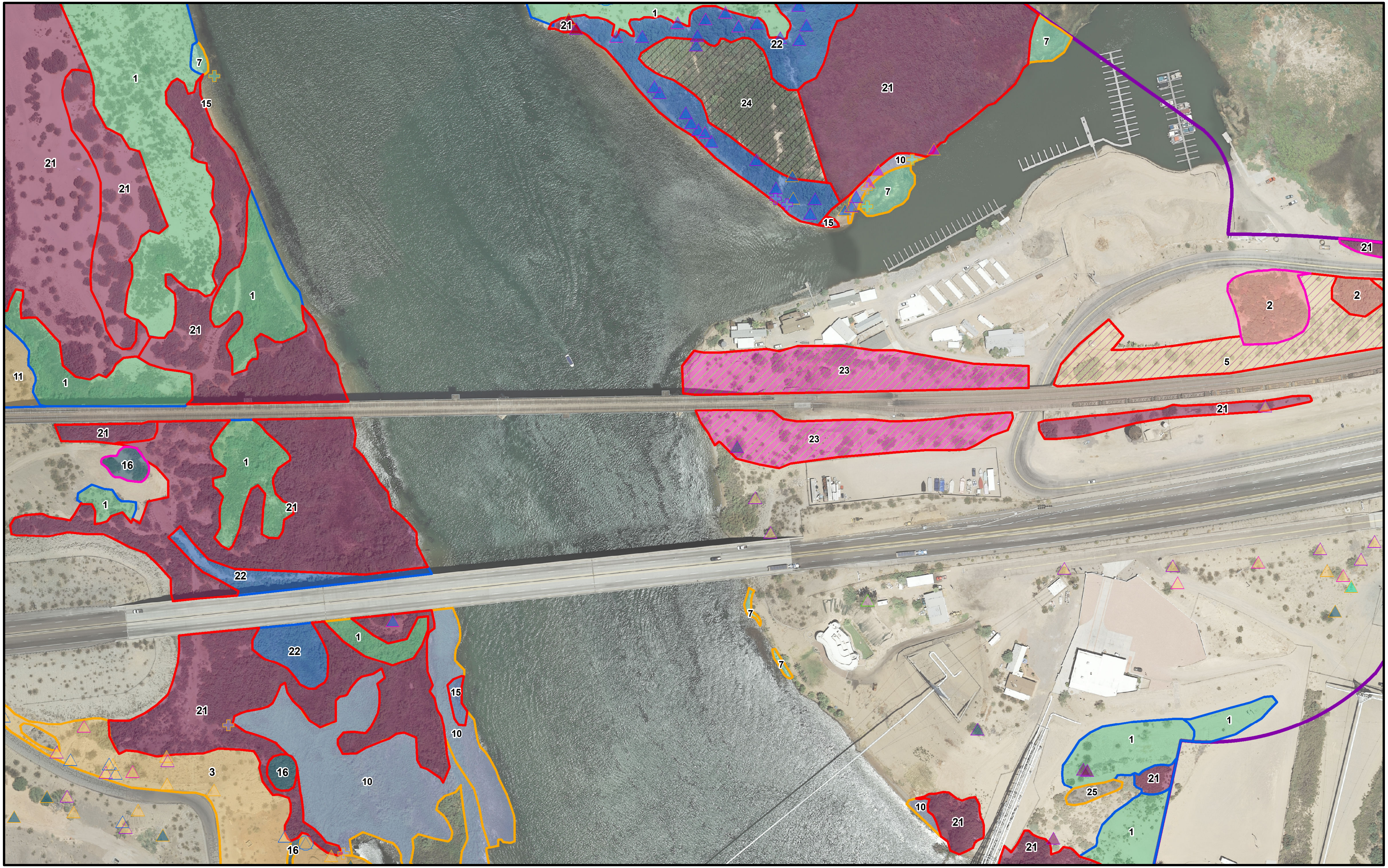

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MAP 13

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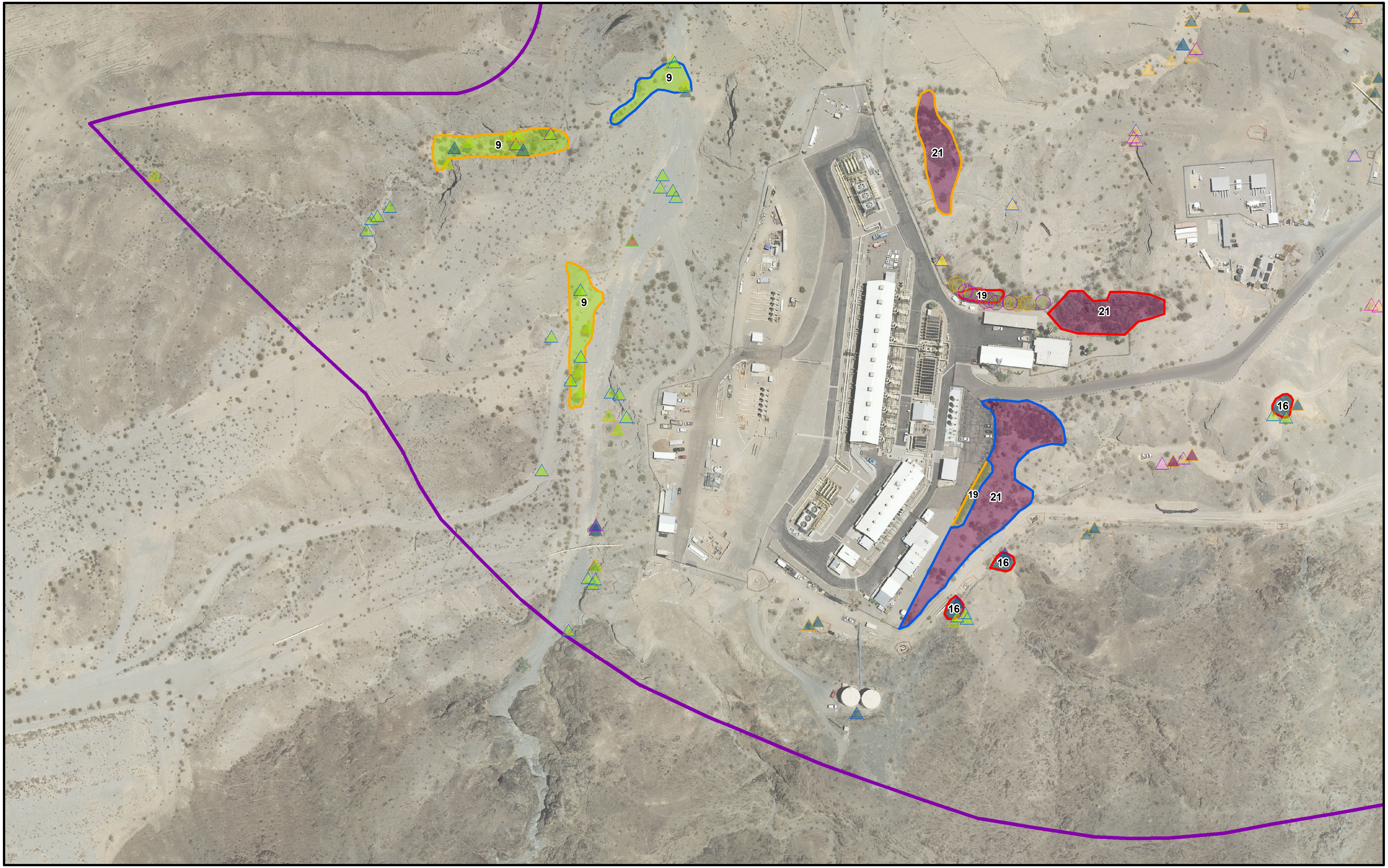
MAP 14



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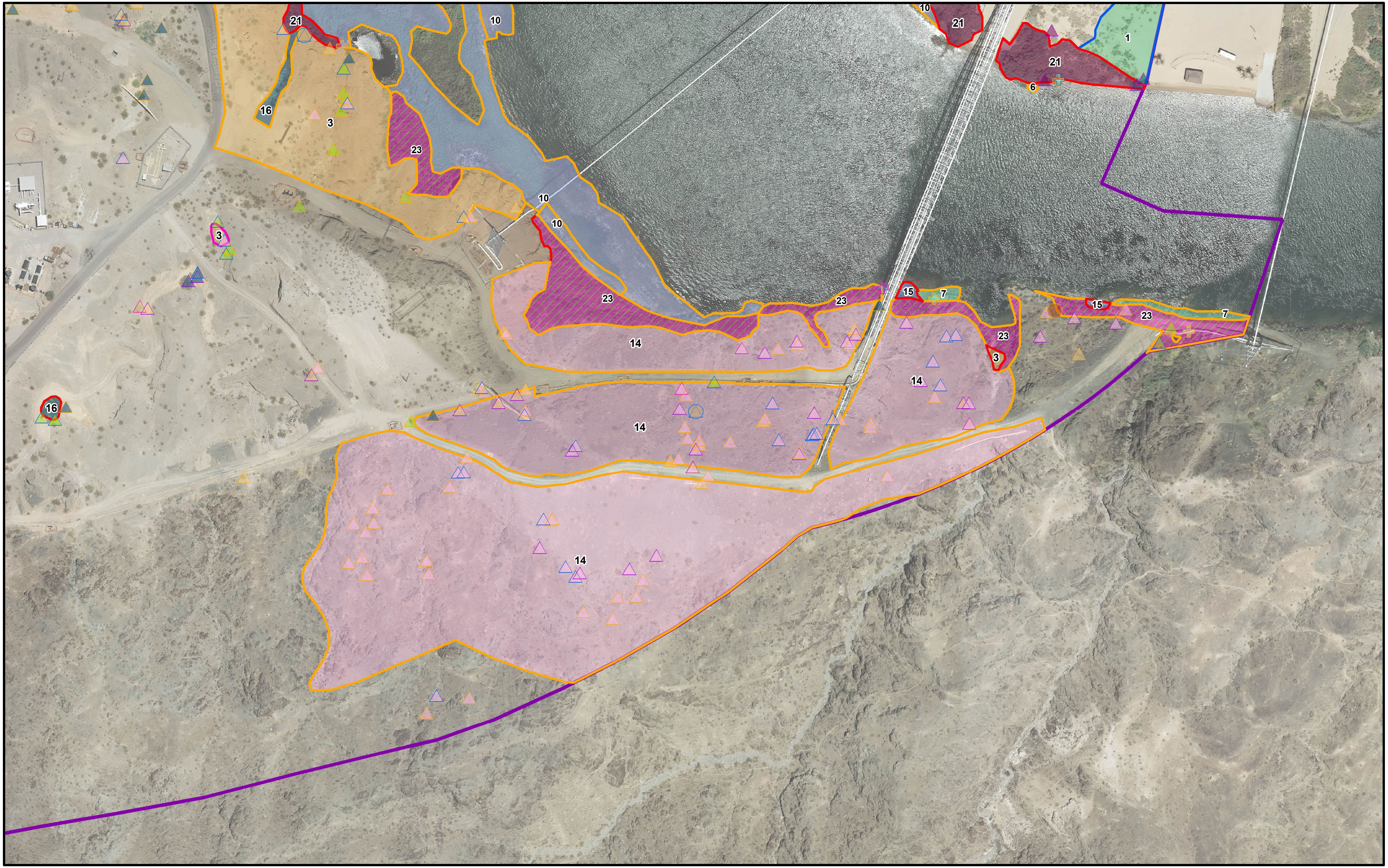
MAP 15



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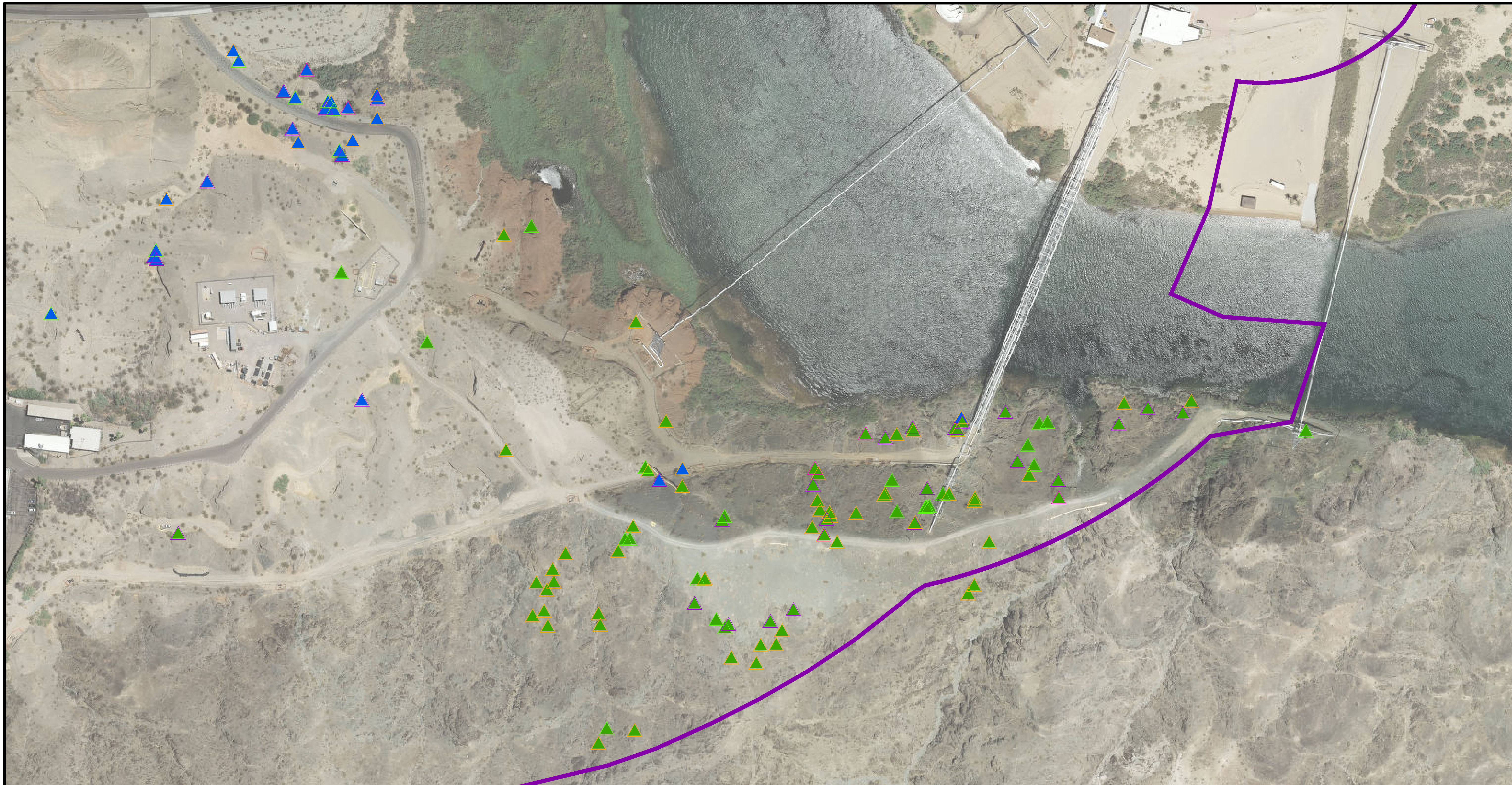
MAP 17



LEGEND

- EIR Project Area
- Blue Palo Verde
- Hillside Palo Verde

Height Designation

- Short
- Medium
- Tall
- Very Tall

0 175 350 700 Feet

N

FIGURE 3
DISTRIBUTION OF HILLSIDE PALO VERDE IN THE SURVEY AREA AT TOPOCK

PG&E Topock Compressor Station
Needles, California

CH2MHILL

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Appendix A
Photographs

Appendix A

Plate 1. (A) Salt cedar (*Tamarix ramosissima*) with flowering branches (B) and (C) athel tamarisk (*Tamarix aphylla*) with branches and leaves (D).

Plate 2. (A) Hillside palo verde (*Parkinsonia microphylla*) with branches and leaves (C) and flower (E)and (B) blue palo verde (*Parkinsonia florida*) with branches and leaves (D) and flower (F).

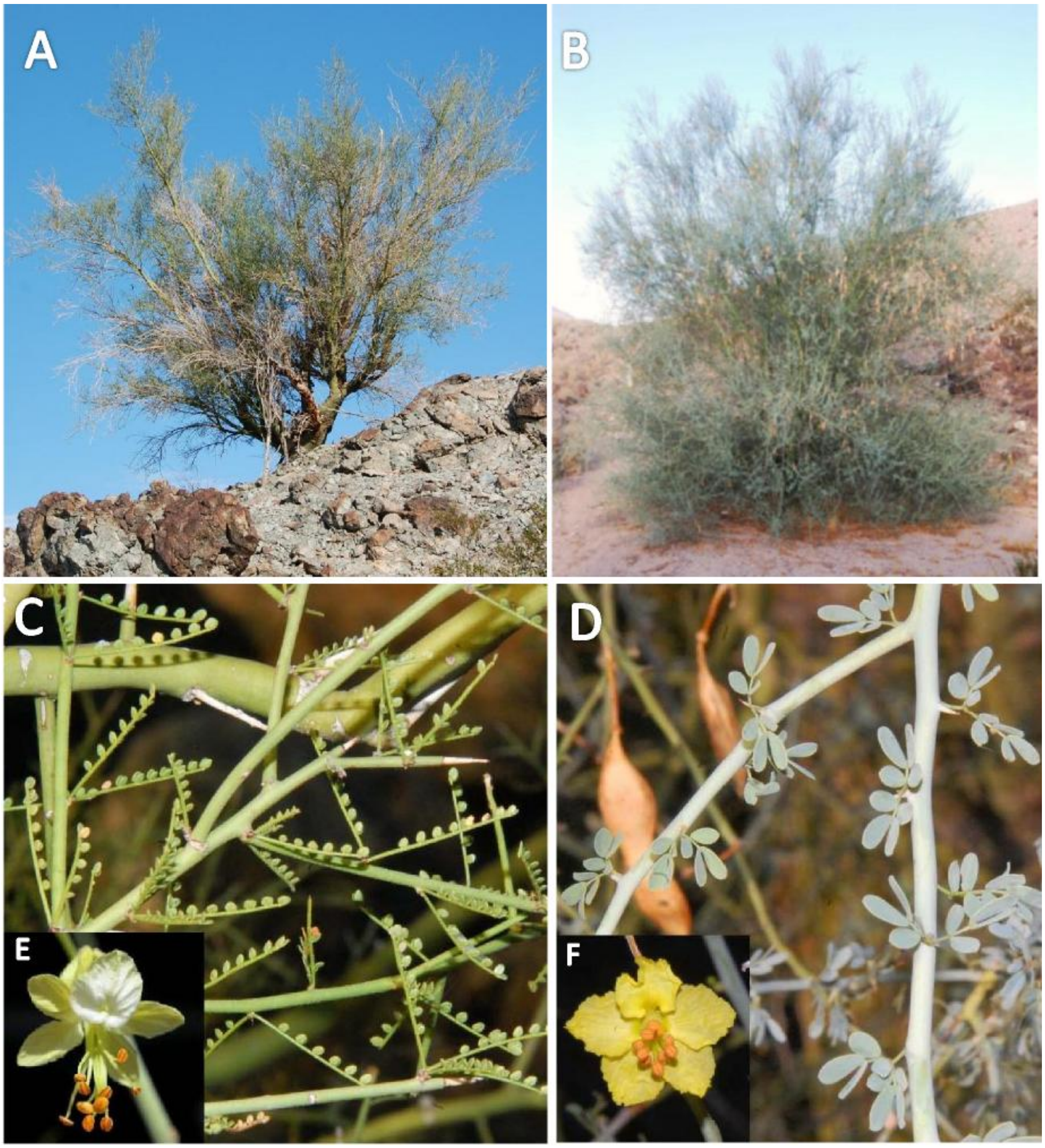


Plate 3. (A) Honey mesquite (*Prosopis glandulosa var. torreyana*) with close-up of fruit (B) and (C) Screwbean mesquite (*Prosopis pubescens*).

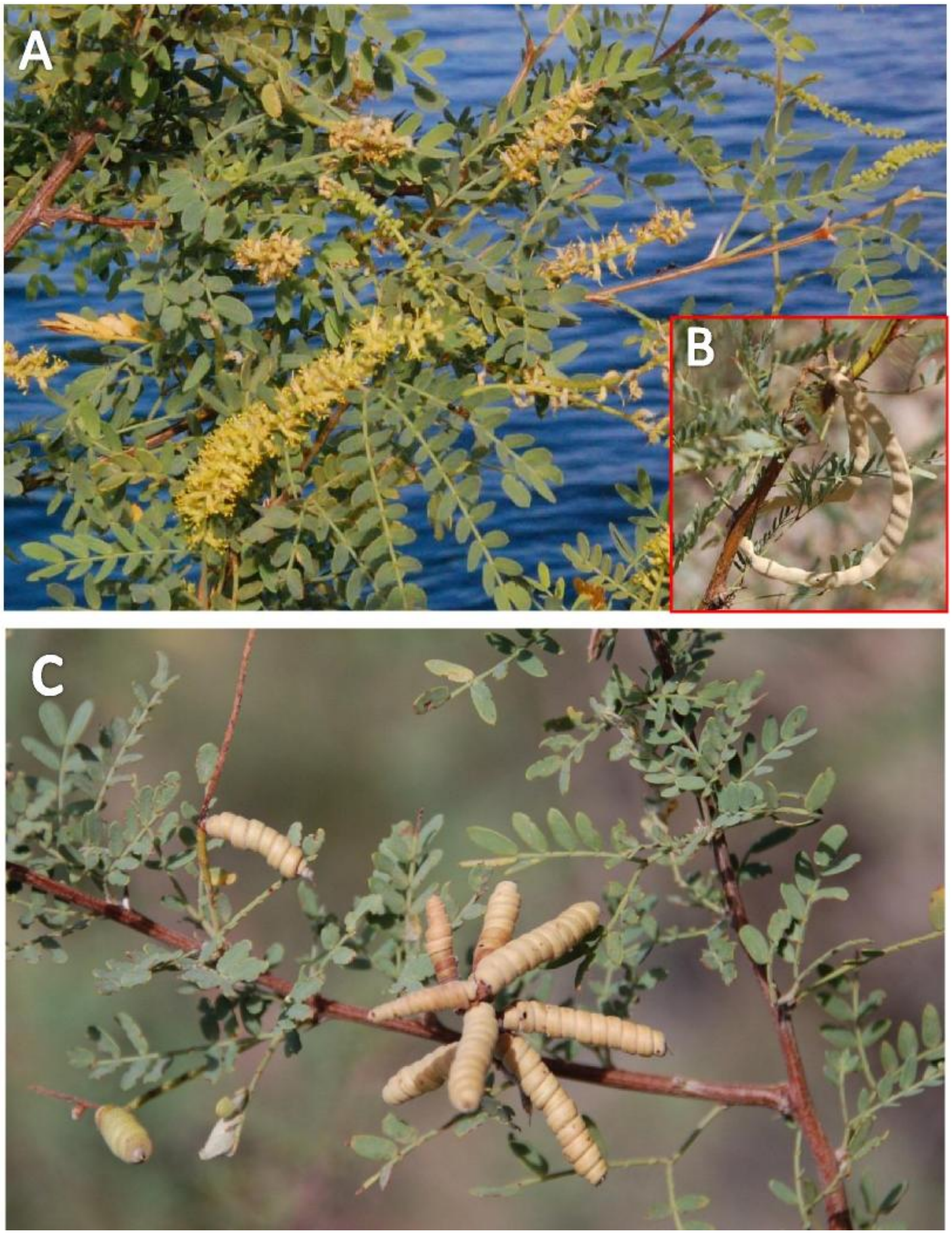


Plate 4. (A) Catclaw acacia (*Senegalia greggii*) and close-up of fruiting branch (B).

Plate 5. (A) Desert smoke tree and branches (B). (C&D) Arrow weed.

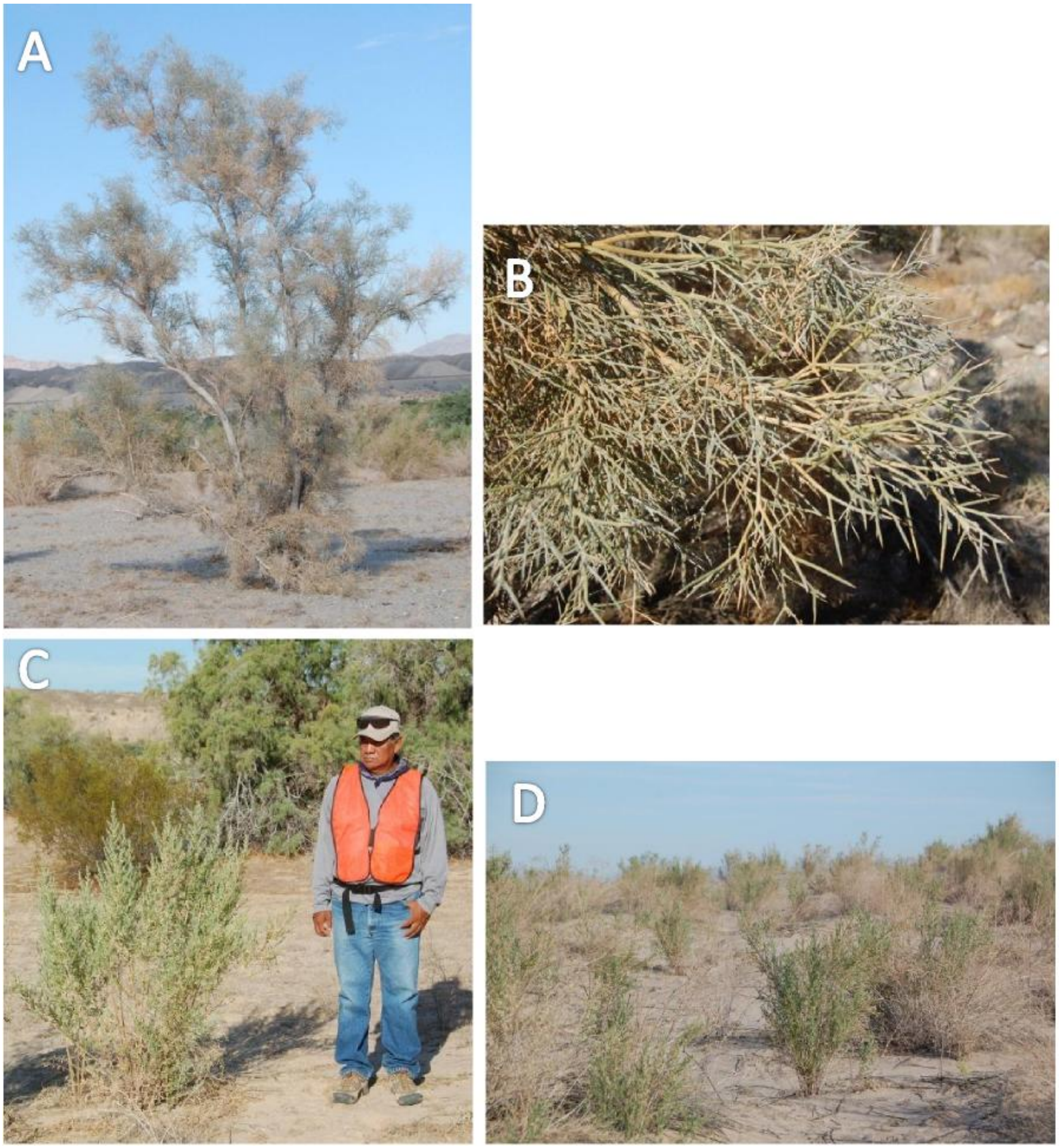
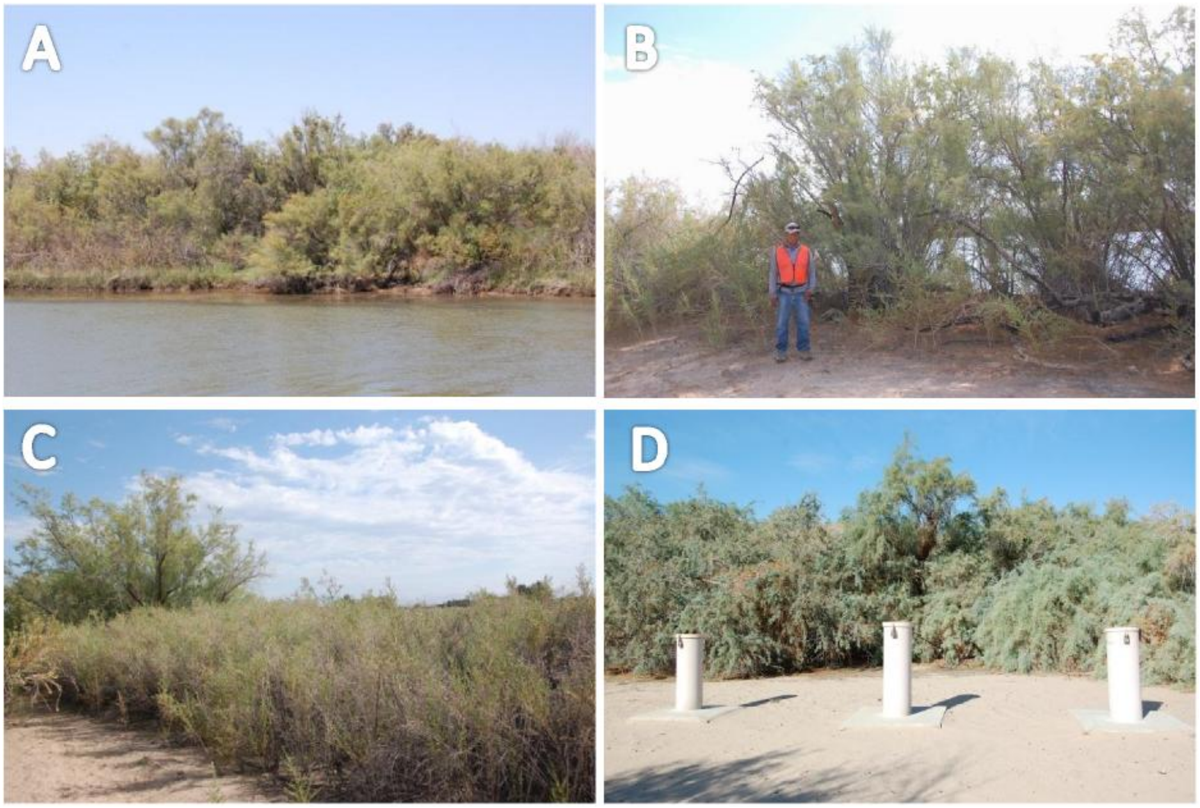


Plate 6. Wetland plants in Section I of the Survey Area. (A) California bulrush (*Schoenoplectus californicus*) marsh (1) and common reed (*Phragmites australis ssp. australis*) marsh (2) along the Colorado River, south of Interstate 40. (B) Eurasian genotype of common reed.

Plate 7. Screening of Survey Area in Section E by Mature Plants. (A) View of Section E shoreline from Topock Marina. (B) View from flood plain (Section E) towards Topock Marina with, from left to right, arrow weed, salt cedar and honey mesquite. (C) Dense arrow weed thicket and honey mesquite on flood plain in Section E. (D) Screening of well heads in flood plain by salt cedar.



Appendix B
Individual Mature Plants Survey Data

Apendix B. Mature plant points for Topock Compressor Station: size, health & location.

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
TREES							
1	Athel tamarisk	*Tamarix aphylla*	Medium	Good	727651.7605	3845370.553	ID_621
2	Athel tamarisk	*Tamarix aphylla*	Medium	Good	729111.8949	3843709.388	ID_196
3	Athel tamarisk	*Tamarix aphylla*	Tall	Good	727708.3417	3845337.217	ID_625
4	Athel tamarisk	*Tamarix aphylla*	Tall	Good	727719.9001	3845329.815	ID_626
5	Athel tamarisk	*Tamarix aphylla*	Tall	Good	727721.0248	3845341.457	ID_627
6	Athel tamarisk	*Tamarix aphylla*	Tall	Good	729169.7124	3843677.501	ID_207
7	Athel tamarisk	*Tamarix aphylla*	Tall	Good	730035.8007	3845086.634	ID_236
8	Athel tamarisk	*Tamarix aphylla*	Tall	Good	730049.8047	3845046.954	ID_240
9	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	731034.5506	3845180.448	ID_1546
10	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	731048.3489	3845188.574	ID_1547
11	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	731047.3924	3845242.395	ID_1548
12	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	729447.1755	3844504.343	ID_1460
13	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	729447.7052	3844510.548	ID_1464
14	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	730138.5652	3844985.966	ID_1206
15	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	730123.7943	3844993.269	ID_1207
16	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	730106.3832	3844984.363	ID_1208
17	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	729390.7124	3845170.568	ID_857
18	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	729390.7124	3845170.568	ID_756
19	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	727652.0334	3845363.829	ID_620
20	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	727661.2031	3845385.669	ID_622
21	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	727691.4108	3845392.019	ID_623
22	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	727683.5622	3845296.362	ID_624
23	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	727736.9559	3845418.143	ID_628
24	Athel tamarisk	*Tamarix aphylla*	Very Tall	Good	730189.0983	3844919.772	ID_227
25	Blue palo verde	*Parkinsonia florida*	Short	Poor	729360.4593	3845049.309	ID_560
26	Blue palo verde	*Parkinsonia florida*	Short	Poor	727386.734	3845332.409	ID_1793
27	Blue palo verde	*Parkinsonia florida*	Short	Fair	728818.7997	3844888.821	ID_1174
28	Blue palo verde	*Parkinsonia florida*	Short	Fair	727527.6944	3845375.892	ID_44
29	Blue palo verde	*Parkinsonia florida*	Short	Fair	727513.865	3845365.382	ID_45
30	Blue palo verde	*Parkinsonia florida*	Short	Good	727422.8603	3845383.606	ID_1795
31	Blue palo verde	*Parkinsonia florida*	Short	Good	727426.0379	3845368.076	ID_1796
32	Blue palo verde	*Parkinsonia florida*	Short	Good	727431.1701	3845357.413	ID_1797
33	Blue palo verde	*Parkinsonia florida*	Short	Good	727527.4903	3845375.655	ID_1798
34	Blue palo verde	*Parkinsonia florida*	Short	Good	729725.8315	3844351.228	ID_1344
35	Blue palo verde	*Parkinsonia florida*	Short	Good	729426.1959	3844598.182	ID_1362
36	Blue palo verde	*Parkinsonia florida*	Short	Good	729430.1173	3844584.886	ID_1364
37	Blue palo verde	*Parkinsonia florida*	Short	Good	728547.3955	3845133.345	ID_1159
38	Blue palo verde	*Parkinsonia florida*	Short	Good	728532.8769	3845025.224	ID_1163
39	Blue palo verde	*Parkinsonia florida*	Short	Good	727844.3208	3845435.495	ID_1026
40	Blue palo verde	*Parkinsonia florida*	Short	Good	730604.2211	3844579.439	ID_1033
41	Blue palo verde	*Parkinsonia florida*	Short	Good	730605.0209	3844568.484	ID_1034
42	Blue palo verde	*Parkinsonia florida*	Short	Good	727656.475	3845265.972	ID_903

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
43	Blue palo verde	*Parkinsonia florida*	Short	Good	727655.8788	3845273.976	ID_904
44	Blue palo verde	*Parkinsonia florida*	Short	Good	727664.6081	3845299.022	ID_905
45	Blue palo verde	*Parkinsonia florida*	Short	Good	727974.1757	3845461.306	ID_909
46	Blue palo verde	*Parkinsonia florida*	Short	Good	727976.3426	3845461.622	ID_910
47	Blue palo verde	*Parkinsonia florida*	Short	Good	728129.6994	3845523.685	ID_913
48	Blue palo verde	*Parkinsonia florida*	Short	Good	728157.3473	3845499.51	ID_917
49	Blue palo verde	*Parkinsonia florida*	Short	Good	728809.0673	3845591.586	ID_933
50	Blue palo verde	*Parkinsonia florida*	Short	Good	729587.1718	3845199.149	ID_948
51	Blue palo verde	*Parkinsonia florida*	Short	Good	729690.1575	3844964.445	ID_954
52	Blue palo verde	*Parkinsonia florida*	Short	Good	729445.1433	3844884.661	ID_782
53	Blue palo verde	*Parkinsonia florida*	Short	Good	729442.7148	3844926.875	ID_792
54	Blue palo verde	*Parkinsonia florida*	Short	Good	729416.6142	3845029.771	ID_805
55	Blue palo verde	*Parkinsonia florida*	Short	Good	729405.5209	3844947.374	ID_812
56	Blue palo verde	*Parkinsonia florida*	Short	Good	729413.6417	3844809.262	ID_818
57	Blue palo verde	*Parkinsonia florida*	Short	Good	729425.3697	3844703.526	ID_819
58	Blue palo verde	*Parkinsonia florida*	Short	Good	729428.4032	3844675.3	ID_821
59	Blue palo verde	*Parkinsonia florida*	Short	Good	729333.9105	3845035.42	ID_823
60	Blue palo verde	*Parkinsonia florida*	Short	Good	729339.1798	3845133.335	ID_833
61	Blue palo verde	*Parkinsonia florida*	Short	Good	729328.942	3845145.967	ID_841
62	Blue palo verde	*Parkinsonia florida*	Short	Good	729490.201	3844995.325	ID_862
63	Blue palo verde	*Parkinsonia florida*	Short	Good	729445.1433	3844884.661	ID_681
64	Blue palo verde	*Parkinsonia florida*	Short	Good	729442.7148	3844926.875	ID_691
65	Blue palo verde	*Parkinsonia florida*	Short	Good	729416.6142	3845029.771	ID_704
66	Blue palo verde	*Parkinsonia florida*	Short	Good	729405.5209	3844947.374	ID_711
67	Blue palo verde	*Parkinsonia florida*	Short	Good	729413.6417	3844809.262	ID_717
68	Blue palo verde	*Parkinsonia florida*	Short	Good	729425.3697	3844703.526	ID_718
69	Blue palo verde	*Parkinsonia florida*	Short	Good	729428.4032	3844675.3	ID_720
70	Blue palo verde	*Parkinsonia florida*	Short	Good	729333.9105	3845035.42	ID_722
71	Blue palo verde	*Parkinsonia florida*	Short	Good	729339.1798	3845133.335	ID_732
72	Blue palo verde	*Parkinsonia florida*	Short	Good	729328.942	3845145.967	ID_740
73	Blue palo verde	*Parkinsonia florida*	Short	Good	729490.201	3844995.325	ID_761
74	Blue palo verde	*Parkinsonia florida*	Short	Good	729456.1005	3844905.149	ID_544
75	Blue palo verde	*Parkinsonia florida*	Short	Good	729456.9485	3844918.002	ID_545
76	Blue palo verde	*Parkinsonia florida*	Short	Good	729454.2519	3844925.087	ID_546
77	Blue palo verde	*Parkinsonia florida*	Short	Good	729449.1864	3844960.916	ID_548
78	Blue palo verde	*Parkinsonia florida*	Short	Good	729415.3762	3845041.95	ID_554
79	Blue palo verde	*Parkinsonia florida*	Short	Good	729384.9039	3845017.921	ID_559
80	Blue palo verde	*Parkinsonia florida*	Short	Good	729361.3144	3845084.918	ID_563
81	Blue palo verde	*Parkinsonia florida*	Short	Good	729382.8683	3845108.306	ID_570
82	Blue palo verde	*Parkinsonia florida*	Short	Good	729353.1129	3845139.241	ID_573
83	Blue palo verde	*Parkinsonia florida*	Short	Good	727297.8756	3845292.844	ID_606
84	Blue palo verde	*Parkinsonia florida*	Short	Good	727353.9319	3845325.245	ID_610
85	Blue palo verde	*Parkinsonia florida*	Short	Good	727400.5114	3845342.61	ID_613
86	Blue palo verde	*Parkinsonia florida*	Short	Good	729854.0846	3844419.427	ID_158
87	Blue palo verde	*Parkinsonia florida*	Short	Good	729652.5699	3844308.288	ID_167
88	Blue palo verde	*Parkinsonia florida*	Short	Good	729850.2242	3844448.093	ID_214

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
89	Blue palo verde	*Parkinsonia florida*	Short	Good	729846.4658	3844453.641	ID_217
90	Blue palo verde	*Parkinsonia florida*	Short	Good	729823.8647	3844456.416	ID_218
91	Blue palo verde	*Parkinsonia florida*	Short	Good	729784.6863	3844482.463	ID_220
92	Blue palo verde	*Parkinsonia florida*	Short	Good	728994.0734	3845286.395	ID_274
93	Blue palo verde	*Parkinsonia florida*	Short	Good	728554.0217	3845103.588	ID_311
94	Blue palo verde	*Parkinsonia florida*	Short	Good	728804.6738	3844905.786	ID_321
95	Blue palo verde	*Parkinsonia florida*	Short	Good	728812.4262	3844887.721	ID_323
96	Blue palo verde	*Parkinsonia florida*	Short	Good	727549.7785	3845195.347	ID_41
97	Blue palo verde	*Parkinsonia florida*	Short	Good	727555.027	3845402.564	ID_42
98	Blue palo verde	*Parkinsonia florida*	Short	Good	727547.8179	3845398.517	ID_43
99	Blue palo verde	*Parkinsonia florida*	Short	Good	727615.1112	3845370.265	ID_46
100	Blue palo verde	*Parkinsonia florida*	Short	Good	728101.1409	3845516.121	ID_56
101	Blue palo verde	*Parkinsonia florida*	Short	Good	729586.5847	3845202.145	ID_74
102	Blue palo verde	*Parkinsonia florida*	Short	Good	729717.0808	3844867.062	ID_80
103	Blue palo verde	*Parkinsonia florida*	Short	Good	729718.1385	3844862.208	ID_81
104	Blue palo verde	*Parkinsonia florida*	Short	Good	729719.9408	3844849.039	ID_83
105	Blue palo verde	*Parkinsonia florida*	Short	Good	729720.251	3844831.728	ID_85
106	Blue palo verde	*Parkinsonia florida*	Short	Good	729721.5262	3844822.828	ID_86
107	Blue palo verde	*Parkinsonia florida*	Medium	Poor	728864.4758	3845310.374	ID_1142
108	Blue palo verde	*Parkinsonia florida*	Medium	Poor	729353.9366	3845053.975	ID_561
109	Blue palo verde	*Parkinsonia florida*	Medium	Poor	729351.7111	3845059.288	ID_562
110	Blue palo verde	*Parkinsonia florida*	Medium	Poor	729193.8278	3845509.181	ID_247
111	Blue palo verde	*Parkinsonia florida*	Medium	Poor	728826.2893	3845209.67	ID_297
112	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728963.1125	3845278.294	ID_1130
113	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728964.576	3845303.524	ID_1131
114	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728948.0883	3845295.563	ID_1132
115	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728944.3097	3845298.03	ID_1133
116	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728941.4077	3845297.704	ID_1134
117	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729561.6705	3845253.126	ID_946
118	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729343.2278	3845187.668	ID_853
119	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729343.2278	3845187.668	ID_752
120	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729447.2587	3844801.994	ID_539
121	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729427.9621	3845038.829	ID_553
122	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729374.8534	3845148.747	ID_586
123	Blue palo verde	*Parkinsonia florida*	Medium	Fair	727302.8588	3845244.985	ID_608
124	Blue palo verde	*Parkinsonia florida*	Medium	Fair	730090.2393	3844195.938	ID_354
125	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729450.211	3844599.624	ID_169
126	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729431.0512	3844650.427	ID_177
127	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729472.8132	3844650.082	ID_178
128	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729780.9088	3844489.615	ID_221
129	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729076.5758	3845340.115	ID_261
130	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728944.3276	3845287.148	ID_279
131	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728868.9069	3845275.31	ID_286
132	Blue palo verde	*Parkinsonia florida*	Medium	Fair	728574.7543	3844923.873	ID_318
133	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729079.8861	3845090.097	ID_324
134	Blue palo verde	*Parkinsonia florida*	Medium	Fair	729138.1811	3845340.414	ID_335

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
135	Blue palo verde	*Parkinsonia florida*	Medium	Good	727316.4979	3845428.394	ID_1780
136	Blue palo verde	*Parkinsonia florida*	Medium	Good	727316.406	3845424.158	ID_1784
137	Blue palo verde	*Parkinsonia florida*	Medium	Good	727381.3456	3845347.213	ID_1791
138	Blue palo verde	*Parkinsonia florida*	Medium	Good	730284.3873	3844229.772	ID_1613
139	Blue palo verde	*Parkinsonia florida*	Medium	Good	729429.694	3844585.303	ID_1363
140	Blue palo verde	*Parkinsonia florida*	Medium	Good	729431.6126	3844588.434	ID_1365
141	Blue palo verde	*Parkinsonia florida*	Medium	Good	729126.5344	3843676.72	ID_1401
142	Blue palo verde	*Parkinsonia florida*	Medium	Good	729880.3737	3844457.846	ID_1441
143	Blue palo verde	*Parkinsonia florida*	Medium	Good	729880.4803	3844441.485	ID_1443
144	Blue palo verde	*Parkinsonia florida*	Medium	Good	729073.7811	3845394.882	ID_1122
145	Blue palo verde	*Parkinsonia florida*	Medium	Good	728936.337	3845300.036	ID_1135
146	Blue palo verde	*Parkinsonia florida*	Medium	Good	728545.9105	3845065.31	ID_1161
147	Blue palo verde	*Parkinsonia florida*	Medium	Good	728530.4284	3845003.543	ID_1165
148	Blue palo verde	*Parkinsonia florida*	Medium	Good	728545.4833	3844898.947	ID_1168
149	Blue palo verde	*Parkinsonia florida*	Medium	Good	728806.9281	3844911.887	ID_1173
150	Blue palo verde	*Parkinsonia florida*	Medium	Good	727517.055	3845769.469	ID_1000
151	Blue palo verde	*Parkinsonia florida*	Medium	Good	727766.4778	3845375.741	ID_1003
152	Blue palo verde	*Parkinsonia florida*	Medium	Good	727787.8889	3845362.747	ID_1005
153	Blue palo verde	*Parkinsonia florida*	Medium	Good	727925.9459	3845396.904	ID_1016
154	Blue palo verde	*Parkinsonia florida*	Medium	Good	727916.0807	3845421.077	ID_1017
155	Blue palo verde	*Parkinsonia florida*	Medium	Good	727924.1105	3845429.523	ID_1018
156	Blue palo verde	*Parkinsonia florida*	Medium	Good	727917.3347	3845431.861	ID_1020
157	Blue palo verde	*Parkinsonia florida*	Medium	Good	727870.2387	3845435.582	ID_1025
158	Blue palo verde	*Parkinsonia florida*	Medium	Good	730565.28	3844560.414	ID_1029
159	Blue palo verde	*Parkinsonia florida*	Medium	Good	727317.2458	3845562.596	ID_982
160	Blue palo verde	*Parkinsonia florida*	Medium	Good	727648.9308	3845279.018	ID_901
161	Blue palo verde	*Parkinsonia florida*	Medium	Good	727652.9325	3845269.124	ID_902
162	Blue palo verde	*Parkinsonia florida*	Medium	Good	727663.3346	3845302.008	ID_906
163	Blue palo verde	*Parkinsonia florida*	Medium	Good	727648.6063	3845311.81	ID_907
164	Blue palo verde	*Parkinsonia florida*	Medium	Good	728133.4928	3845523.437	ID_914
165	Blue palo verde	*Parkinsonia florida*	Medium	Good	728171.0277	3845508.384	ID_920
166	Blue palo verde	*Parkinsonia florida*	Medium	Good	728735.9706	3845584.565	ID_927
167	Blue palo verde	*Parkinsonia florida*	Medium	Good	728784.8984	3845587.881	ID_930
168	Blue palo verde	*Parkinsonia florida*	Medium	Good	729556.4428	3845255.329	ID_945
169	Blue palo verde	*Parkinsonia florida*	Medium	Good	729689.9837	3844963.858	ID_955
170	Blue palo verde	*Parkinsonia florida*	Medium	Good	729691.0988	3844959.73	ID_956
171	Blue palo verde	*Parkinsonia florida*	Medium	Good	729687.4732	3844955.498	ID_957
172	Blue palo verde	*Parkinsonia florida*	Medium	Good	729655.1491	3844926.032	ID_960
173	Blue palo verde	*Parkinsonia florida*	Medium	Good	729654.9218	3844908.696	ID_961
174	Blue palo verde	*Parkinsonia florida*	Medium	Good	729665.9479	3844934.086	ID_964
175	Blue palo verde	*Parkinsonia florida*	Medium	Good	729448.2808	3844760.692	ID_771
176	Blue palo verde	*Parkinsonia florida*	Medium	Good	729450.2879	3844775.889	ID_773
177	Blue palo verde	*Parkinsonia florida*	Medium	Good	729449.2873	3844782.301	ID_774
178	Blue palo verde	*Parkinsonia florida*	Medium	Good	729430.4214	3844854.025	ID_778
179	Blue palo verde	*Parkinsonia florida*	Medium	Good	729443.5161	3844875.462	ID_781
180	Blue palo verde	*Parkinsonia florida*	Medium	Good	729446.6853	3844898.504	ID_787

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
181	Blue palo verde	*Parkinsonia florida*	Medium	Good	729447.6238	3844918.394	ID_789
182	Blue palo verde	*Parkinsonia florida*	Medium	Good	729439.6349	3844919.493	ID_793
183	Blue palo verde	*Parkinsonia florida*	Medium	Good	729415.143	3844950.329	ID_810
184	Blue palo verde	*Parkinsonia florida*	Medium	Good	729406.6809	3844944.853	ID_811
185	Blue palo verde	*Parkinsonia florida*	Medium	Good	729425.2544	3844684.499	ID_820
186	Blue palo verde	*Parkinsonia florida*	Medium	Good	729342.8591	3845039.352	ID_822
187	Blue palo verde	*Parkinsonia florida*	Medium	Good	729339.9034	3845045.994	ID_824
188	Blue palo verde	*Parkinsonia florida*	Medium	Good	729334.2009	3845105.021	ID_830
189	Blue palo verde	*Parkinsonia florida*	Medium	Good	729338.1128	3845134.515	ID_834
190	Blue palo verde	*Parkinsonia florida*	Medium	Good	729324.1653	3845112.348	ID_835
191	Blue palo verde	*Parkinsonia florida*	Medium	Good	729340.6192	3845138.791	ID_839
192	Blue palo verde	*Parkinsonia florida*	Medium	Good	729334.2835	3845150.528	ID_842
193	Blue palo verde	*Parkinsonia florida*	Medium	Good	729336.564	3845173.85	ID_848
194	Blue palo verde	*Parkinsonia florida*	Medium	Good	729332.3679	3845185.595	ID_850
195	Blue palo verde	*Parkinsonia florida*	Medium	Good	729493.5179	3844983.34	ID_864
196	Blue palo verde	*Parkinsonia florida*	Medium	Good	729496.2233	3844980.447	ID_865
197	Blue palo verde	*Parkinsonia florida*	Medium	Good	729512.4663	3844965.505	ID_866
198	Blue palo verde	*Parkinsonia florida*	Medium	Good	729448.2808	3844760.692	ID_670
199	Blue palo verde	*Parkinsonia florida*	Medium	Good	729450.2879	3844775.889	ID_672
200	Blue palo verde	*Parkinsonia florida*	Medium	Good	729449.2873	3844782.301	ID_673
201	Blue palo verde	*Parkinsonia florida*	Medium	Good	729430.4214	3844854.025	ID_677
202	Blue palo verde	*Parkinsonia florida*	Medium	Good	729443.5161	3844875.462	ID_680
203	Blue palo verde	*Parkinsonia florida*	Medium	Good	729446.6853	3844898.504	ID_686
204	Blue palo verde	*Parkinsonia florida*	Medium	Good	729447.6238	3844918.394	ID_688
205	Blue palo verde	*Parkinsonia florida*	Medium	Good	729439.6349	3844919.493	ID_692
206	Blue palo verde	*Parkinsonia florida*	Medium	Good	729415.143	3844950.329	ID_709
207	Blue palo verde	*Parkinsonia florida*	Medium	Good	729406.6809	3844944.853	ID_710
208	Blue palo verde	*Parkinsonia florida*	Medium	Good	729425.2544	3844684.499	ID_719
209	Blue palo verde	*Parkinsonia florida*	Medium	Good	729342.8591	3845039.352	ID_721
210	Blue palo verde	*Parkinsonia florida*	Medium	Good	729339.9034	3845045.994	ID_723
211	Blue palo verde	*Parkinsonia florida*	Medium	Good	729334.2009	3845105.021	ID_729
212	Blue palo verde	*Parkinsonia florida*	Medium	Good	729338.1128	3845134.515	ID_733
213	Blue palo verde	*Parkinsonia florida*	Medium	Good	729324.1653	3845112.348	ID_734
214	Blue palo verde	*Parkinsonia florida*	Medium	Good	729340.6192	3845138.791	ID_738
215	Blue palo verde	*Parkinsonia florida*	Medium	Good	729334.2835	3845150.528	ID_741
216	Blue palo verde	*Parkinsonia florida*	Medium	Good	729336.564	3845173.85	ID_747
217	Blue palo verde	*Parkinsonia florida*	Medium	Good	729332.3679	3845185.595	ID_749
218	Blue palo verde	*Parkinsonia florida*	Medium	Good	729493.5179	3844983.34	ID_763
219	Blue palo verde	*Parkinsonia florida*	Medium	Good	729496.2233	3844980.447	ID_764
220	Blue palo verde	*Parkinsonia florida*	Medium	Good	729512.4663	3844965.505	ID_765
221	Blue palo verde	*Parkinsonia florida*	Medium	Good	729447.8194	3844855.677	ID_541
222	Blue palo verde	*Parkinsonia florida*	Medium	Good	729450.4162	3844875.853	ID_543
223	Blue palo verde	*Parkinsonia florida*	Medium	Good	729446.7042	3844969.658	ID_549
224	Blue palo verde	*Parkinsonia florida*	Medium	Good	729448.4467	3845012.497	ID_551
225	Blue palo verde	*Parkinsonia florida*	Medium	Good	729431.9983	3845020.397	ID_552
226	Blue palo verde	*Parkinsonia florida*	Medium	Good	729368.0405	3845032.016	ID_556

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
227	Blue palo verde	*Parkinsonia florida*	Medium	Good	729382.7001	3845026.653	ID_558
228	Blue palo verde	*Parkinsonia florida*	Medium	Good	729367.1116	3845097.941	ID_565
229	Blue palo verde	*Parkinsonia florida*	Medium	Good	729355.9083	3845103.539	ID_568
230	Blue palo verde	*Parkinsonia florida*	Medium	Good	729349.9974	3845144.317	ID_574
231	Blue palo verde	*Parkinsonia florida*	Medium	Good	729357.1245	3845170.611	ID_575
232	Blue palo verde	*Parkinsonia florida*	Medium	Good	729356.6468	3845194.246	ID_579
233	Blue palo verde	*Parkinsonia florida*	Medium	Good	729355.818	3845205.202	ID_580
234	Blue palo verde	*Parkinsonia florida*	Medium	Good	729351.6843	3845218.777	ID_581
235	Blue palo verde	*Parkinsonia florida*	Medium	Good	729420.657	3845018.721	ID_592
236	Blue palo verde	*Parkinsonia florida*	Medium	Good	729462.0036	3844990.21	ID_593
237	Blue palo verde	*Parkinsonia florida*	Medium	Good	729471.2865	3844965.087	ID_594
238	Blue palo verde	*Parkinsonia florida*	Medium	Good	729463.9672	3844951.812	ID_595
239	Blue palo verde	*Parkinsonia florida*	Medium	Good	729467.5509	3844934.416	ID_596
240	Blue palo verde	*Parkinsonia florida*	Medium	Good	729477.3059	3844914.271	ID_598
241	Blue palo verde	*Parkinsonia florida*	Medium	Good	727278.439	3845457.649	ID_602
242	Blue palo verde	*Parkinsonia florida*	Medium	Good	727336.1628	3845370.867	ID_609
243	Blue palo verde	*Parkinsonia florida*	Medium	Good	727347.722	3845226.48	ID_612
244	Blue palo verde	*Parkinsonia florida*	Medium	Good	727392.9918	3845349.069	ID_614
245	Blue palo verde	*Parkinsonia florida*	Medium	Good	727414.6825	3845382.442	ID_618
246	Blue palo verde	*Parkinsonia florida*	Medium	Good	727412.7676	3845351.873	ID_619
247	Blue palo verde	*Parkinsonia florida*	Medium	Good	729863.3255	3844426.394	ID_156
248	Blue palo verde	*Parkinsonia florida*	Medium	Good	729825.3888	3844425.526	ID_159
249	Blue palo verde	*Parkinsonia florida*	Medium	Good	729733.5063	3844386.922	ID_166
250	Blue palo verde	*Parkinsonia florida*	Medium	Good	729450.7013	3844650.171	ID_176
251	Blue palo verde	*Parkinsonia florida*	Medium	Good	729848.5805	3844453.287	ID_216
252	Blue palo verde	*Parkinsonia florida*	Medium	Good	729116.2765	3845391.209	ID_251
253	Blue palo verde	*Parkinsonia florida*	Medium	Good	729132.3032	3845348.688	ID_256
254	Blue palo verde	*Parkinsonia florida*	Medium	Good	729085.2545	3845334.253	ID_263
255	Blue palo verde	*Parkinsonia florida*	Medium	Good	729056.6151	3845319.874	ID_270
256	Blue palo verde	*Parkinsonia florida*	Medium	Good	729007.2958	3845285.533	ID_273
257	Blue palo verde	*Parkinsonia florida*	Medium	Good	728988.4781	3845289.974	ID_275
258	Blue palo verde	*Parkinsonia florida*	Medium	Good	728982.168	3845292.21	ID_276
259	Blue palo verde	*Parkinsonia florida*	Medium	Good	728969.4378	3845265.686	ID_278
260	Blue palo verde	*Parkinsonia florida*	Medium	Good	728923.8185	3845294.138	ID_281
261	Blue palo verde	*Parkinsonia florida*	Medium	Good	728900.0217	3845309.793	ID_283
262	Blue palo verde	*Parkinsonia florida*	Medium	Good	728896.2809	3845310.186	ID_284
263	Blue palo verde	*Parkinsonia florida*	Medium	Good	728823.0344	3845245.506	ID_288
264	Blue palo verde	*Parkinsonia florida*	Medium	Good	728820.0918	3845243.805	ID_289
265	Blue palo verde	*Parkinsonia florida*	Medium	Good	728820.0094	3845232.592	ID_290
266	Blue palo verde	*Parkinsonia florida*	Medium	Good	728822.5033	3845228.476	ID_291
267	Blue palo verde	*Parkinsonia florida*	Medium	Good	728809.2527	3845253.879	ID_292
268	Blue palo verde	*Parkinsonia florida*	Medium	Good	728809.6863	3845249.912	ID_293
269	Blue palo verde	*Parkinsonia florida*	Medium	Good	728811.3492	3845236.698	ID_295
270	Blue palo verde	*Parkinsonia florida*	Medium	Good	728819.3295	3845198.37	ID_298
271	Blue palo verde	*Parkinsonia florida*	Medium	Good	728810.8052	3845192.381	ID_299
272	Blue palo verde	*Parkinsonia florida*	Medium	Good	728801.9158	3845180.087	ID_300

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
273	Blue palo verde	*Parkinsonia florida*	Medium	Good	728802.5757	3845171.86	ID_301
274	Blue palo verde	*Parkinsonia florida*	Medium	Good	728782.738	3845154.275	ID_302
275	Blue palo verde	*Parkinsonia florida*	Medium	Good	728758.506	3845145.283	ID_303
276	Blue palo verde	*Parkinsonia florida*	Medium	Good	728621.1769	3845190.989	ID_305
277	Blue palo verde	*Parkinsonia florida*	Medium	Good	728620.0828	3845202.623	ID_307
278	Blue palo verde	*Parkinsonia florida*	Medium	Good	728545.8995	3845128.902	ID_310
279	Blue palo verde	*Parkinsonia florida*	Medium	Good	728553.7576	3845060.849	ID_312
280	Blue palo verde	*Parkinsonia florida*	Medium	Good	728544.1964	3845004.015	ID_315
281	Blue palo verde	*Parkinsonia florida*	Medium	Good	728851.8872	3844887.112	ID_319
282	Blue palo verde	*Parkinsonia florida*	Medium	Good	729143.8986	3845313.293	ID_331
283	Blue palo verde	*Parkinsonia florida*	Medium	Good	729148.6874	3845317.407	ID_332
284	Blue palo verde	*Parkinsonia florida*	Medium	Good	727644.9688	3845241.225	ID_50
285	Blue palo verde	*Parkinsonia florida*	Medium	Good	727667.7521	3845307.29	ID_53
286	Blue palo verde	*Parkinsonia florida*	Medium	Good	727648.6201	3845321.57	ID_54
287	Blue palo verde	*Parkinsonia florida*	Medium	Good	727661.9465	3845357.775	ID_55
288	Blue palo verde	*Parkinsonia florida*	Medium	Good	728190.7409	3845544.453	ID_59
289	Blue palo verde	*Parkinsonia florida*	Medium	Good	728183.0943	3845542.725	ID_60
290	Blue palo verde	*Parkinsonia florida*	Medium	Good	729694.503	3844935.501	ID_76
291	Blue palo verde	*Parkinsonia florida*	Medium	Good	729703.4101	3844925.279	ID_77
292	Blue palo verde	*Parkinsonia florida*	Medium	Good	729715.6197	3844876.897	ID_79
293	Blue palo verde	*Parkinsonia florida*	Medium	Good	729717.5345	3844855.082	ID_82
294	Blue palo verde	*Parkinsonia florida*	Medium	Good	729720.368	3844836.443	ID_84
295	Blue palo verde	*Parkinsonia florida*	Medium	Good	729724.2099	3844781.949	ID_87
296	Blue palo verde	*Parkinsonia florida*	Tall	Poor	728791.4891	3845199.656	ID_1150
297	Blue palo verde	*Parkinsonia florida*	Tall	Poor	727972.2822	3845463.856	ID_908
298	Blue palo verde	*Parkinsonia florida*	Tall	Poor	729445.6448	3844973.173	ID_550
299	Blue palo verde	*Parkinsonia florida*	Tall	Fair	727293.1235	3845440.786	ID_1782
300	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729102.5037	3845417.763	ID_1114
301	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728914.0159	3845312.06	ID_1139
302	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729100.5169	3845405.568	ID_1115
303	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728827.1736	3845304.348	ID_1144
304	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728827.2956	3845297.489	ID_1145
305	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728785.6549	3845191.761	ID_1151
306	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728786.139	3845183.976	ID_1152
307	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728722.7626	3845173.362	ID_1155
308	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728641.907	3845201.474	ID_1157
309	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728543.0902	3845087.176	ID_1160
310	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728528.6379	3845041.138	ID_1162
311	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728537.1226	3844912.707	ID_1167
312	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728786.7347	3845228.384	ID_1149
313	Blue palo verde	*Parkinsonia florida*	Tall	Fair	730585.2902	3844567.081	ID_1031
314	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729135.4893	3844848.57	ID_977
315	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728764.9143	3845586.582	ID_929
316	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729683.0108	3844951.302	ID_959
317	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729451.2839	3844731.462	ID_768
318	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729450.6557	3844753.783	ID_769

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
319	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729453.7024	3844756.636	ID_770
320	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729434.0597	3844941.447	ID_797
321	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729407.5439	3844967.1	ID_808
322	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729332.2945	3845153.201	ID_844
323	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729328.8973	3845158.509	ID_845
324	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729451.2839	3844731.462	ID_667
325	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729450.6557	3844753.783	ID_668
326	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729453.7024	3844756.636	ID_669
327	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729407.5439	3844967.1	ID_707
328	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729434.0597	3844941.447	ID_696
329	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729332.2945	3845153.201	ID_743
330	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729328.8973	3845158.509	ID_744
331	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729448.7582	3844796.866	ID_538
332	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729369.6025	3845030.621	ID_557
333	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729465.5976	3844925.172	ID_597
334	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728932.1145	3845283.358	ID_280
335	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728813.7362	3845222.366	ID_296
336	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728704.4784	3845165.611	ID_304
337	Blue palo verde	*Parkinsonia florida*	Tall	Fair	728532.9335	3844970.86	ID_317
338	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729151.5285	3845257.073	ID_328
339	Blue palo verde	*Parkinsonia florida*	Tall	Fair	727641.6705	3845236.995	ID_49
340	Blue palo verde	*Parkinsonia florida*	Tall	Fair	729581.5056	3845207.382	ID_72
341	Blue palo verde	*Parkinsonia florida*	Tall	Good	727311.1131	3845418.742	ID_1781
342	Blue palo verde	*Parkinsonia florida*	Tall	Good	727330.0699	3845309.554	ID_1787
343	Blue palo verde	*Parkinsonia florida*	Tall	Good	727425.6661	3845391.063	ID_1794
344	Blue palo verde	*Parkinsonia florida*	Tall	Good	729761.8632	3844398.845	ID_1343
345	Blue palo verde	*Parkinsonia florida*	Tall	Good	729724.4494	3844347.043	ID_1345
346	Blue palo verde	*Parkinsonia florida*	Tall	Good	729726.2925	3844345.12	ID_1346
347	Blue palo verde	*Parkinsonia florida*	Tall	Good	729451.3596	3844634.69	ID_1354
348	Blue palo verde	*Parkinsonia florida*	Tall	Good	729881.0838	3844455.171	ID_1440
349	Blue palo verde	*Parkinsonia florida*	Tall	Good	729102.9274	3845385.127	ID_1117
350	Blue palo verde	*Parkinsonia florida*	Tall	Good	729086.3543	3845386.921	ID_1118
351	Blue palo verde	*Parkinsonia florida*	Tall	Good	729077.0807	3845376.241	ID_1119
352	Blue palo verde	*Parkinsonia florida*	Tall	Good	729092.1627	3845377.511	ID_1120
353	Blue palo verde	*Parkinsonia florida*	Tall	Good	729059.6141	3845417.765	ID_1123
354	Blue palo verde	*Parkinsonia florida*	Tall	Good	729078.1794	3845417.325	ID_1124
355	Blue palo verde	*Parkinsonia florida*	Tall	Good	729059.293	3845399.379	ID_1125
356	Blue palo verde	*Parkinsonia florida*	Tall	Good	729018.242	3845320.934	ID_1126
357	Blue palo verde	*Parkinsonia florida*	Tall	Good	729017.8765	3845301.639	ID_1127
358	Blue palo verde	*Parkinsonia florida*	Tall	Good	728989.7277	3845299.751	ID_1128
359	Blue palo verde	*Parkinsonia florida*	Tall	Good	728969.9287	3845304.238	ID_1129
360	Blue palo verde	*Parkinsonia florida*	Tall	Good	728932.0906	3845302.478	ID_1136
361	Blue palo verde	*Parkinsonia florida*	Tall	Good	728930.5578	3845297.972	ID_1137
362	Blue palo verde	*Parkinsonia florida*	Tall	Good	728881.0326	3845304.524	ID_1140
363	Blue palo verde	*Parkinsonia florida*	Tall	Good	728870.878	3845304.577	ID_1141
364	Blue palo verde	*Parkinsonia florida*	Tall	Good	728857.2506	3845307.73	ID_1143

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
365	Blue palo verde	*Parkinsonia florida*	Tall	Good	728801.9346	3845278.46	ID_1148
366	Blue palo verde	*Parkinsonia florida*	Tall	Good	728777.5269	3845179.947	ID_1153
367	Blue palo verde	*Parkinsonia florida*	Tall	Good	728528.7513	3845002.303	ID_1166
368	Blue palo verde	*Parkinsonia florida*	Tall	Good	727776.2632	3845391.71	ID_1001
369	Blue palo verde	*Parkinsonia florida*	Tall	Good	727765.5346	3845378.122	ID_1002
370	Blue palo verde	*Parkinsonia florida*	Tall	Good	727782.0647	3845374.706	ID_1004
371	Blue palo verde	*Parkinsonia florida*	Tall	Good	727844.1675	3845394.98	ID_1008
372	Blue palo verde	*Parkinsonia florida*	Tall	Good	727875.7486	3845386.42	ID_1010
373	Blue palo verde	*Parkinsonia florida*	Tall	Good	727893.7106	3845346.348	ID_1013
374	Blue palo verde	*Parkinsonia florida*	Tall	Good	727897.179	3845348.443	ID_1014
375	Blue palo verde	*Parkinsonia florida*	Tall	Good	727912.1858	3845433.819	ID_1021
376	Blue palo verde	*Parkinsonia florida*	Tall	Good	730561.3177	3844573.416	ID_1030
377	Blue palo verde	*Parkinsonia florida*	Tall	Good	730593.4483	3844577.214	ID_1032
378	Blue palo verde	*Parkinsonia florida*	Tall	Good	730474.2562	3844564.156	ID_1041
379	Blue palo verde	*Parkinsonia florida*	Tall	Good	730410.4965	3844563.312	ID_1042
380	Blue palo verde	*Parkinsonia florida*	Tall	Good	727322.5976	3845583.213	ID_983
381	Blue palo verde	*Parkinsonia florida*	Tall	Good	727629.2501	3845177.215	ID_897
382	Blue palo verde	*Parkinsonia florida*	Tall	Good	727984.8793	3845460.114	ID_911
383	Blue palo verde	*Parkinsonia florida*	Tall	Good	728729.2918	3845584.238	ID_926
384	Blue palo verde	*Parkinsonia florida*	Tall	Good	729380.302	3845487.586	ID_944
385	Blue palo verde	*Parkinsonia florida*	Tall	Good	729687.6157	3844965.587	ID_953
386	Blue palo verde	*Parkinsonia florida*	Tall	Good	729659.9739	3844902.546	ID_962
387	Blue palo verde	*Parkinsonia florida*	Tall	Good	729665.2773	3844933.345	ID_963
388	Blue palo verde	*Parkinsonia florida*	Tall	Good	729442.9253	3844711.591	ID_766
389	Blue palo verde	*Parkinsonia florida*	Tall	Good	729451.7925	3844767.91	ID_772
390	Blue palo verde	*Parkinsonia florida*	Tall	Good	729441.6491	3844779.267	ID_775
391	Blue palo verde	*Parkinsonia florida*	Tall	Good	729436.2869	3844825.573	ID_777
392	Blue palo verde	*Parkinsonia florida*	Tall	Good	729442.3713	3844886.998	ID_783
393	Blue palo verde	*Parkinsonia florida*	Tall	Good	729448.2482	3844890.748	ID_784
394	Blue palo verde	*Parkinsonia florida*	Tall	Good	729446.8309	3844895.064	ID_786
395	Blue palo verde	*Parkinsonia florida*	Tall	Good	729449.4927	3844910.115	ID_788
396	Blue palo verde	*Parkinsonia florida*	Tall	Good	729447.5818	3844921.264	ID_790
397	Blue palo verde	*Parkinsonia florida*	Tall	Good	729431.5603	3844930.917	ID_795
398	Blue palo verde	*Parkinsonia florida*	Tall	Good	729424.0376	3844959.148	ID_798
399	Blue palo verde	*Parkinsonia florida*	Tall	Good	729422.9155	3844963.211	ID_799
400	Blue palo verde	*Parkinsonia florida*	Tall	Good	729427.0495	3844990.121	ID_801
401	Blue palo verde	*Parkinsonia florida*	Tall	Good	729405.4699	3844987.635	ID_807
402	Blue palo verde	*Parkinsonia florida*	Tall	Good	729410.477	3844952.998	ID_809
403	Blue palo verde	*Parkinsonia florida*	Tall	Good	729418.1063	3844911.371	ID_816
404	Blue palo verde	*Parkinsonia florida*	Tall	Good	729333.0093	3845054.434	ID_825
405	Blue palo verde	*Parkinsonia florida*	Tall	Good	729332.4069	3845069.411	ID_827
406	Blue palo verde	*Parkinsonia florida*	Tall	Good	729337.1524	3845096.355	ID_828
407	Blue palo verde	*Parkinsonia florida*	Tall	Good	729338.528	3845123.809	ID_831
408	Blue palo verde	*Parkinsonia florida*	Tall	Good	729335.9487	3845129.082	ID_832
409	Blue palo verde	*Parkinsonia florida*	Tall	Good	729309.5098	3845135.323	ID_837
410	Blue palo verde	*Parkinsonia florida*	Tall	Good	729332.5883	3845141.542	ID_840

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
411	Blue palo verde	*Parkinsonia florida*	Tall	Good	729333.236	3845160.612	ID_846
412	Blue palo verde	*Parkinsonia florida*	Tall	Good	729333.1878	3845166.374	ID_847
413	Blue palo verde	*Parkinsonia florida*	Tall	Good	729325.5802	3845179.587	ID_849
414	Blue palo verde	*Parkinsonia florida*	Tall	Good	729332.1352	3845187.394	ID_851
415	Blue palo verde	*Parkinsonia florida*	Tall	Good	729341.8966	3845181.07	ID_852
416	Blue palo verde	*Parkinsonia florida*	Tall	Good	729342.1565	3845197.304	ID_855
417	Blue palo verde	*Parkinsonia florida*	Tall	Good	729339.4585	3845203.452	ID_856
418	Blue palo verde	*Parkinsonia florida*	Tall	Good	729425.2349	3845039.229	ID_860
419	Blue palo verde	*Parkinsonia florida*	Tall	Good	729488.2852	3844988.44	ID_863
420	Blue palo verde	*Parkinsonia florida*	Tall	Good	729442.9253	3844711.591	ID_665
421	Blue palo verde	*Parkinsonia florida*	Tall	Good	729451.7925	3844767.91	ID_671
422	Blue palo verde	*Parkinsonia florida*	Tall	Good	729441.6491	3844779.267	ID_674
423	Blue palo verde	*Parkinsonia florida*	Tall	Good	729436.2869	3844825.573	ID_676
424	Blue palo verde	*Parkinsonia florida*	Tall	Good	729442.3713	3844886.998	ID_682
425	Blue palo verde	*Parkinsonia florida*	Tall	Good	729448.2482	3844890.748	ID_683
426	Blue palo verde	*Parkinsonia florida*	Tall	Good	729446.8309	3844895.064	ID_685
427	Blue palo verde	*Parkinsonia florida*	Tall	Good	729449.4927	3844910.115	ID_687
428	Blue palo verde	*Parkinsonia florida*	Tall	Good	729447.5818	3844921.264	ID_689
429	Blue palo verde	*Parkinsonia florida*	Tall	Good	729431.5603	3844930.917	ID_694
430	Blue palo verde	*Parkinsonia florida*	Tall	Good	729424.0376	3844959.148	ID_697
431	Blue palo verde	*Parkinsonia florida*	Tall	Good	729422.9155	3844963.211	ID_698
432	Blue palo verde	*Parkinsonia florida*	Tall	Good	729427.0495	3844990.121	ID_700
433	Blue palo verde	*Parkinsonia florida*	Tall	Good	729405.4699	3844987.635	ID_706
434	Blue palo verde	*Parkinsonia florida*	Tall	Good	729410.477	3844952.998	ID_708
435	Blue palo verde	*Parkinsonia florida*	Tall	Good	729418.1063	3844911.371	ID_715
436	Blue palo verde	*Parkinsonia florida*	Tall	Good	729333.0093	3845054.434	ID_724
437	Blue palo verde	*Parkinsonia florida*	Tall	Good	729332.4069	3845069.411	ID_726
438	Blue palo verde	*Parkinsonia florida*	Tall	Good	729337.1524	3845096.355	ID_727
439	Blue palo verde	*Parkinsonia florida*	Tall	Good	729338.528	3845123.809	ID_730
440	Blue palo verde	*Parkinsonia florida*	Tall	Good	729335.9487	3845129.082	ID_731
441	Blue palo verde	*Parkinsonia florida*	Tall	Good	729309.5098	3845135.323	ID_736
442	Blue palo verde	*Parkinsonia florida*	Tall	Good	729332.5883	3845141.542	ID_739
443	Blue palo verde	*Parkinsonia florida*	Tall	Good	729333.236	3845160.612	ID_745
444	Blue palo verde	*Parkinsonia florida*	Tall	Good	729333.1878	3845166.374	ID_746
445	Blue palo verde	*Parkinsonia florida*	Tall	Good	729325.5802	3845179.587	ID_748
446	Blue palo verde	*Parkinsonia florida*	Tall	Good	729332.1352	3845187.394	ID_750
447	Blue palo verde	*Parkinsonia florida*	Tall	Good	729341.8966	3845181.07	ID_751
448	Blue palo verde	*Parkinsonia florida*	Tall	Good	729342.1565	3845197.304	ID_754
449	Blue palo verde	*Parkinsonia florida*	Tall	Good	729339.4585	3845203.452	ID_755
450	Blue palo verde	*Parkinsonia florida*	Tall	Good	729425.2349	3845039.229	ID_759
451	Blue palo verde	*Parkinsonia florida*	Tall	Good	729488.2852	3844988.44	ID_762
452	Blue palo verde	*Parkinsonia florida*	Tall	Good	729452.1803	3844789.082	ID_537
453	Blue palo verde	*Parkinsonia florida*	Tall	Good	729451.4188	3844947.151	ID_547
454	Blue palo verde	*Parkinsonia florida*	Tall	Good	729408.6134	3845044.052	ID_555
455	Blue palo verde	*Parkinsonia florida*	Tall	Good	729359.8742	3845098.474	ID_566
456	Blue palo verde	*Parkinsonia florida*	Tall	Good	729360.763	3845116.276	ID_569

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
457	Blue palo verde	*Parkinsonia florida*	Tall	Good	729374.7186	3845118.367	ID_571
458	Blue palo verde	*Parkinsonia florida*	Tall	Good	729372.2796	3845138.535	ID_572
459	Blue palo verde	*Parkinsonia florida*	Tall	Good	729365.3715	3845174.342	ID_576
460	Blue palo verde	*Parkinsonia florida*	Tall	Good	729358.2884	3845179.215	ID_577
461	Blue palo verde	*Parkinsonia florida*	Tall	Good	729360.23	3845189.963	ID_578
462	Blue palo verde	*Parkinsonia florida*	Tall	Good	729335.5391	3845224.708	ID_582
463	Blue palo verde	*Parkinsonia florida*	Tall	Good	729393.5329	3845155.463	ID_583
464	Blue palo verde	*Parkinsonia florida*	Tall	Good	729389.1959	3845148.21	ID_584
465	Blue palo verde	*Parkinsonia florida*	Tall	Good	729384.1793	3845147.826	ID_585
466	Blue palo verde	*Parkinsonia florida*	Tall	Good	729375.7877	3845134.977	ID_587
467	Blue palo verde	*Parkinsonia florida*	Tall	Good	727283.5427	3845511.524	ID_599
468	Blue palo verde	*Parkinsonia florida*	Tall	Good	727264.5229	3845504.1	ID_600
469	Blue palo verde	*Parkinsonia florida*	Tall	Good	727278.7115	3845319.619	ID_605
470	Blue palo verde	*Parkinsonia florida*	Tall	Good	727402.8338	3845355.081	ID_615
471	Blue palo verde	*Parkinsonia florida*	Tall	Good	727402.1117	3845369.214	ID_616
472	Blue palo verde	*Parkinsonia florida*	Tall	Good	727405.9017	3845376.28	ID_617
473	Blue palo verde	*Parkinsonia florida*	Tall	Good	729009.4945	3845678.311	ID_380
474	Blue palo verde	*Parkinsonia florida*	Tall	Good	730074.2159	3844188.289	ID_353
475	Blue palo verde	*Parkinsonia florida*	Tall	Good	729855.9204	3844416.029	ID_157
476	Blue palo verde	*Parkinsonia florida*	Tall	Good	729821.5671	3844434.896	ID_160
477	Blue palo verde	*Parkinsonia florida*	Tall	Good	729451.0456	3844600.979	ID_170
478	Blue palo verde	*Parkinsonia florida*	Tall	Good	729448.1975	3844607.383	ID_171
479	Blue palo verde	*Parkinsonia florida*	Tall	Good	729444.9493	3844609.011	ID_172
480	Blue palo verde	*Parkinsonia florida*	Tall	Good	729445.8158	3844615.826	ID_173
481	Blue palo verde	*Parkinsonia florida*	Tall	Good	729441.6976	3844615.602	ID_174
482	Blue palo verde	*Parkinsonia florida*	Tall	Good	729436.9038	3844648.077	ID_175
483	Blue palo verde	*Parkinsonia florida*	Tall	Good	729466.7743	3844649.311	ID_179
484	Blue palo verde	*Parkinsonia florida*	Tall	Good	729867.9246	3844245.949	ID_210
485	Blue palo verde	*Parkinsonia florida*	Tall	Good	729844.6359	3844448.702	ID_215
486	Blue palo verde	*Parkinsonia florida*	Tall	Good	729815.6578	3844460.924	ID_219
487	Blue palo verde	*Parkinsonia florida*	Tall	Good	729192.5795	3845505.799	ID_248
488	Blue palo verde	*Parkinsonia florida*	Tall	Good	729131.4594	3845407.24	ID_249
489	Blue palo verde	*Parkinsonia florida*	Tall	Good	729117.8966	3845394.669	ID_250
490	Blue palo verde	*Parkinsonia florida*	Tall	Good	729125.9291	3845386.887	ID_252
491	Blue palo verde	*Parkinsonia florida*	Tall	Good	729139.6124	3845389.225	ID_253
492	Blue palo verde	*Parkinsonia florida*	Tall	Good	729132.6516	3845368.294	ID_254
493	Blue palo verde	*Parkinsonia florida*	Tall	Good	729137.2679	3845349.658	ID_255
494	Blue palo verde	*Parkinsonia florida*	Tall	Good	729111.0596	3845356.136	ID_257
495	Blue palo verde	*Parkinsonia florida*	Tall	Good	729099.9157	3845350.504	ID_258
496	Blue palo verde	*Parkinsonia florida*	Tall	Good	729085.228	3845347.513	ID_259
497	Blue palo verde	*Parkinsonia florida*	Tall	Good	729076.1998	3845350.439	ID_260
498	Blue palo verde	*Parkinsonia florida*	Tall	Good	729081.2018	3845337.281	ID_262
499	Blue palo verde	*Parkinsonia florida*	Tall	Good	729060.6279	3845363.116	ID_264
500	Blue palo verde	*Parkinsonia florida*	Tall	Good	729051.104	3845350.983	ID_265
501	Blue palo verde	*Parkinsonia florida*	Tall	Good	729046.4529	3845344.862	ID_266
502	Blue palo verde	*Parkinsonia florida*	Tall	Good	729051.8651	3845338.44	ID_267

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
503	Blue palo verde	*Parkinsonia florida*	Tall	Good	729055.5899	3845338.013	ID_268
504	Blue palo verde	*Parkinsonia florida*	Tall	Good	729049.7107	3845327.835	ID_269
505	Blue palo verde	*Parkinsonia florida*	Tall	Good	729008.781	3845278.097	ID_272
506	Blue palo verde	*Parkinsonia florida*	Tall	Good	728974.2401	3845274.84	ID_277
507	Blue palo verde	*Parkinsonia florida*	Tall	Good	728908.3853	3845294.182	ID_282
508	Blue palo verde	*Parkinsonia florida*	Tall	Good	728896.6846	3845305.278	ID_285
509	Blue palo verde	*Parkinsonia florida*	Tall	Good	728824.1443	3845252.112	ID_287
510	Blue palo verde	*Parkinsonia florida*	Tall	Good	728807.1294	3845243.231	ID_294
511	Blue palo verde	*Parkinsonia florida*	Tall	Good	728628.4301	3845198.1	ID_306
512	Blue palo verde	*Parkinsonia florida*	Tall	Good	728564.6837	3845175.403	ID_308
513	Blue palo verde	*Parkinsonia florida*	Tall	Good	728563.9481	3845143.577	ID_309
514	Blue palo verde	*Parkinsonia florida*	Tall	Good	728589.4242	3845037.359	ID_313
515	Blue palo verde	*Parkinsonia florida*	Tall	Good	728587.0595	3845029.68	ID_314
516	Blue palo verde	*Parkinsonia florida*	Tall	Good	728539.5386	3845001.947	ID_316
517	Blue palo verde	*Parkinsonia florida*	Tall	Good	728826.5494	3844902.706	ID_320
518	Blue palo verde	*Parkinsonia florida*	Tall	Good	728763.598	3844920.867	ID_322
519	Blue palo verde	*Parkinsonia florida*	Tall	Good	729136.6859	3845189.043	ID_325
520	Blue palo verde	*Parkinsonia florida*	Tall	Good	729154.2763	3845255.793	ID_327
521	Blue palo verde	*Parkinsonia florida*	Tall	Good	729139.3511	3845303.003	ID_329
522	Blue palo verde	*Parkinsonia florida*	Tall	Good	729141.4129	3845310.566	ID_330
523	Blue palo verde	*Parkinsonia florida*	Tall	Good	727631.1963	3845207.535	ID_48
524	Blue palo verde	*Parkinsonia florida*	Tall	Good	727678.9063	3845243.137	ID_52
525	Blue palo verde	*Parkinsonia florida*	Tall	Good	729565.5153	3845245.671	ID_68
526	Blue palo verde	*Parkinsonia florida*	Tall	Good	729572.1172	3845213.318	ID_71
527	Blue palo verde	*Parkinsonia florida*	Tall	Good	729582.8163	3845204.379	ID_73
528	Blue palo verde	*Parkinsonia florida*	Tall	Good	729671.4756	3845018.934	ID_75
529	Blue palo verde	*Parkinsonia florida*	Tall	Good	729712.929	3844885.554	ID_78
530	Blue palo verde	*Parkinsonia florida*	Tall	Good	729746.232	3844882.901	ID_88
531	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	729860.2502	3844449.124	ID_1442
532	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	728830.452	3845286.448	ID_1146
533	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	728820.5599	3845282.877	ID_1147
534	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	730651.9907	3844582.075	ID_1035
535	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	730669.4801	3844581.838	ID_1036
536	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	728774.5824	3845179.154	ID_1154
537	Blue palo verde	*Parkinsonia florida*	Very Tall	Fair	727821.5068	3845389.558	ID_1006
538	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727374.5153	3845389.858	ID_1790
539	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729451.9332	3844593.107	ID_1350
540	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729458.5346	3844600.534	ID_1351
541	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729457.1668	3844629.658	ID_1352
542	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729449.6274	3844627.008	ID_1353
543	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729105.478	3845385.588	ID_1116
544	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729081.96	3845364.33	ID_1121
545	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	728928.2004	3845313.477	ID_1138
546	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	728648.7826	3845199.524	ID_1156
547	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	728552.7448	3845023.662	ID_1164
548	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729136.7812	3845307.628	ID_1186

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
549	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729138.0445	3845346.117	ID_1187
550	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727829.6627	3845397.338	ID_1007
551	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727857.0079	3845397.486	ID_1009
552	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727879.6833	3845377.871	ID_1011
553	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727895.8376	3845325.067	ID_1015
554	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	730574.7233	3844557.425	ID_1028
555	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	730524.8224	3844565.674	ID_1039
556	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	730477.1705	3844554.261	ID_1040
557	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	730945.6046	3844927.13	ID_1048
558	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727630.3904	3845184.43	ID_898
559	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727627.2966	3845210.897	ID_899
560	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	727628.3224	3845253.924	ID_900
561	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729591.6925	3845190.443	ID_947
562	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729565.788	3845191.561	ID_950
563	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729568.43	3845196.562	ID_951
564	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729688.204	3844969.035	ID_952
565	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729683.8345	3844954.933	ID_958
566	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729450.1658	3844712.546	ID_767
567	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729439.2281	3844808.457	ID_776
568	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729429.4246	3844858.971	ID_779
569	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729439.5041	3844873.848	ID_780
570	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729448.5026	3844896.026	ID_785
571	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729444.4356	3844932.591	ID_791
572	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729432.3443	3844927.705	ID_794
573	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729433.5742	3844933.522	ID_796
574	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729422.2678	3844968.041	ID_800
575	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729413.8841	3845003.07	ID_802
576	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729413.3304	3844936.561	ID_814
577	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729420.0183	3844922.011	ID_815
578	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729344.5723	3845053.49	ID_826
579	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729328.9403	3845109.348	ID_829
580	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729317.0882	3845114.256	ID_836
581	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729346.3602	3845126.522	ID_838
582	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729335.6804	3845154.826	ID_843
583	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729342.3786	3845194.012	ID_854
584	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729398.6545	3845067.27	ID_858
585	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729407.0916	3845046.484	ID_859
586	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729430.5001	3845023.31	ID_861
587	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729450.1658	3844712.546	ID_666
588	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729439.2281	3844808.457	ID_675
589	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729429.4246	3844858.971	ID_678
590	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729439.5041	3844873.848	ID_679
591	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729448.5026	3844896.026	ID_684
592	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729444.4356	3844932.591	ID_690
593	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729432.3443	3844927.705	ID_693
594	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729433.5742	3844933.522	ID_695

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
595	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729422.2678	3844968.041	ID_699
596	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729413.8841	3845003.07	ID_701
597	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729413.3304	3844936.561	ID_713
598	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729420.0183	3844922.011	ID_714
599	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729344.5723	3845053.49	ID_725
600	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729328.9403	3845109.348	ID_728
601	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729317.0882	3845114.256	ID_735
602	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729346.3602	3845126.522	ID_737
603	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729335.6804	3845154.826	ID_742
604	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729342.3786	3845194.012	ID_753
605	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729398.6545	3845067.27	ID_757
606	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729407.0916	3845046.484	ID_758
607	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729430.5001	3845023.31	ID_760
608	Blue palo verde	*Parkinsonia florida*	Very Tall	Good	729831.8934	3844475.847	ID_222
609	Catclaw acacia	*Senegalia greggii*	Short	Poor	728748.549	3845177.814	ID_1261
610	Catclaw acacia	*Senegalia greggii*	Short	Poor	729380.179	3844233.076	ID_186
611	Catclaw acacia	*Senegalia greggii*	Short	Poor	729142.1081	3843674.347	ID_205
612	Catclaw acacia	*Senegalia greggii*	Short	Fair	729142.3236	3843704.795	ID_199
613	Catclaw acacia	*Senegalia greggii*	Short	Good	727293.8928	3845440.457	ID_1783
614	Catclaw acacia	*Senegalia greggii*	Short	Good	727313.4197	3845316.473	ID_1785
615	Catclaw acacia	*Senegalia greggii*	Short	Good	727335.2439	3845305.029	ID_1788
616	Catclaw acacia	*Senegalia greggii*	Short	Good	727336.7968	3845315.004	ID_1789
617	Catclaw acacia	*Senegalia greggii*	Short	Good	729617.6575	3844065.733	ID_1667
618	Catclaw acacia	*Senegalia greggii*	Short	Good	729622.3966	3844067.504	ID_1668
619	Catclaw acacia	*Senegalia greggii*	Short	Good	729623.5056	3844064.385	ID_1669
620	Catclaw acacia	*Senegalia greggii*	Short	Good	729985.0135	3844386.34	ID_1471
621	Catclaw acacia	*Senegalia greggii*	Short	Good	729397.6657	3844260.384	ID_1461
622	Catclaw acacia	*Senegalia greggii*	Short	Good	729373.6199	3844154.222	ID_1462
623	Catclaw acacia	*Senegalia greggii*	Short	Good	729454.323	3844393.93	ID_1370
624	Catclaw acacia	*Senegalia greggii*	Short	Good	729115.4992	3845407.825	ID_1219
625	Catclaw acacia	*Senegalia greggii*	Short	Good	729110.0998	3845417.861	ID_1220
626	Catclaw acacia	*Senegalia greggii*	Short	Good	729103.8497	3845416.419	ID_1221
627	Catclaw acacia	*Senegalia greggii*	Short	Good	729068.5788	3845397.712	ID_1225
628	Catclaw acacia	*Senegalia greggii*	Short	Good	729013.0536	3845303.271	ID_1232
629	Catclaw acacia	*Senegalia greggii*	Short	Good	728972.3549	3845294.788	ID_1235
630	Catclaw acacia	*Senegalia greggii*	Short	Good	728975.5627	3845284.63	ID_1236
631	Catclaw acacia	*Senegalia greggii*	Short	Good	728971.7248	3845281.872	ID_1237
632	Catclaw acacia	*Senegalia greggii*	Short	Good	728956.995	3845300.667	ID_1238
633	Catclaw acacia	*Senegalia greggii*	Short	Good	728954.2719	3845301.215	ID_1239
634	Catclaw acacia	*Senegalia greggii*	Short	Good	728948.0314	3845297.92	ID_1240
635	Catclaw acacia	*Senegalia greggii*	Short	Good	728944.0415	3845294.733	ID_1241
636	Catclaw acacia	*Senegalia greggii*	Short	Good	728924.9416	3845299.489	ID_1242
637	Catclaw acacia	*Senegalia greggii*	Short	Good	728924.1647	3845305.576	ID_1243
638	Catclaw acacia	*Senegalia greggii*	Short	Good	728924.3929	3845308.395	ID_1244
639	Catclaw acacia	*Senegalia greggii*	Short	Good	728919.9141	3845308.784	ID_1245
640	Catclaw acacia	*Senegalia greggii*	Short	Good	728908.6003	3845308.309	ID_1246

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
641	Catclaw acacia	*Senegalia greggii*	Short	Good	728859.0787	3845303.53	ID_1247
642	Catclaw acacia	*Senegalia greggii*	Short	Good	728840.1072	3845303.006	ID_1248
643	Catclaw acacia	*Senegalia greggii*	Short	Good	728839.6063	3845299.852	ID_1249
644	Catclaw acacia	*Senegalia greggii*	Short	Good	728830.0169	3845296.768	ID_1252
645	Catclaw acacia	*Senegalia greggii*	Short	Good	728833.6514	3845292.36	ID_1253
646	Catclaw acacia	*Senegalia greggii*	Short	Good	728813.3604	3845279.122	ID_1254
647	Catclaw acacia	*Senegalia greggii*	Short	Good	728812.3025	3845269.811	ID_1256
648	Catclaw acacia	*Senegalia greggii*	Short	Good	728716.503	3845179.189	ID_1263
649	Catclaw acacia	*Senegalia greggii*	Short	Good	728707.7487	3845180.358	ID_1264
650	Catclaw acacia	*Senegalia greggii*	Short	Good	728654.3968	3845188.574	ID_1267
651	Catclaw acacia	*Senegalia greggii*	Short	Good	728652.2689	3845190.58	ID_1268
652	Catclaw acacia	*Senegalia greggii*	Short	Good	728606.6541	3845207.209	ID_1269
653	Catclaw acacia	*Senegalia greggii*	Short	Good	728598.5524	3845212.615	ID_1270
654	Catclaw acacia	*Senegalia greggii*	Short	Good	728547.4659	3845157.381	ID_1271
655	Catclaw acacia	*Senegalia greggii*	Short	Good	728549.1354	3845146.664	ID_1272
656	Catclaw acacia	*Senegalia greggii*	Short	Good	728542.306	3845143.665	ID_1273
657	Catclaw acacia	*Senegalia greggii*	Short	Good	728543.4152	3845082.097	ID_1276
658	Catclaw acacia	*Senegalia greggii*	Short	Good	728544.1221	3845059.1	ID_1277
659	Catclaw acacia	*Senegalia greggii*	Short	Good	728540.8695	3845053.542	ID_1278
660	Catclaw acacia	*Senegalia greggii*	Short	Good	728543.0941	3845020.83	ID_1279
661	Catclaw acacia	*Senegalia greggii*	Short	Good	728546.1493	3845011.444	ID_1280
662	Catclaw acacia	*Senegalia greggii*	Short	Good	728654.8758	3844932.497	ID_1283
663	Catclaw acacia	*Senegalia greggii*	Short	Good	728794.4329	3845058.741	ID_1284
664	Catclaw acacia	*Senegalia greggii*	Short	Good	728863.2785	3845005.943	ID_1285
665	Catclaw acacia	*Senegalia greggii*	Short	Good	728877.5446	3844969.481	ID_1289
666	Catclaw acacia	*Senegalia greggii*	Short	Good	728875.9807	3844952.288	ID_1291
667	Catclaw acacia	*Senegalia greggii*	Short	Good	728864.9297	3844940.611	ID_1292
668	Catclaw acacia	*Senegalia greggii*	Short	Good	728865.1016	3844928.53	ID_1294
669	Catclaw acacia	*Senegalia greggii*	Short	Good	728863.9455	3844922.145	ID_1295
670	Catclaw acacia	*Senegalia greggii*	Short	Good	728868.8948	3844922.457	ID_1296
671	Catclaw acacia	*Senegalia greggii*	Short	Good	728862.2828	3844917.852	ID_1297
672	Catclaw acacia	*Senegalia greggii*	Short	Good	728857.46	3844912.324	ID_1298
673	Catclaw acacia	*Senegalia greggii*	Short	Good	728830.116	3844909.987	ID_1300
674	Catclaw acacia	*Senegalia greggii*	Short	Good	728784.4048	3844927.609	ID_1303
675	Catclaw acacia	*Senegalia greggii*	Short	Good	728747.4023	3844933.015	ID_1304
676	Catclaw acacia	*Senegalia greggii*	Short	Good	729070.9205	3845007.981	ID_1306
677	Catclaw acacia	*Senegalia greggii*	Short	Good	729075.9592	3845008.714	ID_1307
678	Catclaw acacia	*Senegalia greggii*	Short	Good	729074.4353	3845017.82	ID_1308
679	Catclaw acacia	*Senegalia greggii*	Short	Good	729061.7637	3845005.877	ID_1309
680	Catclaw acacia	*Senegalia greggii*	Short	Good	729062.071	3845005.98	ID_1310
681	Catclaw acacia	*Senegalia greggii*	Short	Good	729100.9783	3845100.97	ID_1311
682	Catclaw acacia	*Senegalia greggii*	Short	Good	746815.8227	3852376.873	ID_1319
683	Catclaw acacia	*Senegalia greggii*	Short	Good	729116.6916	3845205.009	ID_1322
684	Catclaw acacia	*Senegalia greggii*	Short	Good	729116.0466	3845203.028	ID_1325
685	Catclaw acacia	*Senegalia greggii*	Short	Good	729115.8878	3845202.999	ID_1326
686	Catclaw acacia	*Senegalia greggii*	Short	Good	729114.57	3845200.013	ID_1327

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
687	Catclaw acacia	*Senegalia greggii*	Short	Good	729135.2183	3845304.44	ID_1331
688	Catclaw acacia	*Senegalia greggii*	Short	Good	729135.7191	3845334.631	ID_1335
689	Catclaw acacia	*Senegalia greggii*	Short	Good	729142.8816	3844893.497	ID_1337
690	Catclaw acacia	*Senegalia greggii*	Short	Good	729157.8572	3844954.286	ID_1338
691	Catclaw acacia	*Senegalia greggii*	Short	Good	729191.7037	3844969.842	ID_1340
692	Catclaw acacia	*Senegalia greggii*	Short	Good	729278.488	3844305.03	ID_1051
693	Catclaw acacia	*Senegalia greggii*	Short	Good	729285.7868	3844310.495	ID_1052
694	Catclaw acacia	*Senegalia greggii*	Short	Good	727473.5242	3845731.729	ID_1060
695	Catclaw acacia	*Senegalia greggii*	Short	Good	727477.1166	3845738.247	ID_1061
696	Catclaw acacia	*Senegalia greggii*	Short	Good	727480.4761	3845742.386	ID_1062
697	Catclaw acacia	*Senegalia greggii*	Short	Good	727482.6239	3845745.941	ID_1063
698	Catclaw acacia	*Senegalia greggii*	Short	Good	727486.0893	3845750.732	ID_1064
699	Catclaw acacia	*Senegalia greggii*	Short	Good	727628.1686	3845221.633	ID_969
700	Catclaw acacia	*Senegalia greggii*	Short	Good	727633.0677	3845233.441	ID_971
701	Catclaw acacia	*Senegalia greggii*	Short	Good	729420.6474	3844878.395	ID_817
702	Catclaw acacia	*Senegalia greggii*	Short	Good	729420.6474	3844878.395	ID_716
703	Catclaw acacia	*Senegalia greggii*	Short	Good	729437.9389	3844831.981	ID_540
704	Catclaw acacia	*Senegalia greggii*	Short	Good	729388.6215	3845087.565	ID_588
705	Catclaw acacia	*Senegalia greggii*	Short	Good	727295.2198	3845344.777	ID_603
706	Catclaw acacia	*Senegalia greggii*	Short	Good	727303.3703	3845331.859	ID_604
707	Catclaw acacia	*Senegalia greggii*	Short	Good	727307.2316	3845288.712	ID_607
708	Catclaw acacia	*Senegalia greggii*	Short	Good	729441.0234	3844464.01	ID_168
709	Catclaw acacia	*Senegalia greggii*	Short	Good	729446.7082	3844327.453	ID_181
710	Catclaw acacia	*Senegalia greggii*	Short	Good	729452.471	3844318.363	ID_182
711	Catclaw acacia	*Senegalia greggii*	Short	Good	729397.4198	3844220.827	ID_184
712	Catclaw acacia	*Senegalia greggii*	Short	Good	729391.3633	3844207.061	ID_187
713	Catclaw acacia	*Senegalia greggii*	Short	Good	729404.6393	3844089.753	ID_191
714	Catclaw acacia	*Senegalia greggii*	Short	Good	729402.9075	3844087.119	ID_192
715	Catclaw acacia	*Senegalia greggii*	Short	Good	729423.9227	3844185.013	ID_194
716	Catclaw acacia	*Senegalia greggii*	Short	Good	729419.7664	3844198.557	ID_195
717	Catclaw acacia	*Senegalia greggii*	Short	Good	729106.9266	3843713.313	ID_197
718	Catclaw acacia	*Senegalia greggii*	Short	Good	729138.0662	3843707.769	ID_200
719	Catclaw acacia	*Senegalia greggii*	Short	Good	729136.2699	3843715.211	ID_201
720	Catclaw acacia	*Senegalia greggii*	Short	Good	729812.7319	3844180.95	ID_212
721	Catclaw acacia	*Senegalia greggii*	Short	Good	729572.9229	3845231.718	ID_69
722	Catclaw acacia	*Senegalia greggii*	Medium	Fair	729356.768	3844352.482	ID_1056
723	Catclaw acacia	*Senegalia greggii*	Medium	Fair	729986.39	3844368.543	ID_362
724	Catclaw acacia	*Senegalia greggii*	Medium	Fair	729983.2185	3844361.555	ID_363
725	Catclaw acacia	*Senegalia greggii*	Medium	Fair	728857.0978	3844859.621	ID_1050
726	Catclaw acacia	*Senegalia greggii*	Medium	Fair	729140.5131	3843694.711	ID_202
727	Catclaw acacia	*Senegalia greggii*	Medium	Fair	729145.0494	3843686.937	ID_204
728	Catclaw acacia	*Senegalia greggii*	Medium	Good	727316.9829	3845291.962	ID_1786
729	Catclaw acacia	*Senegalia greggii*	Medium	Good	730405.1793	3844172.641	ID_1670
730	Catclaw acacia	*Senegalia greggii*	Medium	Good	730470.8223	3844228.3	ID_1671
731	Catclaw acacia	*Senegalia greggii*	Medium	Good	729978.5384	3844338.731	ID_1527
732	Catclaw acacia	*Senegalia greggii*	Medium	Good	731087.9709	3845124.856	ID_1549

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
733	Catclaw acacia	*Senegalia greggii*	Medium	Good	729379.5089	3845515.28	ID_1480
734	Catclaw acacia	*Senegalia greggii*	Medium	Good	729363.9989	3844040.957	ID_1463
735	Catclaw acacia	*Senegalia greggii*	Medium	Good	729916.8496	3844280.455	ID_1466
736	Catclaw acacia	*Senegalia greggii*	Medium	Good	729453.2483	3844395.409	ID_1369
737	Catclaw acacia	*Senegalia greggii*	Medium	Good	729116.5034	3845410.283	ID_1218
738	Catclaw acacia	*Senegalia greggii*	Medium	Good	729095.8521	3845387.871	ID_1222
739	Catclaw acacia	*Senegalia greggii*	Medium	Good	729071.8158	3845384.572	ID_1223
740	Catclaw acacia	*Senegalia greggii*	Medium	Good	729072.3395	3845396.147	ID_1224
741	Catclaw acacia	*Senegalia greggii*	Medium	Good	729064.3279	3845383.92	ID_1226
742	Catclaw acacia	*Senegalia greggii*	Medium	Good	729055.4609	3845373.818	ID_1227
743	Catclaw acacia	*Senegalia greggii*	Medium	Good	729037.1147	3845332.398	ID_1228
744	Catclaw acacia	*Senegalia greggii*	Medium	Good	729035.0436	3845317.812	ID_1229
745	Catclaw acacia	*Senegalia greggii*	Medium	Good	729025.9307	3845314.05	ID_1230
746	Catclaw acacia	*Senegalia greggii*	Medium	Good	729020.1008	3845300.311	ID_1231
747	Catclaw acacia	*Senegalia greggii*	Medium	Good	729004.692	3845311.972	ID_1233
748	Catclaw acacia	*Senegalia greggii*	Medium	Good	728984.6177	3845309.031	ID_1234
749	Catclaw acacia	*Senegalia greggii*	Medium	Good	728835.4417	3845299.447	ID_1250
750	Catclaw acacia	*Senegalia greggii*	Medium	Good	728809.1012	3845272.81	ID_1255
751	Catclaw acacia	*Senegalia greggii*	Medium	Good	728795.6366	3845234.367	ID_1257
752	Catclaw acacia	*Senegalia greggii*	Medium	Good	728799.5071	3845194.03	ID_1258
753	Catclaw acacia	*Senegalia greggii*	Medium	Good	728768.641	3845182.262	ID_1259
754	Catclaw acacia	*Senegalia greggii*	Medium	Good	728762.1225	3845181.051	ID_1260
755	Catclaw acacia	*Senegalia greggii*	Medium	Good	728739.1178	3845174.189	ID_1262
756	Catclaw acacia	*Senegalia greggii*	Medium	Good	728673.9073	3845174.726	ID_1265
757	Catclaw acacia	*Senegalia greggii*	Medium	Good	728663.0401	3845189.096	ID_1266
758	Catclaw acacia	*Senegalia greggii*	Medium	Good	728544.6587	3845122.67	ID_1274
759	Catclaw acacia	*Senegalia greggii*	Medium	Good	728541.3558	3845094.264	ID_1275
760	Catclaw acacia	*Senegalia greggii*	Medium	Good	728526.4769	3844983.594	ID_1281
761	Catclaw acacia	*Senegalia greggii*	Medium	Good	728528.985	3844925.81	ID_1282
762	Catclaw acacia	*Senegalia greggii*	Medium	Good	728882.6645	3844993.906	ID_1286
763	Catclaw acacia	*Senegalia greggii*	Medium	Good	728880.6672	3844984.747	ID_1287
764	Catclaw acacia	*Senegalia greggii*	Medium	Good	728876.8141	3844971.486	ID_1288
765	Catclaw acacia	*Senegalia greggii*	Medium	Good	728874.2	3844964.192	ID_1290
766	Catclaw acacia	*Senegalia greggii*	Medium	Good	728867.9309	3844935.773	ID_1293
767	Catclaw acacia	*Senegalia greggii*	Medium	Good	728843.9021	3844920.853	ID_1299
768	Catclaw acacia	*Senegalia greggii*	Medium	Good	728796.6826	3844917.667	ID_1301
769	Catclaw acacia	*Senegalia greggii*	Medium	Good	728787.5655	3844918.759	ID_1302
770	Catclaw acacia	*Senegalia greggii*	Medium	Good	728749.9136	3844919.747	ID_1305
771	Catclaw acacia	*Senegalia greggii*	Medium	Good	729106.7151	3845110.93	ID_1312
772	Catclaw acacia	*Senegalia greggii*	Medium	Good	729140.1043	3845129.011	ID_1314
773	Catclaw acacia	*Senegalia greggii*	Medium	Good	729163.8868	3845127.22	ID_1315
774	Catclaw acacia	*Senegalia greggii*	Medium	Good	729150.4156	3845150.503	ID_1317
775	Catclaw acacia	*Senegalia greggii*	Medium	Good	729116.8444	3845204.925	ID_1320
776	Catclaw acacia	*Senegalia greggii*	Medium	Good	729116.7878	3845204.999	ID_1321
777	Catclaw acacia	*Senegalia greggii*	Medium	Good	729116.9852	3845204.946	ID_1323
778	Catclaw acacia	*Senegalia greggii*	Medium	Good	729136.4402	3845276.363	ID_1328

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
779	Catclaw acacia	*Senegalia greggii*	Medium	Good	729135.0481	3845304.795	ID_1329
780	Catclaw acacia	*Senegalia greggii*	Medium	Good	729135.1563	3845304.435	ID_1330
781	Catclaw acacia	*Senegalia greggii*	Medium	Good	729134.9691	3845304.282	ID_1332
782	Catclaw acacia	*Senegalia greggii*	Medium	Good	729135.5124	3845305.054	ID_1334
783	Catclaw acacia	*Senegalia greggii*	Medium	Good	729099.9887	3844855.652	ID_1336
784	Catclaw acacia	*Senegalia greggii*	Medium	Good	729158.289	3844953.691	ID_1339
785	Catclaw acacia	*Senegalia greggii*	Medium	Good	729202.3812	3845094.693	ID_1341
786	Catclaw acacia	*Senegalia greggii*	Medium	Good	729201.9153	3845094.39	ID_1342
787	Catclaw acacia	*Senegalia greggii*	Medium	Good	729174.7432	3844656.517	ID_1049
788	Catclaw acacia	*Senegalia greggii*	Medium	Good	729320.0498	3844335.616	ID_1053
789	Catclaw acacia	*Senegalia greggii*	Medium	Good	729332.5212	3844348.152	ID_1054
790	Catclaw acacia	*Senegalia greggii*	Medium	Good	729361.8948	3844352.206	ID_1057
791	Catclaw acacia	*Senegalia greggii*	Medium	Good	727466.3232	3845723.561	ID_1059
792	Catclaw acacia	*Senegalia greggii*	Medium	Good	731091.9802	3845124.902	ID_1070
793	Catclaw acacia	*Senegalia greggii*	Medium	Good	727609.3158	3845182.021	ID_967
794	Catclaw acacia	*Senegalia greggii*	Medium	Good	727623.5475	3845210.306	ID_968
795	Catclaw acacia	*Senegalia greggii*	Medium	Good	727629.2366	3845228.332	ID_970
796	Catclaw acacia	*Senegalia greggii*	Medium	Good	729568.8233	3845192.812	ID_976
797	Catclaw acacia	*Senegalia greggii*	Medium	Good	729421.2211	3845020.693	ID_803
798	Catclaw acacia	*Senegalia greggii*	Medium	Good	729421.2211	3845020.693	ID_702
799	Catclaw acacia	*Senegalia greggii*	Medium	Good	729448.6112	3844858.105	ID_542
800	Catclaw acacia	*Senegalia greggii*	Medium	Good	729356.463	3845088.649	ID_564
801	Catclaw acacia	*Senegalia greggii*	Medium	Good	729360.7092	3845100.306	ID_567
802	Catclaw acacia	*Senegalia greggii*	Medium	Good	729418.0674	3845022.45	ID_591
803	Catclaw acacia	*Senegalia greggii*	Medium	Good	727276.2065	3845457.6	ID_601
804	Catclaw acacia	*Senegalia greggii*	Medium	Good	729984.7991	3844371.946	ID_361
805	Catclaw acacia	*Senegalia greggii*	Medium	Good	729460.5512	3844379.77	ID_180
806	Catclaw acacia	*Senegalia greggii*	Medium	Good	729402.1833	3844238.29	ID_183
807	Catclaw acacia	*Senegalia greggii*	Medium	Good	729396.6335	3844212.495	ID_185
808	Catclaw acacia	*Senegalia greggii*	Medium	Good	729397.352	3844200.273	ID_188
809	Catclaw acacia	*Senegalia greggii*	Medium	Good	729405.136	3844097.713	ID_190
810	Catclaw acacia	*Senegalia greggii*	Medium	Good	729418.7378	3844177.825	ID_193
811	Catclaw acacia	*Senegalia greggii*	Medium	Good	729143.1891	3843708.229	ID_198
812	Catclaw acacia	*Senegalia greggii*	Medium	Good	729144.1007	3843692.984	ID_203
813	Catclaw acacia	*Senegalia greggii*	Medium	Good	729139.5067	3843671.049	ID_206
814	Catclaw acacia	*Senegalia greggii*	Medium	Good	727638.5835	3845223.377	ID_47
815	Catclaw acacia	*Senegalia greggii*	Medium	Good	727648.6454	3845238.006	ID_51
816	Catclaw acacia	*Senegalia greggii*	Medium	Good	729578.963	3845221.162	ID_70
817	Catclaw acacia	*Senegalia greggii*	Tall	Good	729124.5811	3843741.868	ID_1465
818	Catclaw acacia	*Senegalia greggii*	Tall	Good	729120.5124	3845129.219	ID_1313
819	Catclaw acacia	*Senegalia greggii*	Tall	Good	729150.3804	3845150.424	ID_1316
820	Catclaw acacia	*Senegalia greggii*	Tall	Good	729149.8271	3845150.54	ID_1318
821	Catclaw acacia	*Senegalia greggii*	Tall	Good	729135.6092	3845304.575	ID_1333
822	Catclaw acacia	*Senegalia greggii*	Tall	Good	729360.3383	3844346.664	ID_1055
823	Catclaw acacia	*Senegalia greggii*	Tall	Good	729380.8802	3844352.58	ID_1058
824	Catclaw acacia	*Senegalia greggii*	Tall	Good	729408.3808	3844938.214	ID_813

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
825	Catclaw acacia	*Senegalia greggii*	Tall	Good	729408.3808	3844938.214	ID_712
826	Catclaw acacia	*Senegalia greggii*	Very Tall	Fair	728831.8662	3845303.946	ID_1251
827	Catclaw acacia	*Senegalia greggii*	Very Tall	Good	729116.507	3845202.783	ID_1324
828	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727368.5461	3845632.504	ID_984
829	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727370.3034	3845633.772	ID_985
830	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727374.3841	3845633.67	ID_986
831	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727374.5585	3845636.242	ID_987
832	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727379.3192	3845636.744	ID_988
833	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727380.3464	3845640.91	ID_989
834	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727382.4024	3845646.659	ID_990
835	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727389.3548	3845652.235	ID_991
836	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727429.5838	3845692.934	ID_992
837	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727443.7452	3845706.528	ID_993
838	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727447.9538	3845710.341	ID_994
839	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727452.2671	3845716.365	ID_995
840	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727458.2106	3845717.266	ID_996
841	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727495.5964	3845774.118	ID_999
842	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	729418.3851	3845026.032	ID_804
843	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	729418.3851	3845026.032	ID_703
844	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	727359.1305	3845317.761	ID_611
845	Desert smoke tree	*Psorothamnus spinosus*	Short	Good	729041.9812	3845310.709	ID_271
846	Desert smoke tree	*Psorothamnus spinosus*	Medium	Fair	730579.3252	3844551.022	ID_1037
847	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	727378.8472	3845328.325	ID_1792
848	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	727298.4682	3845463.468	ID_1676
849	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	727461.5523	3845720.898	ID_997

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
850	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	727470.461	3845727.697	ID_998
851	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	729394.8153	3845015.157	ID_806
852	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	729394.8153	3845015.157	ID_705
853	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	729390.8259	3845062.832	ID_589
854	Desert smoke tree	*Psorothamnus spinosus*	Medium	Good	729393.7609	3845057.665	ID_590
855	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730523.9603	3844218.163	ID_1579
856	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730334.6087	3844196.159	ID_1603
857	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730330.3487	3844210.193	ID_1607
858	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730338.5749	3844225.001	ID_1608
859	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730344.1643	3844225.78	ID_1609
860	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730099.8963	3844119.465	ID_1636
861	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730112.7394	3844091.203	ID_1638
862	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730118.5944	3844085.346	ID_1639
863	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730271.069	3844176.709	ID_1654
864	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730258.8244	3844167.566	ID_1655
865	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730259.7599	3844168.03	ID_1656
866	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730261.5526	3844168.308	ID_1657
867	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730235.6832	3844186.5	ID_1659
868	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730239.1099	3844164.691	ID_1661
869	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730119.3164	3844162.581	ID_1664
870	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730035.8986	3844015.973	ID_1404
871	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	729913.6419	3844285.621	ID_1439
872	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730053.311	3844147.607	ID_337

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
873	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730049.9686	3844147.508	ID_338
874	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	730064.5686	3844197.228	ID_351
875	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	729986.8702	3844365.738	ID_358
876	Hillside palo verde	*Parkinsonia microphylla*	Short	Good	729854.5216	3844334.836	ID_96
877	Hillside palo verde	*Parkinsonia microphylla*	Medium	Poor	730031.9823	3844087.936	ID_340
878	Hillside palo verde	*Parkinsonia microphylla*	Medium	Poor	730089.9843	3844183.788	ID_357
879	Hillside palo verde	*Parkinsonia microphylla*	Medium	Poor	730030.9279	3844095.816	ID_341
880	Hillside palo verde	*Parkinsonia microphylla*	Medium	Fair	730251.4632	3844157.203	ID_1663
881	Hillside palo verde	*Parkinsonia microphylla*	Medium	Fair	730055.1431	3844014.573	ID_1403
882	Hillside palo verde	*Parkinsonia microphylla*	Medium	Fair	729993.0558	3844098.055	ID_344
883	Hillside palo verde	*Parkinsonia microphylla*	Medium	Fair	729995.2945	3844112.875	ID_345
884	Hillside palo verde	*Parkinsonia microphylla*	Medium	Fair	729999.3866	3844126.98	ID_348
885	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730104.7813	3844118.99	ID_1566
886	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730179.9577	3844154.253	ID_1567
887	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730197.2465	3844144.042	ID_1568
888	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730302.8173	3844142.95	ID_1571
889	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730444.3101	3844239.65	ID_1585
890	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730397.6436	3844238.433	ID_1596
891	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730331.1593	3844189.236	ID_1602
892	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730281.9072	3844220.973	ID_1615
893	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730251.037	3844221.039	ID_1618
894	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730239.3325	3844218.479	ID_1619
895	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730184.7058	3844191.691	ID_1623

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
896	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730183.8156	3844172.962	ID_1625
897	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730185.4478	3844166.294	ID_1626
898	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730192.2096	3844164.791	ID_1627
899	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730192.7282	3844162.217	ID_1628
900	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730210.5692	3844163.969	ID_1630
901	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730230.0622	3844176.027	ID_1631
902	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730187.9536	3844148.994	ID_1632
903	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730105.2246	3844119.639	ID_1635
904	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730122.8978	3844064.478	ID_1642
905	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730140.1387	3844060.386	ID_1643
906	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730143.4505	3844072.895	ID_1644
907	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730154.2103	3844073.232	ID_1645
908	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730158.3146	3844083.06	ID_1646
909	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730288.0103	3844107.225	ID_1649
910	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730292.2145	3844113.023	ID_1650
911	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730293.0164	3844171.543	ID_1651
912	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730293.2174	3844173.786	ID_1652
913	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730275.2029	3844176.532	ID_1653
914	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730231.1197	3844177.467	ID_1660
915	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730030.0259	3844005.765	ID_1405
916	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730055.4326	3844156.559	ID_336
917	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730044.9476	3844139.115	ID_339
918	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	729995.6207	3844087.684	ID_342

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
919	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	729985.0662	3844094.962	ID_343
920	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730000.0965	3844118.306	ID_346
921	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	729988.0332	3844117.878	ID_347
922	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730008.3647	3844138.082	ID_349
923	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	729967.8388	3844210.227	ID_350
924	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730066.3815	3844194.776	ID_352
925	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730079.0484	3844229.1	ID_355
926	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	730058.9177	3844298.163	ID_356
927	Hillside palo verde	*Parkinsonia microphylla*	Medium	Good	729967.6006	3844359.634	ID_359
928	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730438.3856	3844231.547	ID_1586
929	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730414.0773	3844234.984	ID_1593
930	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730393.7028	3844224.321	ID_1598
931	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730351.27	3844185.351	ID_1605
932	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730323.1405	3844198.72	ID_1606
933	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730315.0139	3844233.175	ID_1611
934	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730285.1114	3844226.538	ID_1614
935	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730279.8107	3844222.357	ID_1616
936	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730250.4039	3844222.915	ID_1617
937	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730231.3588	3844216.232	ID_1620
938	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730180.8387	3844183.796	ID_1624
939	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730190.0925	3844159.845	ID_1629
940	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730188.3598	3844149.245	ID_1633
941	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730117.3522	3844159.84	ID_1634

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
942	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730097.6704	3844102.613	ID_1637
943	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730121.1315	3844087.456	ID_1640
944	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730166.3783	3844097.378	ID_1647
945	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730150.2593	3844089.438	ID_1648
946	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730260.1777	3844180.536	ID_1658
947	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	730251.1375	3844156.446	ID_1662
948	Hillside palo verde	*Parkinsonia microphylla*	Tall	Good	729739.254	3844154.689	ID_131
949	Hillside palo verde	*Parkinsonia microphylla*	Very Tall	Fair	730217.8372	3844219.037	ID_1621
950	Hillside palo verde	*Parkinsonia microphylla*	Very Tall	Fair	730182.2923	3844195.511	ID_1622
951	Hillside palo verde	*Parkinsonia microphylla*	Very Tall	Good	730351.5929	3844173.312	ID_1574
952	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Fair	729754.0679	3844401.483	ID_165
953	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	728087.1368	3845511.045	ID_912
954	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	728592.1661	3845574.285	ID_922
955	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	728722.3595	3845586.405	ID_925
956	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	729330.4196	3845514.742	ID_943
957	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	728453.2108	3845578.243	ID_382
958	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	729897.6939	3844266.785	ID_209
959	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Short	Good	728102.1275	3845517.197	ID_57
960	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Poor	729764.0613	3844436.654	ID_163
961	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Fair	730569.8308	3844536.578	ID_1038
962	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Fair	730035.5255	3844181.314	ID_360
963	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Fair	728747.8917	3845575.255	ID_62
964	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Fair	728802.8039	3845582.758	ID_63

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
965	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729699.0108	3844117.021	ID_1552
966	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729535.4647	3844063.439	ID_1555
967	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	730299.0614	3844243.686	ID_1612
968	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729988.2029	3844392.526	ID_1470
969	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729383.1969	3845508.608	ID_1479
970	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729239.8132	3845603.825	ID_1485
971	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729191.1433	3845657.788	ID_1491
972	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729115.4567	3845695.001	ID_1497
973	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729087.6733	3845705.395	ID_1499
974	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729067.7895	3845685.952	ID_1502
975	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	727924.0803	3845429.719	ID_1019
976	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	727911.2634	3845441.282	ID_1022
977	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	727903.808	3845434.954	ID_1023
978	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	727887.5728	3845435.194	ID_1024
979	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728150.0933	3845506.335	ID_916
980	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728524.2896	3845569.704	ID_921
981	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728598.9182	3845575.244	ID_923
982	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728640.2698	3845578.762	ID_924
983	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728752.8118	3845585.806	ID_928
984	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728795.2785	3845587.463	ID_931
985	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728800.3275	3845588.674	ID_932
986	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728817.6603	3845590.028	ID_934
987	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729187.8484	3845560.03	ID_937

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
988	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729192.7583	3845558.418	ID_938
989	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729195.2415	3845557.098	ID_939
990	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729300.46	3845529.054	ID_940
991	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729277.7427	3845534.652	ID_942
992	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729587.3145	3845193.81	ID_949
993	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729190.9675	3845686.023	ID_373
994	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729184.7423	3845690.609	ID_374
995	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729134.7016	3845710.736	ID_376
996	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729124.8054	3845713.904	ID_377
997	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729088.8797	3845672.395	ID_378
998	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728748.4627	3845612.623	ID_381
999	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728401.9422	3845575.835	ID_383
1000	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728358.2143	3845573.329	ID_384
1001	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729869.0772	3844380.775	ID_154
1002	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729877.7719	3844411.409	ID_155
1003	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729809.6361	3844434.825	ID_161
1004	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729790.3095	3844423.13	ID_162
1005	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729766.6766	3844444.152	ID_164
1006	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729819.3205	3844188.366	ID_211
1007	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729150.2631	3845323.109	ID_333
1008	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729148.4408	3845337.833	ID_334
1009	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	728199.5579	3845546.547	ID_58
1010	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729242.6487	3845545.656	ID_64

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1011	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729248.7497	3845543.129	ID_65
1012	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729266.408	3845539.123	ID_66
1013	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729271.2213	3845535.885	ID_67
1014	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Medium	Good	729731.3738	3844904.006	ID_90
1015	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Poor	728979.5901	3845689.14	ID_1507
1016	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Fair	729728.0145	3844912.235	ID_965
1017	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729646.0374	3844102.226	ID_1553
1018	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729617.9037	3844074.074	ID_1554
1019	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729782.2907	3844820.55	ID_1473
1020	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729849.7824	3844989.846	ID_1474
1021	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729497.9905	3845461.586	ID_1476
1022	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729418.6506	3845492.662	ID_1477
1023	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729400.7012	3845504.25	ID_1478
1024	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729371.7391	3845519.409	ID_1481
1025	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729172.8926	3845673.536	ID_1489
1026	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729060.4654	3845699.125	ID_1500
1027	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729052.8641	3845698.701	ID_1501
1028	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729039.2176	3845690.326	ID_1503
1029	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729032.6087	3845690.751	ID_1504
1030	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729019.29	3845695.46	ID_1505
1031	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728604.8992	3845617.53	ID_1516
1032	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728578.5495	3845611.37	ID_1518
1033	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728389.6955	3845601.501	ID_1519

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1034	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728390.6973	3845588.051	ID_1520
1035	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	731081.3496	3845221.678	ID_1522
1036	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	730517.3008	3844810.944	ID_1524
1037	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	731127.6662	3845172.713	ID_1043
1038	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	731134.9735	3845163.479	ID_1044
1039	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	731126.7524	3845155.638	ID_1045
1040	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	731114.4048	3845156.544	ID_1046
1041	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728138.5583	3845520.88	ID_915
1042	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728160.3338	3845512.118	ID_918
1043	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728163.6965	3845509.991	ID_919
1044	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728885.5348	3845592.773	ID_935
1045	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728896.0804	3845593.324	ID_936
1046	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729285.6215	3845531.447	ID_941
1047	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729028.3151	3845679.381	ID_379
1048	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729405.3369	3844121.636	ID_189
1049	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729897.3783	3844264.365	ID_208
1050	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729160.9206	3845254.444	ID_326
1051	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	728174.1155	3845524.926	ID_61
1052	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Tall	Good	729740.1392	3844898.536	ID_89
1053	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Fair	729707.7258	3844953.844	ID_966
1054	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	729348.0987	3845530.61	ID_1482
1055	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	729288.7958	3845564.675	ID_1483
1056	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	729283.4979	3845567.892	ID_1484

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1057	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	729005.1067	3845690.042	ID_1506
1058	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	728953.4961	3845686.306	ID_1508
1059	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	728626.7232	3845621.6	ID_1515
1060	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	728595.2808	3845613.847	ID_1517
1061	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	731058.5568	3845215.901	ID_1521
1062	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	731110.5741	3845162.072	ID_1523
1063	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	729135.5221	3845304.937	ID_1185
1064	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	727889.9472	3845356.988	ID_1012
1065	Honey mesquite	*Prosopis glandulosus* var. *torreyana*	Very Tall	Good	730456.0172	3844375.475	ID_1027
1066	Mexican fan palm	*Washingtonia robusta*	Tall	Good	729571.6145	3845382.88	ID_1475
1067	Mexican fan palm	*Washingtonia robusta*	Tall	Good	729610.8778	3844275.891	ID_1459
1068	Narrow-leaved willow	*Salix exigua*	Medium	Good	729619.4599	3845368.451	ID_1528
1069	Narrow-leaved willow	*Salix exigua*	Medium	Good	729332.4494	3845549.783	ID_1534
1070	Narrow-leaved willow	*Salix exigua*	Medium	Good	729320.3874	3845558.215	ID_1535
1071	Narrow-leaved willow	*Salix exigua*	Medium	Good	729310.2513	3845564.815	ID_1536
1072	Narrow-leaved willow	*Salix exigua*	Medium	Good	730286.988	3844777.76	ID_1191
1073	Narrow-leaved willow	*Salix exigua*	Medium	Good	730297.6109	3844792.106	ID_1194
1074	Narrow-leaved willow	*Salix exigua*	Medium	Good	730302.9778	3844799.121	ID_1195
1075	Narrow-leaved willow	*Salix exigua*	Medium	Good	730336.0055	3844811.295	ID_1197
1076	Narrow-leaved willow	*Salix exigua*	Medium	Good	729869.8992	3845401.214	ID_1217
1077	Salt cedar	*Tamarix ramosissima*	Short	Good	728157.2287	3845503.532	ID_972
1078	Salt cedar	*Tamarix ramosissima*	Short	Good	728154.6016	3845507.959	ID_973
1079	Salt cedar	*Tamarix ramosissima*	Medium	Poor	729745.8206	3844156.164	ID_213
1080	Salt cedar	*Tamarix ramosissima*	Medium	Poor	730070.4798	3844990.58	ID_244
1081	Salt cedar	*Tamarix ramosissima*	Medium	Fair	730057.3804	3845028.644	ID_241
1082	Salt cedar	*Tamarix ramosissima*	Medium	Fair	730060.0426	3845016.77	ID_242
1083	Salt cedar	*Tamarix ramosissima*	Medium	Good	729756.9167	3844159.473	ID_1467

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1084	Salt cedar	*Tamarix ramosissima*	Medium	Good	730140.5655	3844998.236	ID_1209
1085	Salt cedar	*Tamarix ramosissima*	Medium	Good	730116.5797	3845002.879	ID_1210
1086	Salt cedar	*Tamarix ramosissima*	Medium	Good	730100.0775	3845053.612	ID_1213
1087	Salt cedar	*Tamarix ramosissima*	Medium	Good	730120.6907	3845034.951	ID_1214
1088	Salt cedar	*Tamarix ramosissima*	Medium	Good	728166.0623	3845509.07	ID_974
1089	Salt cedar	*Tamarix ramosissima*	Medium	Good	728168.3329	3845520.978	ID_975
1090	Salt cedar	*Tamarix ramosissima*	Medium	Good	730157.2352	3845077.884	ID_232
1091	Salt cedar	*Tamarix ramosissima*	Medium	Good	730046.5224	3845173.949	ID_233
1092	Salt cedar	*Tamarix ramosissima*	Medium	Good	730033.7781	3845094.544	ID_235
1093	Salt cedar	*Tamarix ramosissima*	Medium	Good	730042.1164	3845072.696	ID_238
1094	Salt cedar	*Tamarix ramosissima*	Medium	Good	730092.0935	3844933.32	ID_245
1095	Salt cedar	*Tamarix ramosissima*	Medium	Good	730121.7411	3844890.292	ID_246
1096	Salt cedar	*Tamarix ramosissima*	Tall	Fair	730043.4194	3845065.951	ID_239
1097	Salt cedar	*Tamarix ramosissima*	Tall	Good	730126.0253	3844884.319	ID_1198
1098	Salt cedar	*Tamarix ramosissima*	Tall	Good	730182.2127	3844947.253	ID_1200
1099	Salt cedar	*Tamarix ramosissima*	Tall	Good	730176.6914	3844953.778	ID_1201
1100	Salt cedar	*Tamarix ramosissima*	Tall	Good	730175.1489	3844956.143	ID_1202
1101	Salt cedar	*Tamarix ramosissima*	Tall	Good	730168.0457	3844966.342	ID_1203
1102	Salt cedar	*Tamarix ramosissima*	Tall	Good	730155.3114	3844967.107	ID_1204
1103	Salt cedar	*Tamarix ramosissima*	Tall	Good	730154.407	3844954.081	ID_1205
1104	Salt cedar	*Tamarix ramosissima*	Tall	Good	730135.7175	3845021.656	ID_1211
1105	Salt cedar	*Tamarix ramosissima*	Tall	Good	730055.5069	3845095.344	ID_1212
1106	Salt cedar	*Tamarix ramosissima*	Tall	Good	730111.2036	3845019.274	ID_1215
1107	Salt cedar	*Tamarix ramosissima*	Tall	Good	730082.7968	3845034.435	ID_1216
1108	Salt cedar	*Tamarix ramosissima*	Tall	Good	730397.8868	3844375.307	ID_1067
1109	Salt cedar	*Tamarix ramosissima*	Tall	Good	730402.3675	3844404.393	ID_1068
1110	Salt cedar	*Tamarix ramosissima*	Tall	Good	730422.8904	3844444.05	ID_1069
1111	Salt cedar	*Tamarix ramosissima*	Tall	Good	730036.7504	3845084.015	ID_237
1112	Salt cedar	*Tamarix ramosissima*	Tall	Good	730065.8071	3845004.188	ID_243
1113	Salt cedar	*Tamarix ramosissima*	Very Tall	Good	730186.2868	3844945.562	ID_1199
1114	Screw bean mesquite	*Prosopis pubescens*	Medium	Poor	729261.5258	3845601.41	ID_369
1115	Screw bean mesquite	*Prosopis pubescens*	Medium	Poor	729251.0206	3845612.24	ID_370
1116	Screw bean mesquite	*Prosopis pubescens*	Medium	Poor	729220.6294	3845637.767	ID_371
1117	Screw bean mesquite	*Prosopis pubescens*	Medium	Poor	729166.8449	3845698.307	ID_375
1118	Screw bean mesquite	*Prosopis pubescens*	Medium	Fair	729222.3589	3845651.006	ID_372
1119	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730283.3792	3844776.06	ID_1082
1120	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730080.4666	3845085.013	ID_1099
1121	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730088.167	3845081.402	ID_1100

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1122	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730064.6025	3845051.416	ID_1110
1123	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730252.8516	3844783.11	ID_225
1124	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730252.4546	3844796.288	ID_226
1125	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730251.0891	3844913.274	ID_228
1126	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730266.6541	3844904.164	ID_229
1127	Screw bean mesquite	*Prosopis pubescens*	Medium	Good	730268.0325	3844946.42	ID_231
1128	Screw bean mesquite	*Prosopis pubescens*	Tall	Poor	730018.9705	3845195.001	ID_234
1129	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729219.7353	3845642.219	ID_1486
1130	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729219.2125	3845652.259	ID_1487
1131	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729209.5276	3845676.862	ID_1488
1132	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729182.1531	3845661.163	ID_1490
1133	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729203.5478	3845653.677	ID_1492
1134	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729206.2335	3845648.947	ID_1493
1135	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729167.2921	3845671.808	ID_1495
1136	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729171.9746	3845680.42	ID_1496
1137	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	728948.0721	3845683.266	ID_1509
1138	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730171.726	3844849.727	ID_1072
1139	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730174.9759	3844846.088	ID_1073
1140	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730190.1228	3844834.097	ID_1074
1141	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730197.3595	3844824.057	ID_1075
1142	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730205.0802	3844817.128	ID_1077
1143	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730231.4797	3844805.939	ID_1078
1144	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730242.7814	3844789.258	ID_1079

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1145	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730265.7033	3844782.651	ID_1080
1146	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730262.8195	3844773.93	ID_1081
1147	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730287.3567	3844778.116	ID_1083
1148	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730290.0199	3844783.614	ID_1084
1149	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730164.9402	3844879.387	ID_1085
1150	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730196.5702	3844873.984	ID_1087
1151	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730197.5338	3844879.438	ID_1088
1152	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730232.5334	3844886.457	ID_1092
1153	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730246.2505	3844877.775	ID_1093
1154	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730257.5354	3844876.512	ID_1094
1155	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730261.7593	3844885.058	ID_1095
1156	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730257.2427	3844896.727	ID_1096
1157	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730057.9946	3845095.44	ID_1097
1158	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730072.412	3845092.103	ID_1098
1159	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730115.4706	3845024.718	ID_1105
1160	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730099.5132	3845015.619	ID_1106
1161	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730086.6859	3845007.954	ID_1107
1162	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730081.0505	3845030.436	ID_1108
1163	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730079.9956	3845045.099	ID_1109
1164	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730052.2288	3845073.034	ID_1112
1165	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730050.1687	3845085.749	ID_1113
1166	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	729584.9046	3845375.378	ID_367
1167	Screw bean mesquite	*Prosopis pubescens*	Tall	Poor	729274.3781	3845579.913	ID_368

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1168	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730193.2416	3844828.149	ID_223
1169	Screw bean mesquite	*Prosopis pubescens*	Tall	Good	730279.6032	3844914.687	ID_230
1170	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	729195.2186	3845642.255	ID_1494
1171	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	729100.3635	3845704.555	ID_1498
1172	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730014.4864	3844536.405	ID_1468
1173	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730149.7308	3844879.48	ID_1071
1174	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730201.2853	3844822.405	ID_1076
1175	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730185.8046	3844887.319	ID_1086
1176	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730202.2925	3844889.243	ID_1089
1177	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730214.027	3844893.082	ID_1090
1178	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730221.6887	3844884.844	ID_1091
1179	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730091.5694	3845071.698	ID_1101
1180	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730093.8768	3845060.363	ID_1102
1181	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730107.6462	3845048.371	ID_1103
1182	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730114.4917	3845038.777	ID_1104
1183	Screw bean mesquite	*Prosopis pubescens*	Very Tall	Good	730057.3878	3845067.524	ID_1111
Shrubs							
1184	Creosote bush	*Larrea tridentata*	Medium	Good	729788.6387	3845043.586	ID_364
1185	Creosote bush	*Larrea tridentata*	Medium	Good	729764.1736	3845055.124	ID_365
1186	Creosote bush	*Larrea tridentata*	Medium	Good	729636.6079	3845318.377	ID_366
1187	Ocotillo	*Fouquieria splendens*	Medium	Poor	729062.3956	3844988.867	ID_147
1188	Ocotillo	*Fouquieria splendens*	Medium	Good	730402.3098	3844239.268	ID_1595
1189	Ocotillo	*Fouquieria splendens*	Medium	Good	729073.152	3844991.557	ID_148
1190	Ocotillo	*Fouquieria splendens*	Medium	Good	729081.1626	3844977.957	ID_149
1191	Ocotillo	*Fouquieria splendens*	Medium	Good	729082.6467	3844973.006	ID_150
1192	Ocotillo	*Fouquieria splendens*	Medium	Good	729609.0115	3845079.481	ID_37
1193	Ocotillo	*Fouquieria splendens*	Medium	Good	729635.6963	3845051.948	ID_38
1194	Ocotillo	*Fouquieria splendens*	Medium	Good	729646.5411	3845047.112	ID_39
1195	Oleander	*Nerium oleander*	Medium	Fair	729661.0681	3844249.674	ID_1447
1196	Oleander	*Nerium oleander*	Medium	Fair	729655.1138	3844249.214	ID_1448

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1197	Oleander	*Nerium oleander*	Medium	Fair	729651.5445	3844250.091	ID_1449
1198	Oleander	*Nerium oleander*	Medium	Fair	729621.217	3844260.038	ID_1457
1199	Oleander	*Nerium oleander*	Medium	Fair	729618.7956	3844261.694	ID_1458
1200	Oleander	*Nerium oleander*	Medium	Good	728782.3091	3845660.314	ID_1543
1201	Oleander	*Nerium oleander*	Tall	Fair	729624.3765	3844257.07	ID_1456
1202	Oleander	*Nerium oleander*	Tall	Good	729669.8072	3844250.335	ID_1446
1203	Oleander	*Nerium oleander*	Tall	Good	729650.333	3844250.204	ID_1450
1204	Oleander	*Nerium oleander*	Tall	Good	729642.1997	3844250.249	ID_1451
1205	Oleander	*Nerium oleander*	Tall	Good	729638.9168	3844251.782	ID_1452
1206	Oleander	*Nerium oleander*	Tall	Good	729627.0337	3844255.964	ID_1455
1207	Oleander	*Nerium oleander*	Very Tall	Good	729636.2979	3844251.316	ID_1453
1208	Oleander	*Nerium oleander*	Very Tall	Good	729631.7564	3844255.188	ID_1454
Herbs							
1209	Broad-leaved cattail	*Typha latifolia*	Medium	Good	730481.6891	3844226.208	ID_1672
1210	Broad-leaved cattail	*Typha latifolia*	Medium	Good	729543.1175	3845377.74	ID_1532
1211	Broad-leaved cattail	*Typha latifolia*	Medium	Good	729272.4533	3845572.129	ID_1533
1212	Broad-leaved cattail	*Typha latifolia*	Medium	Good	729253.8362	3845601.639	ID_1537
1213	Broad-leaved cattail	*Typha latifolia*	Medium	Good	729240.2914	3845603.162	ID_1538
1214	Broad-leaved cattail	*Typha latifolia*	Medium	Good	730406.0156	3844374.911	ID_1065
1215	California bulrush	*Schoenoplectus californicus*	Short	Good	730406.4404	3844375.42	ID_1066
1216	California bulrush	*Schoenoplectus californicus*	Medium	Good	729912.8895	3844858.432	ID_1675
1217	California bulrush	*Schoenoplectus californicus*	Medium	Good	729616.555	3845378.485	ID_1529
1218	California bulrush	*Schoenoplectus californicus*	Medium	Good	729600.2221	3845385.402	ID_1530
1219	California bulrush	*Schoenoplectus californicus*	Medium	Good	729581.8764	3845394.98	ID_1531
1220	California bulrush	*Schoenoplectus californicus*	Medium	Good	728861.7893	3845671.373	ID_1542
1221	California bulrush	*Schoenoplectus californicus*	Medium	Good	728564.1988	3845622.857	ID_1545
1222	California bulrush	*Schoenoplectus californicus*	Medium	Good	730705.4445	3844782.28	ID_1550
1223	California bulrush	*Schoenoplectus californicus*	Medium	Good	730516.4377	3844811.766	ID_1551
1224	California bulrush	*Schoenoplectus californicus*	Medium	Good	730296.7501	3844777.779	ID_1192
1225	California bulrush	*Schoenoplectus californicus*	Medium	Good	730323.6459	3844804.999	ID_1196

[1]Coordinates are UTM NAD 83 Zone 11N;

No.	Common Name	Scientific Name	Size Class	Health	Easting[1]	Northing	Object ID
1226	Common reed	*Phragmites australis*	Medium	Good	729984.2857	3844399.47	ID_1526
1227	Common reed	*Phragmites australis*	Medium	Good	728923.5756	3845690.137	ID_1540
1228	Common reed	*Phragmites australis*	Medium	Good	728861.6738	3845674.729	ID_1541
1229	Common reed	*Phragmites australis*	Medium	Good	729917.3269	3844475.785	ID_1469
1230	Common reed	*Phragmites australis*	Medium	Good	730296.7273	3844788.34	ID_1193
1231	Giant reed	*Arundo donax*	Tall	Fair	730242.8115	3844782.914	ID_224
1232	Giant reed	*Arundo donax*	Tall	Good	730249.4705	3844779.315	ID_1190
1233	Giant reed	*Arundo donax*	Very Tall	Good	730301.5935	3844253.476	ID_1674
1234	Giant reed	*Arundo donax*	Very Tall	Good	729126.6877	3845689.14	ID_1539
1235	Giant reed	*Arundo donax*	Very Tall	Good	728723.018	3845646.121	ID_1544

[1]Coordinates are UTM NAD 83 Zone 11N;

Topock Project Executive Abstract

Document Title: *Addendum to Topock Compressor Station Groundwater Remediation Project Mature Plants Survey Report* Submitting Agency: DTSC, RWQCB Final Document? ☒ Yes ☐ No	Date of Document: May 19, 2014 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 ☒ 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 addendum complies with the EIR mitigation measures AES-1a and AES-2b. 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 the environmental impacts associated with the groundwater cleanup. Mitigation measures AES-1a and AES-2b require a survey of mature plant vegetation in Project areas visible from Key View 5, Topock Maze Locus B, and Key View 11, the Colorado River. The surveys will be used to design the Project in a manner that minimizes the Project's aesthetic impacts on these Key Views. At the kickoff for the August 2011 survey, Tribes requested and PG&E agreed to survey Mature Plants across the entire EIR Project Area. The Mature Plants Survey was performed in August 2011 with a field check in November 2011. A report was submitted in January 2012.

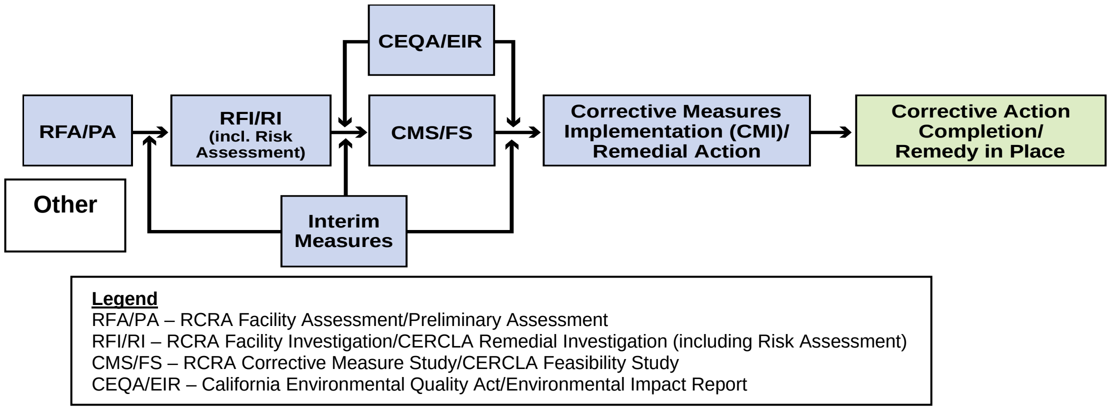
This addendum presents the results of subsequent July 2012 and April 2014 surveys for 56 acres added to the EIR Project Area during remedy design following the initial report submittal. This addendum presents updated detailed maps of Mature Plant occurrence, a list of Mature Plant species mapped in the EIR Project Area, and representative photographs. The data presented with this report will be considered in the 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 2012 Mature Plants Survey Report and this 2014 Addendum complied with EIR mitigation measures AES-1a and AES-2b.
.

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).*



Version 9

Pacific Gas and Electric Company®

Yvonne J. Meeks
Manager

Environmental Remediation

Mailing Address
4325 South Higuera Street
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May 19, 2014

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

Subject: *Addendum to Mature Plant Survey Report for the PG&E Topock Compressor Station*

Dear Mr. Yue:

Enclosed is the Technical Memorandum *Addendum to the Topock Compressor Station Groundwater Remediation Project Mature Plants Survey Report.* This Technical Memorandum presents data that was collected from surveys conducted in July 2012 and April 2014, pursuant to the EIR mitigation measures AES-1a and AES-2b. These surveys mapped mature plants in 56 acres of land added to the original EIR project area after submittal of the January 2012 *Mature Plants Survey Report* based on 2011 survey data.

This Technical Memorandum is a supplement to the January 2012 *Topock Compressor Station Groundwater Remediation Project Mature Plants Survey Report*. This information will be used in the groundwater remedy design and inform the risk assessment.

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

Sincerely,

Yvonne Meeks

Yvonne Meeks
Topock Project Manager

Enclosure

Supplemental Ethnobotanical Plant Surveys Technical Memorandum

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

TECHNICAL MEMORANDUM

Addendum to the January 2012 Mature Plant Report for the Topock Compressor Station Final Groundwater Remedy

PREPARED FOR: Pacific Gas and Electric Company

PREPARED BY: Russell Huddleston/E2 Consulting Engineers

DATE: May 19, 2014

Introduction

This is an addendum to the Topock Compressor Station Groundwater Remediation Project Mature Plants Survey Report, completed in January 2012. This addendum provides updated information that includes the additional 56 acres that were added to the original EIR project area after the surveys for the January 2012 Report had been completed. The additional areas were comprised of the primary and secondary locations (HNWR-1 and Site B wells) for the proposed freshwater supply for the Final Groundwater Remedy along the Oatman –Topock Highway (Figure 1). This report specifically documents the mature plants that were identified in the additional area and provides a complete, updated set of maps showing the locations of mature plants throughout the project area (Attachment A).

For the purpose of the survey, mature plants were defined as living trees, large or prominent shrubs, and tall predominantly herbaceous plants that were considered important to the aesthetic value of the Project Area (GANDA and CH2M HILL 2012). Seedlings, small saplings and other immature plants were not mapped due to their small stature. A total of twenty-one species were considered appropriate to categorize and map as Mature Plants (Table 1). More than half of these (N=13) are trees, with the remainder split between shrubs (N= 5) and herbaceous perennials (N= 4; Table 1).

TABLE 1
List of Plant Species Considered to be Mature Plants

Common Name	Scientific Name	Plant Habit	Sections in which Species Occurs
TREES			
Athel tamarisk	*Tamarix aphylla*	Tall to very tall tree	A, B, D, F, G, L
Blue palo verde	*Parkinsonia florida*	Shrub to tree	A, C, D, E, F, G, H, I, J, L
Catclaw acacia	*Senegalia greggii* (*Acacia greggii*)	Shrub to small tree	A, B, C, D, E, G, H, I
Desert smoke tree	*Psorothamnus spinosus*	Medium to tall tree	A, B, C, D, J
Eucalyptus	*Eucalyptus* sp.	Tall tree	A, B
Fremont's cottonwood	*Populus fremontii*	Tall tree	B
Goodding's willow	*Salix gooddingii*	Medium to tall tree	B
Hillside palo verde	*Parkinsonia microphylla*	Shrub to tree	H, I

TABLE 1
List of Plant Species Considered to be Mature Plants

Common Name	Scientific Name	Plant Habit	Sections in which Species Occurs
Honey mesquite	*Prosopis glandulosa* var. *torreyana*	Medium to tall tree	A, B, C, D, E, G, H, I, J
Mexican fan palm	*Washingtonia robusta*	Medium to tall tree	A, B, E, H, J
Narrow-leaved willow	*Salix exigua*	Medium tree	A, E, F, G, I
Salt cedar	*Tamarix ramosissima*	Shrub to large tree	A, B, C, D, E, F, G, H, I, J, L
Screwbean mesquite	*Prosopis pubescens*	Medium to tall tree	A, E, F, I
SHRUBS			
Arrow weed	*Pluchea sericea*	Medium to tall shrub	A, B, C, D, E, F, G, H, I, J
Creosote bush	*Larrea tridentata*	Shrub	A, B, C, D, E, F, G, H, I, J, L
Ocotillo	*Fouquieria splendens*	Tall shrub	C, D, I
Oleander	*Nerium oleander*	Medium to tall shrub	A, B, H
Big saltbush	*Atriplex lentiformis*	Shrub	A, G, J
HERBS			
Broad-leaved cattail	*Typha latifolia*	Tall herb	A, B, C, E, I, J
California bulrush	*Schoenoplectus californicus*	Tall sedge	A, B, E, F, G, I, J
Common reed	*Phragmites australis*	Tall perennial grass	A, E, F, G, I, J
Giant reed	*Arundo donax*	Tall perennial grass	A, E, F, G, I

Methods

The survey methods for the additional area followed the same protocols developed expressly for Mitigation Measures AES-1a and AES-2b (upon which, the Mature Plants Survey Report was based) as well as stakeholder comments. The methodology was developed to ensure that all mature plants in the project area were identified and recorded. Surveys of the additional area were completed on July 16 and 17, 2012 by biologists Russell Huddleston and Melissa Williams and on April 7 through 10, 2014 by biologists Russell Huddleston and Steve Long. Mature plants were mapped using a combination of high-resolution aerial photographs and Global Positioning System (GPS). Field data was collected using Trimble GeoXH and GeoXT GPS units. In areas where individual plants were numerous and closely clustered together, GPS data was collected along the perimeter of the clusters forming a polygon.

For each Mature Plant or cluster of Mature Plants, surveyors recorded the height and health of the plant. Four height categories were used as follows:

- short (< 6 feet),
- medium (≥ 6 and < 12 feet),
- tall (≥ 12 and < 20 feet), or
- very tall (≥ 20 feet).

The results of the field mapping for the entire project area is presented in Attachment A of this memorandum.

Plant health was also assessed using three categories as follows:

- good (plants with no dead or damaged branches or other signs of branch senescence),
- fair (plants with a few dead or senescent branches), or
- poor (plants with more than half of the branches dead or damaged).

Results

The area on the west side of the Oatman-Topock highway was previously dense athel tamarisk and salt cedar that was burned during a wildfire in October of 2008. In early 2011, the Havasu National Wildlife Refuge (Refuge) initiated restoration activities in the burn area that included the removal of logs and woody debris and irrigation to leach salts form the soils. Applying a two-phase approach, the Refuge has planted native vegetation in 22-acres of the burned area, a portion of which, is included in the additional survey area. Native vegetation that had been planted in this area includes 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*). Trees and shrubs in this area were all short to medium and were generally in fair to good condition, although some of the planted trees were in poor condition.

With the exception of the re-vegetation plantings most of the 2008 burn area is barren with only a few scattered athel tamarisk (*Tamarix aphylla*) seedlings and occasional weedy herbaceous plants such as tansy mustard (*Descurainia sophia*) and Russian thistle (*Salsola tragus*). The burn areas had all been mechanically cleared and scarified and wood chips and logs and woody debris piles are still present in a few locations (see photographs in Attachment B).

In the former burn area, mature vegetation is found at two locations: the medium-sized quailbush (*Atriplex lentiformis*) in the southern portion of the added survey area; and two patches of tall blue palo-verde trees on the earthen berms along the Sacramento Wash in the northern part of the additional survey area (see photographs in Attachment B). Vegetation at both of these locations appears to be in generally good condition. The area on the east side of the highway includes the outer edges of a dense stand of tall athel tamarisk with some salt cedar along the edge of the roadway (see photos in Attachment B). Trees in this area were unaffected by the 2008 Sacramento Wash fire and appeared to be in good condition.

Reference Cited

GANDA and CH2M HILL, 2012. Mature Plants Survey Report. January 16.

Attachment A
Mature Plant Mapping in the Topock Project Area

MATURE PLANTS LEGEND

TREES

Common Name	Species	Plant Habit
Athel Tamarisk (2)	*Tamarix aphylla*	Tall to very tall tree
Blue Palo Verde (3)	*Parkinsonia florida*	Shrub to tree
Catclaw Acacia (9)	*Senegalia greggii (Acacia greggii)*	Shrub to small tree
Desert Smoke Tree (12)	*Psorothamnus spinosus*	Medium to tall tree
Hillside Palo Verde (13)	*Parkinsonia microphylla*	Medium to tall tree
Honey Mesquite (15)	*Prosopis glandulosa* var. *torreyana*	Medium to tall tree
Mexican Fan Palm (8)	*Washingtonia robusta*	Medium to tall tree
Narrow-leaved Willow (18)	*Salix exigua*	Shrub or small tree
Salt Cedar (19)	*Tamarix ramosissima*	Shrub to large tree
Screwbean Mesquite (26)	*Prosopis pubescens*	Medium to tall tree
Fremont's Cottonwood	*Populus fremontii*	Tall tree
Goodding's Willow	*Salix gooddingii*	Shrub to small tree
Eucalyptus	*Eucalyptus* sp.	Tall tree

SHRUBS

Common Name	Species	Plant Habit
Arrow Weed (1)	*Pluchea sericea*	Medium to tall shrub
Quailbush Scrub (28)	*Atriplex lentiformis*	Medium to tall shrub
Creosote Bush Scrub (11)	*Larrea tridentata*	Shrub
Oleander (17)	*Nerium oleander*	Medium to tall shrub
Bush Seepweed Scrub	*Suaeda moquinii*	Shrub
Ocotillio	*Fouquieria splendens*	Tall shrub

HERBS

Common Name	Species	Plant Habit
Broad-leaved Cattail (6)	*Typha latifolia*	Tall herb
California Bulrush (7)	*Schoenoplectus californicus*	Tall sedge
Common Reed (10)	*Phragmites australis*	Tall perennial grass
Giant Reed (15)	*Arundo donax*	Tall perennial grass

MULTI-SPECIES AREAS

Common Name

- Blue Palo Verde/Catclaw Acacia (4)
- Blue Palo Verde/Honey Mesquite (22)
- Blue Palo Verde/Salt Cedar/Honey Mesquite (5)
- Salt Cedar/Arrow Weed (25)
- Salt Cedar/Athel Tamarisk (29)
- Salt Cedar/Honey Mesquite (24)
- Salt Cedar/Screwbean Mesquite (23)

OTHER

- Restoration Area (31)

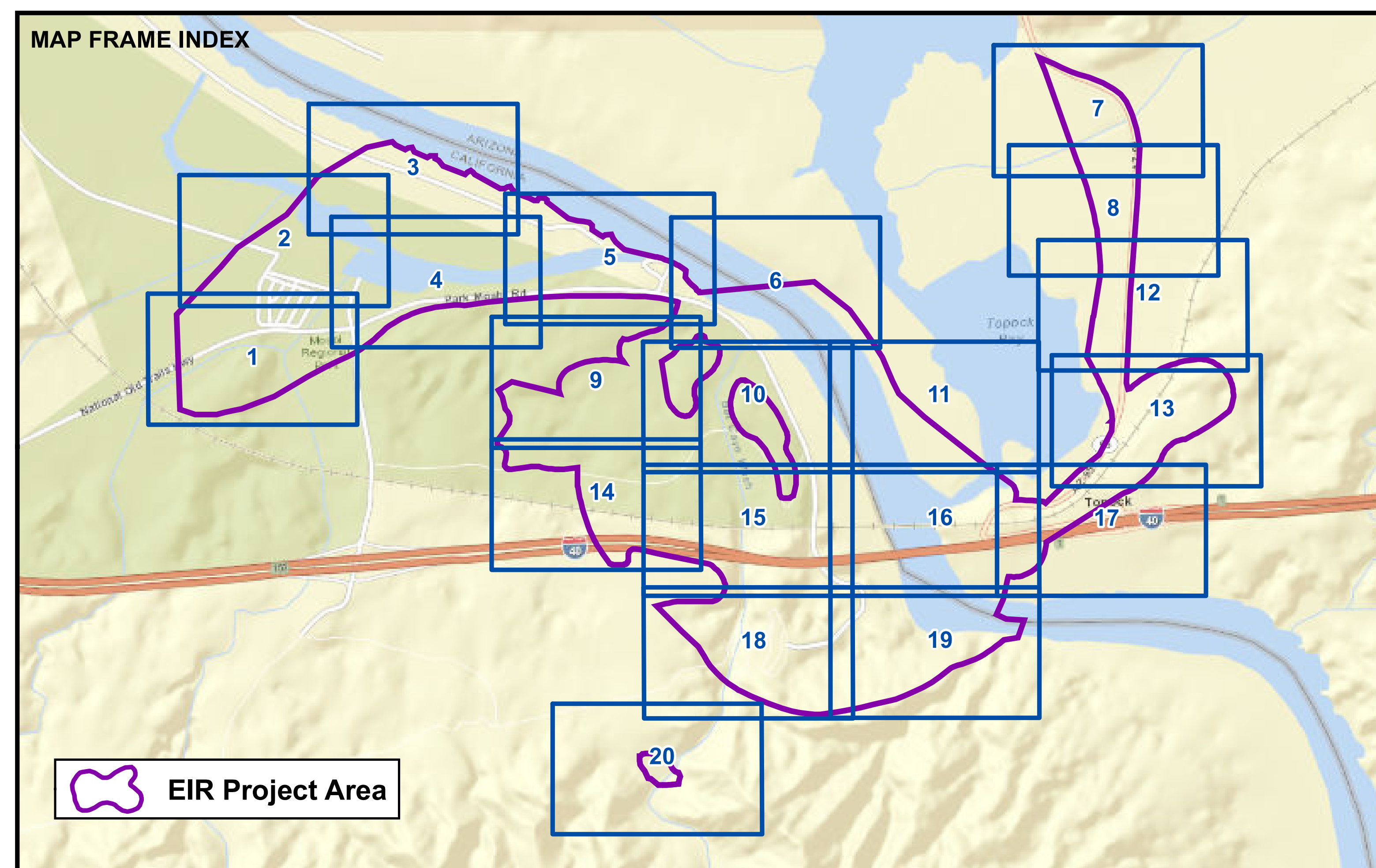
HEIGHT DESIGNATIONS

- Very Tall features are outlined in PINK
- Tall features are outlined in PURPLE
- Medium features are outlined in ORANGE
- Short features are outlined in BLUE
- Features with multiple height classes are outlined in GREEN

N

0 120 240 480 Feet

Scale bar and north arrow pertain to map frames, not frame index



CH2MHILL

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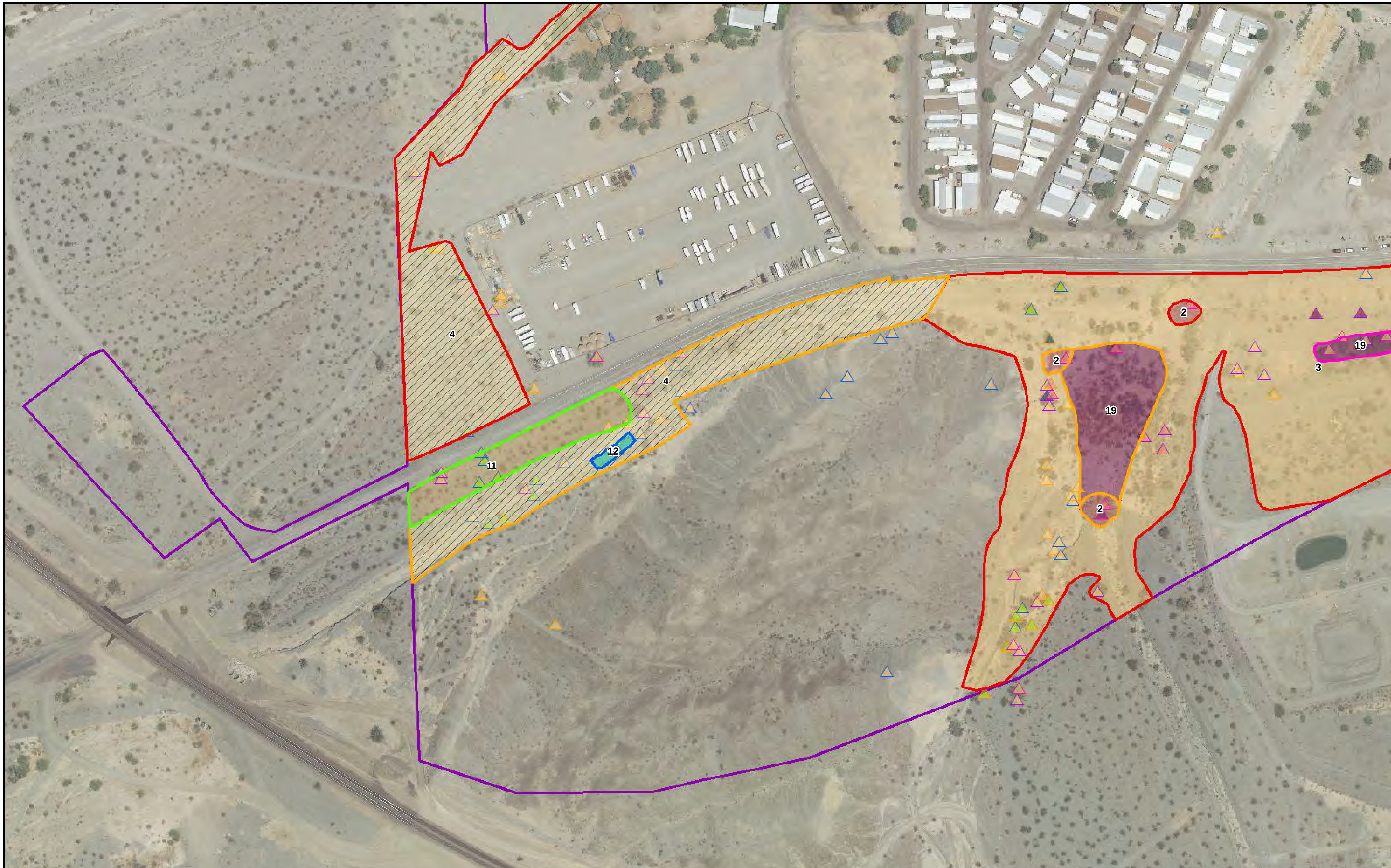

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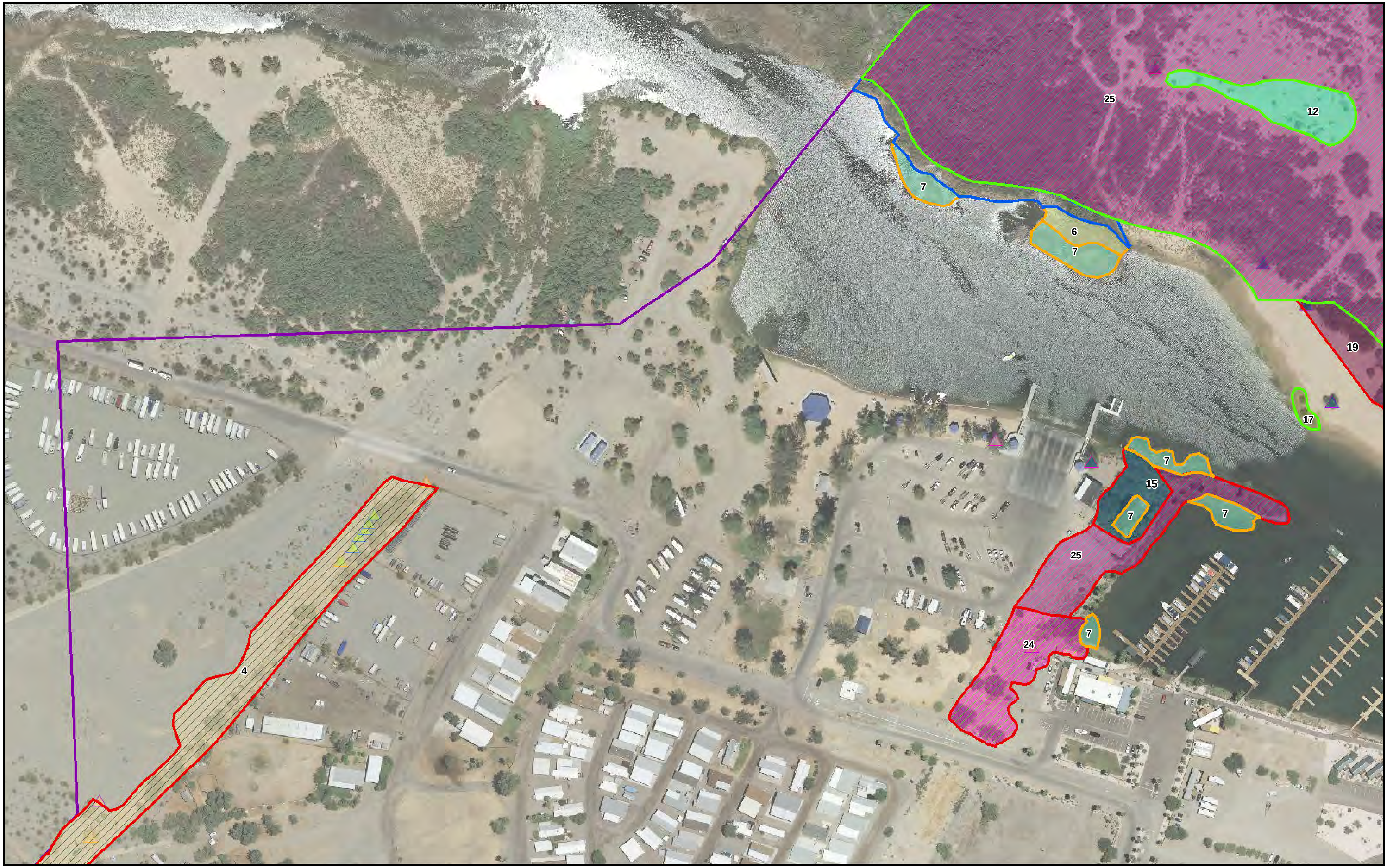
MAP 1



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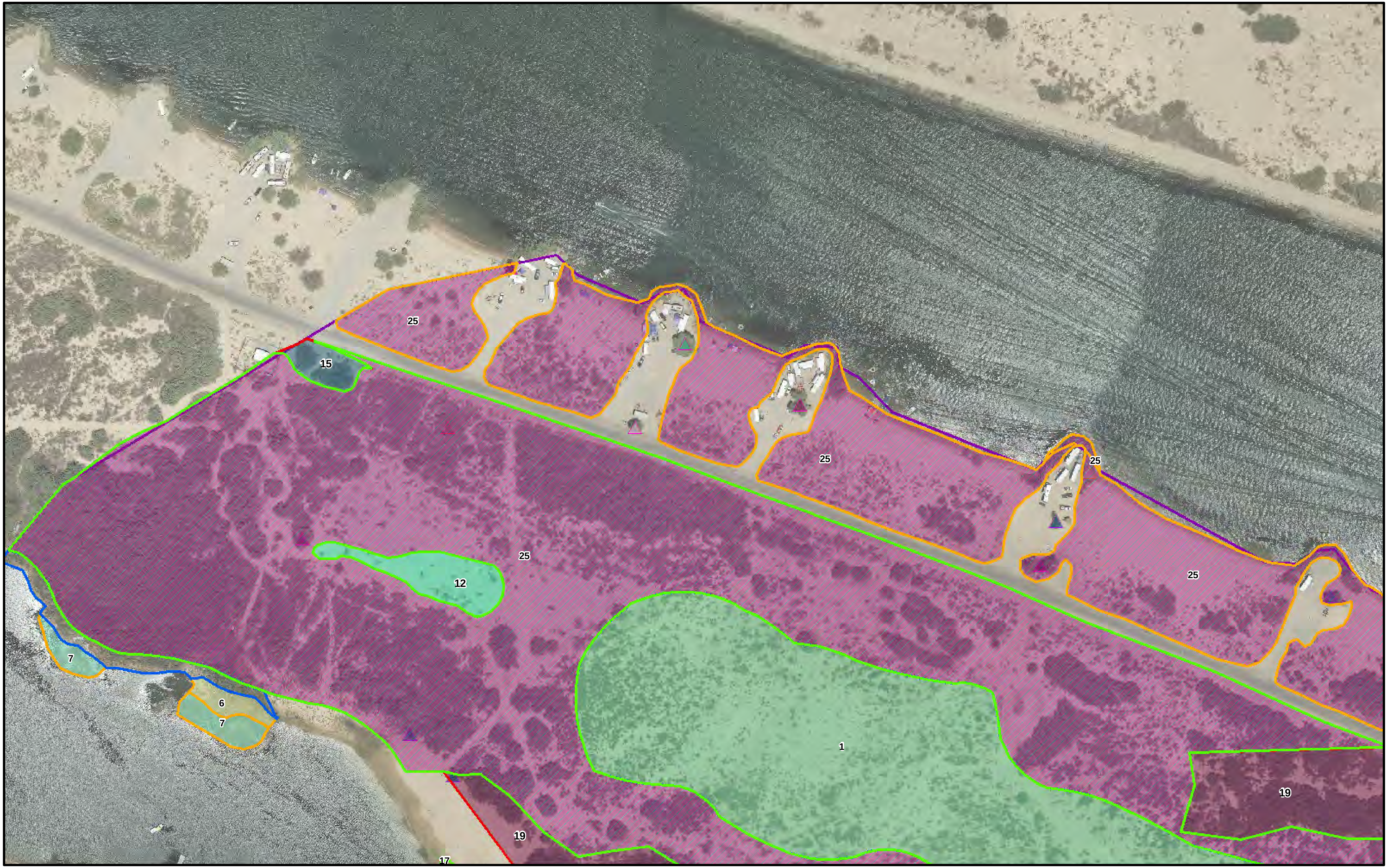

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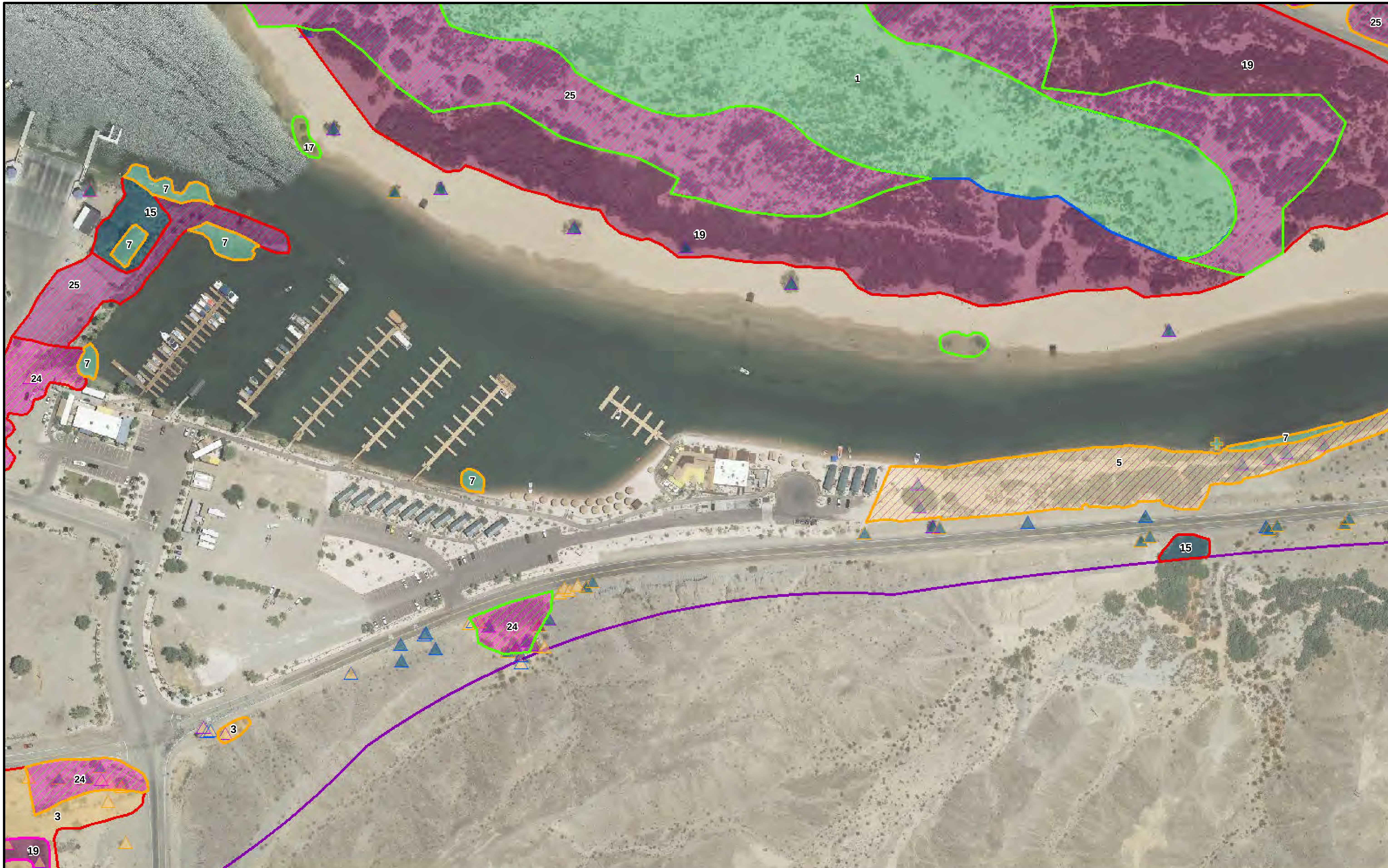

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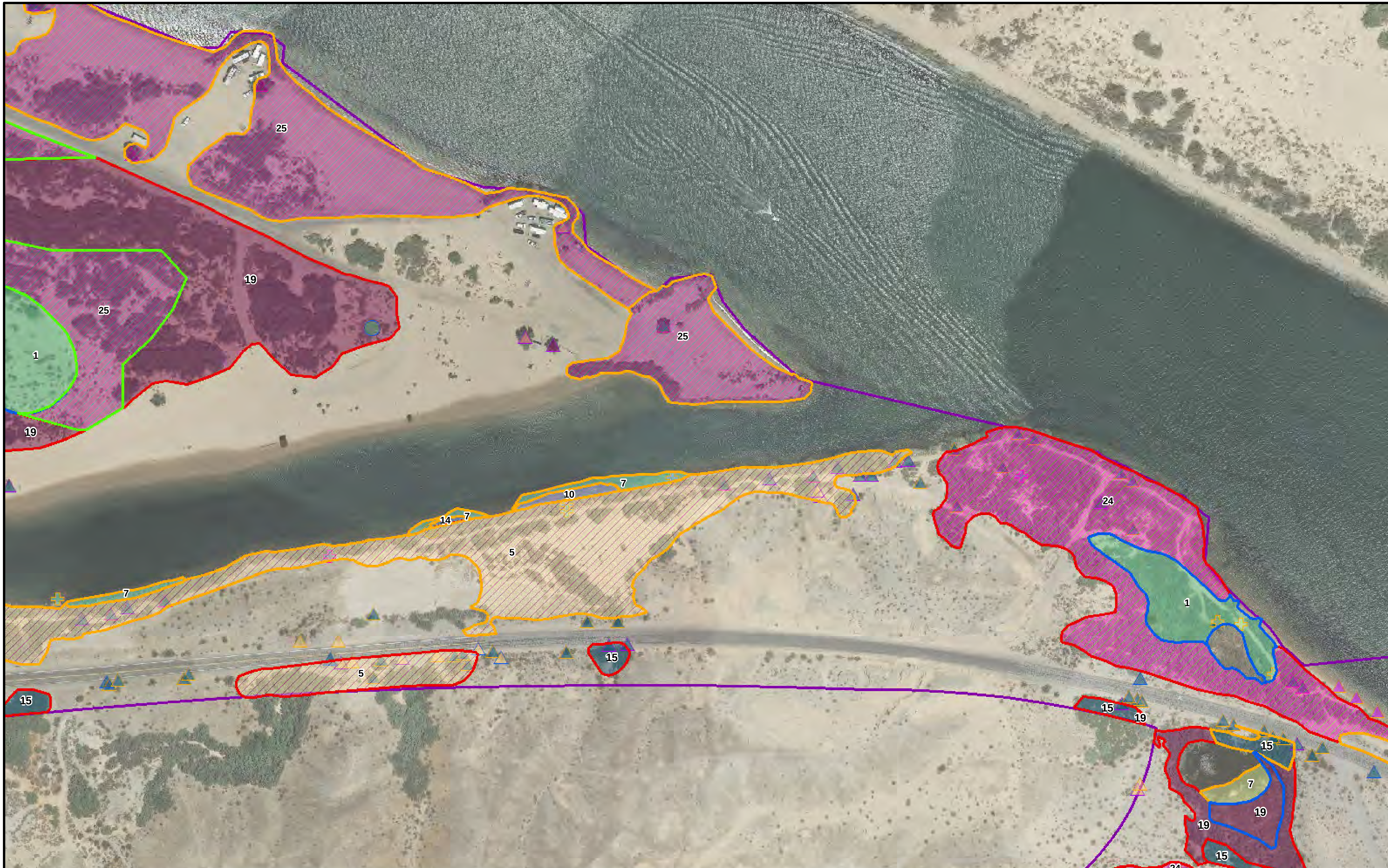
MAP 4



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MAP 5

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MAP 6

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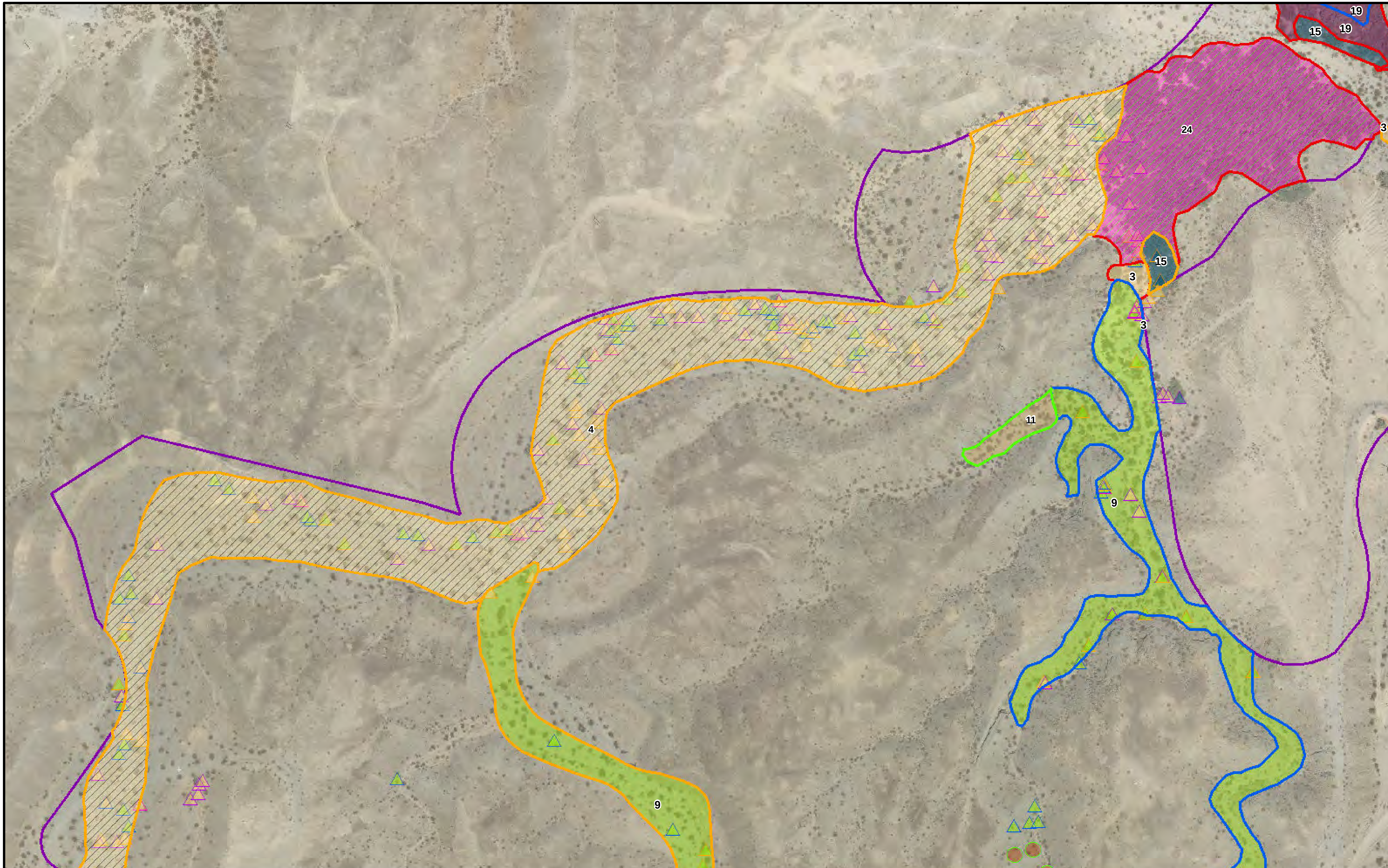
MAP 8



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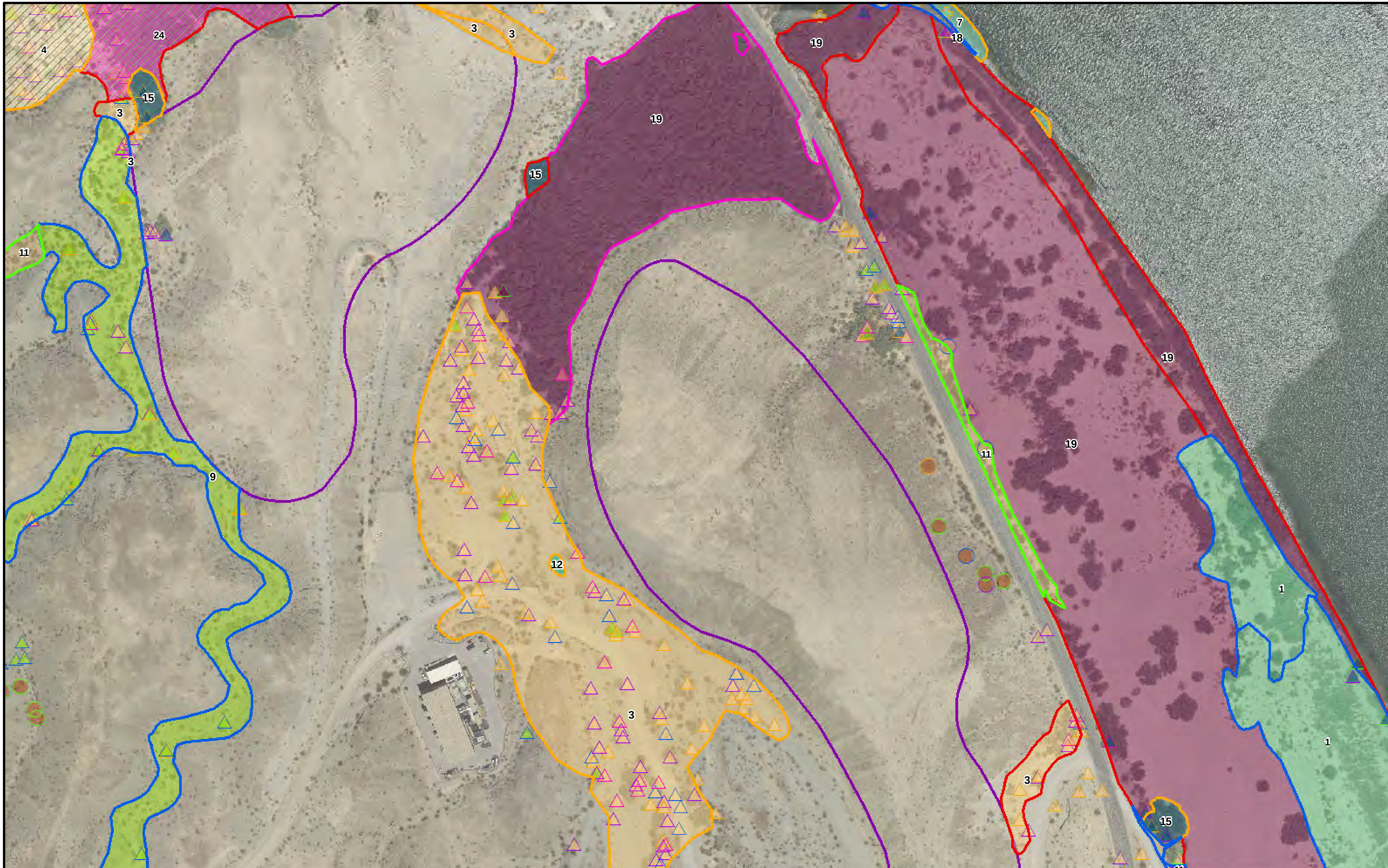

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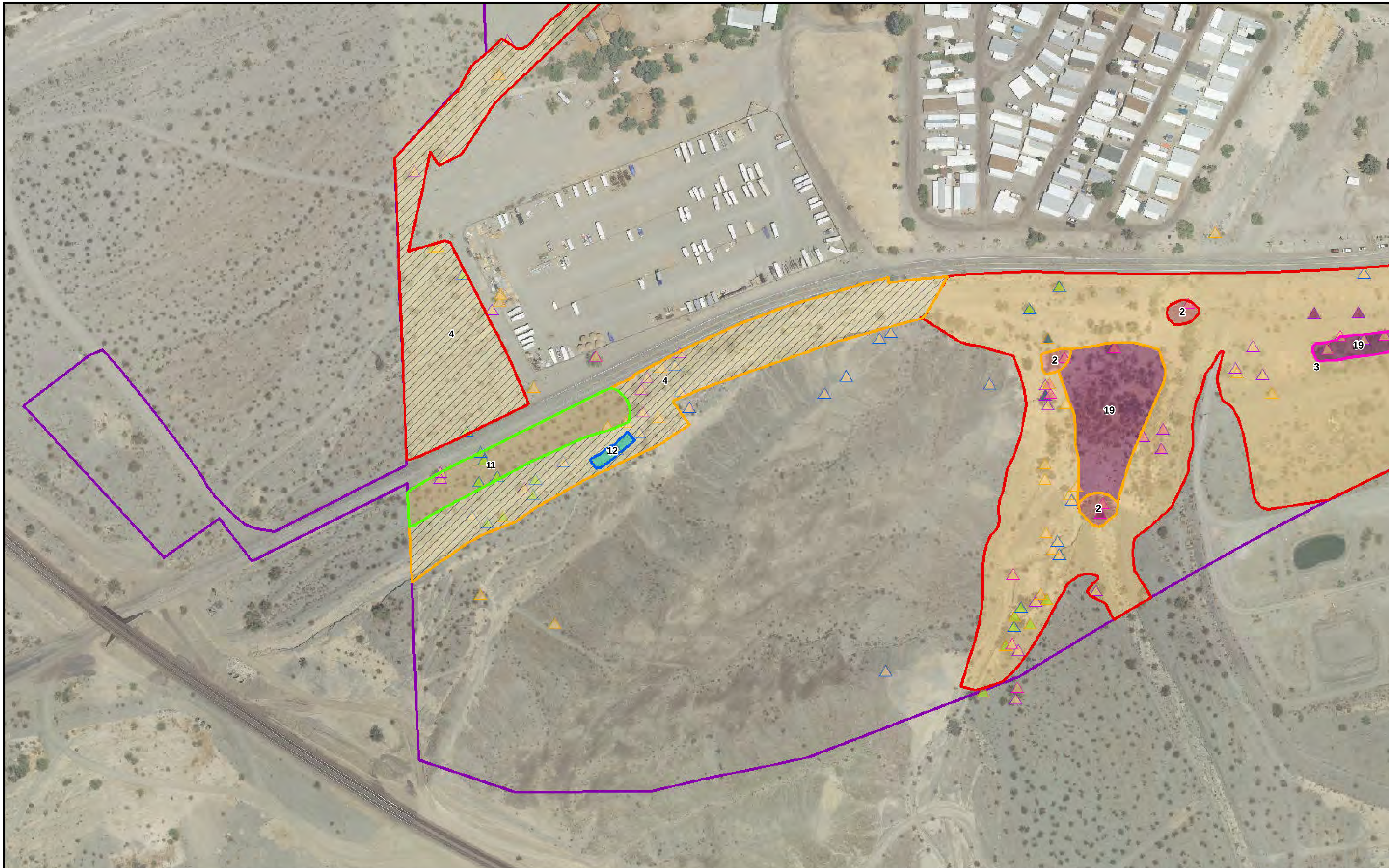

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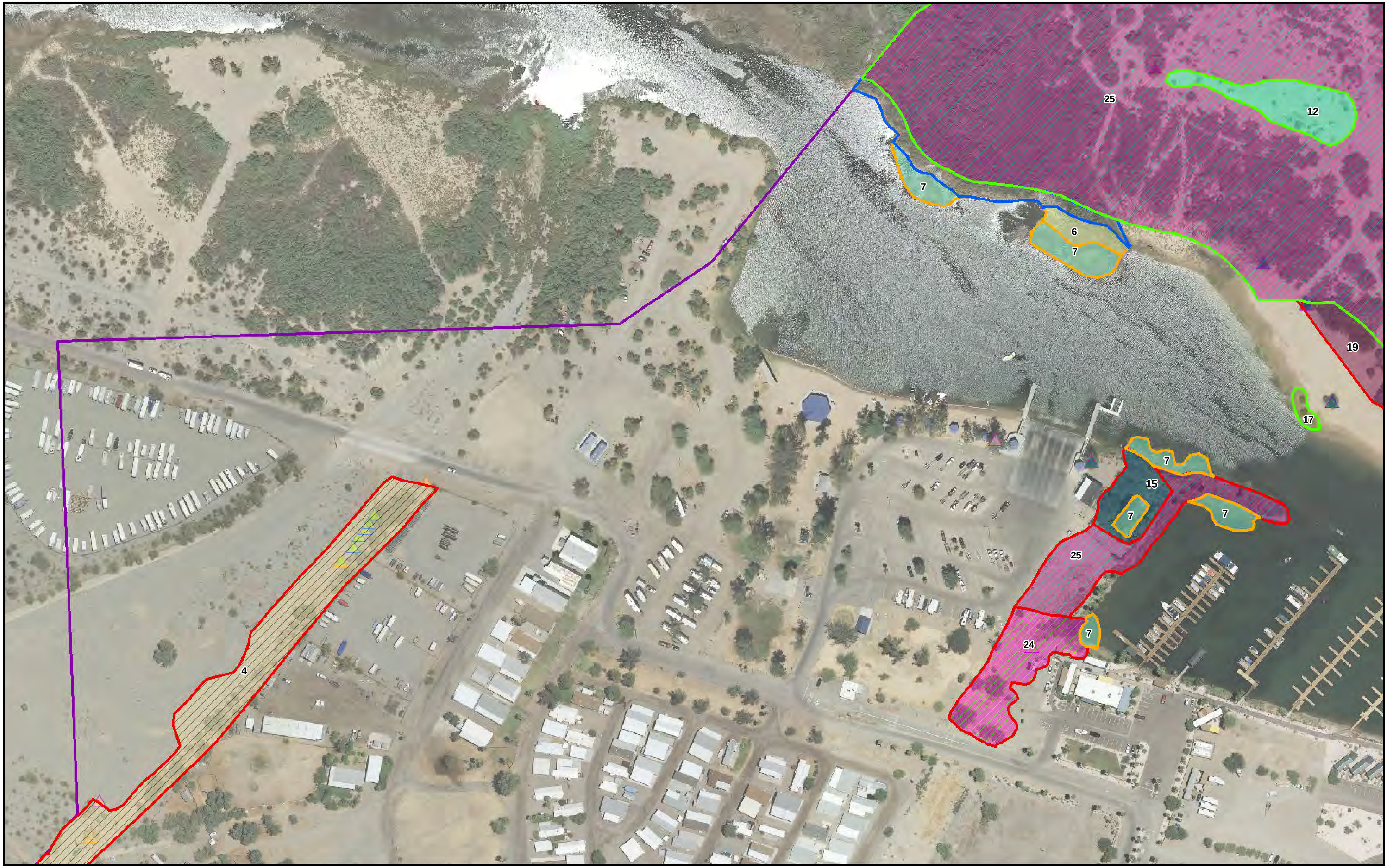

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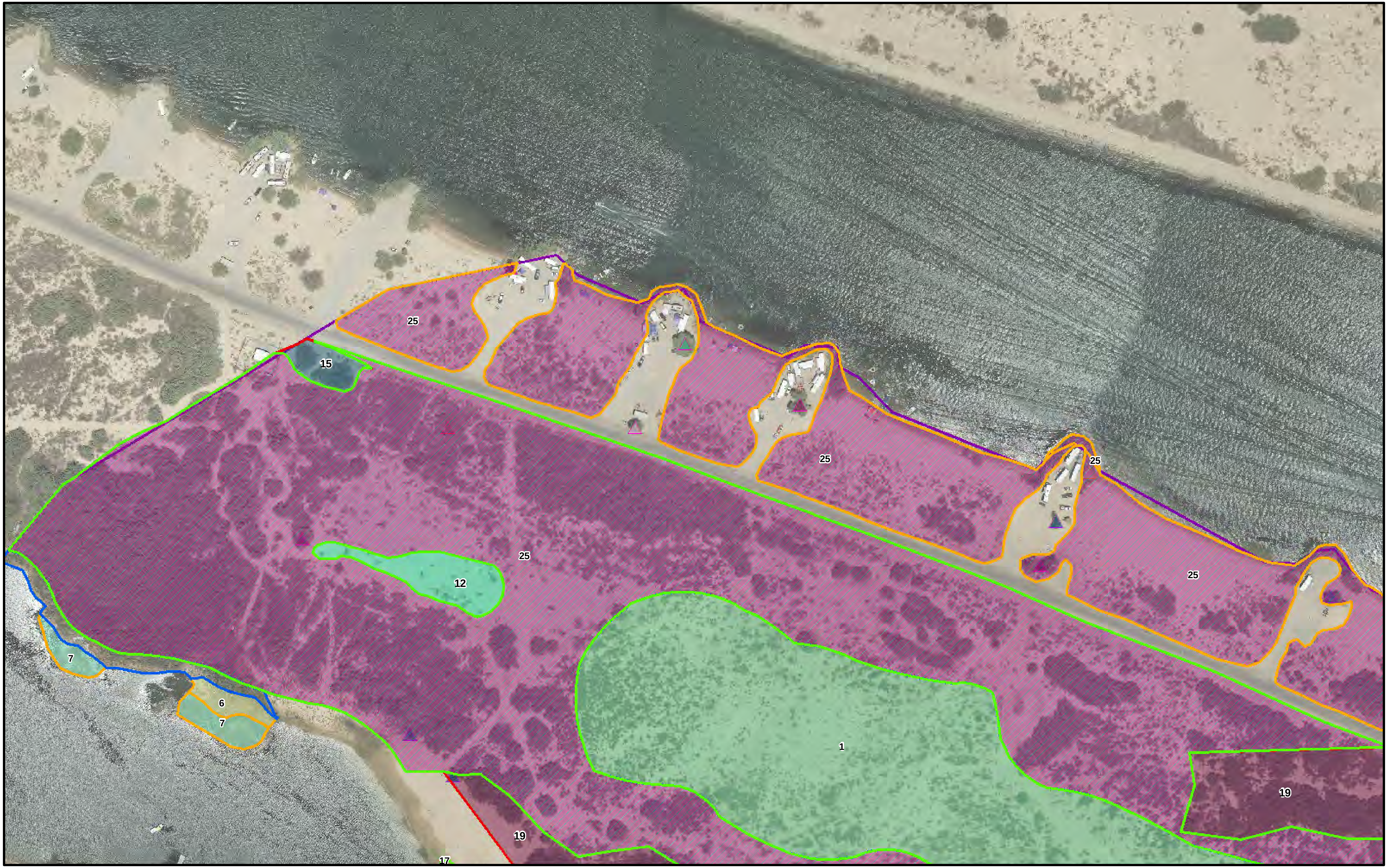

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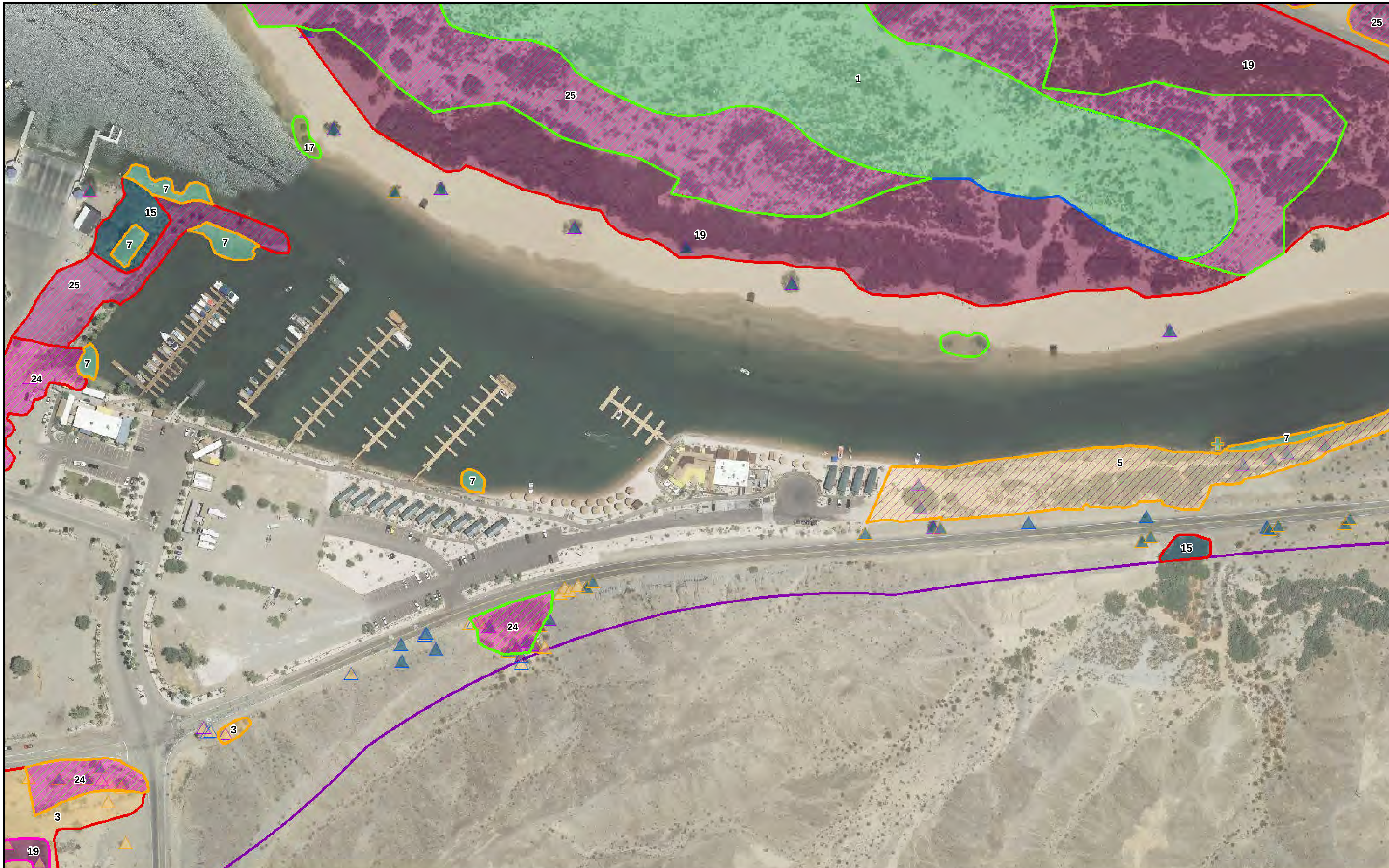

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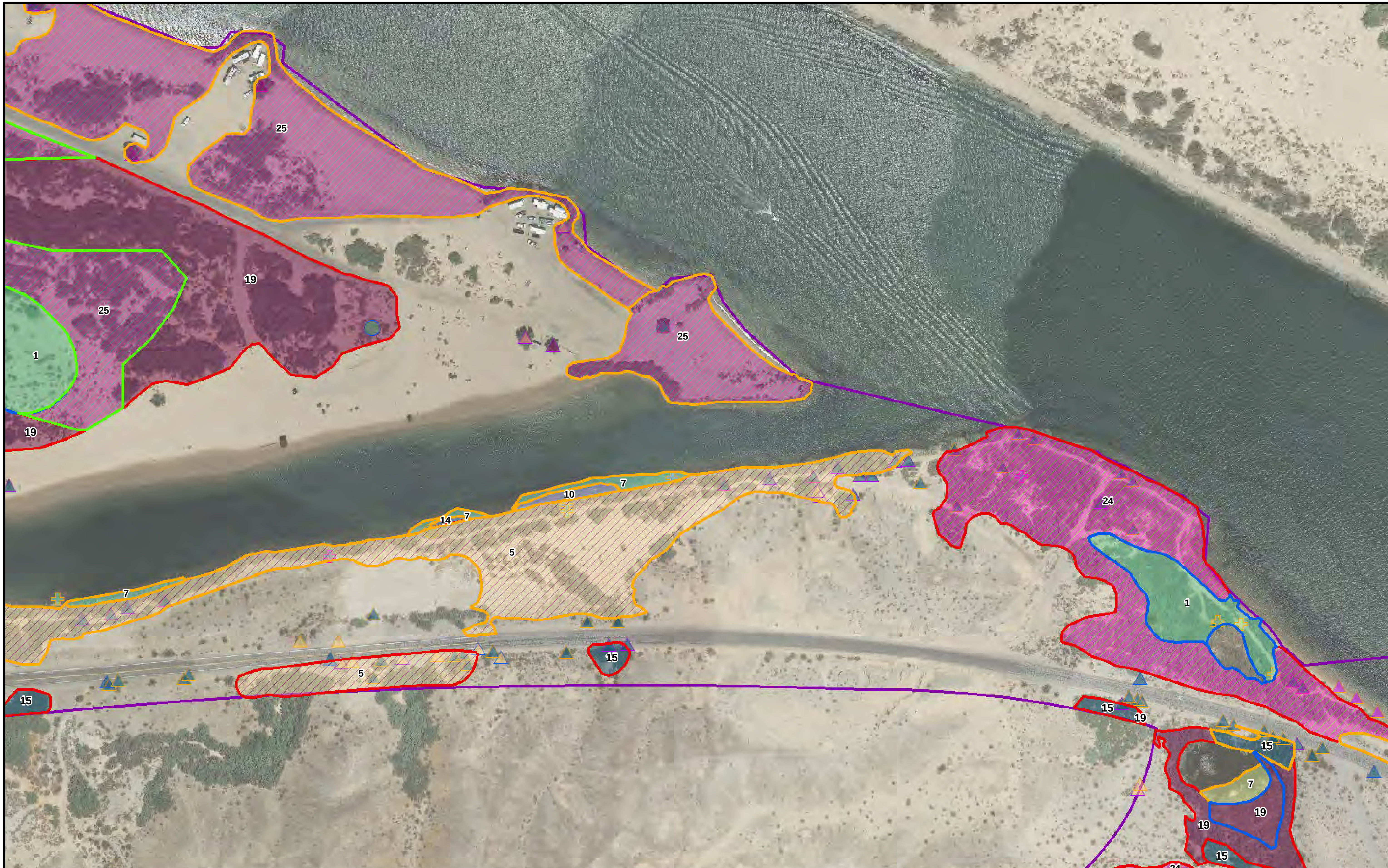

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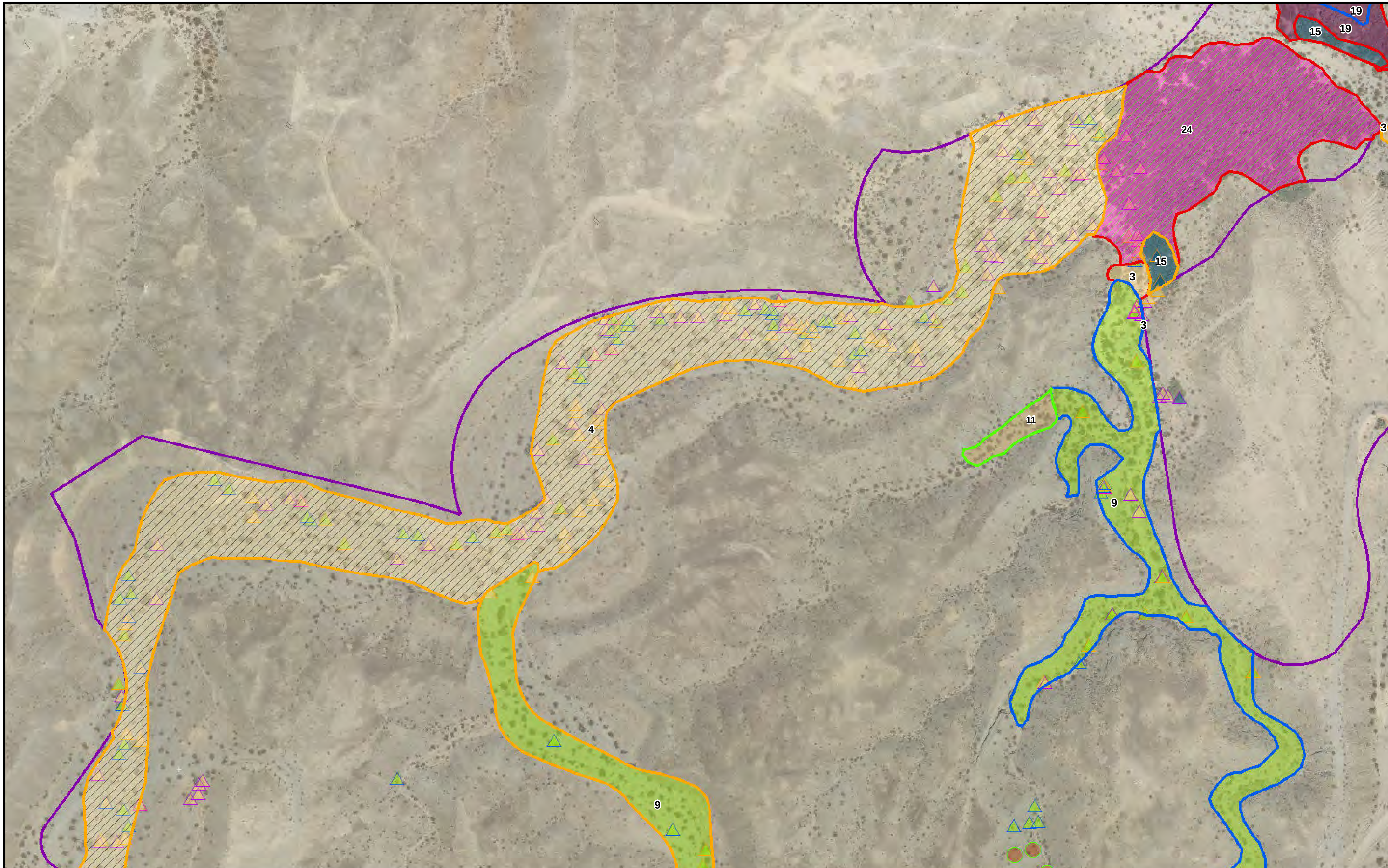

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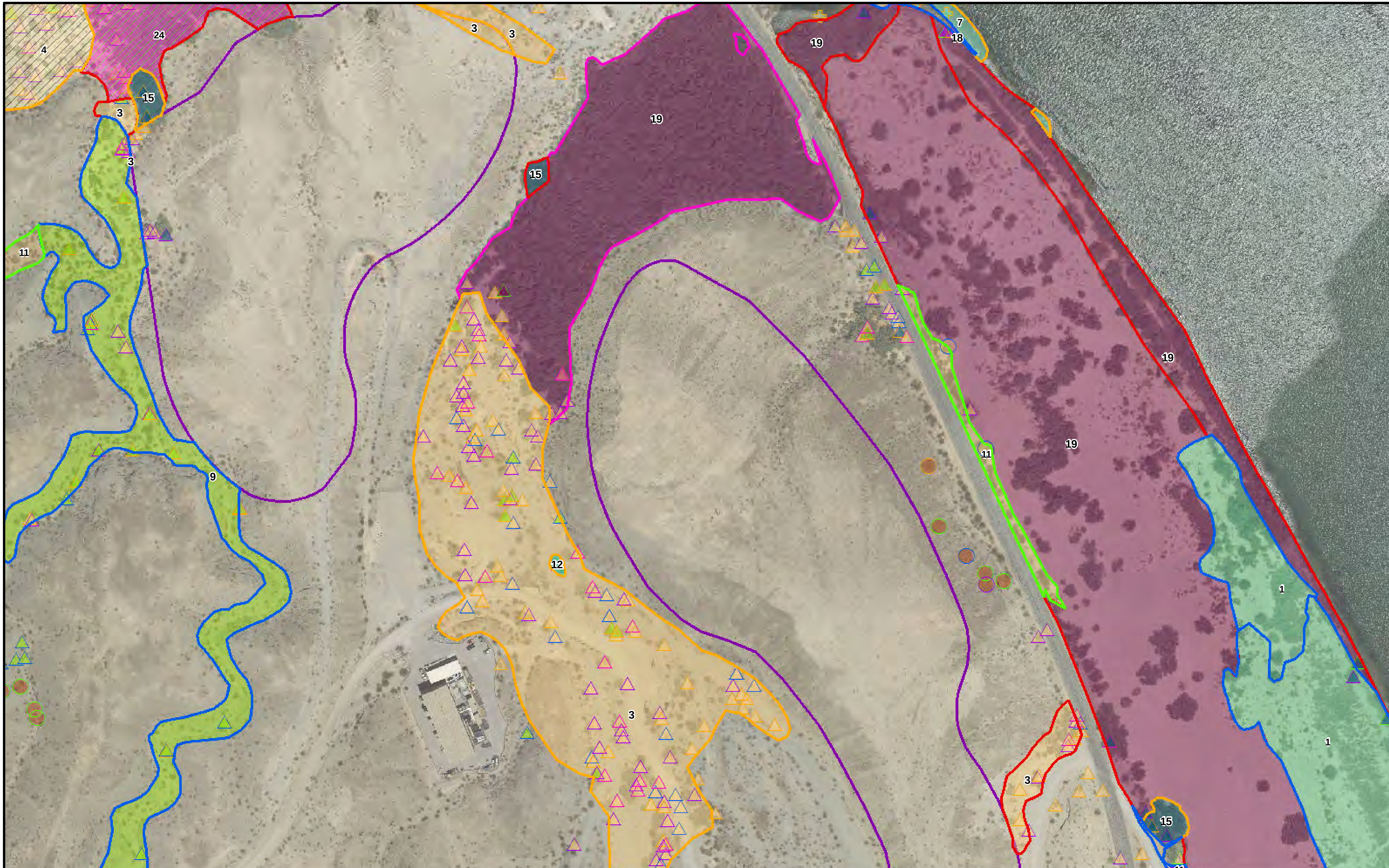

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MAP 10

Attachment B
Representative Photographs

Attachment B – Representative Photographs
PG&E Topock Compressor Station
Mature Plant Survey Addendum

Added survey area on west side of Topock-Oatman Highway burned in 2008 wildfire and subsequently cleared by the Havasu National Wildlife Refuge with scattered re-sprouts of athel tamarisk

Added survey area on west side of Topock-Oatman Highway burned in 2008 wildfire and subsequently cleared by the Havasu National Wildlife Refuge with scattered wood chip and woody debris

Attachment B – Representative Photographs
PG&E Topock Compressor Station
Mature Plant Survey Addendum

Screw bean mesquite planted as part of the Havasu National Wildlife Refuge 22-acre habitat restoration project in part of the burn area west of the Oatman-Topock Highway

Scattered quailbush in the southern part of the added survey area, west of the Oatman-Topock Highway

Attachment B – Representative Photographs
PG&E Topock Compressor Station
Mature Plant Survey Addendum

Blue palo-verde trees on the earthen berm along the Sacramento Wash in the northern part of the additional survey area, on the west side of the Oatman-Topock Highway

Athel tamarisk along the east side of the Oatman-Topock Highway

Appendix A5
Topock Groundwater Remediation Project
Floristic Survey Reports
(*on CD-ROM only*)

Topock Project Executive Abstract

Document Title: Topock Groundwater Remediation Project Floristic Survey Report Submitting Agency/Authored by: DTSC Final Document? ☒ Yes ☐ No	Date of Document: March 29, 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 ☒ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR) ☐ Interim Measures ☐ Other / Explain: Programmatic Biological Assessment (PBA)	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 cleanup. Mitigation measures for aesthetics included AES-1a and AES-2b, requiring a survey of mature vegetation, and mitigation measure CUL-1a-5 for cultural resource protection required a survey for ethnobotanically significant plants, with data from both surveys used in remedy design planning. In order to collect this data, a comprehensive floristic survey was performed with field effort in August and November 2011, and March 2012. Incidental floristic data was also collected during the February 2012 Wetlands Survey performed under mitigation measure BIO-1. This report presents the results of the floristic surveys and detailed maps of Federal and State listed rare plant occurrence, as well as appendices of photographs and GPS data. Avoidance and restoration plans for rare plant communities are included. The data presented with this report will be considered in the remedy design.

Written by: PG&E

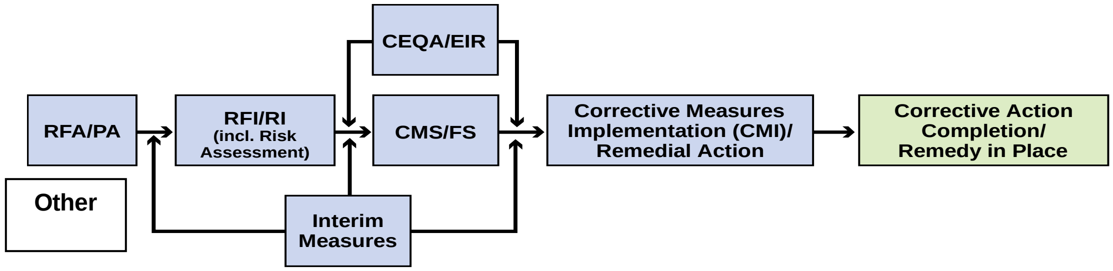
Recommendations:
This report is for information only.

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, BIO-1, and CUL-1a-5, with separate reports issued in relation to those mitigation measures. Rare plant results are 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). **The link to the Documents Library is currently UNDER CONSTRUCTION.**



Version 9

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

FINAL

Topock Groundwater Remediation Project
Floristic Survey Report

Prepared for

Pacific Gas and Electric Company

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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
PG&E	Pacific Gas and Electric Company
Project	Topock Groundwater Remediation Project
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 15 miles southeast of the city of Needles, California. 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 (Project), 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). The 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 for a survey to identify traditional culturally (ethnobotanically) significant plants, and aesthetics measures AES-1a and AES-2b for a survey of mature plant specimens intrinsic to key viewsheds. 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 findings 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 Area

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 approximately one mile along the Colorado River to the Topock Compressor Station.

1.2 Survey Area

The Survey Area encompasses the entire Project Area and totals approximately 780 acres. It varies in elevation from approximately 400 to 700 feet above sea level.[1] The survey team arbitrarily divided the Project Area into twelve segments designated A—L (Figure 2). One of these, Segment K which contains the new evaporation ponds in operational use by PG&E TCS, was excluded from the Survey Area after August and Fall surveys were completed because this location is outside of the EIR project area. 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

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[1] The Burlington Northern and Santa Fe railroad and Interstate 40 rights-of-way are within the boundaries of the Project Area; however, they were not included in the Floristic Survey because the project is not anticipated to impact these right-of-way areas.

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.

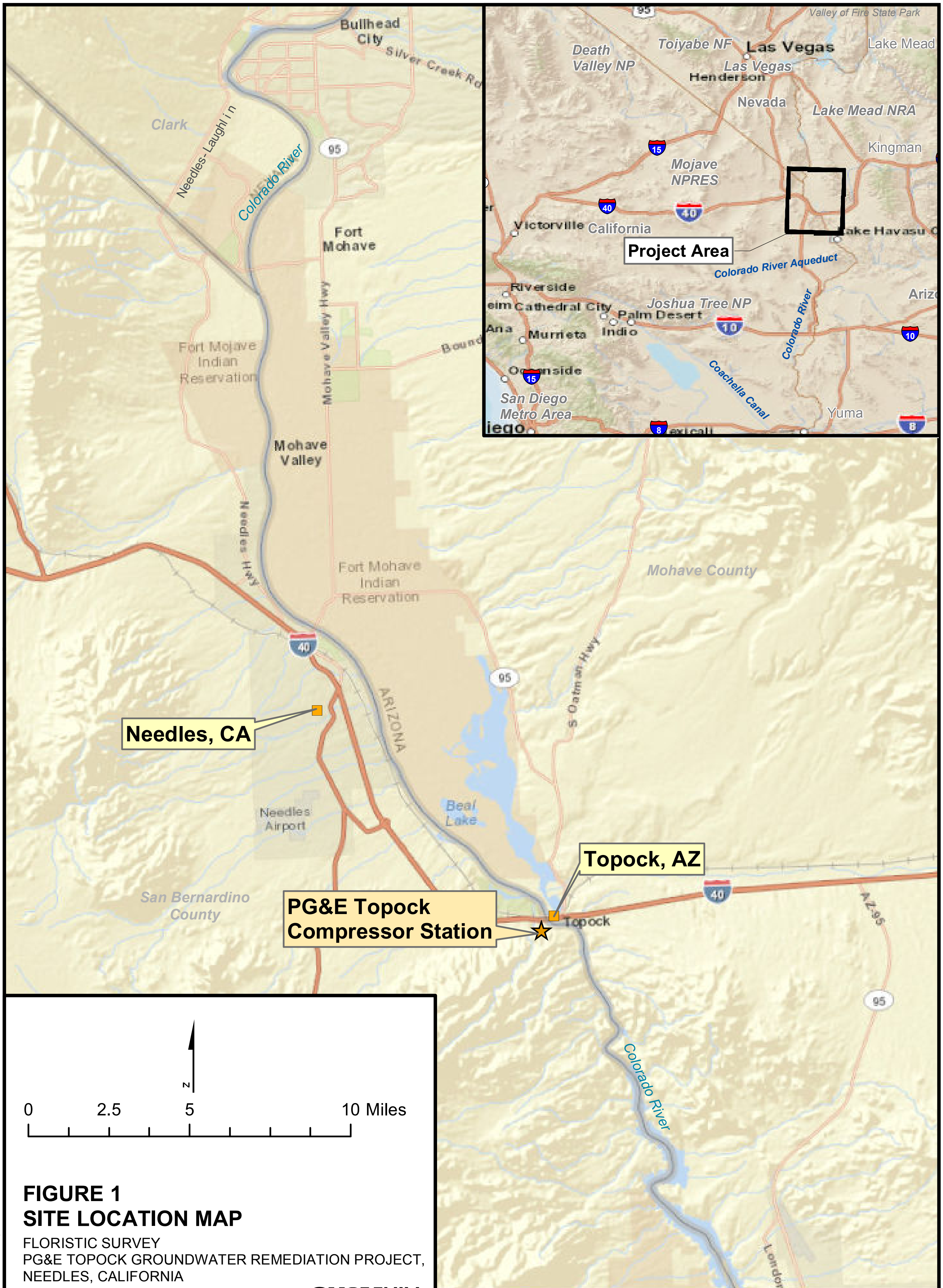

FIGURE 1
SITE LOCATION MAP
FLORISTIC SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

CH2MHILL

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LEGEND

Survey Segments

N

0 500 1,000 2,000 Feet

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, foothill palo verde scrub, allscale scrub, quailbush scrub, western honey mesquite bosque, and screwbean mesquite bosque (Sawyer et al. 2009). 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 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*). In many locations salt cedar trees and shrubs occur as monospecific stands; in other areas associated trees or shrubs include athel (*Tamarix aphylla*), 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, but occurs in openings between such thickets where scattered individuals of fanleaf crinklemat (*Tiquilia plicata*), Spanish needle (*Palafoxia arida*) and *Cryptantha* spp. may be present.

2.1.3 Arrow Weed Thicket

Arrow weed thicket is also 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 inter-digitates with tamarisk thickets and mesquite bosque. Associated species include salt cedar, smoke tree (*Psorothamnus spinosus*), western honey mesquite, brittlebush, and broom baccharis (*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 is restricted to the edges and channel bottoms of the ephemeral washes in the dissected alluvial terraces that characterize the largest portion of the Project Area south of the Colorado River (Appendix C, Plate 3, D-1). Total vegetation cover is generally low, but species diversity is relatively high compared to the other vegetation types in the Project Area. Blue palo verde is the dominant tree with scattered individuals of salt cedar, athel, 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*), 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 Foothill Palo Verde Scrub

Foothill 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 foothill palo verde (*Parkinsonia microphylla*). Associated species in this area include creosote bush, pygmy-cedar (*Peucephyllum schottii*), brittlebush, white rhatany, beavertail cactus, buckhorn cholla (*Cylindropuntia acanthocarpa*), California barrel cactus (*Ferocactus cylindraceus* var. *cylindraceus*), and inflated desert trumpet (*Eriogonum inflatum* var. *inflatum*).

2.1.7 Quailbush Scrub

Quailbush scrub is dominated by big saltbush (*Atriplex lentiformis*) and occurs on low-lying alkaline or saline soils (Sawyer et al. 2009). In the Project Area, it is most common in Segment G, where it occurs on both sides of Arizona County Road 10, formerly Route 66. On the west side of the road, it occurs on sandy saline/alkaline soils north of the Topock Marsh on the Havasu National Wildlife Refuge (Appendix C, Plate 4, G-3). The only common associate at this site is bush seepweed (*Suaeda moquinii).* Quailbush scrub also occurs in Segment A with bush seepweed in a disturbed area near the Colorado River and in Segment J on the edge of arrow weed thickets 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 occupies a portion of the broad flat wash in Survey Segment C (Appendix C, Plate 2, C-1) (where it occurs with creosote bush), the north end of Segment E, and various parts of Segment A.

2.1.9 Western Honey Mesquite Bosque

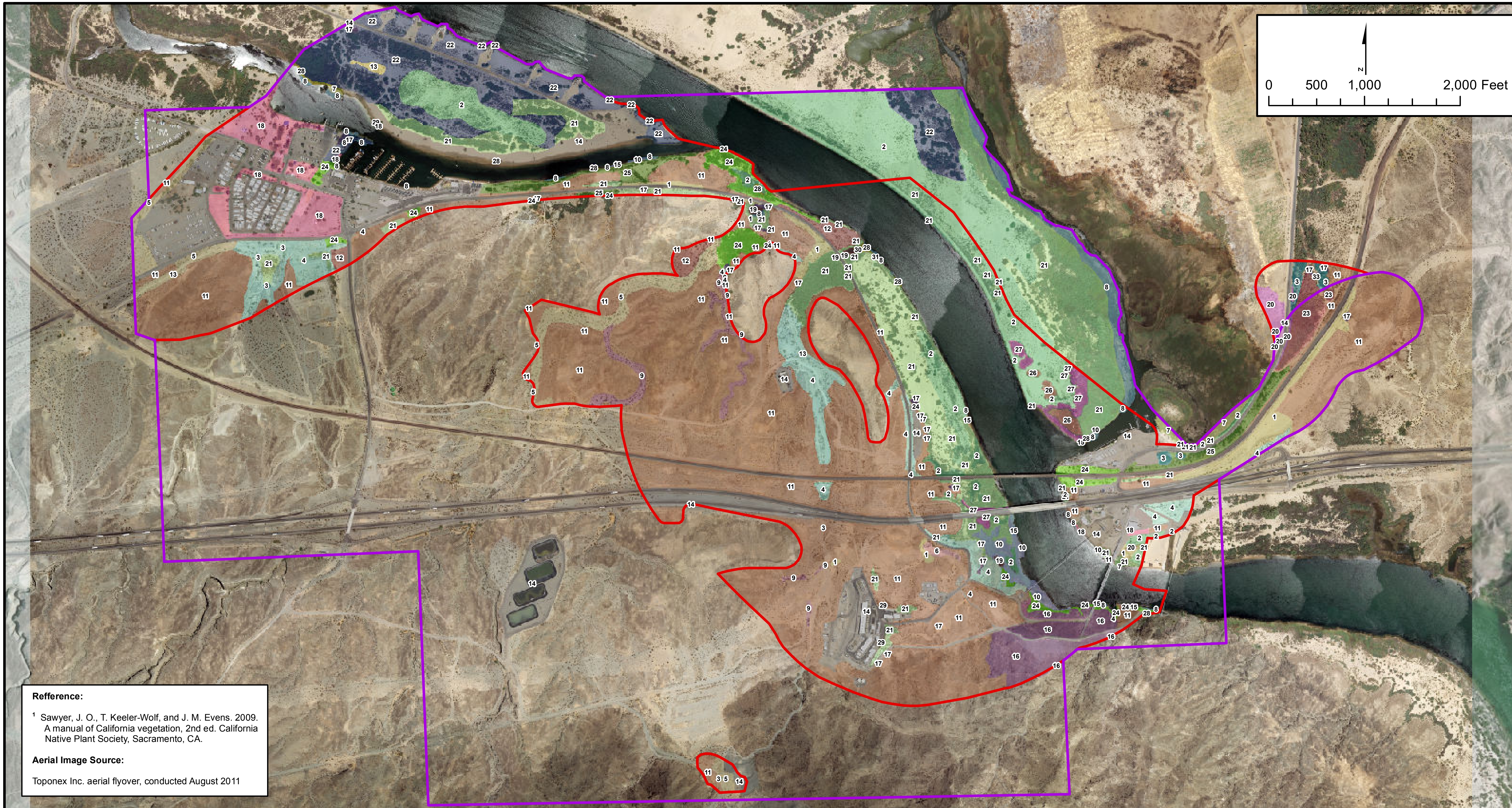
Western Honey Mesquite bosque is restricted to the low sandy terraces along the Colorado River. This vegetation type is characterized by western honey mesquite. Common associated species include salt cedar and in some areas screwbean mesquite. It is most common in Survey Segments A, B, E, and F, where it occurs intermixed with tamarisk thickets (Appendix C, Plate 4, F-2).

2.1.10 Screwbean Mesquite Bosque

Screwbean Mesquite bosque is also restricted to the low terraces along the Colorado River, but 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, especially 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 Burlington Northern and Santa Fe (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.

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 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. It is likely that the common reed species in the Project Area is an invasive, non-indigenous form of *Phragmites australis*.



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

- Area of Potential Effects (APE)
- Project Area

Vegetation Types

- 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 GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

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SECTION 3

Survey Segments in the Project Area

Segment A: The western portion of Segment A north of National Trails Highway is developed and landscaped and is publicly owned (Moabi Regional Park) and privately (Pirates Cove Resort and Marina) owned. The developed portion of Moabi Regional Park includes offices, a mobile home park, RV storage lots, parking areas, camping areas, and a boat launch (Appendix C, Plate 1, A-4); whereas the Pirate's Cove portion includes the marina, a store, a restaurant, vacation housing, and paved and unpaved parking lots (Appendix C, Plate 1, A-5). 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*), honey mesquite, Fremont's cottonwood *(Populus fremontii*)*,* eucalyptus (*Eucalyptus* spp.), and other native and exotic landscape plants (Appendix C, Plate 1, A-4). Undeveloped areas with natural vegetation are restricted primarily to areas to the south of National Trails Highway (Appendix C, Plate 1, A-1, A-2), 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 and athel 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). This hill is with creosote bush scrub that is dominated almost exclusively 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 prominent rocky hills. 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 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. The central portion of the peninsula is dominated by arrow weed thickets (Appendix C, Plate 1, B-1) and tamarisk thickets with and fanleaf crinklemat, and open sandy areas with scattered individuals of honey mesquite, smoke tree, and creosote bush. The river's edge is mostly disturbed with a series of RV camping pads (Appendix C, Plate 2, B-2) and restrooms. Landscape plantings in this area include Fremont's cottonwood, eucalyptus, and athel. On the cove side is a small wetland area dominated by California bulrush, 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 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 occupied primarily 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 covered with creosote bush scrub dominated by creosote bush and white bursage. The tops of the hills are mostly flat and rocky with desert pavement.

Segment D: This Segment is similar to Segment C and dominated by one major wash system, (Bat Cave Wash). Most of this wash is dominated by blue palo verde woodland with occasional smoke trees (Appendix C, Plate 3, D-1), but it ends in an extensive tamarisk and mesquite bosque thicket (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. 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 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 with a narrow strip of tamarisk thickets on the northwest of the Bat Cave Wash inlet (Appendix C, Plate 3, E-3 and 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 dominated by arrow weed thickets (Appendix C, Plate 4, F-1), tamarisk thickets or tamarisk thickets mixed with athel or screwbean mesquite. However, unlike Segment E, there are no areas of upland rocky hills with creosote bush scrub vegetation. Instead, this Segment has a lowland area at its southern tip that includes screwbean mesquite and tamarisk thickets, as well as 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 Segment in Arizona is bisected by the BN&SF railroad tracks. On the north side of the tracks at the western end is the Topock Marina with a mobile home park and associated parking areas. On the northwest side of the road at the eastern end is a small portion of the Topock marsh that is dominated by California bulrush (Appendix C, Plate 4, G-1). Between the road and the tracks is a strip of tamarisk/honey mesquite/blue palo verde thicket that grades into a denser stand of salt cedar as one progresses northeastward (Appendix C, Plate 4, G-2). Further along County Road 10 (formerly Route 66), there is a sandy alkaline/saline area dominated by big saltbush with scattered shrubs of bush seepweed (Appendix C, Plate 4, G-3). There is also a section of big saltbush scrub on the southeast side of the road. The largest portion of Segment G, however, consists of upland hills dominated by creosote bush scrub in the northeast portion of the Segment (Appendix C, Plate 5, G-5). Most of this area is accessed from a gravel road that goes to a small PG&E facility. The western part of this area south of the railroad tracks is sandy and flat and although disturbed by roads at its western end, is relatively rich in annuals and allscale scrub at the eastern end.

Segment H: This Segment is botanically interesting and diverse because it encompasses two areas of different geologic history that profoundly influence soils and vegetation (Appendix C, Plate 5, H-3). 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 bedrock that forms the northernmost extension of the Chemehuevi Mountains. The TCS, its auxiliary structures and landscaping, are built on the alluvial terraces. The slopes around and just below the compressor station are disturbed, highly eroded and mostly devoid of natural vegetation (Appendix C, Plate 5, H-1). 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 5, H-2). The rocky north-facing slopes composed of metadiorite, gneiss, and granitic rocks provide a rich substrate for succulents, including California barrel cactus, buckhorn cholla, and corkseed mammillaria (*Mammillaria tetrancistra*) (Appendix C, Plate 5, H-4). These rocky slopes also provide habitat for hillside palo verde, and Pima rhatany (*Krameria erecta*); species that occur only on this rock formation. Two vegetatively similar species of *Asclepias* (*A. subulata* and *A. albicans*) that occur in this Segment, as do two similar species of *Krameria* (*K. bicolor* and *K. erecta*), and two similar species of *Parkinsonia* (*P. florida* and *P. microphylla* and possible hybrids) (Appendix D, Plate 1).

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 (Appendix C, Plate 6, I-2 and I-3). This Segment is similar to Segment H because it includes both the pre-tertiary bedrock 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 that sit on recent (Quaternary) alluvial deposits (Appendix C, Plate 6, I-1). The Miocene conglomerate in this area includes the only known location for rock nettle (*Eucnide urens*) within the Project Area.

Segment J: This Segment is a small one that is developed and landscaped with private residences set back on the hills overlooking the Colorado River in Arizona. 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 scrub (Appendix C, Plate 6, J-1), and tamarisk thickets, as well as California bulrush and cattail marshes. There is also landscaping with Mexican fan palms and a variety of other cultivated plants on the river's edge (Appendix C, Plate 6, J-2). Segment J contains a small area of partially degraded slopes above a wash at the east end of the Segment that is accessed from a road that drops down to the south from the frontage road next to I-40. These slopes are characterized by degraded creosote bush scrub, while the wash has remnants of blue palo verde woodland.

Segment L. This Segment is located next to a quarry site in a small valley that is approximately 0.3 miles southwest of the compressor station and consists mainly of a flat, but gently sloping (to the northeast) dry wash which 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 hills are covered with creosote bush scrub vegetation. The eastern portion of Segment L is covered by rocks from the gravel quarry and is devoid of vegetation. These rocks have been taken from the pre-tertiary bedrock that forms the northern extension of the Chemehuevi Mountains (Appendix C, Plate 6, L-1).

SECTION 4

Methodology

4.1 Research and Literature Review

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. Therefore, prior to the survey, research was conducted to: 1) determine the appropriate times to conduct surveys to maximize the potential for identifying plants that occur in the East Mojave Desert, and 2) identify special-status and culturally significant plant species with a potential to occur in the Project Area.

Research included identification of rainfall patterns in the East Mojave Desert, and specifically, the potential timing of fall and spring surveys. Rainfall in the East 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, a regional botanical expert and the director of the University of California Riverside, Granite Mountains Research Center, Jim Andre, Ph.D., was contracted to review survey planning and timing and to check target plant lists. 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 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 late spring survey (Jim Andre, pers. comm.).

4.2 Special-Status Plants

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 (USFWS 1996, 2006, 2011; California Natural Diversity Database [CNDDB] 2011a)
- Special Plant as defined by the California Natural Diversity Database (CNDDB, 2011b)
- 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 (CNPS, 2011)
- Listed by the BLM as a Sensitive Plant (BLM, 2011)
- Listed by the Arizona Rare Plant Committee (2001)

- Listed by Arizona Department of Agriculture (ADA) (2012)
- Listed under the California Desert Native Plants Act (CDNPA) (1981)

A preliminary list of potentially occurring special-status plants (target list) was derived from several sources. Quadrangle-based searches of the CNPS (2011) Inventory 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 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 the CNPS and CNDDB RareFind 3 database searches. The CNDDB Quickviewer online database (CNDDB 2011c) was also searched to identify potentially occurring plant species such as CRPR List 4 plants that are not recorded on a quadrangle basis in other databases. Since part of the Project Area occurs in Arizona and special-status plants in that state are not available in a database that can be queried by USGS quadrangle, each rare plant species listed for Mohave County (Arizona Rare Plant Committee, 2001 and ADA, 2012) was individually checked against data in the Southwest Environmental Information Network (SEINet, 2011) to determine the likelihood of any of these plants occurring in the Project Area. Additional special-status plants with potential to occur in the Project Area, based on observations and collections by Dr. Andre, were also included in the target list.

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 or was within 10 miles of the Project Area, or if its known or expected habitat was found within or adjacent to the Project Area during the August 2011 botanical survey.

Based on the pre-survey research and literature review, 53 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. Also included in this table are 21 special-status plants that are protected under the CNDPA and one special-status species (*Hesperocallis undulata*) protected under the ADA (2012).

4.3 Field Surveys

Transect-based protocol-level Floristic surveys that conform to the guidelines of the California Department of Fish and Game[2] (CDFG, 2009), the USFWS (2000), and the CNPS (2001) were conducted in the fall (October 31–Nov 8, 2011) and in the 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. 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) 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)

[2] California Department of Fish and Game has changed its name to the California Department of Fish and Wildlife, effective January 1, 2013

would be detected during the surveys. The surveys were floristic and comprehensive in nature, meaning that all plants found were identified. Species that were not immediately recognizable to the surveyors were identified using the Jepson Manual (Baldwin et al. 2012) or the Jepson Online Interchange (2011), 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 of targeted special-status plants on the Jepson Online Interchange (2011) prior to the Floristic surveys. These materials supplemented the Jepson Manual, the primary resource used to identify plants.

Trimble GeoXT and GeoXH global positioning system (GPS) units with sub-meter accuracy were used to collect data on sensitive plant species. The GPS units were equipped with data files for navigation and with data dictionaries for data collection. 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. Data dictionaries were used to record locality information, the actual or estimated number of special-status individuals observed, and habitat information. Point data collected in the field was mapped using Geographic Information System software to depict the total extent of each special-status plant occurrence, where practicable.

A list of all plant species observed was compiled for the Project Area during the surveys (Appendix B). Nomenclature for scientific names followed the Jepson Manual (Baldwin et al. 2012) or the Jepson Online Interchange (2011)

4.4 Reference Site Visits

Before the spring 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 data in the database of the Consortium of California Herbaria (2011) and on collection data of Jim Andre. These plants represented the special-status species that were closest to the Project Area and most likely to occur there. 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 (*Androstephium breviflorum*) 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 (*Tetracoccus hallii*) NW of Needles, California was successful. Photographs and descriptions of other special-status species that were on the target list were examined by accessing the Jepson Interchange (2011).

SECTION 5

Results

5.1 Survey Summaries

Mature plant and vegetation mapping (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, 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 [e.g., buckhorn cholla, blue palo verde, sweet bush, white bursage, among others.]. The relatively few perennial herbs encountered were mainly in wetland areas (e.g., marsh fleabane or catchfly gentian (*Eustoma exaltatum*). A few summer/fall annuals were already present and just starting to flower such as spiderling (*Boerhavia coccinea*), California kallstroemia (*Kallstroemia californica*), and chinch-weed (*Pectis papposa* var. *papposa*), 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 (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 the grasses 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 (Feb 13-17, 2012). During a wetland delineation of the 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*.,* 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 (*Chylismia arenaria* ssp. *arenaria*) had not yet started flowering*.* Many of the trees (e.g., *Parkinsonia*), 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 surveys. Many of these were in early stages of flowering, but others were approaching their flowering peak.

Spring survey (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 for a total count of 193 species (Appendix B).

5.1.1 The Flora of Topock

The final plant list for the Project Area included 193 species in 45 families and 142 genera, however four of the species on the list (oleander, California fan palm, and eucalyptus, and Mexican palo verde) were cultivated. Among this list were 12 species of trees, 42 species of shrubs and 136 species of herbaceous plants. The greatest numbers of species were found in Segments A, H, and D with 111, 97, and 91 species respectively, whereas the Segment with the fewest species was Segment L with only 38. Considering its small size, however, this Segment is relatively species rich, compared to the other Segments.

5.2 Special-status plants in the Project Area

5.2.1 Federal or State Listed Plants

No Federal or State Listed Endangered, Threatened, or Rare plants or candidates for Federal or State listing were found in the Project Area either in California or in Arizona.

5.2.1.1 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. In the potential occurrence table for the Project Area, there are only three plant species that fit this designation. These species are Harwood's woolly star (*Eriastrum harwoodii*), Kofa Mountain barberry (*Berberis harrisoniana*), and Howe's hedgehog cactus (*Eichenocereus engelmannii* var. *howei*). None of these species were found to occur in the Project Area, but the absence of Harwood's woolly star, an annual that grows on sand dunes, could be the result of a poor rainfall year; however, its nearest known occurrence is 40 miles southwest of the Project Area. Seventeen additional taxa are listed by the Needles office of the BLM as sensitive taxa (BLM 2011), but none of these taxa were considered as potential species for the Project Area and none were found there. In Arizona, none of the 42 plant species listed as sensitive by the BLM were found in the Project Area.

5.2.1.2 Plants with Special-Status in Arizona

None of the plants listed by the Arizona Rare Plant Committee (2001) were found in the Arizona portion of the Project Area (i.e., segments F, G, and J). Furthermore, no highly safeguarded protected native plants (ADA list A) were identified in the Project Area. However, a few ADA category B (Salvage Restricted Native Plants), category C (Salvage Assessed Protected Plants), and category D (Salvage Restricted Native Plants) were found in the Project Area (Appendix A). 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. All of the protected plants from Arizona are also protected under the CDNPA with the exception of desert lily. Although spiny-haired blazing star (*Mentzelia tricuspis*) is considered a special-status plant in California (CNPS list 2.1), this plant was only found in Arizona (below the BN&SF railroad tracks that bisect Segment G) where it is not considered a special-status plant.

5.2.1.3 Plants with special-status in California

Two special-status plants (mousetail suncup and hillside palo verde) were discovered in the California portion of the Project Area (Figure 4). Mousetail suncup (*Chylismia arenaria*), a CRPR list 2.2, occurs in Survey Segments C, D and H. The largest population (with approximately 9 individuals) is on a vertical conglomerate wall above Bat Cave Wash in Survey Segment D. Single individuals also occur on a conglomerate wall 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 bank 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 2011). Hillside palo verde, a CRPR list 4.3 species occupies relatively small areas within Survey

Segments H, and I (Figure 5). 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.

5.2.1.4 Plant species protected under the California Desert Native Plants Act (CDNPA)

Fourteen 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 (Appendix A and Figures 5–7). The intent of this act is to protect California desert native plants from unlawful harvesting on both public and privately owned lands. Photographs of these species can be found in Appendix E, Plates 1-4.

5.3 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 will be completed in the spring of 2013 to focus on areas where any missed herbaceous plant species are most likely to be present within the Project Area. The purpose of these surveys is 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. The results of the 2013 surveys will be provided in an addendum to this report.

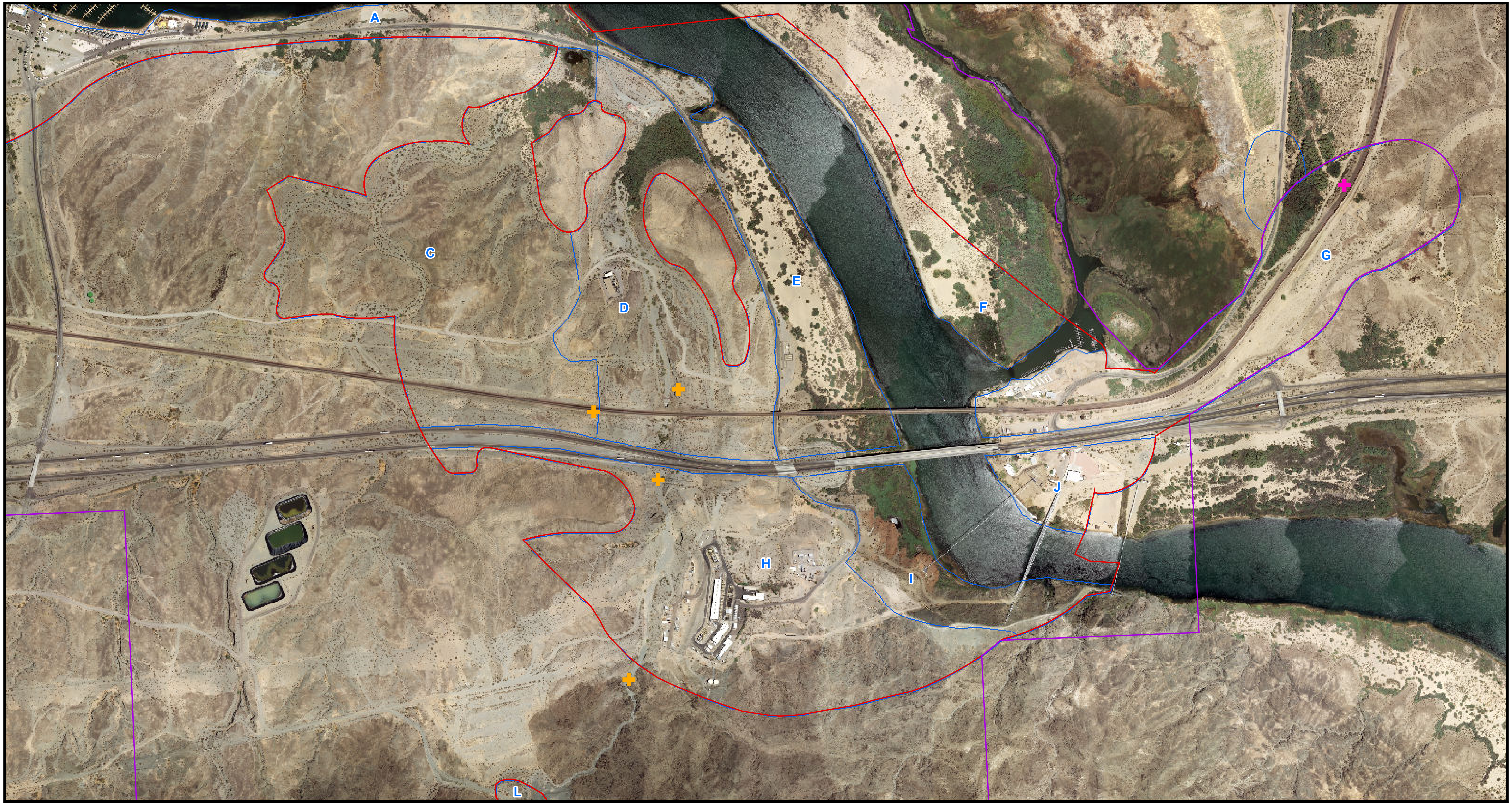
5.4 Special-status Plants versus Culturally Significant Plants

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 the Native American tribes, whether or not they have protection under any federal or state legislation.

TABLE 1

Plants from the Ethnobotany List in the Appendix PLA found in the Project Area

Common Name	Scientific Name	Flowering Period
Trees		
Blue palo verde	*Parkinsonia florida*	Apr–May
Hillside (Yellow) palo verde	*Parkinsonia microphylla*	Apr–May
Goodding's willow	*Salix gooddingii*	Mar–Apr
Screwbean mesquite	*Prosopis pubescens*	Apr–Sep
Western honey mesquite	*Prosopis glandulosa* var. *torreyana*	Apr–Aug
Shrubs		
Big Saltbush	*Atriplex lentiformis*	Jul--Oct
Cattle saltbush	*Atriplex polycarpa*	Jul–Oct
Desert tobacco	*Nicotiana obtusifolia* var. *obtusifolia*	Mar–Jun
Herbs		
Broadleaf cattail	*Typha latifolia*	Jun–Jul
Golden suncup	*Chylismia brevipes* subsp. *brevipes*	Mar–May
Chia	*Salvia columbariae*	Mar–Jun
Common Reed	*Phragmites australis*	Jul–Nov
Desert lily	*Hesperocallis undulata*	Mar–May



LEGEND

Area of Potential Effects (APE)
Project Area
Survey Segments

PLANT SPECIES

Common Name:	Scientific Name:
Mousetail suncup	*Chylismia arenaria*
Spiny-haired blazing-star	*Mentzelia tricuspis*

N

0 500 1,000 2,000 Feet

FIGURE 4
SPECIAL STATUS PLANTS IN THE PROJECT AREA

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

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LEGEND

Area of Potential Effects (APE)

Project Area

Survey Segments

PLANT SPECIES

Common Name:	Scientific Name:
Blue palo verde	*Parkinsonia florida*
Hillside palo verde	*Parkinsonia microphylla*

N

0 500 1,000 2,000 Feet

FIGURE 5
HILLSIDE PALO VERDE AND BLUE PALO VERDE IN THE PROJECT AREA

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

CH2MHILL

LEGEND

- Area of Potential Effects (APE)
- Project Area
- Survey Segments

PLANT SPECIES

Common Name:	Scientific Name:
Beavertail[1]	*Opuntia basilaris var. basilaris*
Buckhorn cholla	*Cylindropuntia acanthocarpa var. coloradensis*
California barrel cactus	*Ferocactus cylindraceus*
Corkseed mammillaria	*Mammillaria tetrancistra*
Silver cholla[2]	*Cylindropuntia echinocarpa*
Teddy bear cholla	*Cylindropuntia bigelovii*

NOTES:

[1] Beavertail 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 IN THE PROJECT AREA

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

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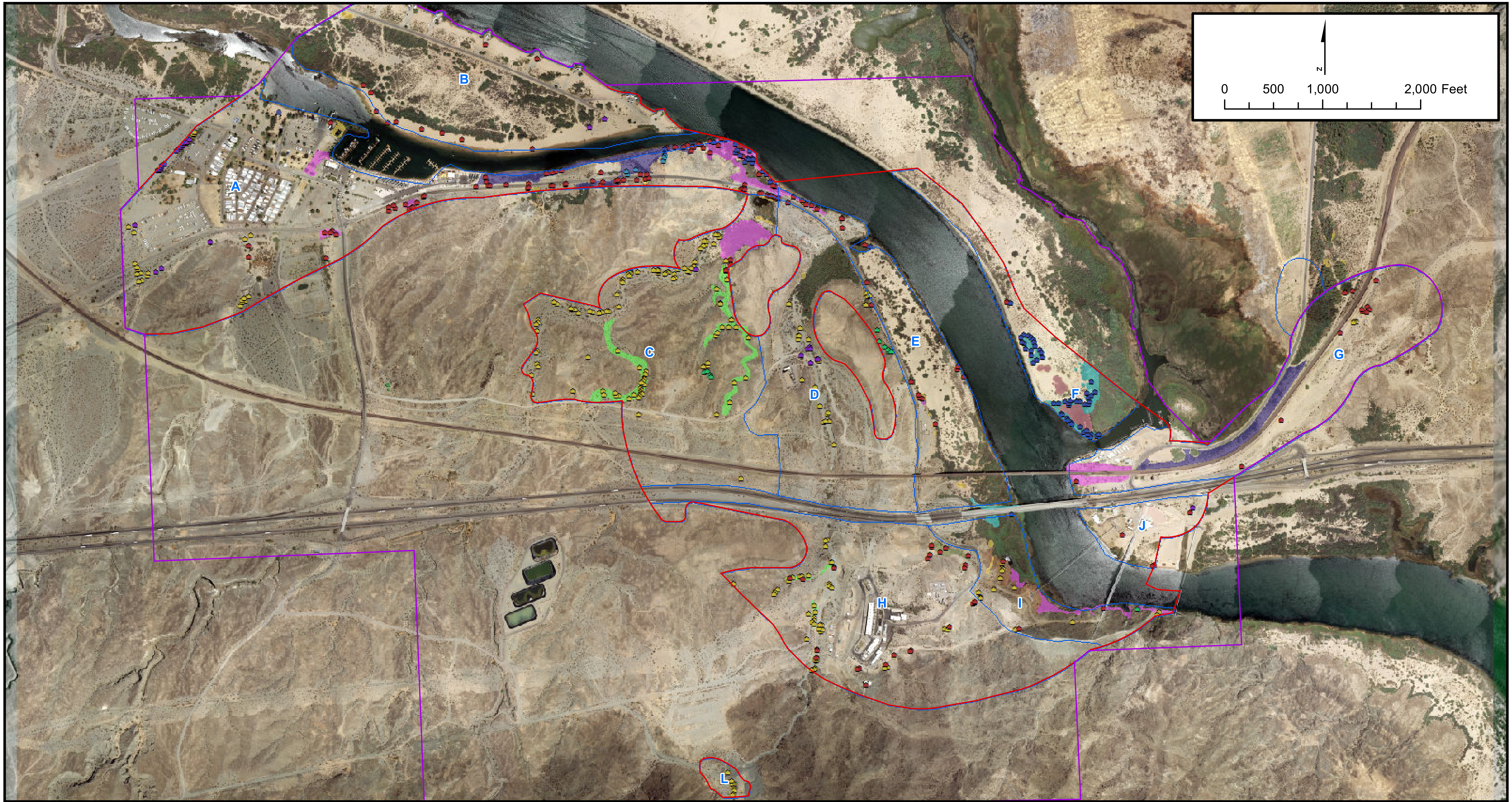

LEGEND

- Area of Potential Effects (APE)
- Project Area
- Survey Segments

PLANT SPECIES (POINTS)

Common Name:	Scientific Name:
Catclaw acacia	*Senegalia greggii*
Desert smoke tree	*Psorothamnus spinosa*
Holly-leaved saltbush	*Atriplex hymenelytra*
Honey mesquite	*Prosopis glandulosa var. torreyana*
Ocotillo	*Fouquieria splendens*
Screw bean mesquite	*Prosopis pubescens*

PLANT SPECIES (COMMUNITIES)

Common Name:

- Blue Palo Verde/Salt Cedar/Honey Mesquite
- Blue Paloverde/Honey Mesquite
- Catclaw Acacia
- Honey Mesquite
- Salt Cedar/Honey Mesquite
- Salt Cedar/Screwbean Mesquite
- Screwbean Mesquite

FIGURE 7
CDNPA PROTECTED SPECIES EXCLUDING CACTI AND PALO VERDE SPECIES IN THE PROJECT AREA

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

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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] Fed/State/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 has been planted in 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 washes associated with the dissected terraces south of the Colorado River
Desert ironwood	*Olneya tesota*	--/--/--/CDNPA/C	Apr–May	Creosote bush scrub; desert washes	**Absent.** Suitable habitat present; however, it was found in the Project Area
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 not common 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 on the rocky slopes in Segment I
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 highway and BN&SF bridges that cross the Colorado River, and on the Arizona side of the river opposite the Topock Marina.
Velvet mesquite	*Prosopis velutina*	--/--/--/CDNPA/C	Apr–Jun	Mojave desert scrub; sandy, rocky soils in canyons, washes; only naturalized in CA, not native	**Absent.** A single occurrence of this tree is known from the Topock Marsh; however, it was not found 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] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
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 the Project Area especially on the low sandy terraces along the Colorado River
SHRUBS					
Beavertail prickly pear	*Opuntia basilaris* ssp. *basilaris*	--/--/--/CDNPA/B	Mar–Jun	Mojave an desert scrub to pinyon-juniper woodland.	**Present.** This succulent shrub is scattered throughout the upland portionrocky dissected terraces and slopes 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 scattered throughout the rocky dissected terraces and slopes of the Project Areaupland portion of the Project Area.
California Barrel Cactus	*Ferocactus cylindraceus* var. *cylindraceus*	--/--/--/CDNPA/B	Apr–May	Creosote bush scrub and Joshua tree woodland; gravelly or rocky placess.	**Present.** This succulent shrub is locally scattered on the rocky hillsopes in the southern portion of the Project Area near the Colorado River.
Corkseed mammillaria	*Mammillaria tetrancistra*	--/--/--/CDNPA/B	Apr	Creosote bush scrub; sandy hills.	**Present.** This small succulent shrub is uncommon on rocky slopes and dissected terraces in upland parts ofin the Project Area.
Crucifixion thorn	*Castela emoryi*	--/--/2.3/CDNPA/B	Apr, Jun–Jul	Mojave an or Sonoran desert scrub; gravelly soils, sometimes in alkali playas or washes.	**Absent.** Suitable habitat is present, for this shrub; however, there are no occurrence records in the immediate vicinity of the Project Area. It has been collected near Chemehuevi Wash 19 miles southeast of Topock.
desert holly saltbush	*Atriplex hymenelytra*	--/--/--/CDNPA/B	Jan–Apr	Desert slopes, washes, scrub; below 4800 feet	**Present.** A few individuals of Tthis small woody shrub occurs in the foothills of segment A

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] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Graham's fishhook cactus	*Mammillaria grahamii* var. *grahamii*	--/--/2.2/CDNPA/B	Apr–Jun	Creosote bush scrub; gravelly alluvial fans and rocky slopes.	**Absent.** Small succulent shrub; with nearest known occurrences in is from the Whipple Mtns. 25 miles south of the Project Area; however typically occurs above 900 feet elevation.
Hall's tetracoccus	*Tetracoccus hallii*	--/--/4.3/--/--	Jan–May	Creosote bush scrub; rocky slopes and washes.	**Absent.** This woody shrub is not known from the Project Area. The closest nearest known population of this woody shrub is 14 miles southwest of 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.	**Absent.** Suitable habitat for this stem succulent cactus occurs in the project area, but none were found during the surveys; however, there are no occurrence records there. It is known to occur 35 miles northwest of the Project Area on rocky ledges.
Kofa Mountain barberry	*Berberis harrisoniana*	S/--/1B.2/--/--	Jan–Mar	Mojave desert scrub, usually north-facing talus slopes, sometimes volcanic.	**Absent.** Known to occur near Colorado River in Whipple Mtns. Approximately 30 miles south of the Project Area
Mojave yucca	*Yucca schidigera*	--/--/--/CDNPA/B	Apr–May	Creosote bush scrub.	**Absent.** Shrub or tree-like; nearest known occurrence known fromis 10 miles south of Needles.
Narrow-leaved dalea	*Psorothamnus fremontii* var. *attenuatus*	--/--/2.2/--/--	Mar–May	Desert scrub; granitic or volcanic rocky slopes and canyons.	**Absent.** Known only from the Whipple Mtns approx. 30 miles south of project area.
Narrow-leaved yerba santa	*Eriodictyon angustifolium*	--/--/2.3/--/--	May–Aug	Washes and slopes in pinyon-juniper woodland; 4670–5660 feet	**Absent.** sShrub known only from at higher elevations in pinyon/juniper woodland.

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Common Name	Scientific Name	Status[1] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Ocotillo	*Fouquieria splendens*	--/--/--/CDNPA/B	Mar–Jul	Creosote bush scrub; dry, generally rocky soils.	**Present.** This large shrub is known to occur as aA few individuals of this large shrub are found in Segments C, D, and I.
Pencil cholla	*Cylindropuntia ramosissima*	--/--/--/CDNPA/--	Apr–Aug	Creosote bush scrub and other Mojave desert scrub.	**Absent.** Suitable habitat but none found in the Project Area. Small individuals of silver cholla can be mistaken for this species, but the absence of larger shrubs indicates that they are juvenile silver cholla.
Silver cholla	*Cylindropuntia echinocarpa*	--/--/--/CDNPA/B	May–Jun	Mojavean desert scrub.	**Present.** This succulent shrub is common on rocky slopes in uplandand dissected terraces parts of in the Project Area.
Utah funastrum	*Funastrum utahense*	--/--/4.2/--/--	Apr–Jun, Sep	Mojave desert scrub; dry, sandy or gravelly areas	**Absent.** This perennial shrub is not known from the Project Area; however, sSuitable habitat is present and itbut not found in the Project Area; nearest occurrence is occurs 12 miles northwest of the Project Area.
HERBACEOUS PLANTS					
Abram's spurge	*Chamaesyce abramsiana*	--/--/2.2/--/--	Aug–Nov	Creosote bush scrub; open or vegetated sandy flats.	**Absent.** Annual herb known sporadically from Imperial County California to eastern Riverside and San Bernardino Counties in California. Nearest known occurrences are 35 miles west of the Project Area.
Arizona pholistoma	*Pholistoma auritum* var. *arizonicum*	--/--/2.3/--/--	Feb–Apr	Creosote bush scrub; rocky canyons, north-facing slopes	**Absent. N**earest known occurrence of this annual herb is from the Dead Mtns. 15 miles northwest of Project Area
Bare-stem larkspur	*Delphinium scaposum*	--/--/2.3/--/--	Mar–May	Creosote bush scrub; rocky granitic slopes and canyons	**Absent.** Nearest occurrence of this perennial herb is from the Whipple Mtns. 30 miles south of the Project Area

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Common Name	Scientific Name	Status[1] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Bitter hymenoxys	*Hymenoxys odorata*	--/--/2.2/--/--	Apr–Jun, Sep–Oct	Seasonally moist silty soils, sandy flats near the Colorado River	**Absent.** Annual herb rediscovered in California in 2009 40 miles south of the Project Area along the flood plain of Colorado River
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	**Absent.** The nearest known occurrence of this annual herb is 45 miles south of the Project Area
Cooper's rush	*Juncus cooperi*	--/--/4.3/--/--	Apr–May	Alkali sink scrub; meadows and seeps; often alkaline or saline	**Absent.** This perennial herb is not known from the Project Area; however, suitable habitat is present and it is known from the Chemehuevi Mountains 10 miles SW of the Project Area
Cove's cassia	*Senna covesii*	--/--/2.2/--/--	Mar–Jun, Sep	Creosote bush scrub, washes, alluvial slopes, and sandy disturbed areas	**Absent.** The nearest known occurrence of this perennial herb is from the Whipple Mtns. 30 miles south of the Project Area
Darlington's blazing star	*Mentzelia puberula*	--/--/2.2/--/--	April–May, Sept–Oct	Rocky slopes and canyons; sandy washes	**Absent.** Perennial herb with nearest known occurrences 10 miles SE of the Project
Desert germander	*Teucrium glandulosum*	--/--/2.3/--/--	Mar–May	Desert scrub; dry rocky slopes	**Absent.** Stoloniferous herb; nearest occurrences from Whipple Mtns. 30 miles south of the Project Area
Desert lily	*Hesperocallis undulata*	--/--/--/--/B	Mar–May	Desert shrublands; sandy flats and washes	**Present.** Bulbous perennial, known to occur in sandy areas of Segment G
Desert portulaca	*Portulaca halimoides*	--/--/4.2/--/--	Aug–Oct	Desert scrub; sandy washes, alluvial fans and flats. Emerges after summer rains	**Absent.** Annual herb that is known from Little San Bernardino Mtns. to eastern San Bernardino County Mtns. Occurs in Piute Valley

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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] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Desert unicorn-plant	*Proboscidea althaeifolia*	--/--/4.3/--/--	May–Oct	Creosote bush scrub; sandy soil	**Absent.** The nearest known occurrences of this annual species is from the Chemehuevi Wash 19 miles southeast of the Project Area
Glandular ditaxis	*Ditaxis claryana*	--/--/2.2/--/--	Oct–Mar	Mojave and Sonoran desert scrub; dry washes and rocky hillsides, sandy soils	**Possible.** Not found in the project area during the surveys but this annual herb has been collected in the vicinity of the Topock Compressor Station near the Colorado River
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	**Absent.** Nearest known occurrence of this annual herb is 40 miles southwest of the Project Area
Lobed ground-cherry	*Physalis lobata*	--/--/2.3/--/--	Apr–Jun	Mojave desert scrub; seasonally moist depressions, dry lake margins and washes, active following summer rains	**Absent.** Perennial herb known to occur along the Colorado River near Las Vegas; also occurs in the Piute Valley 13 miles from Needles
Mousetail suncup	*Chylismia arenaria*	--/--/2.2/--/--	Jan–May	Mojave desert scrub; rocky slopes and canyon walls, may also be found in washes	**Present.** Perennial herb found on steep nearly vertical rocky slopes in Segments C, D and H
Playa milkvetch	*Astragalus allochrous* var. *playanus*	--/--/2.2/--/--	March– May	Creosote bush scrub; sandy saline flats	**Absent.** Annual herb known in California only from near Goffs, 30 miles west of the Project Area
Pointed dodder	*Cuscuta californica* var. *apiculata*	--/--/3/--/--	Feb–Aug	Mojave desert scrub; sandy soils	**Absent.** Suitable habitat is present; not found in the Project Area; nearest occurrence is near Parker Dam road, 38 miles southwest of Project Area

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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] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Reveal's buckwheat	*Eriogonum contiguum*	--/--/2.3/--/--	May–Jul, Sept–Oct	Creosote bush scrub; sandy, clay or gypsum soils	**Possible.** Annual herb not found during the surveys; nearest known occurrence is along the Needles Hwy., 12 miles north of Needles, California
Ribbed cryptantha	*Cryptantha costata*	--/--/4.3/--/--	Feb–May	Mojave and Sonoran desert scrub; sandy soil, dunes	**Possible.** Not found in the project area during the surveys. This small annual herb normally occurs in desert sand dunes. Nearest known occurrence is along the Colorado River just north of Topock, Arizona. It has also been collected 30 miles northwest of the Project Area
Slender cottonheads	*Nemacaulis denudata* var. *gracilis*	--/--/2.2/--/--	Mar–May	Creosote bush scrub; sandy soils on stabilized dunes and sand ramps	**Absent.** Annual herb; nearest known occurrence is from along the Colorado River in Arizona, 15 miles south of Project Area
Small-flowered androstephium	*Androstephium breviflorum*	--/--/2.2/--/--	Mar–Apr	Mojave desert scrub; widely scattered in stabilized to semi-stabilized sandy areas in valleys	**Possible.** Perennial herb (bulb) with nearest occurrence from sandy banks of Colorado River just north of Topock, Arizona
Spearleaf	*Matelea parvifolia*	--/--/2.3/--/--	Mar–May	Mojave desert scrub, dry rocky areas, especially granitic rock	**Possible.** Perennial herb not found during the surveys with scattered populations to the south and west, nearest occurrence 15 miles west of the Project Area in the S. Sacramento Mtns
Spiny-hair blazing star	*Mentzelia tricuspis*	--/--/2.1/--/--	Apr–Jun, Sept–Oct	Mojave desert scrub; sandy or gravelly slopes and washes	**Present.** Found on rocky slope below the BN&SF railroad tracks in Segment G
Three-awned gramma	*Bouteloua trifida*	--/--/2.3/--/--	Apr–Nov	Creosote bush scrub; Rocky slopes, usually on limestone	**Absent.** Perennial herb not found in the survey area; nearest occurrence is in the Whipple Mtns. 30 miles to the south of the Project Area.

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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] Fed/State/CRPR/ CDNPA/ADA	Flowering Period	Habitat	Potential to Occur[2]
Wand-like fleabane daisy	*Erigeron oxyphyllus*	--/--/2.3/--/--	Apr–Jun	Desert scrub, rocky slopes and canyons	**Absent.** Perennial herb not found in the survey area; nearest occurrence is in the Whipple Mtns. 30 miles to the south of the Project Area.
Winged cryptantha	*Cryptantha holoptera*	--/--/4.3/--/--	Mar–Apr	Mojave desert scrub; sandy to rocky soils	**Absent.** Suitable habitat for this annual is present but not found during the surveys, nearest known occurrence is 33 miles southwest of the Project Area.

Notes

[1] **Conservation status abbreviations:**

Federal (Fed)

U.S. Fish and Wildlife Service

-- No federally listed or proposed threatened or endangered species were considered to have potential to occur in the Project Area.

BLM designations:

S - The California State Director has also conferred sensitive status on California State Endangered, Threatened, and Rare species, or species on List 1B (plants rare and endangered in California and elsewhere) of the CNPS' Inventory of Rare and Endangered Plants of California

State

California Department of Fish and Wildlife designations:

-- No state listed threatened, endangered or rare species were considered to have potential to occur in the Project Area

CNPS

California Rare Plant Ranks (formerly CNPS Lists)

1B Plants rare, threatened or endangered in California and elsewhere.
2 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 endangered in California.
.2 Fairly endangered in California.

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

.3 Not very endangered in California.

CDNPA

Plants that are protected by the California Desert Native Plants Act

Arizona Department of Agriculture (ADA):

B. Salvage Restricted Protected Native Plants
C. Salvage Assessed Protected Native Plants

[2] **Potential to occur definitions:**

Present: Species observed in one or more of the survey segments of the Project Area.
Possible: Species not observed, however conditions suitable for occurrence.
Absent: Species or suitable habitat not observed on the site during protocol-level surveys

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, K
APIACEAE	**carrot family**	
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	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 stevioides	stevia pincushion	G, J
Encelia farinosa	brittlebush	A, B, C, D, E, F, G, H, J, L
Encelia farinosa x frutescens	brittlebush hybrid	E
Encelia frutescens	button brittlebush	E
Eriophyllum lanosum	white woolly eriophyllum	C, L
Geraea canescens	desert sunflower	A, C, D, E, G, H, I, J

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Scientific name	Common name	Survey Segments
Lactuca serriola	prickly lettuce	A
Malacothrix glabrata	smooth desert dandelion	A, 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	arrow weed	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	G
Senecio mohavensis	Mojave groundsel	D, H, I
Sonchus asper	prickly sow-thistle	A, I
Stephanomeria pauciflora	skeletonweed	A, B, C, E, F, G, H, I, J
Stylocline micropoides	woolly-head nest straw	C, D, H
Trichoptilium incisum	yellowdome	D
Xanthisma spinulosum var. *gooddingii*	goldenweed	H, I
Xanthium strumarium	common cocklebur	B
BORAGINACEAE	**borage family**	
Amsinckia tessellata	devil's lettuce	A, C, D, E, H, J, L
Cryptantha angustifolia	narrow-leaved cryptantha	A, C, E, F, G, H, J, L
Cryptantha barbigera var. *barbigera*	bearded cryptantha	C, D, E, F, G, H, I, J, L
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
Cryptantha nevadensis var. *rigida*	rigid cryptantha	D
Cryptantha pterocarya	winged-nut cryptantha	A, C, D, E, H, I, L
Heliotropium curassavicum	alkali heliotrope	A, B, I
Pectocarya heterocarpa	chuckwalla combseed	B, F

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Scientific name	Common name	Survey Segments
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	D
Phacelia pedicillata	pedicellate phacelia	D, L
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
Dithyrea californica	California spectacle pod	D
Draba cuneifolia	wedge-leaved draba	D
Guillenia lasiophylla	California mustard	D
Lepidium lasiocarpum	pepperweed	C, D, H, I, L
Sisymbrium orientale	Oriental hedge-mustard	A, B, E, F, G
CACTACEAE	**cactus family**	
Cylindropuntia acanthocarpa	buckhorn cholla	C, D, H, I
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, E, C, D, H
CARYOPHYLLACEAE	**carnation family**	
Achyronychia cooperi	onyx flower	B, E, F
CHENOPODIACEAE	**goosefoot family**	
Atriplex elegans var. *elegans*	wheelscale	A
Atriplex fruticulosa	ball saltbush	A
Atriplex hymenelytra	desert holly	A
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

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Scientific name	Common name	Survey Segments
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
Ditaxis neomexicana	common ditaxis	A, H, L
Stillingia paucidentata	Mojave toothleaf	I
FABACEAE	**legume family**	
FABACEAE	**legume family**	
Acmispon maritimus var. *maritimus*	coastal bird's foot trefoil	D
Acmispon strigosus	strigose bird's foot trefoil	D, H, I, L
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
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
Psorothamnus spinosus	smoke tree	A, B, C, D, 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**	

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Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
Erodium cicutarium	red-stemmed filaree	A, C, D, E, F, G, H, L
Erodium texanum	Texas filaree	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	D, H, L
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**	
Hibiscus denudatus	paleface hibiscus	I
Malva parviflora	small-flowered cheeseweed	A
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	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
Chylismia multijuga	multi-paired suncup	F, G

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
Eremothera boothii ssp. *condensata*	Booth's shreading suncup	C
Eremothera refracta	narrow-leaf suncup	C, D, G
Oenothera deltoides ssp. *deltoides*	bird-cage evening primrose	G
PAPAVERACEAE	**poppy family**	
Eschscholzia minutiflora	small-flowered California poppy	A, C, D, E, I, L
PHRYMACEAE	**lopseed family**	
Mimulus bigelovii	Bigelow's monkeyflower	D
PLANTAGINACEAE	**plantain family**	
Mohavea confertiflora	Mojave ghost-flower	D, H, I
Plantago ovata	ovate plantain	A, B, C, D, E, F, G, H, I, L
POLEMONIACEAE	**phlox family**	
Gilia scopulorum	rock gilia	D, F, I
Langloisia setosissima ssp. *setosissima*	bristly calico	D
POLYGONACEAE	**buckwheat family**	
Chorizanthe corrugata	wrinkled spineflower	A, C, H, I,
Chorizanthe brevicornu var. *brevicornu*	brittle spineflower	A, C, D, E, G, H, I, L
Chorizanthe rigida	rigid spineflower	A, C, D, 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
RESEDACEAE	**mignonette family**	
Oligomeris linifolia	linear-leaved oligomeris	B
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**	

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
Lycium andersonii	Anderson's desert-thorn	C, D, H, I
Nicotiana obtusifolia	desert tobacco	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—L
Tribulus terrestris	puncture vine	A, C, D, G, H, J
MONOCOTS		
AGAVACEAE	**century-plant family**	
Hesperocallis undulata	desert lily	G
ARECACEAE	**palm family**	
*Washingtonia filifera**	California fan palm	A
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**	

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
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	I
Arundo donax	giant reed	A, E, F, I, J
Bouteloua aristidoides	needle gamma	A, C, D, G, H, I, L
Bouteloua barbata ssp. *barbata*	six weeks gamma	A, C, D, G, H, I, L
Bromus arizonicus	Arizona brome	A, C, D, G, H, I
Bromus catharticus	rescue brome	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, J, I
Distichlis spicata	saltgrass	A, E, H
Erioneuron pulchellum	fluff grass	H, I
Hordeum murinum ssp. *glaucum*	glaucus barley	A, B, C, E, G, H, I, J
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, H
Phragmites australis	common reed	A, B, E, F, G, I, J
Pleuraphis rigida	big galeta	A, H
Schismus barbatus	Mediterranean grass	A, C, D, G, H, I, J, L
Setaria gracilis	knotroot bristlegrass	B
Triticum aestivum	wheat	G
Vulpia myuros	foxtail fescue	C, D
Vulpia octoflora	six weeks fescue	C, D
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 the 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 SW 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.

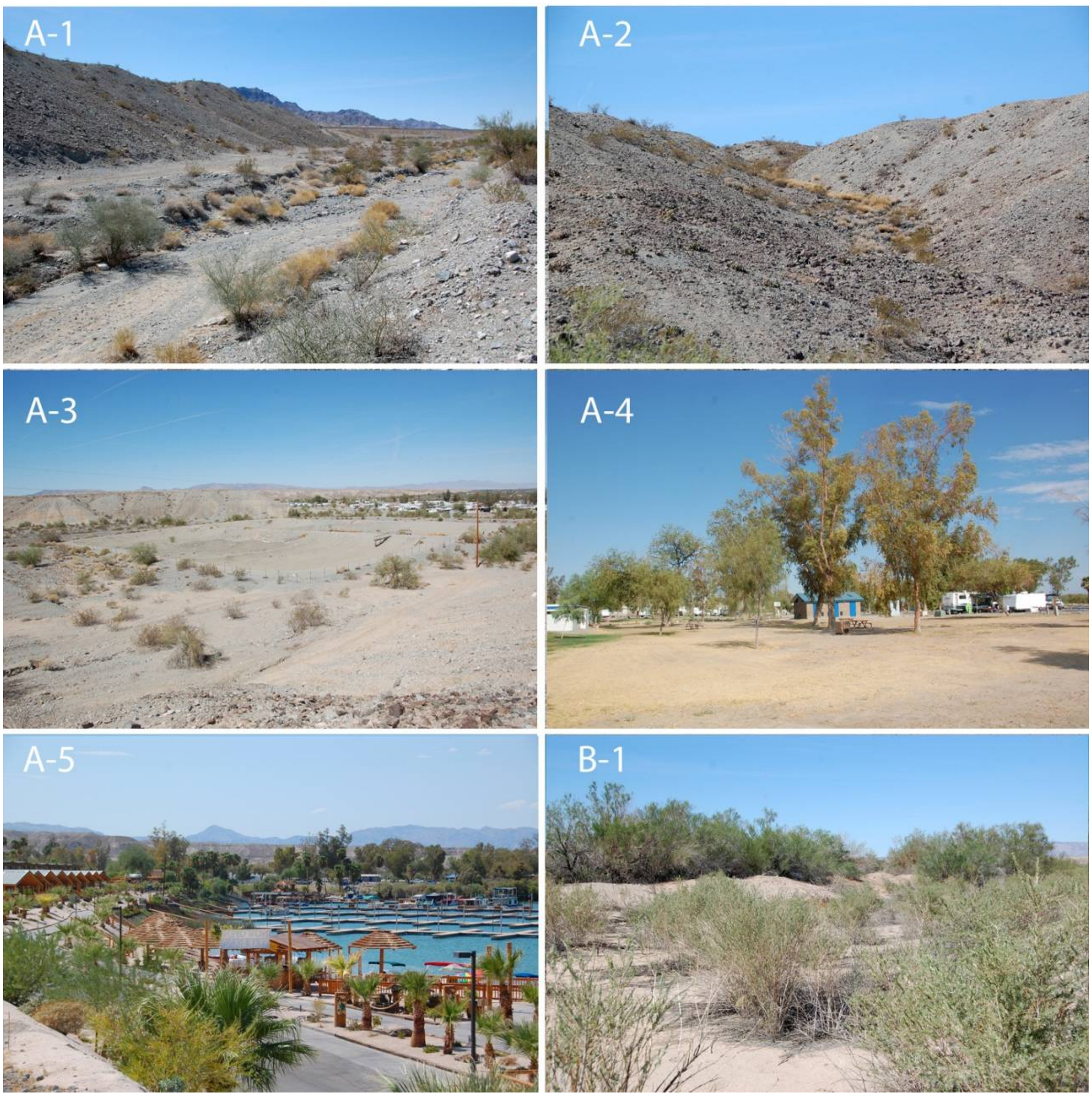


Plate 2. Segments B and C. (B-2) Camping pad on peninsula adjacent to Colorado River. (B-3) Maintained beach opposite Pirate's Cove Resort with western honey mesquite and salt cedar in background. (C-1) Broad wash at north end of Segment C with cattle saltbush and creosote bush. (C-2) Rocky slopes above 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) Upland area of Segment E with creosote bush scrub.

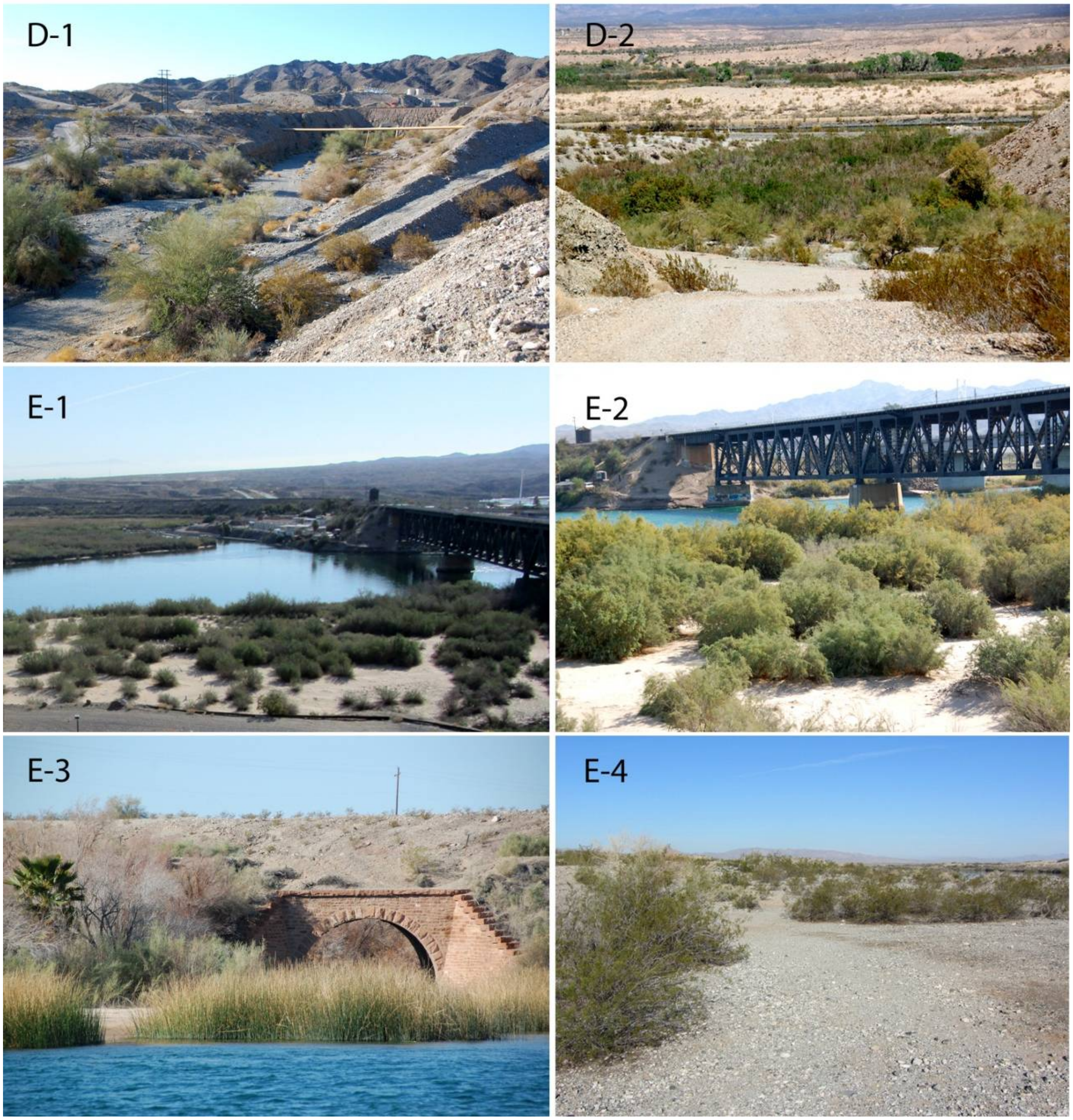


Plate 4. Segments F and G. (F-1) Arrow weed thicket on dredge sands looking north. (F-2) Western honey mesquite, screwbean and tamarisk thickets at southern end of Segment F with small wetland in the southeast corner of photo. (F-3) Close-up of wetland with common reed and sand-bar willow on drier land and California bulrush standing in water. (G-1) Edge of Topock Marsh next to Route 66; 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 Route 66. (G-3) Big saltbush on alkaline soils north of the Topock Marsh, west of County Road 10.

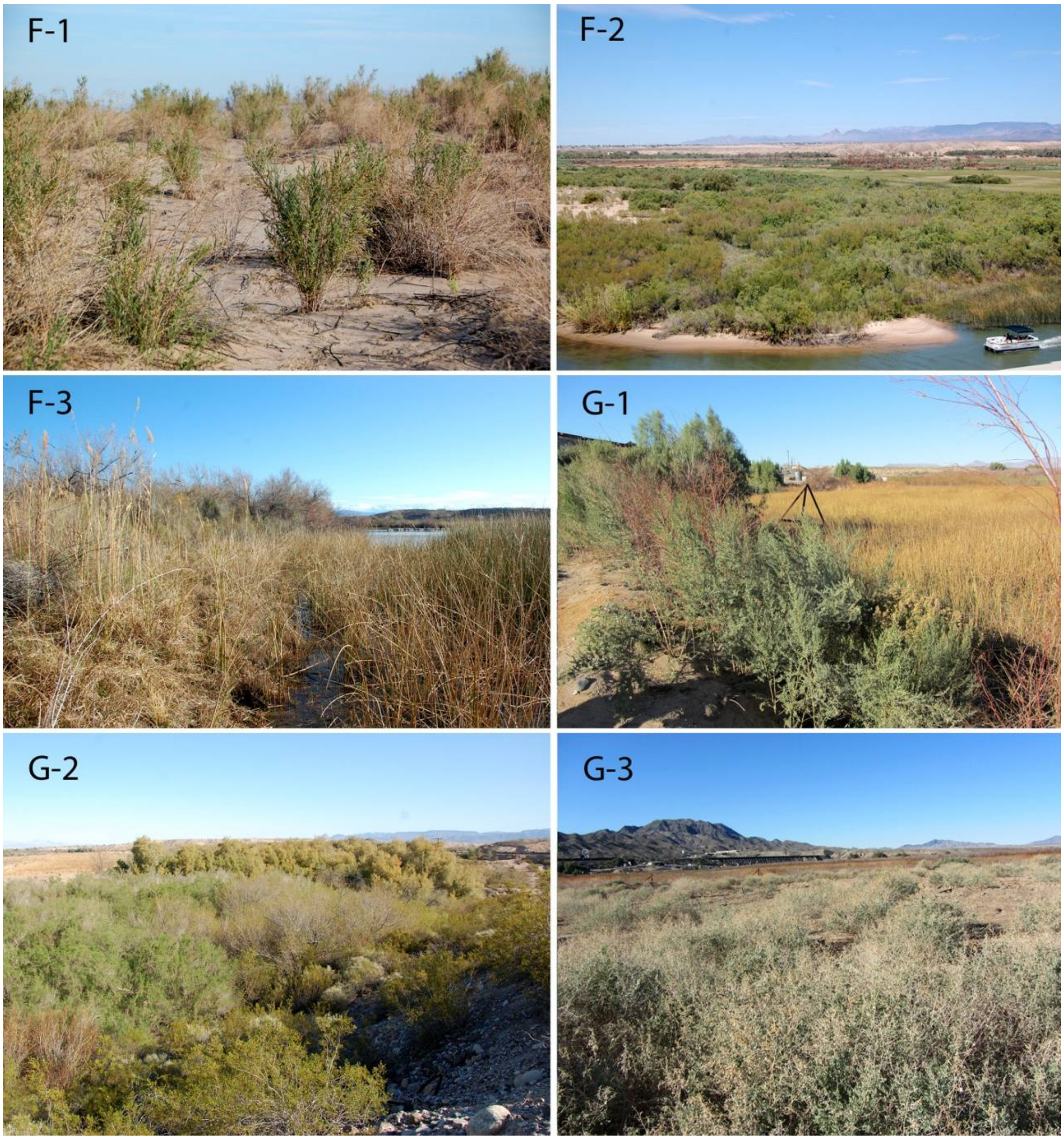


Plate 5. Segments G and H. (G-4) Sandy area with spring annuals including multi-paired suncup, stevia pincushion, brittle spineflower, *Cryptantha* spp., Spanish needles, and desert sunflower. (G-5) Upland rocky area dominated by creosote bush scrub. (H-1) Steep, disturbed, and eroded alluvial terraces 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.

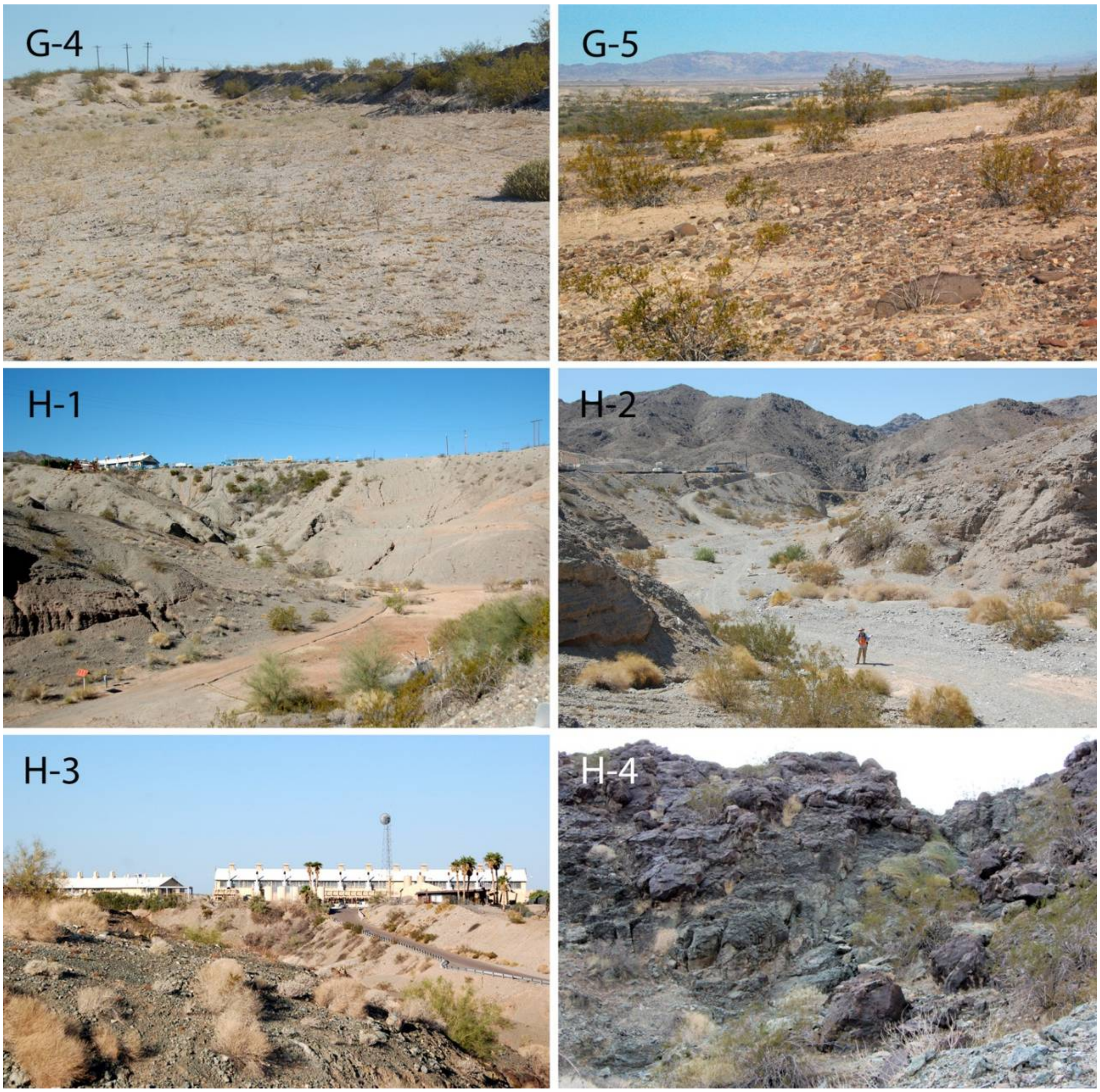
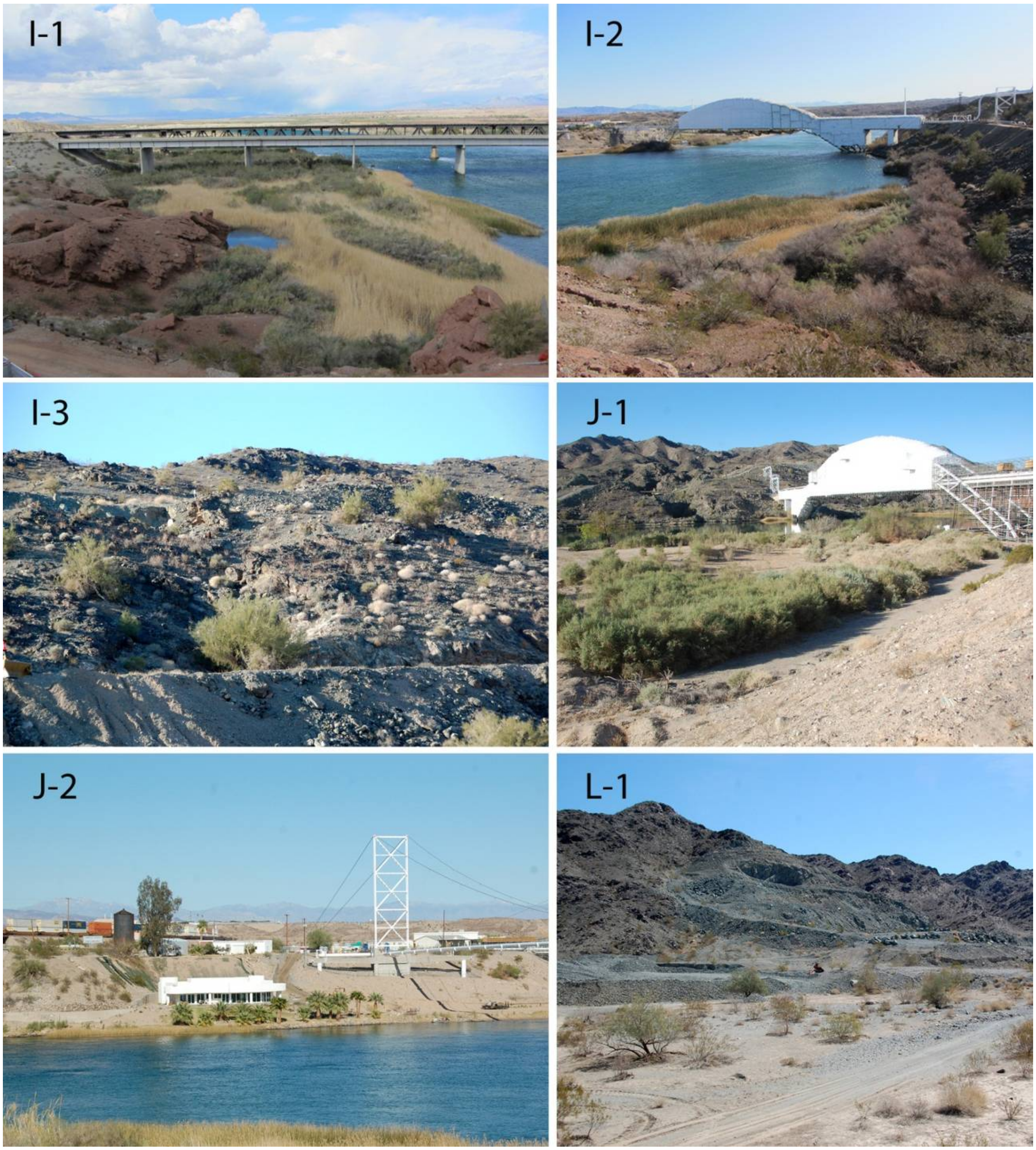


Plate 6. Segments I, J and L. (I-1) Common reed and California bulrush marshes at north end of Segment I with Miocene conglomerate outcrop in lower left of picture. (I-2) California bulrush marsh in river, honey mesquite at base of upland slope and hillside palo verde slightly higher up slope. (I-3) 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 Section D. (2) Close-up of habitat with four plants visible. (3) Close-up of flower (front view). (4) Close-up of flower (side view) showing elongated hypanthium with white arrow.

Plate 2. Hillside palo verde (***Parkinsonia microphylla***), **CRPR 2.2**. (1) Habit 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.

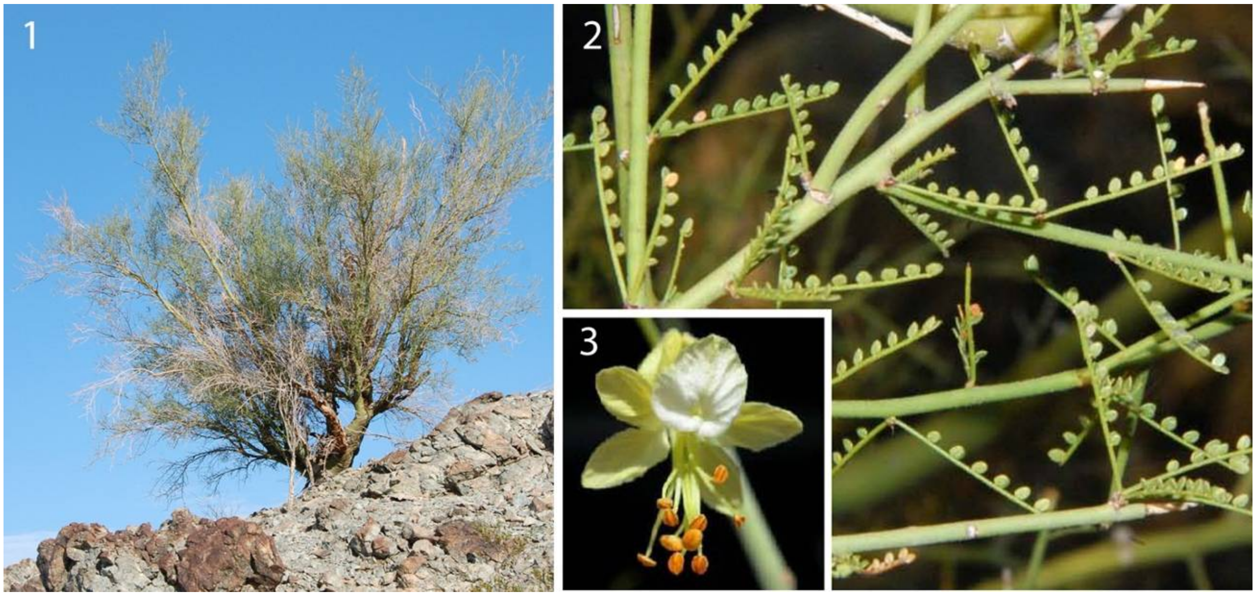
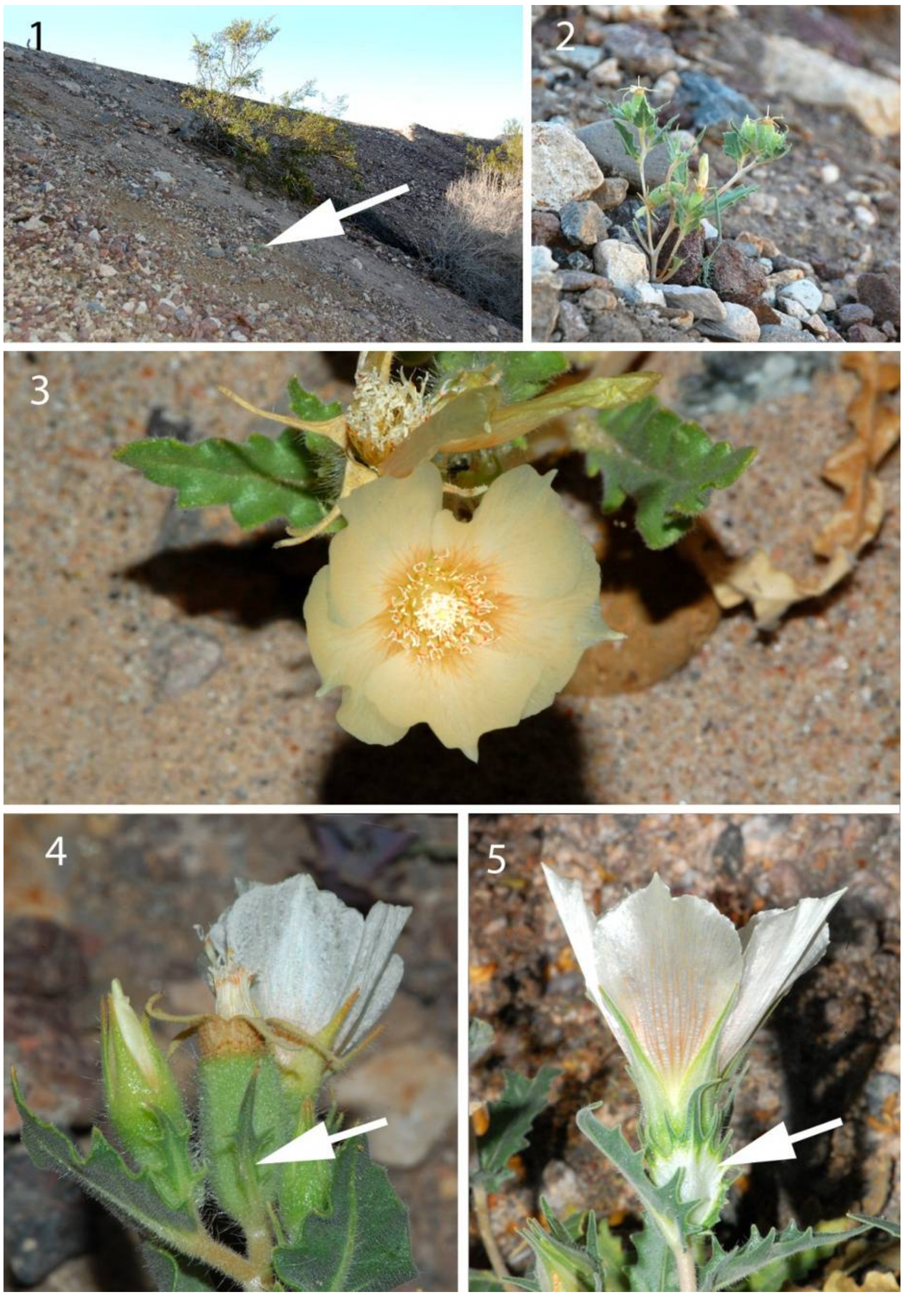


Plate 3. Spiny-haired blazing star (*Mentzelia tricuspis*) CRPR 2.1; Photographs of this plant are included, because although not considered rare in Arizona, it is considered rare in California. (1) Habitat on steep scree slope on north side of railroad tracks in Survey Section G with plant indicated 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.



Appendix E
Plants Protected Under California Desert Native Plants Act

APPENDIX E

Plants Protected Under California Desert Native Plants Act (CDNPA)

Plate 1. CDNPA: 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.

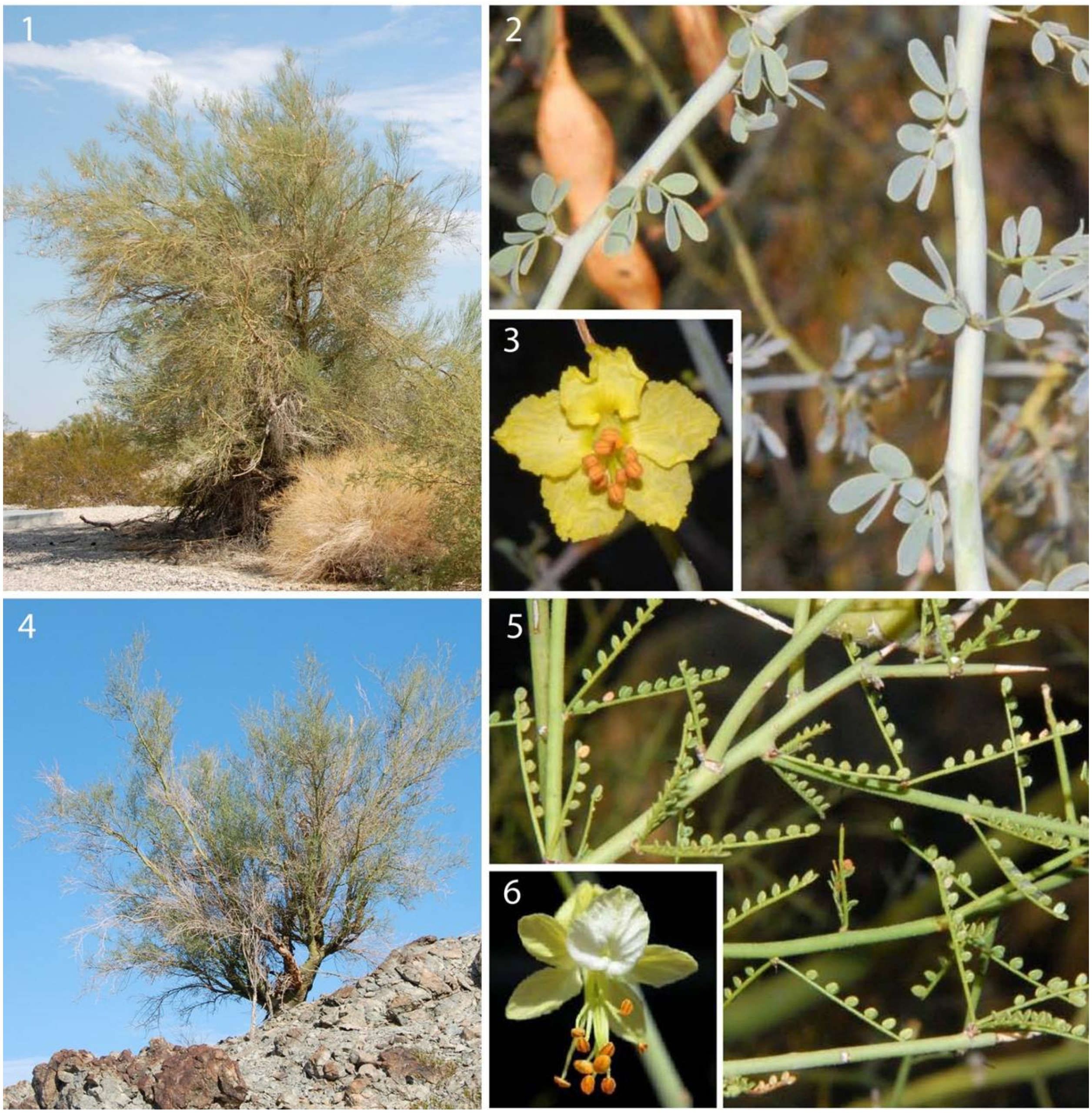
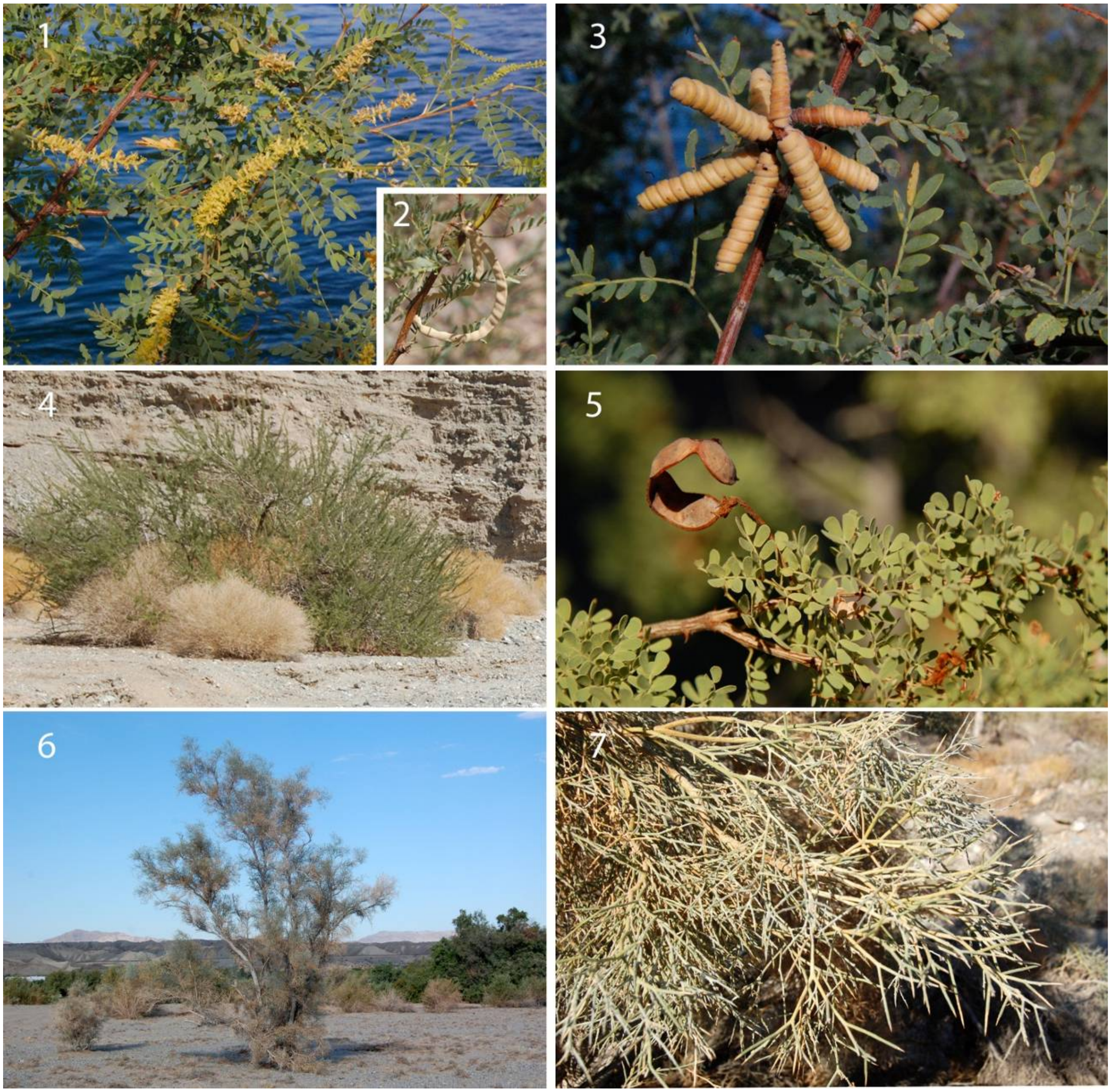


Plate 2. CDNPA cacti. 1) Habit of buckhorn cholla (*Cylindropuntia acanthocarpa* ssp. *coloradensis*). 2) Flower close-up of buckhorn cholla. 3) Habit of silver cholla (*Cylindropuntia echinocarpa*). 4) Flower close-up of silver cholla. 5) Habit of barrel cactus (*Ferocactus cylindraceus*). 6) Habit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

Plate 3. CDNPA. 1) Habit of teddy bear cholla (*Cylindropuntia bigelovii*). 2) Habit of beavertail (*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. 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.



Appendix F
Avoidance and Restoration Plan for Special-Status Plant Species

APPENDIX F

Avoidance and Restoration Plan for Special-Status Plant Species

All efforts are to be made during the remediation process to avoid impacts to plants and animals, especially to those of cultural significance listed in the Appendix PLA of the EIR as well as any other special-status plants protected by federal or state regulations.

Under Mitigation Number CUL-1a-5 in the mitigation monitoring and reporting program for the Topock Groundwater Remediation Project (DTSC, 2011), it is proposed that if any indigenous plants of traditional cultural significance listed in the Appendix PLA of the FEIR are identified in 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.

Furthermore, it states that in the event that identified plants cannot be avoided and such plants will be displaced, PG&E shall retain a qualified botanist who shall prepare a plant transplantation/monitoring plan which can be included as part of the Cultural Impact Mitigation Program either by:

- Transplanting such indigenous plants to an on-site location or
- Providing a 2:1 ratio replacement to another location decided upon between PG&E and members of the Interested Tribes.

A separate salvage and transplantation plan is being developed to address potential impacts to culturally significant plant species.

Mitigation for Special-status plants

No federal or state listed threatened or endangered plants are known to occur in the Project area and no BLM sensitive plants were found during the surveys. Several plant species that area protected under the CNDPA and/or the ADA are present in the survey area. The California Department of Agriculture and the ADA will need to be consulted with prior to removal and transplantation of any of these species. In addition, three plant species that have special status in California are also present in the Project Area.

Mousetail suncup is a CRPR list 2.2 species. This plant has been characterized as an annual or perennial herb (Baldwin et al. 2012), but in the Project area, it appears to be mostly perennial. It occurs at two sites above Bat Cave Wash. The largest population consists of approximately 9 plants, whereas the other populations consist of a single individual. This species was also observed outside of the Project Area, in the railroad right-of-way in Segment C and on a rock face at the end of Bat Cave Wash in Segment H. While this species could potentially be impacted by the activities of the remediation project it occupies an unlikely site for construction activities (steep vertical rock cliffs). Therefore this species is unlikely to be affected by remediation activities. However, if mitigation for mousetail suncup with its very specialized habitat becomes necessary, one should collect and store seed prior to the disturbance and re-seed post-construction. Digging up and transplanting individuals is not a viable option with this species, nor is soil salvage of the topsoil, because these plants grow in rock crevices.

Spiny-haired blazing star is also a special-status plant that occurs in the project area, but it has been found only in Arizona where it has no special-status. In California, it is classed as a CRPR 2.3 species. CRPR list 2 plants are considered to be rare in California, but more common elsewhere in their distribution. This species has no special-status designation in Arizona.

Hillside Paloverde is a CRPR list 4 (watch list) that has a limited distribution on the rock hill slopes southeast of the compressor station. Project activities are not anticipated to affect this species.

Appendix G
Locations of Special-Status Species in the Project Area

APPENDIX G
Locations of Special-Status Species in the Project Area

Common Name	Species	Northing	Easting
Mousetail suncup	*Chylismia arenaria*	--	--
Mousetail suncup	*Chylismia arenaria*	--	--
Mousetail suncup	*Chylismia arenaria*	--	--
Hillside palo verde	*Parkinsonia microphylla*	7618435.435	12612239.09
Hillside palo verde	*Parkinsonia microphylla*	7617815.16	12612166.9
Hillside palo verde	*Parkinsonia microphylla*	7617800.731	12612212.94
Hillside palo verde	*Parkinsonia microphylla*	7617827.225	12612261.52
Hillside palo verde	*Parkinsonia microphylla*	7617845.531	12612264.08
Hillside palo verde	*Parkinsonia microphylla*	7617047.906	12611915.28
Hillside palo verde	*Parkinsonia microphylla*	7617090.95	12611822.56
Hillside palo verde	*Parkinsonia microphylla*	7617110.343	12611803.34
Hillside palo verde	*Parkinsonia microphylla*	7617607.412	12612103.09
Hillside palo verde	*Parkinsonia microphylla*	7617567.553	12612073.09
Hillside palo verde	*Parkinsonia microphylla*	7617570.606	12612074.61
Hillside palo verde	*Parkinsonia microphylla*	7617576.476	12612075.53
Hillside palo verde	*Parkinsonia microphylla*	7617491.041	12612135.21
Hillside palo verde	*Parkinsonia microphylla*	7617502.992	12612063.66
Hillside palo verde	*Parkinsonia microphylla*	7617110.188	12612056.74
Hillside palo verde	*Parkinsonia microphylla*	7616841.402	12611575.74
Hillside palo verde	*Parkinsonia microphylla*	7616431.64	12612460.41
Hillside palo verde	*Parkinsonia microphylla*	7616894.206	12612007.61
Hillside palo verde	*Parkinsonia microphylla*	7616883.248	12612007.28
Hillside palo verde	*Parkinsonia microphylla*	7616929.506	12612170.41
Hillside palo verde	*Parkinsonia microphylla*	7616669.182	12612723.26
Hillside palo verde	*Parkinsonia microphylla*	7616236.142	12612621.87
Hillside palo verde	*Parkinsonia microphylla*	7617063.943	12611913.72
Hillside palo verde	*Parkinsonia microphylla*	7617309.338	12612029.41
Hillside palo verde	*Parkinsonia microphylla*	7617366.372	12611995.91
Hillside palo verde	*Parkinsonia microphylla*	7617712.636	12611992.33
Hillside palo verde	*Parkinsonia microphylla*	7618173.514	12612309.59
Hillside palo verde	*Parkinsonia microphylla*	7618020.507	12612305.59
Hillside palo verde	*Parkinsonia microphylla*	7617804.074	12612144.19

APPENDIX G
Locations of Special-Status Species in the Project Area

Common Name	Species	Northing	Easting
Hillside palo verde	*Parkinsonia microphylla*	7617641.511	12612248.31
Hillside palo verde	*Parkinsonia microphylla*	7617540.267	12612248.52
Hillside palo verde	*Parkinsonia microphylla*	7617501.965	12612240.13
Hillside palo verde	*Parkinsonia microphylla*	7617323.687	12612152.24
Hillside palo verde	*Parkinsonia microphylla*	7617321.379	12612090.79
Hillside palo verde	*Parkinsonia microphylla*	7617326.95	12612068.92
Hillside palo verde	*Parkinsonia microphylla*	7617349.175	12612063.98
Hillside palo verde	*Parkinsonia microphylla*	7617350.96	12612055.54
Hillside palo verde	*Parkinsonia microphylla*	7617409.414	12612061.29
Hillside palo verde	*Parkinsonia microphylla*	7617472.949	12612100.85
Hillside palo verde	*Parkinsonia microphylla*	7617335.733	12612012.16
Hillside palo verde	*Parkinsonia microphylla*	7617065.375	12611915.85
Hillside palo verde	*Parkinsonia microphylla*	7617125.138	12611734.87
Hillside palo verde	*Parkinsonia microphylla*	7617181.815	12611721.45
Hillside palo verde	*Parkinsonia microphylla*	7617192.268	12611762.49
Hillside palo verde	*Parkinsonia microphylla*	7617227.544	12611763.6
Hillside palo verde	*Parkinsonia microphylla*	7617240.684	12611795.84
Hillside palo verde	*Parkinsonia microphylla*	7617665.242	12611875.12
Hillside palo verde	*Parkinsonia microphylla*	7617678.841	12611894.14
Hillside palo verde	*Parkinsonia microphylla*	7617679.559	12612086.14
Hillside palo verde	*Parkinsonia microphylla*	7617680.145	12612093.5
Hillside palo verde	*Parkinsonia microphylla*	7617620.975	12612102.51
Hillside palo verde	*Parkinsonia microphylla*	7617476.37	12612105.57
Hillside palo verde	*Parkinsonia microphylla*	7617543.75	12612039.09
Hillside palo verde	*Parkinsonia microphylla*	7616904.561	12611571.15
Hillside palo verde	*Parkinsonia microphylla*	7616822.475	12611542.25
Hillside palo verde	*Parkinsonia microphylla*	7616900.872	12612036.98
Hillside palo verde	*Parkinsonia microphylla*	7616867.055	12611979.75
Hillside palo verde	*Parkinsonia microphylla*	7616826.207	12611811.84
Hillside palo verde	*Parkinsonia microphylla*	7616822.491	12611837.69
Hillside palo verde	*Parkinsonia microphylla*	7616706.964	12611811.01
Hillside palo verde	*Parkinsonia microphylla*	7616672.111	12611834.89

APPENDIX G
Locations of Special-Status Species in the Project Area

Common Name	Species	Northing	Easting
Hillside palo verde	*Parkinsonia microphylla*	7616698.213	12611845.03
Hillside palo verde	*Parkinsonia microphylla*	7616705.071	12611893.66
Hillside palo verde	*Parkinsonia microphylla*	7616720.642	12611911.48
Hillside palo verde	*Parkinsonia microphylla*	7616681.093	12611910.07
Hillside palo verde	*Parkinsonia microphylla*	7616718.03	12611939.93
Hillside palo verde	*Parkinsonia microphylla*	7616747.112	12611976.36
Hillside palo verde	*Parkinsonia microphylla*	7616611.847	12612213.05
Hillside palo verde	*Parkinsonia microphylla*	7616935.531	12612162.36
Hillside palo verde	*Parkinsonia microphylla*	7616975.952	12612274.97
Hillside palo verde	*Parkinsonia microphylla*	7616907.676	12612501.56
Hillside palo verde	*Parkinsonia microphylla*	7617013.298	12612126.31
Hillside palo verde	*Parkinsonia microphylla*	7616606.185	12612703.23
Hillside palo verde	*Parkinsonia microphylla*	7618154.349	12612283
Hillside palo verde	*Parkinsonia microphylla*	7618074.515	12612294.28
Hillside palo verde	*Parkinsonia microphylla*	7618008.044	12612259.29
Hillside palo verde	*Parkinsonia microphylla*	7617870.155	12612131.44
Hillside palo verde	*Parkinsonia microphylla*	7617777.465	12612175.3
Hillside palo verde	*Parkinsonia microphylla*	7617749.688	12612288.34
Hillside palo verde	*Parkinsonia microphylla*	7617651.837	12612266.57
Hillside palo verde	*Parkinsonia microphylla*	7617634.59	12612252.85
Hillside palo verde	*Parkinsonia microphylla*	7617538.129	12612254.68
Hillside palo verde	*Parkinsonia microphylla*	7617475.888	12612232.75
Hillside palo verde	*Parkinsonia microphylla*	7617311.262	12612126.34
Hillside palo verde	*Parkinsonia microphylla*	7617342.393	12612047.76
Hillside palo verde	*Parkinsonia microphylla*	7617337.057	12612012.98
Hillside palo verde	*Parkinsonia microphylla*	7617103.836	12612047.74
Hillside palo verde	*Parkinsonia microphylla*	7617041.157	12611859.99
Hillside palo verde	*Parkinsonia microphylla*	7617118.595	12611810.26
Hillside palo verde	*Parkinsonia microphylla*	7617266.661	12611842.81
Hillside palo verde	*Parkinsonia microphylla*	7617214.057	12611816.77
Hillside palo verde	*Parkinsonia microphylla*	7617571.568	12612115.64
Hillside palo verde	*Parkinsonia microphylla*	7617542.707	12612036.61

APPENDIX G
Locations of Special-Status Species in the Project Area

Common Name	Species	Northing	Easting
Hillside palo verde	*Parkinsonia microphylla*	7615863.997	12612030.84
Hillside palo verde	*Parkinsonia microphylla*	7617871.608	12612091.94
Hillside palo verde	*Parkinsonia microphylla*	7617431.451	12612241.96
Hillside palo verde	*Parkinsonia microphylla*	7617315.647	12612164.77
Spiny-haired blazing star	*Mentzelia tricuspis*	--	--

Appendix H
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☐
T____ R____ Sec ____, ____ ¼ of ______¼, Meridian: H☐ M☐ S☐

Source of Coordinates (GPS, topo. map & type): GPS
GPS Make & Model Garmin GeoXT
Horizontal Accuracy 17 feet meters/feet

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐

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

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:

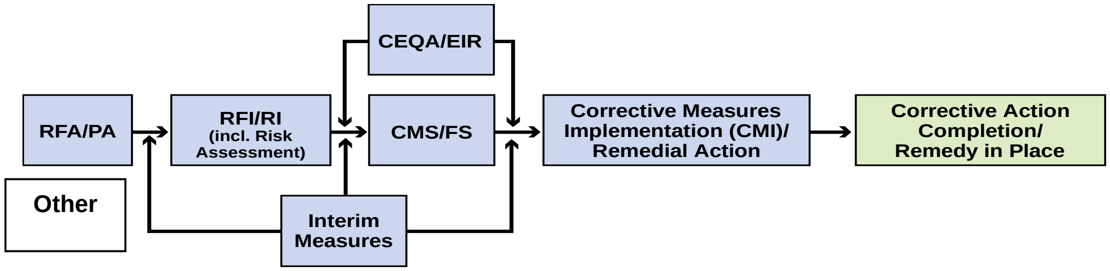
This report presents data collected for use with the remedy design. The comprehensive Floristic Survey collected data for compliance with EIR mitigation measures AES-1a, AES-2b, and CUL-1a-5, with separate reports issued in relation to those mitigation measures. Rare plant results are also reported herein.

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

Yvonne J. Meeks
Manager

Environmental Remediation

Mailing Address
4325 South Higuera Street
San Luis Obispo, CA 93401

Location
6588 Ontario Road
San Luis Obispo, CA 93405

805.234.2257
Fax: 805.773.8281
E-Mail: yjm1@pge.com

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

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

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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.

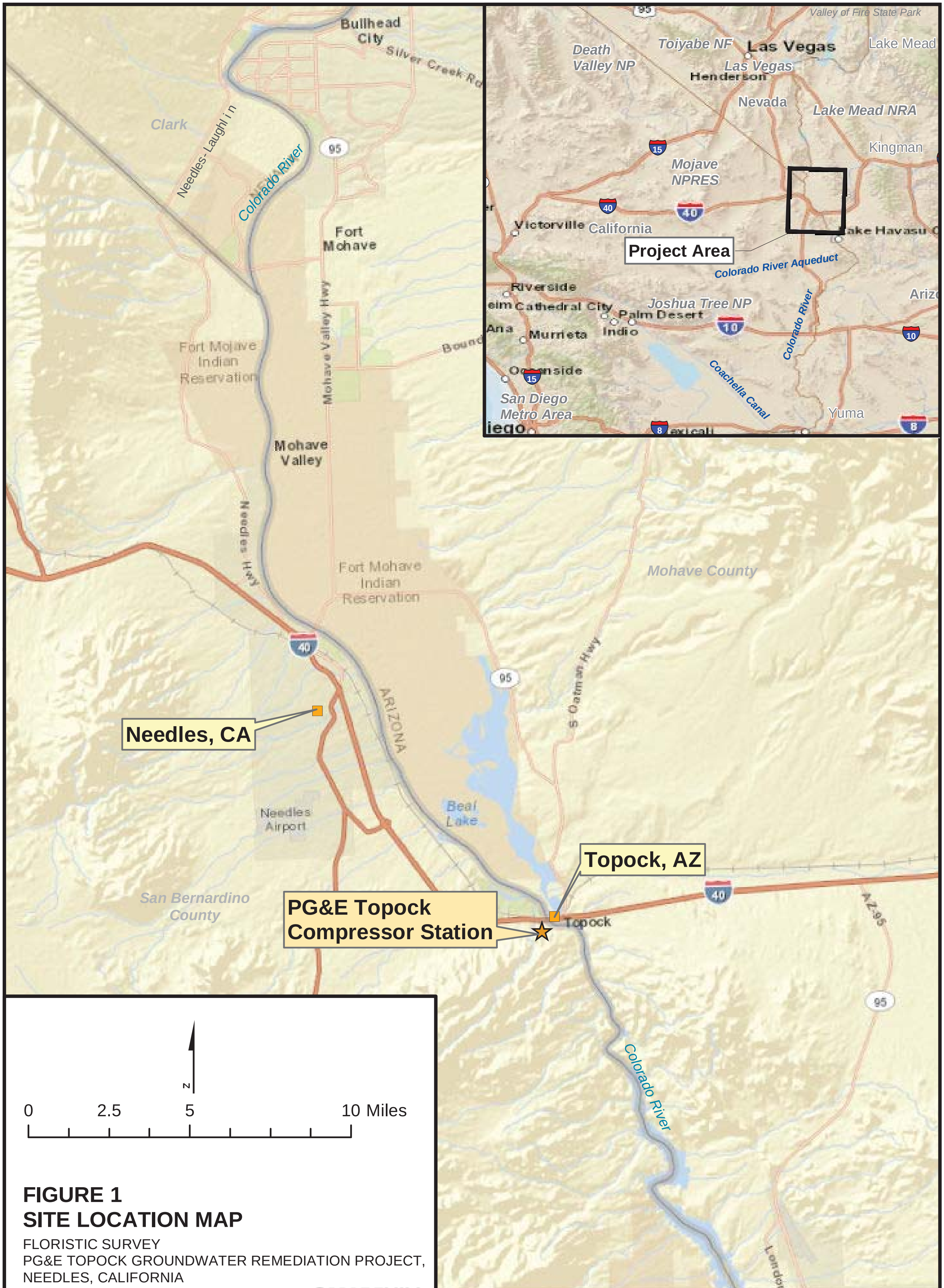
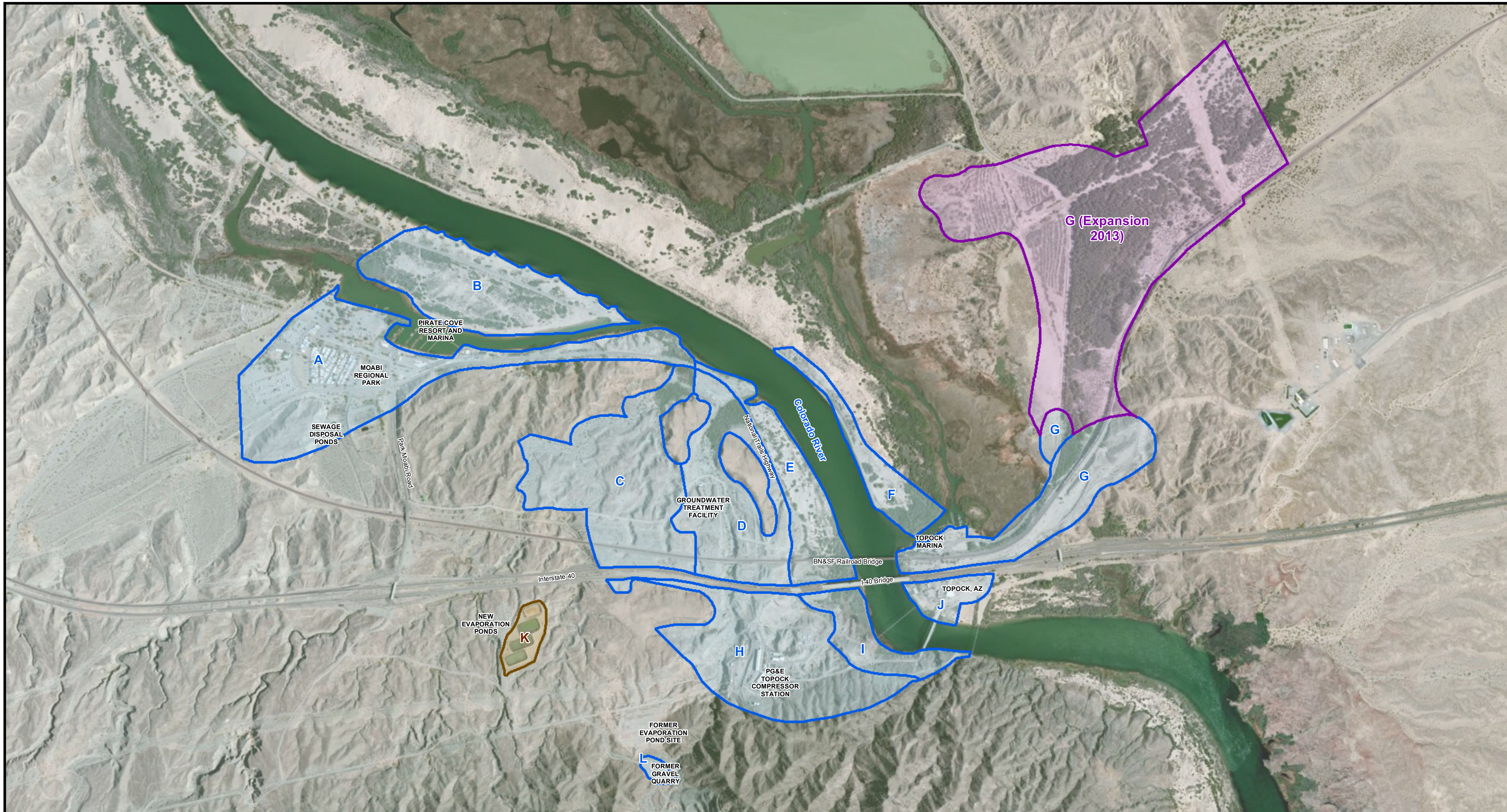


FIGURE 1
SITE LOCATION MAP

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

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2013\Vegetation\Floristic\SiteLocation.mxd Date Saved: 3/27/2013 4:32:35 PM



LEGEND

Survey Segments

Survey Segment G (Expansion)

Survey Segement K (Removed From Projecct Study Area)

N

0 600 1,200 2,400 Feet

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

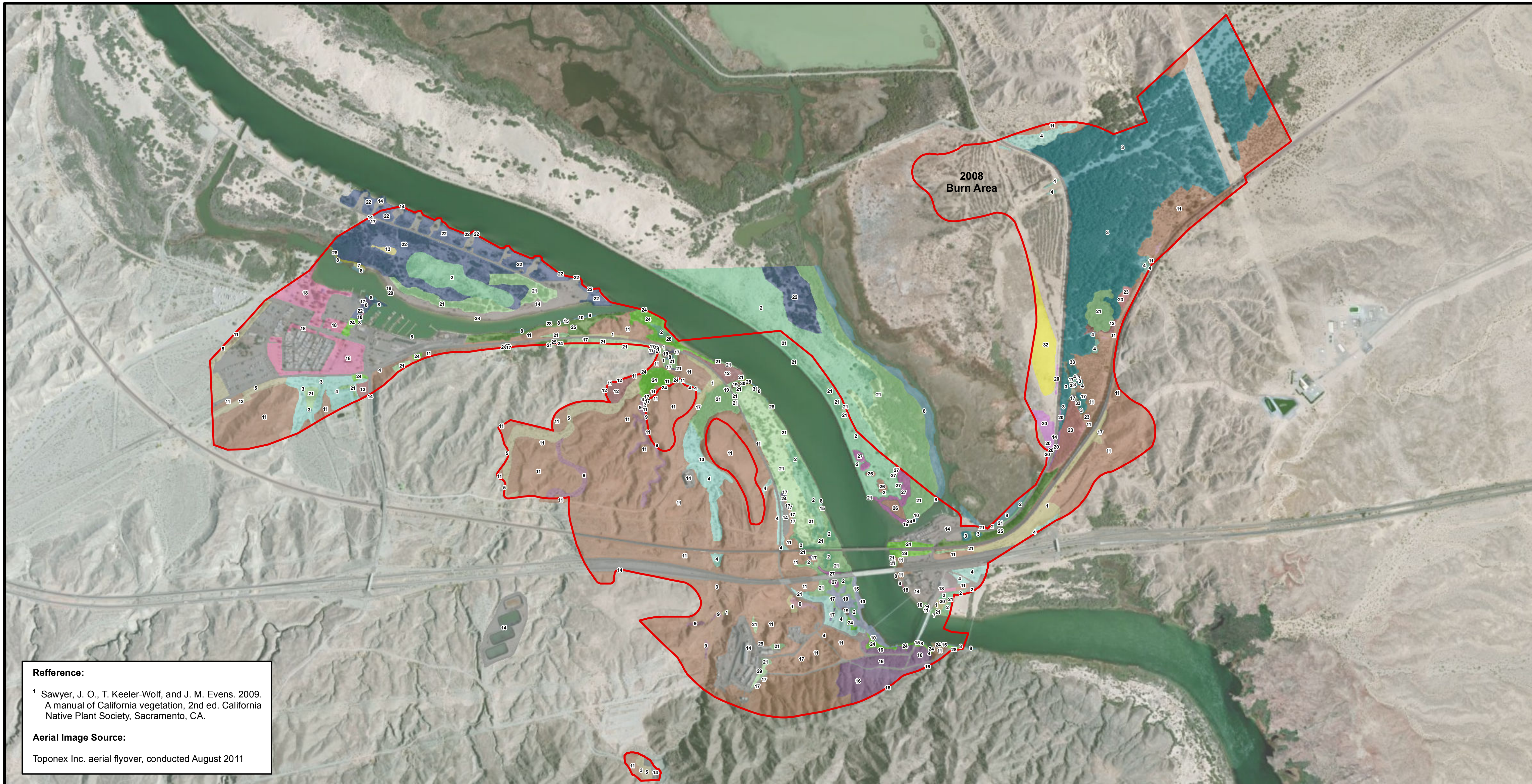
Western Honey Mesquite bosque is mostly found on the low sandy terraces along the Colorado River in Survey segments A, B, E, and F, where it occurs intermixed with tamarisk thickets (Appendix C, Plate 4, F-2)., but also occurs in a few scattered locations on the Havasu National Wildlife Refuge on the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



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

Path: D:\Projects\Topock\MapFiles\2013\Vegetation\Floristic\VegCommunities_11X17.mxd Date Saved: 7/26/2013 12:10:26 PM

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).

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.

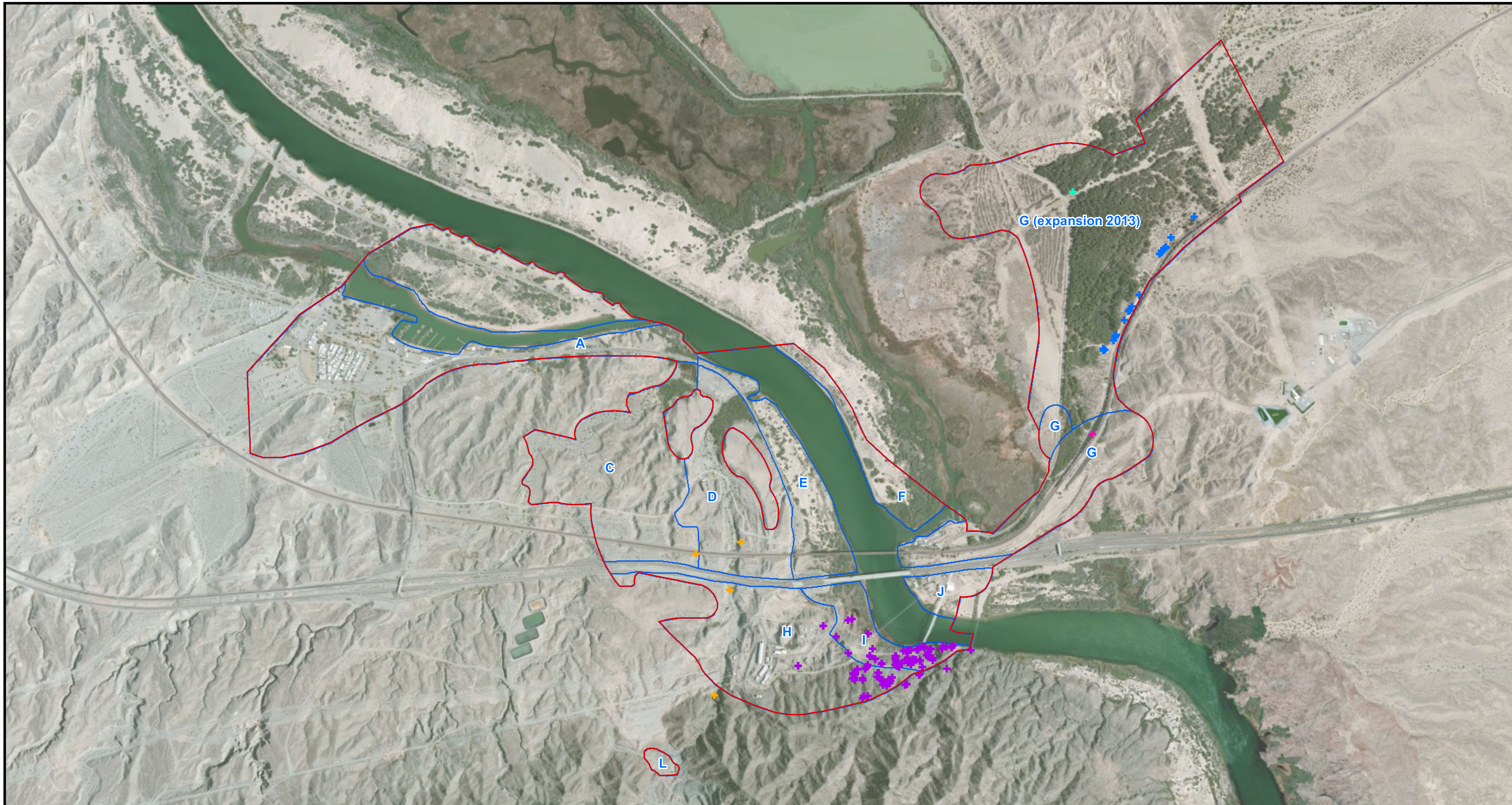
The Arizona Department of Agriculture regulates the salvage, harvesting, transport and sale of native plants under Section 3-901 through 3-916 of the Revised Statutes as well as Article 11 of the ADA Administrative Code. Salvage, clearing and removal of protected native plants located on private lands 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

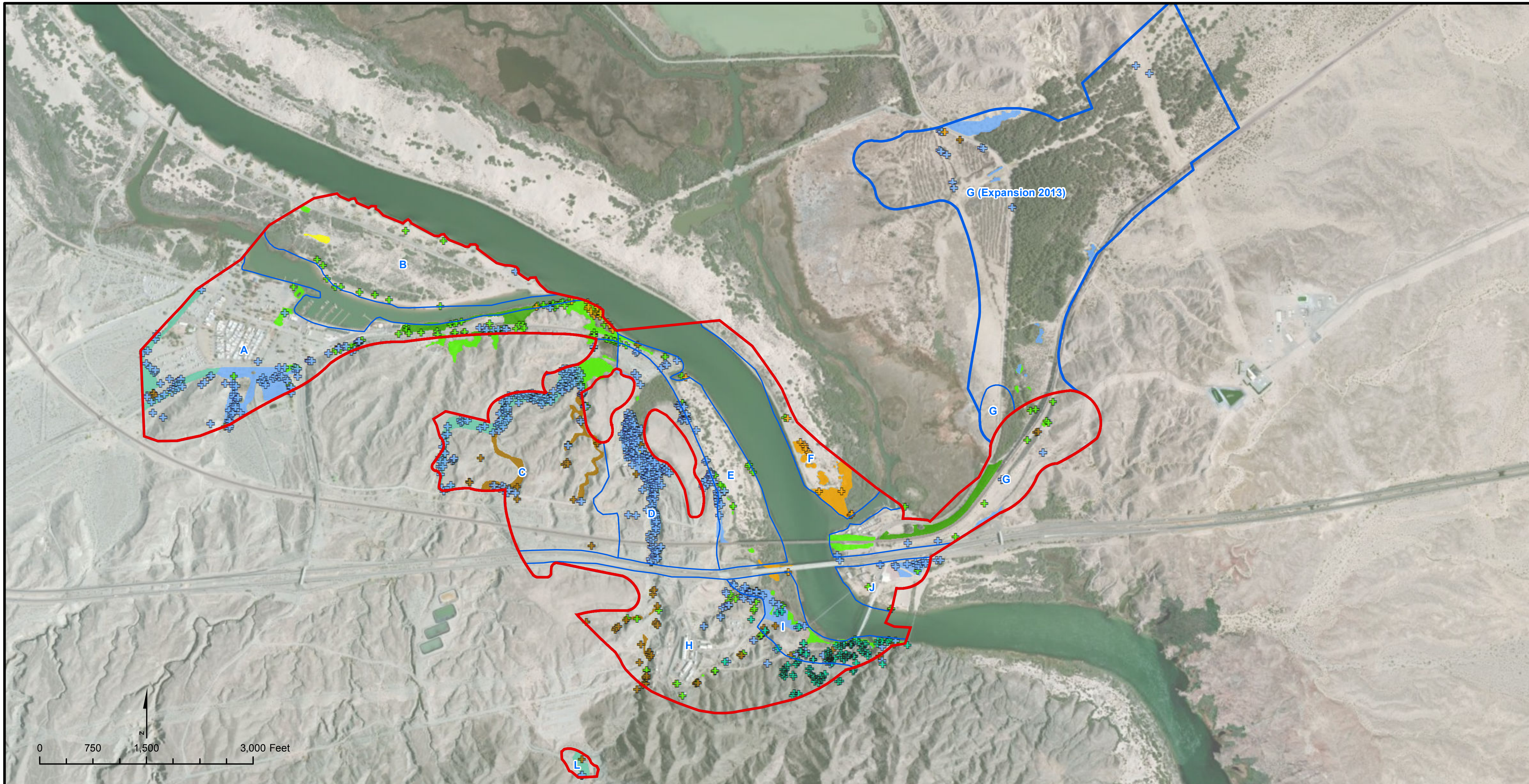
Plant Species

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*

FIGURE 4
CALIFORNIA RARE PLANT RANKED PLANTS IN THE PROJECT AREA

FLORISTIC SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



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*

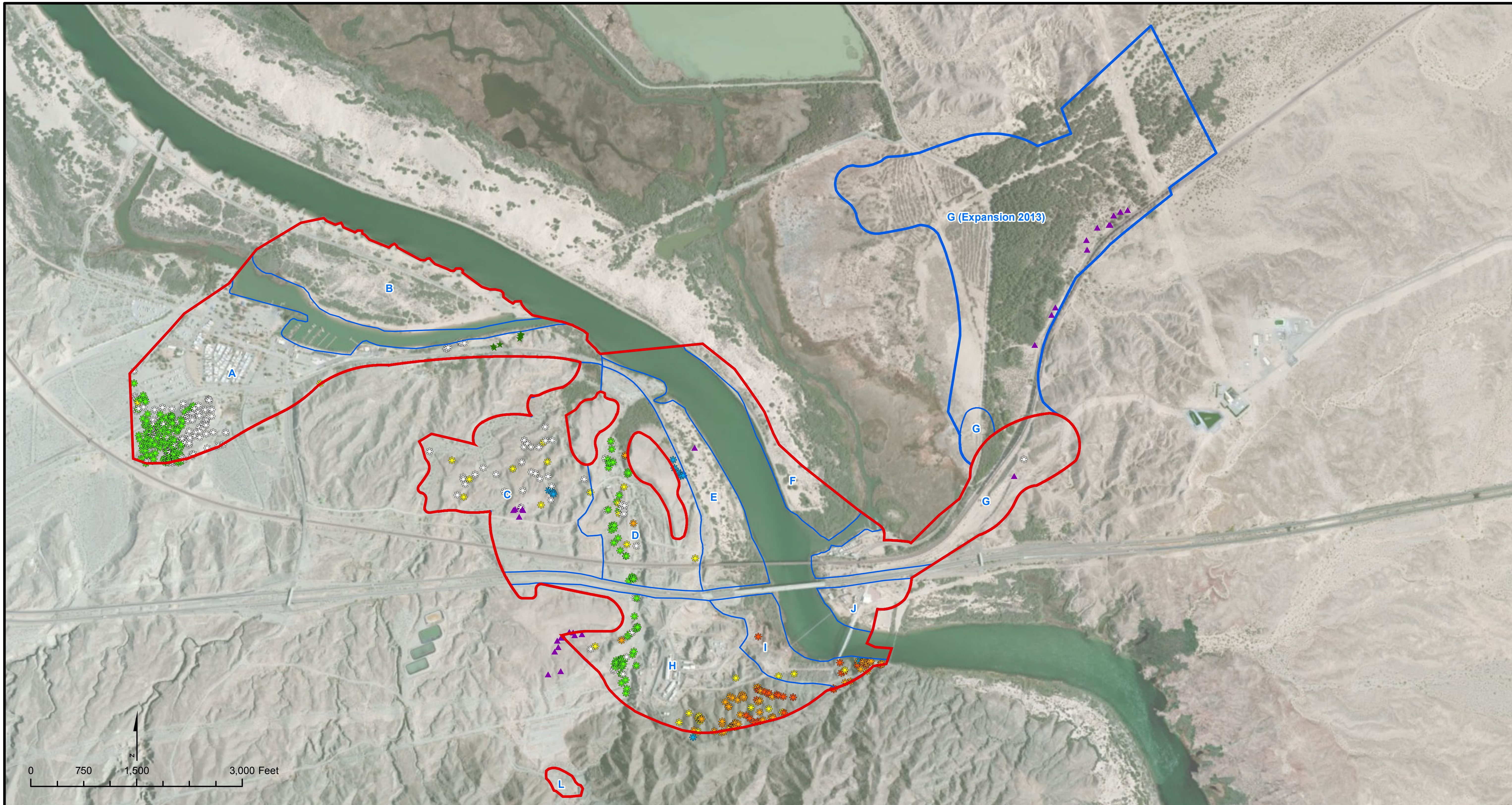
Common Name	Scientific Name
Hillside Palo Verde	*Parkinsonia microphylla*
Blue palo verde	*Parkinsonia florida*
Catclaw acacia	*Senegalia greggii*
Desert smoke tree	*Psorothamnus spinosus*
Screwbean mesquite	*Prosopis pubescens*
Western honey mesquite	*Prosopis glandulosa var. torreyana*

FIGURE 5
TREES PROTECTED BY THE CDNPA AND THE ADA

FLORISTIC SURVEY
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Document Path: D:\Projects\Topock\MapFiles\2013\Vegetation\Trees.mxd



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

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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.

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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]
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.

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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]
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.

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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]
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.

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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]
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.

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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.

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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

APPENDIX B
Vascular Plant Species Observed in the Project Area

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
Vascular Plant Species Observed in the Project Area

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

APPENDIX B
Vascular Plant Species Observed in the Project Area

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

APPENDIX B
Vascular Plant Species Observed in the Project Area

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.

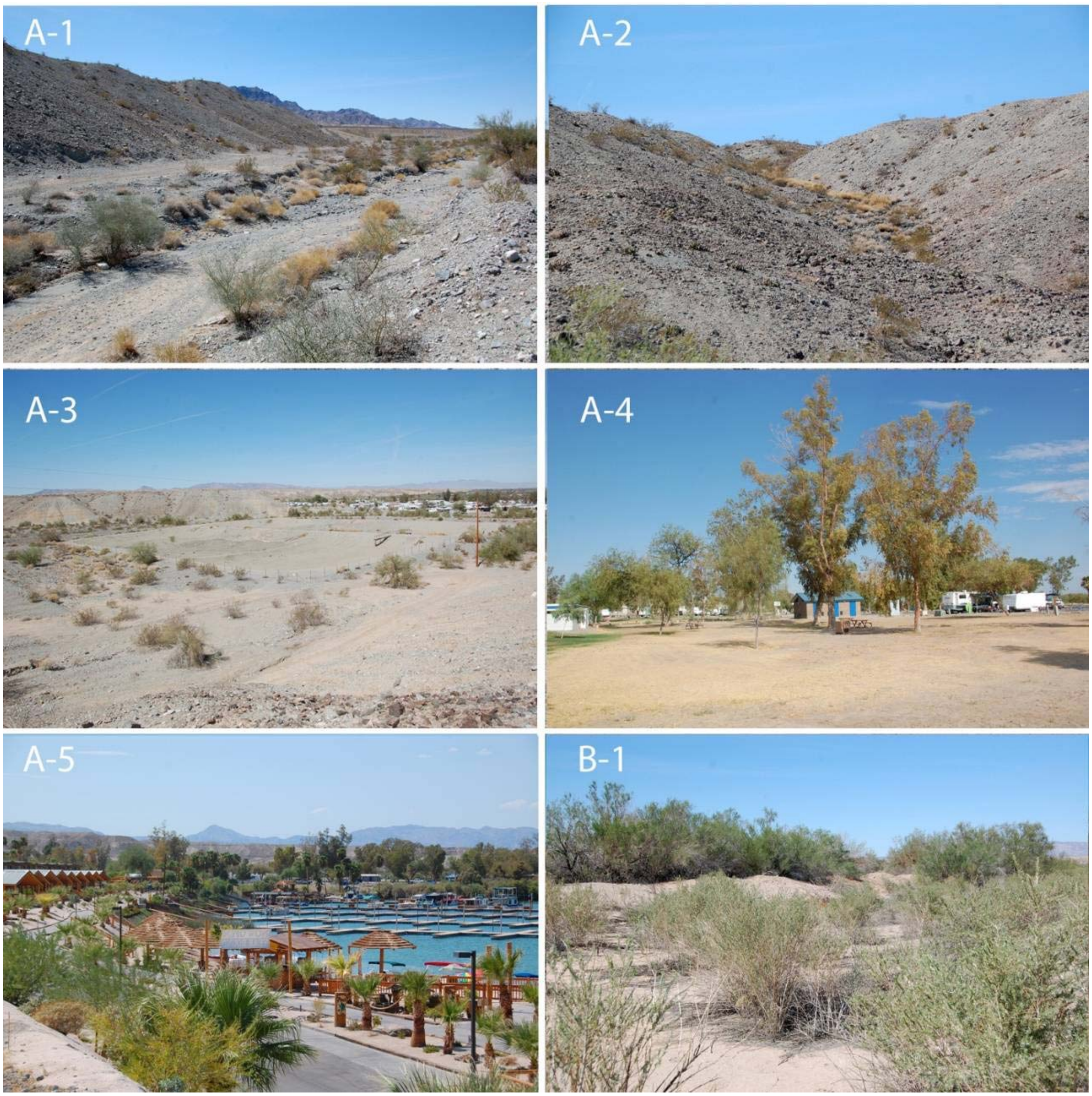


Plate 2. Segments B and C. (B-2) Park Moabi camping area on peninsula adjacent to Colorado River. (B-3) Maintained public beach opposite Pirate's Cove Resort with western honey mesquite and salt cedar in background. (C-1) Broad wash at north end of Segment C with cattle saltbush and creosote bush. (C-2) 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.

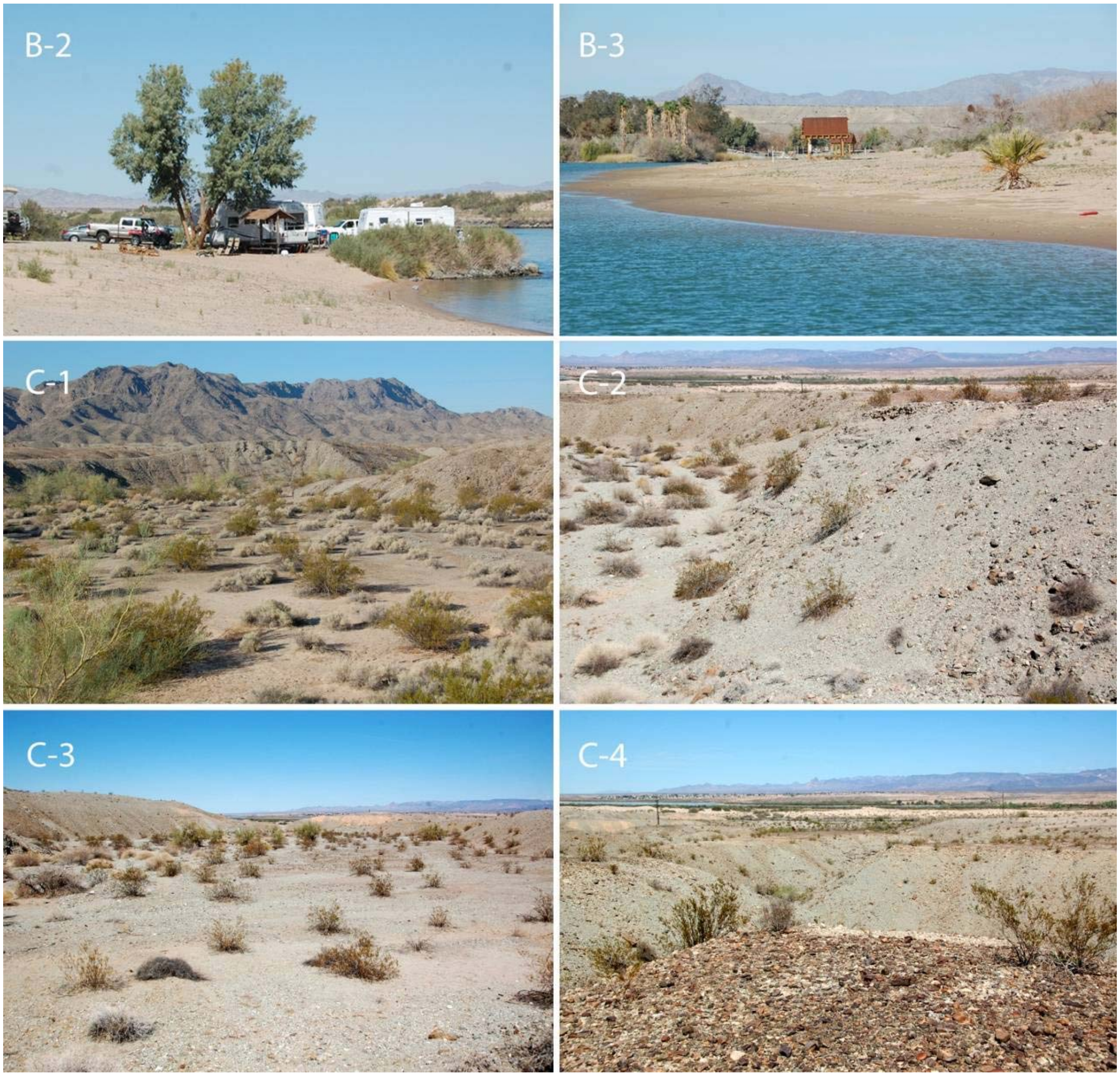


Plate 3. Segments D and E. (D-1) Bat Cave Wash with blue palo verde woodland. (D-2). Tamarisk thicket mixed with western honey mesquite at north end of Bat Cave Wash south of National Trails Highway. (E-1) Colorado River and low terrace of dredged sands with tamarisk and arrow weed thickets. (E-2) Close-up 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.

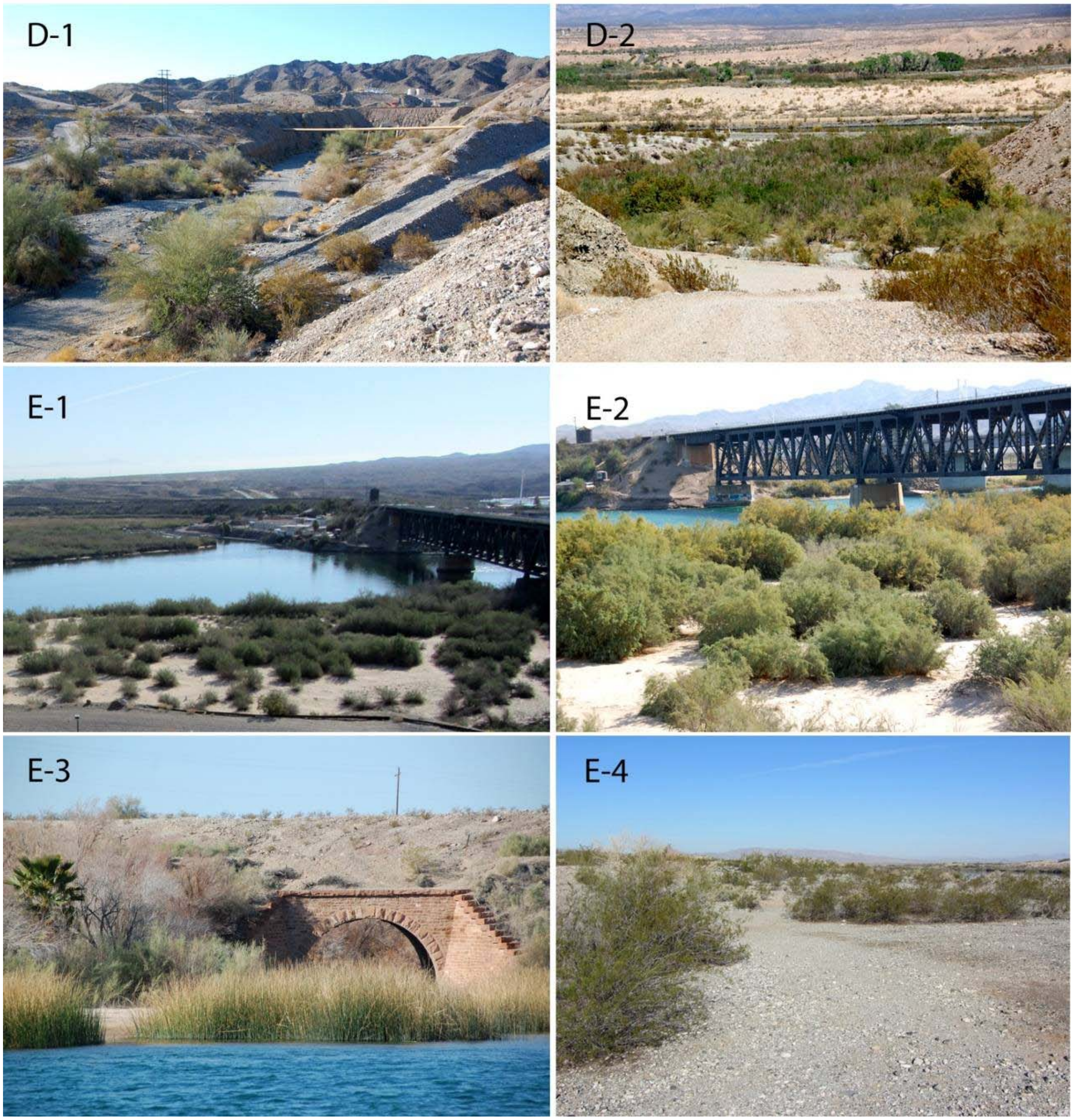


Plate 4. Segments F and G. (F-1) Arrow weed thicket on dredge sands looking north. (F-2) Western honey mesquite, screwbean mesquite and tamarisk thickets at southern end of Segment F with small wetland in the southeast corner of photo. (F-3) Close-up of wetland with common reed and sand-bar willow on 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.

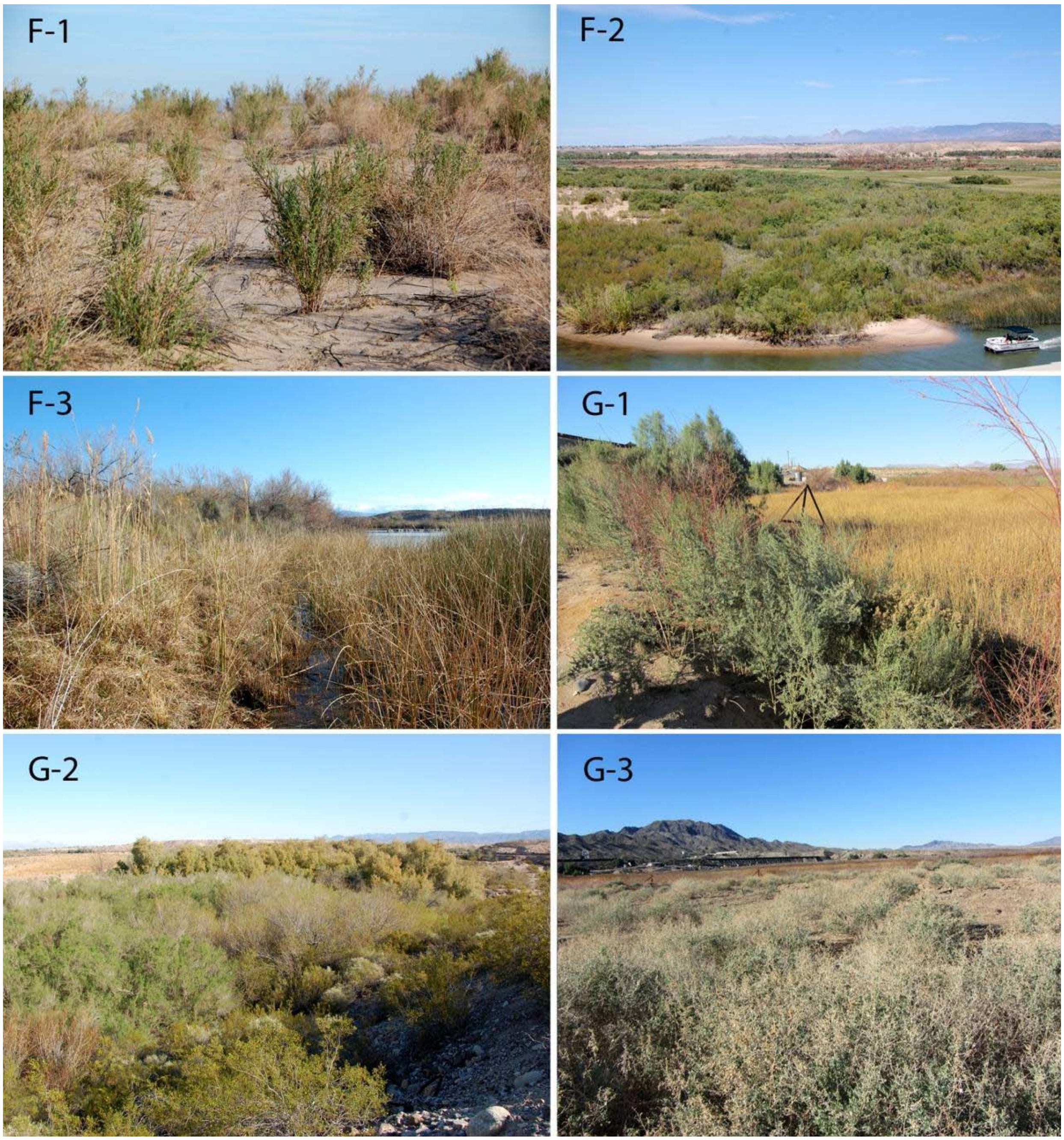


Plate 5. Segment G. (G-4) Sandy area with spring annuals including multi-paired suncup, stevia pincushion, brittle spineflower, *Cryptantha* spp., Spanish needles, and desert sunflower. (G-5) Upland rocky area dominated by creosote bush scrub. (G-6) Native vegetation planting (screwbean mesquite) in 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.

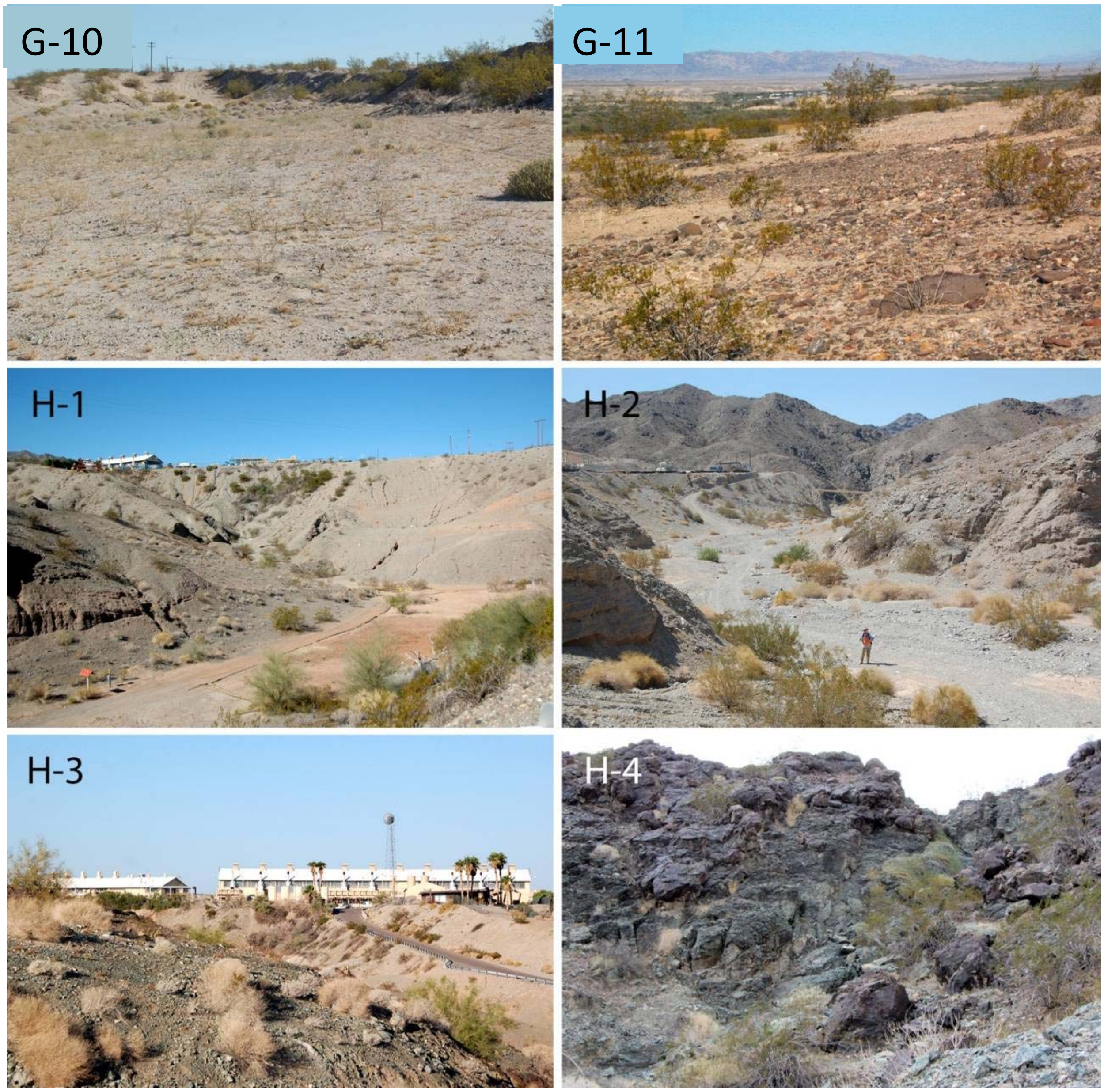
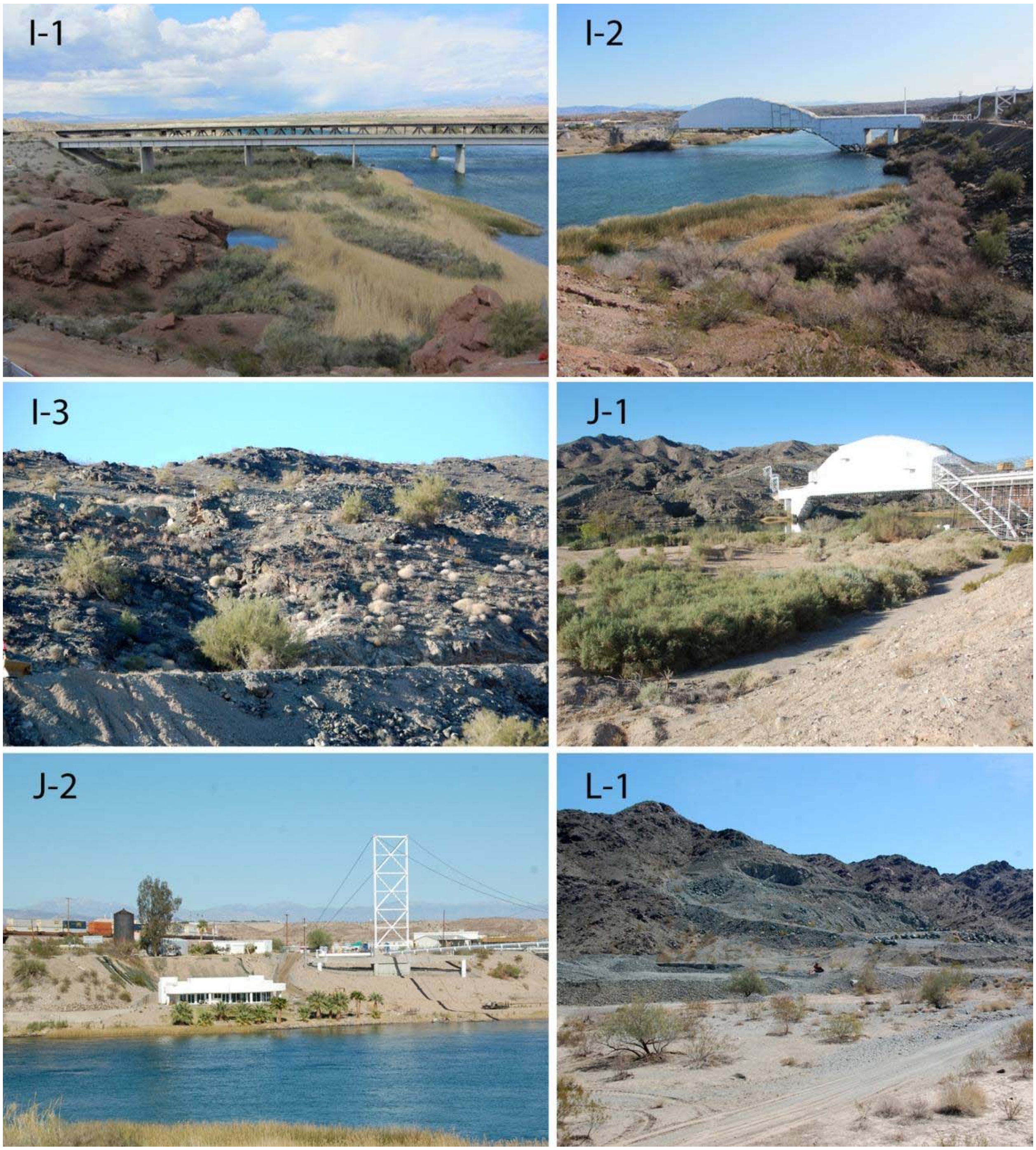


Plate 7. Segments I, J and L. (I-1) Common reed and California bulrush marshes at north end of Segment I with Miocene conglomerate outcrop in lower left of picture. (I-2) California bulrush marsh in river, western honey mesquite at base of upland slope and hillside palo verde slightly higher up slope. (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.

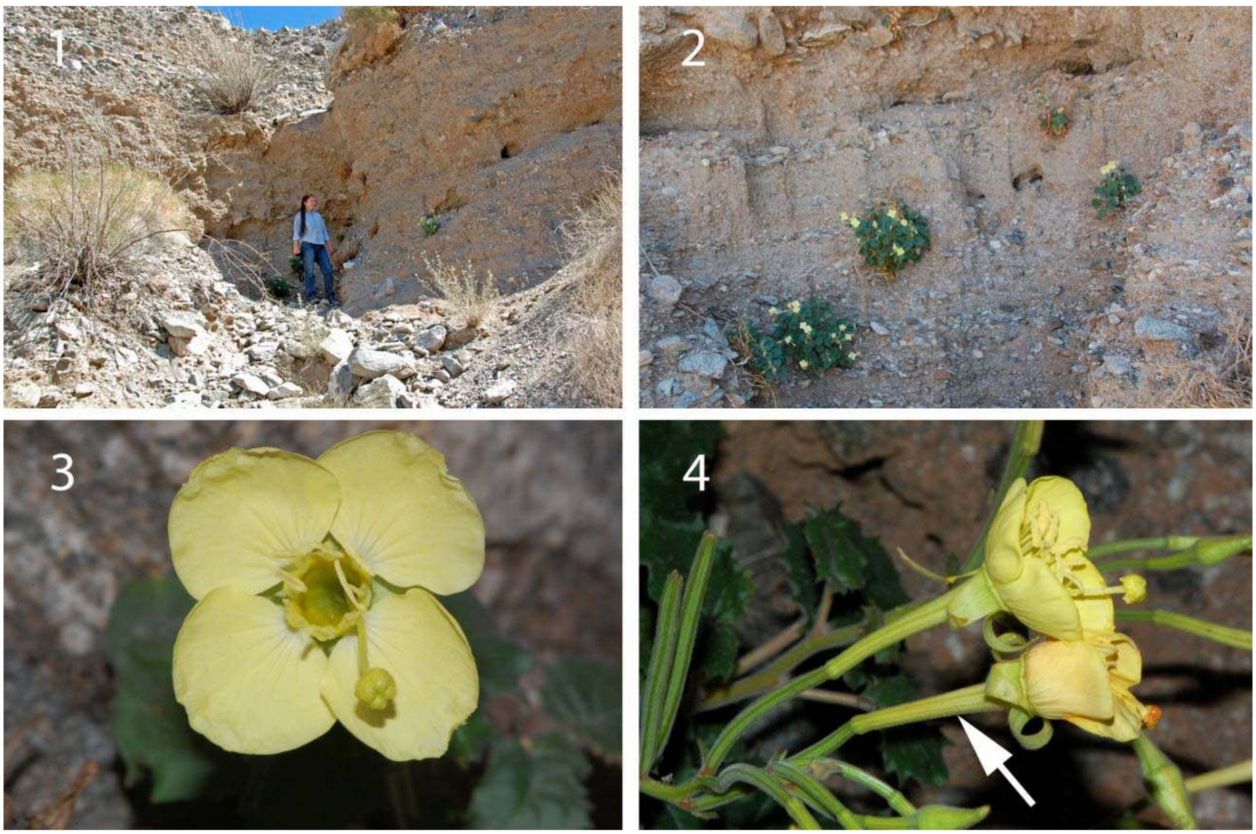


Plate 2. Hillside palo verde (*Parkinsonia microphylla*), CRPR 2.2. (1) Habit of hillside palo verde on rocky hillside in segment H. (2) Branches of hillside palo verde showing numerous small leaves. (3) Close-up of flower.

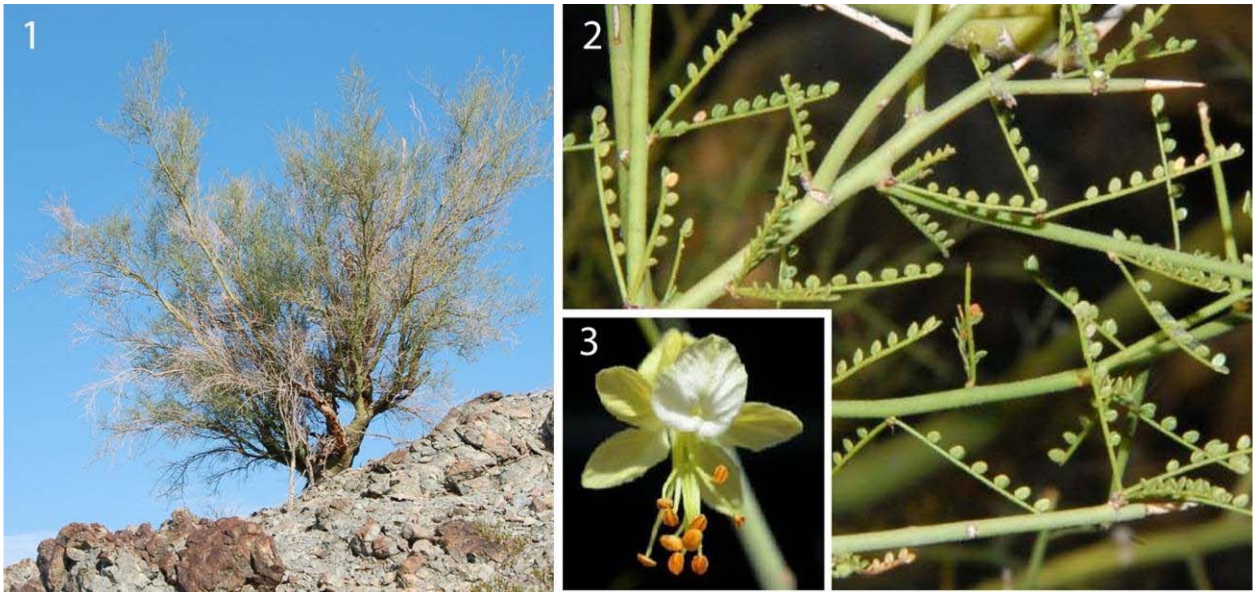


Plate 3. Gravel milkvetch (*Astragalus sabulonum*), CRPR 2.2. Habit of plant growing along the edge of the Sacramento Wash in the northern part of Segment G (added survey area).

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.

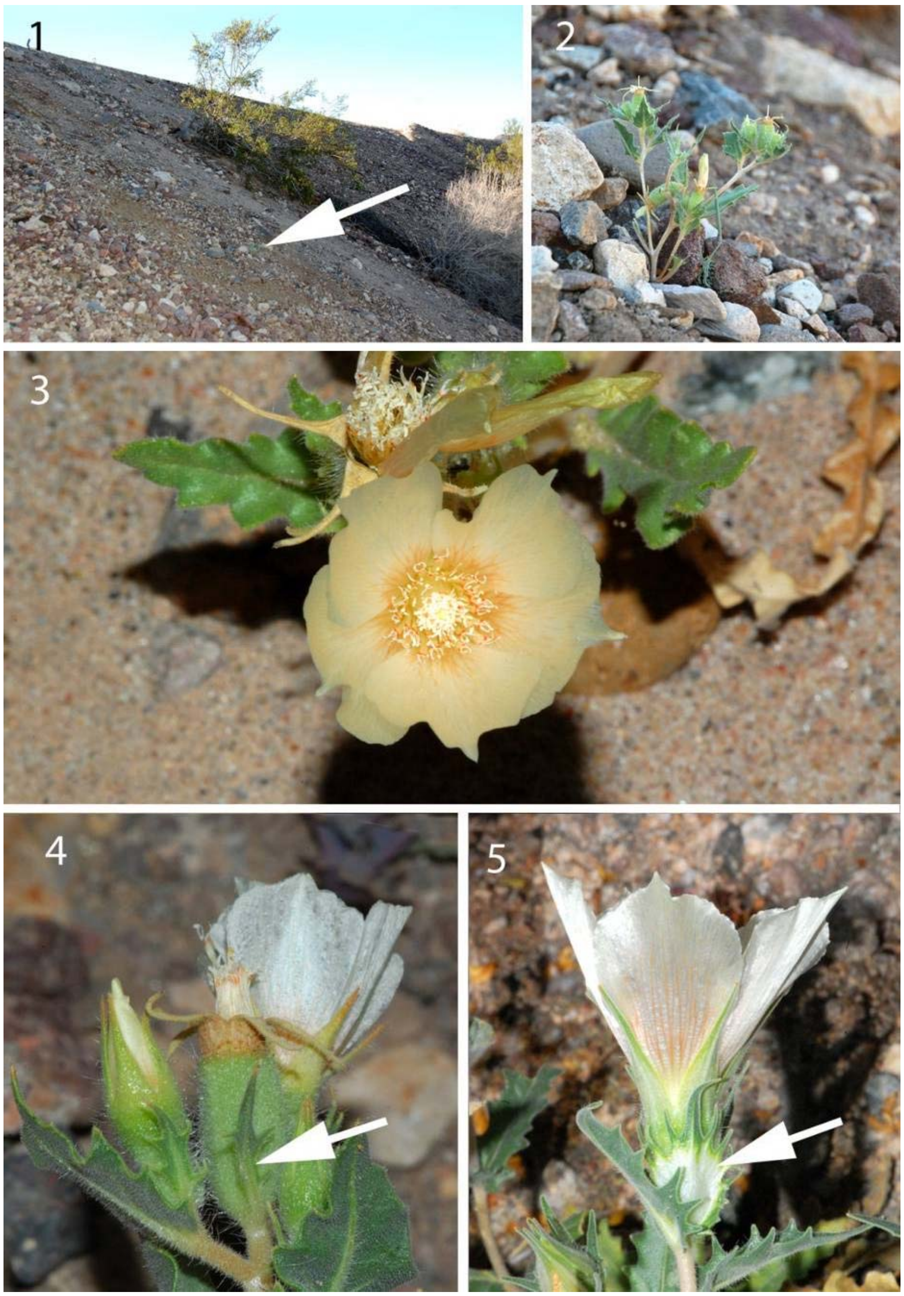


Plate 5. Small-flowered androstephian (*Androstephium breviflorum*) CRPR 2.2; (1) Habit of plant in sandy soil on the west side of BN&SF railroad tracks in added survey area in Survey Segment G (2) Close up of flowers

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.

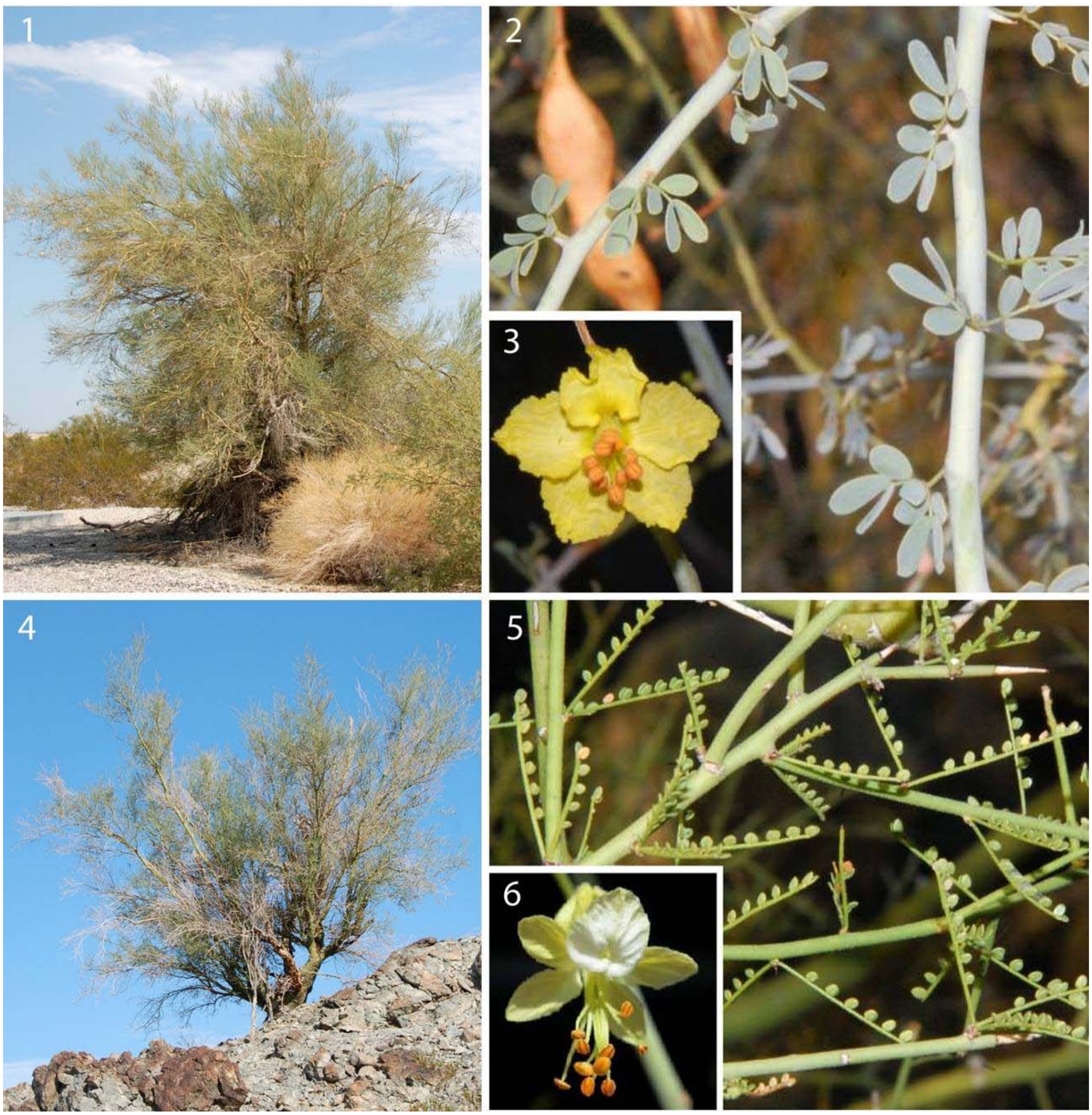


Plate 2. CDNPA and ADA List B cacti. 1) Habit of buckhorn cholla (*Cylindropuntia acanthocarpa* ssp. *coloradensis*). 2) Flower close-up of buckhorn cholla. 3) Habit of silver cholla (*Cylindropuntia echinocarpa*). 4) Flower close-up of silver cholla. 5) Habit of California barrel cactus (*Ferocactus 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.

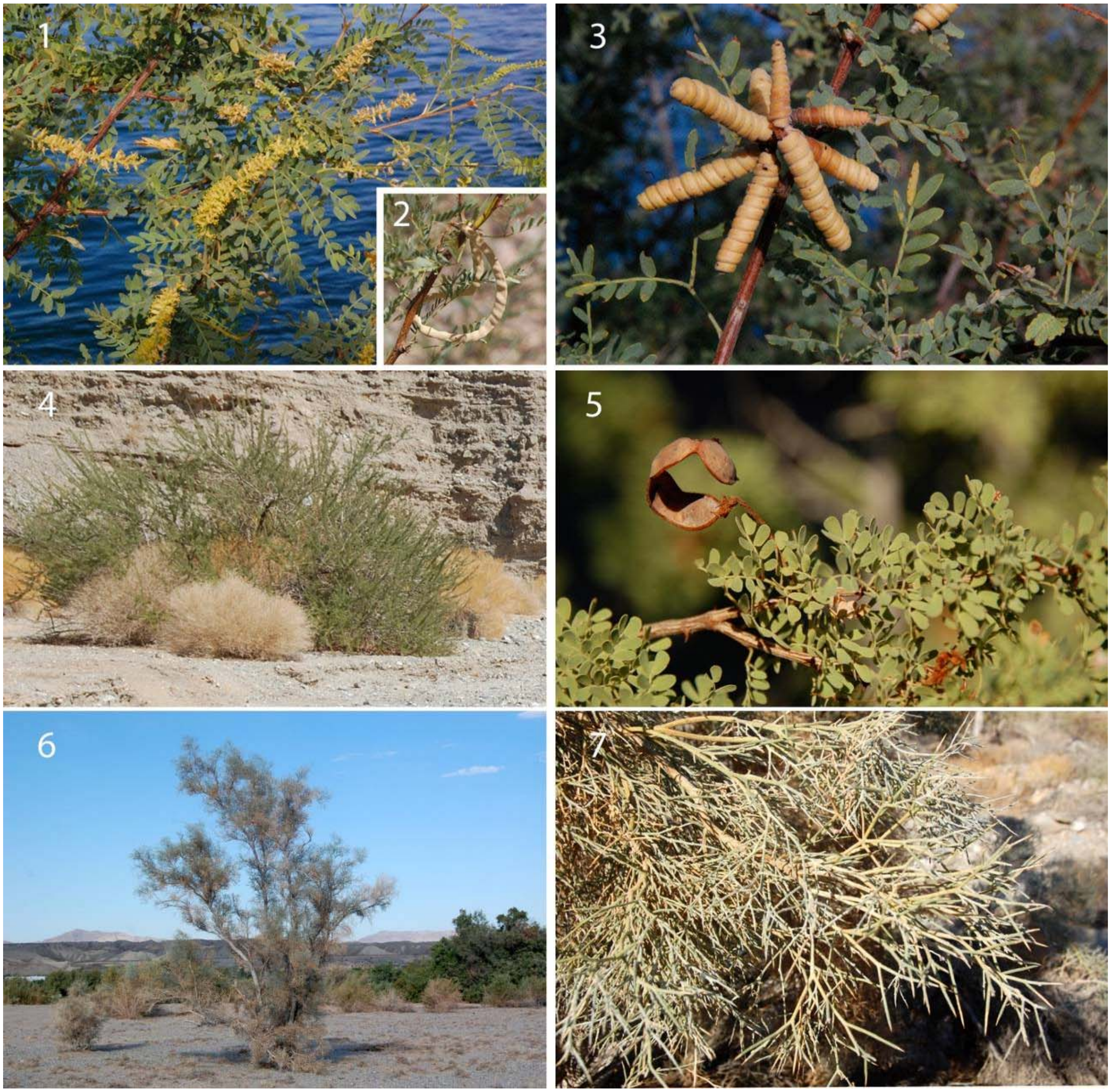
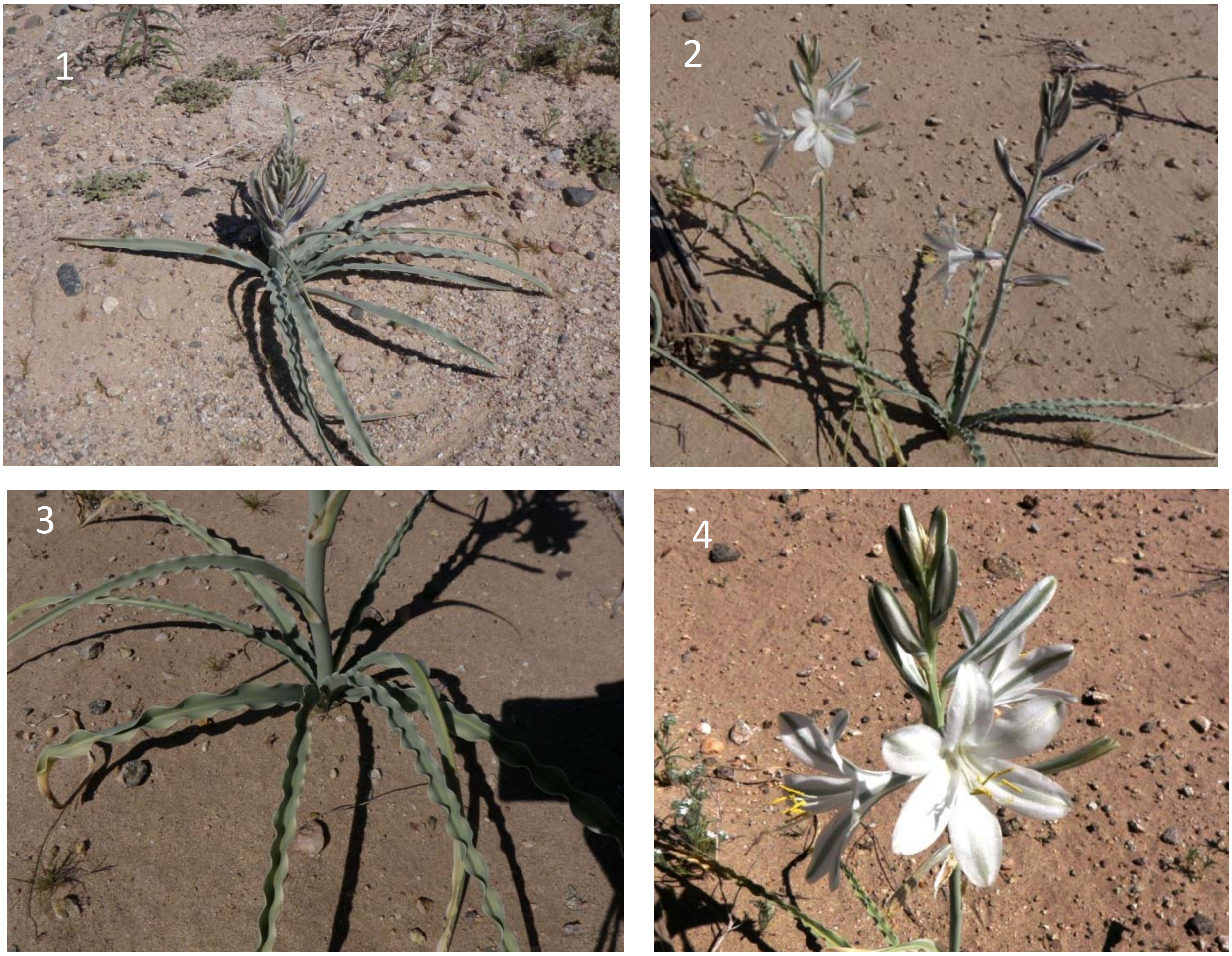


Plate 5. Desert Lily (*Hesperocallis undulata*) *ADA* List B. (1) Desert lily leaves and buds. (2) Desert lily growth habit in sandy soils west of BN&SF railroad tracks in added area of Segment G. (3) Close up of leaves. (4) Close up of flower.



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

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

For Office Use Only

Source Code ______ Quad Code ______
Elm Code ______ Occ. No. ______
EO Index No. ______ Map Index No. ______

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

Appendix A6
Instream Habitat Typing Survey
Technical Memorandum
(*on CD-ROM only*)

Instream Habitat Typing Survey, Topock Compressor Station, Colorado River

PREPARED FOR: Melanie Day/PG&E

COPY TO: Christina Hong/CH2M HILL
Marjorie Eisert/CH2M HILL

PREPARED BY: Earl Byron/CH2M HILL

DATE: May 25, 2012

I. Introduction

In compliance with the Topock Compressor Station Final Remedy Final Environmental Impact Report (EIR) mitigation measure BIO-3b, an instream habitat typing survey was conducted within the EIR defined project area along the California bank of the Colorado River in areas that are under consideration as alternative locations for a river intake structure. The installation of a river intake was considered in the EIR (Volume 2, Section 3.5.2.5 and Exhibit 3-4) (AECOM 2011). As specified in the EIR Mitigation Measure BIO-3b... "Because the type and extent of habitat potentially affected is unknown, PG&E shall have an instream habitat typing survey conducted in the area potentially affected by the intake construction. Further, cooperation with USFWS and other fisheries biologists shall determine suitable and acceptable location(s) for the intake structure(s) to avoid the spawning habitat of special-status fish species. PG&E shall avoid habitat modifications, especially to habitat that is preferred by native fishes for spawning or rearing including side channels, cobble or gravel bars, and shallow backwaters..." Dr. Earl Byron, Senior Technologist/Aquatic Scientist, conducted an instream habitat typing survey on April 4, 2012, and this report presents the results of the survey and supporting background information.

II. Background

The construction of a river intake structure in the Colorado River at Topock is under consideration as one alternative to supply fresh water for the final groundwater remedy at the Topock site. Disturbance of the river and riverbed substrate, as well as any water withdrawals as a result of this intake structure, has the potential to affect two protected fish species that inhabit the Colorado River: the razorback sucker (*Xyrauchen texanus*) and bonytail chub (*Gila elegans*). Both species have been found in recent years in the immediate vicinity of the project area, at Park Moabi lagoon and Topock Marsh (AECOM 2011).

Both species are federally-listed as endangered, California State-listed as endangered (the razorback sucker is also a "fully protected" species under California law), and covered species under the Lower Colorado River Multi-Species Conservation Program (LCR MSCP). Federally designated critical habitat for the bonytail chub occurs within the EIR project area along the Colorado River.

Currently, the project is not authorized by the U.S. Fish and Wildlife Service (USFWS) to result in take of federally-listed species. Project proponents may seek take authorization under sections 7 or 10 of the federal Endangered Species Act. The project's federal Record of Decision for the groundwater remediation states that design and implementation of the remedy will be performed in a manner that does not result in a "take" of threatened or endangered species or damage their critical habitat (USDOI 2010). Evaluation of an adequate fish screen to avoid potential impacts to listed fish is ongoing.

The razorback sucker is also a California Fully Protected species, meaning that the California Department of Fish and Game (CDFG) is unable to issue permits for take of this species [California Fish and Game section Code 5515(a)(1)], except in the following circumstances: 1) impacts are attributable to the implementation of the Quantification Settlement Agreement (QSA) (Fish and Game Code 2081.7); the QSA is the mechanism for Fully

Protected species authorized take under the LCR MSCP (CDFG ITP 2005), 2) a project is covered under a Natural Communities Conservation Plan (NCCP) (Fish and Game Code section 2835), or 3) for research purposes. A project specific NCCP would take a significant amount of time to develop. This project may be able to request coverage under the LCR MSCP via third-party take authorization or a Certificate of Inclusion if it could not be demonstrated that the intake would avoid take. However, regardless of possible LCR MSCP coverage, the Record of Decision states that the project is to be implemented in a manner that does not result in take of bonytail chub and razorback sucker or damage critical habitat.

In Arizona, the razorback sucker and bonytail chub are designated as Wildlife of Special Concern and species of greatest concern to the state from an "endangered species" perspective (Arizona Game and Fish Department, in prep). This designation is informative and nonregulatory, serving mainly as policy guidance for wildlife management (USFWS 2002).

In addition, flannelmouth sucker (*Catostomus latipinnis*) is a species of management concern (LCR MSCP 2008), overlapping with the two listed species in terms of habitat requirements and also previously known from Park Moabi (AECOM 2011). Given its similar habitat requirements, mitigation measures protective of razorback sucker and bonytail chub are likely to also provide protection of flannelmouth sucker.

III. Habitat Requirements

Razorback sucker and bonytail chub evolved to live in the fast, silty, turbulent water of the historical Colorado River (Fed. Register 1994; LCR MSCP 2008). As the character of the river has changed following the construction of dams and as invasive fish species have come to dominate the fish community, very low numbers of these endemic fish species still remain in the mainstem river. Unfortunately, these species were reduced to very low numbers prior to the advent of modern fisheries surveys and, as a result little is known of the habitat requirements for spawning in riverine conditions (USFWS 2002a,b).

Razorback sucker

Razorback sucker begin to reproduce at 3 to 4 years of age and may live for more than 40 years (UCREFRP 2012). In the Colorado River system, razorbacks are found from the Grand Canyon to near the border with Mexico, but these riverine populations are small, with recruitment (young surviving to maturity) being virtually nonexistent (Fed. Register 1994). Fish stocking efforts in the Lower Colorado River are forestalling this species extinction and it has been documented just downriver of the project area (AECOM 2011). Over their lifespan, razorback suckers occupy several distinct habitats consisting of both strong currents and backwaters (NDIS 2012). Exact habitat requirements for successful spawning in rivers are unknown, due to the small numbers of existing river spawners (NDIS 2012). From what can be gleaned from historical records and extant upper Colorado river populations, spawning occurs over cobble, gravel, and sand bars during high spring flows (USFWS 2002a) (spawning habitat) and larvae drift from there to backwaters and floodplain wetlands to rear (rearing habitat) (UCREFRP 2012; USFWS 2002a). Ripe, spawning razorback suckers have been captured in riffles with clean cobble, gravel, and sand (LCR MSCP 2008; Tyus and Karp 1990). Razorbacks have been observed spawning near a river's edge location at the mouth of a backwater of the Colorado River below Hoover dam in 1.2 to 2m water depth; the spawning habitats were depressions in the river bed composed of gravel and cobble substrates (Mueller 1989). The authors noted that the spawning areas did not consist of either the bedrock or sand substrates otherwise common in the area (Mueller 1989).

The juvenile fish rear in quiet backwaters, preferring shallow littoral zones for a few weeks after hatching, and then dispersing to deeper water (Fed. Register 1994). Older, adult fish frequent deep holes, eddies, and backwaters near the shore (adult, foraging, non-spawning habitat) (USFWS 2002a). Juvenile razorback suckers are presumably eaten by invasive predatory fish species and rearing is compromised by limited rearing habitat, which has led to overall low reproductive success, low survival of young, and little or no recruitment (USFWS 2002a).

Spawning fish have been known to spawn in 1 to 2 m depths of water (Mueller 1989) at a temperature range of 9 to 17 deg. C in the April – June period (Tyus and Karp 1990).

Bonytail chub

Historically, bonytail chub inhabited the turbid river and quiet, muddy backwaters of the Colorado River. They are now mostly relegated to survival in Lake Mohave (NDOW 2012) and the rarest native fish in the Colorado River basin, with recruitment being virtually nonexistent (Fed. Register 1994). As with razorback sucker, fish stocking efforts in the Lower Colorado River are forestalling this species extinction and it has been documented in the river adjacent to the project area (AECOM 2011). Spawning requirements have never been documented in riverine environments, however available data suggest that riverine habitats would be suitable for adults and young (Fed. Register 1994). Although little is known of actual bonytail habitat requirements, it is likely that this species of chub is similar to closely related species in spawning over rocky substrates (as has been observed in recent reservoir spawning) (USFWS 2002b). In Lake Mohave, bonytail have been observed to broadcast their adhesive eggs over a gravel shelf (USFWS 2002b). Recent information from the LCR MSCP has documented bonytails spawning on shoreline-associated riprap material (gravel/cobble/boulder) in 1 to 2m depth water at a temperature averaging 18 degrees Celsius in June and July (Fed. Register 1994; LCR MSCP 2008).

Flooded bottomland habitats are probably important to juvenile rearing and non-spawning adults are typically found in pools and shoreline eddies adjacent to swift currents (Valdez 1990 in USFWS 2002b). The young rear in backwater and floodplain nursery areas but the juvenile fish do not survive predation by invasive predator species (USFWS 2002b). The critical habitat designation for this species includes the Topock reach of the river and states that habitats required for its conservation include river channels and flooded, ponded, or inundated riverine habitats (Fed. Register 1994). The primary constituent elements (PCEs) for critical habitat focus on the physical habitat and food supply for the species: 1) Space for individual and population growth and for normal behavior; (2) Food, water, air, light, minerals, or other nutritional or physiological requirements; (3) Cover or shelter; (4) Sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and generally; (5) Habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of a species (Fed. Register 1994).

IV. Methods

Four sites along the California bank of the Colorado River in the vicinity of the Topock Compressor Station were examined in detail to characterize fish habitats in the shallow, shorezone region during the morning of April 4, 2012. A location map of all 4 general site locations is depicted in Figure 1. Other possible sites along the shoreline were not considered due to access limitations, bank steepness, excessive shallowness, or conflict with other sensitive biological habitats (wetlands, etc.). Habitats were characterized as to depth, substrate type, and relative flow. Water surface elevations were taken from continuous records of the I-3 bridge transducer. Numerous water depths at precise locations and times were taken from boat sonar readings matched to Global Positioning System (GPS) coordinates. The area of shoreline examined at each site was at least 100 feet, in order to accommodate the placing of the intake and screen with a construction and operational footprint near 10 feet or less.

Substrate characteristics were recorded as visual observations of substrate type, as observed from the boat in shallow water or from a plexiglass view box held in the water over the side of the boat. Substrates were categorized as bedrock, boulder, small boulder, gravel, or sand (or mixtures). Several representative substrate photographs were taken through the view box window and presented below. When a location was too deep for observation (usually greater than approximately 10 feet water depth), a mini-Ponar dredge was used to bring up bottom material for direct observation. All Ponar deployments yielded sand with some gravel and no dredge deployments failed due to striking boulder or bedrock substrates. Representative Ponar dredge content photographs are included below.

Water depths were computed as depths below the lowest observed low water in the PG&E dataset (since January, 2004) of 450.4 ft. AMSL at Station I-3 Pipeline Bridge on March 9, 2005. The 49 individual water depths distributed among the four sites were plotted over aerial photographs of each site and hand drawn bathymetric contour lines were added to help define the approximate depth profiles as might occur during extreme low water conditions. Water levels were on average 6.6 feet higher on April 4, 2012 during this habitat survey as compared to the March 9, 2005 low water elevation.

V. Habitat Observations by Site

Substrates and Flow

Site 1, immediately upstream of the Southern California Gas Company pipeline bridge (Figure 1), was characterized by a steep bedrock bank and nearshore bedrock formations that graded in deeper water to boulder, cobble, and some sand. Some clam shells were visible in the gravel, sand mixtures. Flows were uniformly swift except for highly-localized back eddies around bedrock outcrops. Most of this site was over 10 feet in depth on April 4, 2012. This site appears to provide the potential for isolated areas of spawning and rearing habitat for suckers or chub. No underwater photos were taken at this site; however, it was adjacent and similar in character to Site 2.

An intake at this location would add some hard substrate (concrete), similar to the predominant bedrock. Depending on location it might eliminate a small area of potential spawning or rearing habitat.

Site 2, just upstream of Site 1 and immediately adjacent to the curve in the shore zone road (Figure 1), was characterized as steep bedrock on the bank that graded in deeper water to small and large boulders, cobble, sand, and a few clam shells. Immediately adjacent to the curve in the road, road gravels were prominent on the bottom substrate. Flows were uniformly swift except for highly-localized back eddies around bedrock outcrops. Most of this site was over 10 feet in depth on April 4, 2012. A representative photograph of the boulder/cobble/gravel at this location (as was also representative for areas of Site 1) is shown in Figure 2A. This site appears to provide the potential for isolated, pocket areas of potential spawning and rearing habitat for suckers or chub and is similar to Site 1.

An intake at this location would add some hard substrate (concrete), similar to the predominant bedrock. Depending on location it might eliminate a small area of potential spawning or rearing habitat.

Site 3, immediately upstream of the Topock Arched pipeline bridge, was the deepest site, with swift currents along this pronounced outer bend of the river having apparently produced a scour hole at this location. Despite the depth, current, and scour, the individual bedrock outcrops and larger back eddies at this location have produced substantial quiet water areas in shallow, inshore locations. The general nature of the site is one of steep drop off from the shore, dominated by bedrock and boulders that grade to small boulders, cobble and sand in deeper water. However, the back eddies and lower velocity locations produced a cobble/gravel/sand substrate with detritus and abundant perilithic diatom growths, indicating a general lack of current scour. In addition, hollowed-out gravel fish nests and close by large fish were seen at this location in depths of 10 feet of water or less, probably of spawning largemouth bass (Figure 2B). The nature of site 3 varies from sloped gravel/cobble substrates grading down from bedrock at the most upstream areas (Figure 2C) to steep bedrock dropoffs near the bridge (Figure 2D). Current velocities were generally high, but locally variable for inshore locations, such as the observed spawning locations. Most of this site was over 15 - 20 feet in depth on April 4, 2012. This site may offer isolated areas of spawning and rearing habitat for suckers or chub, similar to Sites 1 and 2.

An intake at this location would add some hard substrate (concrete), similar to the predominant bedrock. Depending on location it might eliminate a small area of potential spawning or rearing habitat.

Site 4, the most upstream site, between the mouth of Bat Cave Wash and Park Moabi lagoon (Figure 1), was markedly shallower and sandier than the other sites. There was some bedrock at the banks that quickly graded to cobble, gravel, and sand (Figure 3A), with sand and small amounts of gravel dominating all deeper locations at this site (Figures 3B, C, D). This site was unique in generally lacking inshore back eddies and low velocity refugia. The sand bottom was well washed and free of detritus and periphyton diatoms. Representative Ponar grab substrates for Site 4 deeper locations (over 10 feet deep) are shown in Figures 3C and 3D. Shallower Site 4 locations, showing mixed substrates are shown in Figure 3A, as well. This site appears to provide little opportunity for good spawning or rearing habitat for razorback suckers and bonytail chub, particularly at low water conditions where most of the site is reduced to well-washed sand. A shallow, sand beach environment dominates the most downstream end of the site (Figure 3B).

An intake at this location would add some hard substrate (concrete), similar to bedrock, which is relatively rare at this site.

Bathymetry

Figure 4 shows the point depths and resulting hand-drawn bathymetric contours that depict water depths below elevation 450.4 AMSL for all 4 sites (the lowest recently-recorded low water level). Note that for all sites, the change in water surface elevation as would occur for this extreme low water condition required a new “0 depth” shoreline to be hand drawn over the aerial photograph. The underlying photograph used for Figure 4 shows the approximate shoreline as it appeared for the April 4, 2012 survey which was 6.6 feet higher in water elevation than the 2005 lowest elevation used here as a planning boundary.

As was described above, Sites 1, 2, and 3 are similar in having a steep bedrock-dominated bank with deeper water close inshore for most of the shoreline. In contrast, Site 4 is generally shallower and sandier and at low water conditions is expected to be largely sand substrate with a low slope towards mid-channel. The only exception is the most upstream end of Site 4 where the depths drop off more quickly, closer to shore (Figure 4).

VI. Conclusions and Recommendations

The four sites can be compared with regard to their potential to provide spawning or rearing habitat for razorback sucker or bonytail chub. As documented above, little concrete information exists about the spawning habits of these fish in the main Colorado River because these species were essentially considered extirpated prior to modern fisheries surveys. Regardless, what little information exists indicates the likelihood that both species spawn over clean gravel/cobble/sand type of substrates that exist as main river bars and larval fish are washed from cobble or gravel bars in the fast current to rear in quiet and shallow backwaters and shorezone eddies. The non-spawning adults, as well, seem to prefer quieter waters than areas of consistently fast current (as evidenced by their documented presence, along with flannelmouth sucker, in Park Moabi and Topock lagoons, AECOM 2011).

Razorback sucker and bonytail chub currently spawn in shallow, rocky areas of Lake Mohave. Similar quiet, rocky types of environments were available in isolated locations at each of Sites 1, 2, and 3 (Figure 2) but less apparent at Site 4. Instead, Site 4 was dominated by highly washed sand (Figure 3); a substrate less likely to be stable enough for fish egg incubation than the shorezone gravels and cobbles that were more prevalent at the other three sites. For example, Mueller (1989) specifically mentioned that spawning razorback sucker in the river avoided areas of bedrock or sand.

For the high water condition observed in 2012, all four sites contained isolated pockets of gravel, cobble, or sandy substrates with minimal current scour that could be used as spawning habitat or possibly as larval rearing areas (although less likely for rearing, due to the dominant fast flows and relatively small size of these sites). Some of these pocket areas, in back eddies and the lee of outcrops were observed to have active fish nests (Figure 2B). As discussed above, for these small sized potential spawning areas, Site 4 had the least favorable habitat potential. The small areas of potential cobble/gravel spawning or rearing habitat observed for Sites 1, 2, and 3 included areas of favorable water depth (1 to 2m) for spawning. At Site 4 those depths (both as observed in 2012 and for lowest water levels) would be primarily sand.

For the potential lowest water conditions, as in the depth contours of Figure 4, Sites 1, 2, and 3 would retain their small pockets of potential spawning habitats in protected back eddies, but Site 4 would lose what little favorable habitat it had and become almost all well-washed sand.

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FIGURE 1
TOPOCK COMPRESSOR STATION SHOWING THE FOUR POTENTIAL RIVER INTAKE LOCATIONS
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\CMS\FishHabitat\RiverIntakeLocs.mxd Date Saved: 5/17/2012 11:46:44 AM

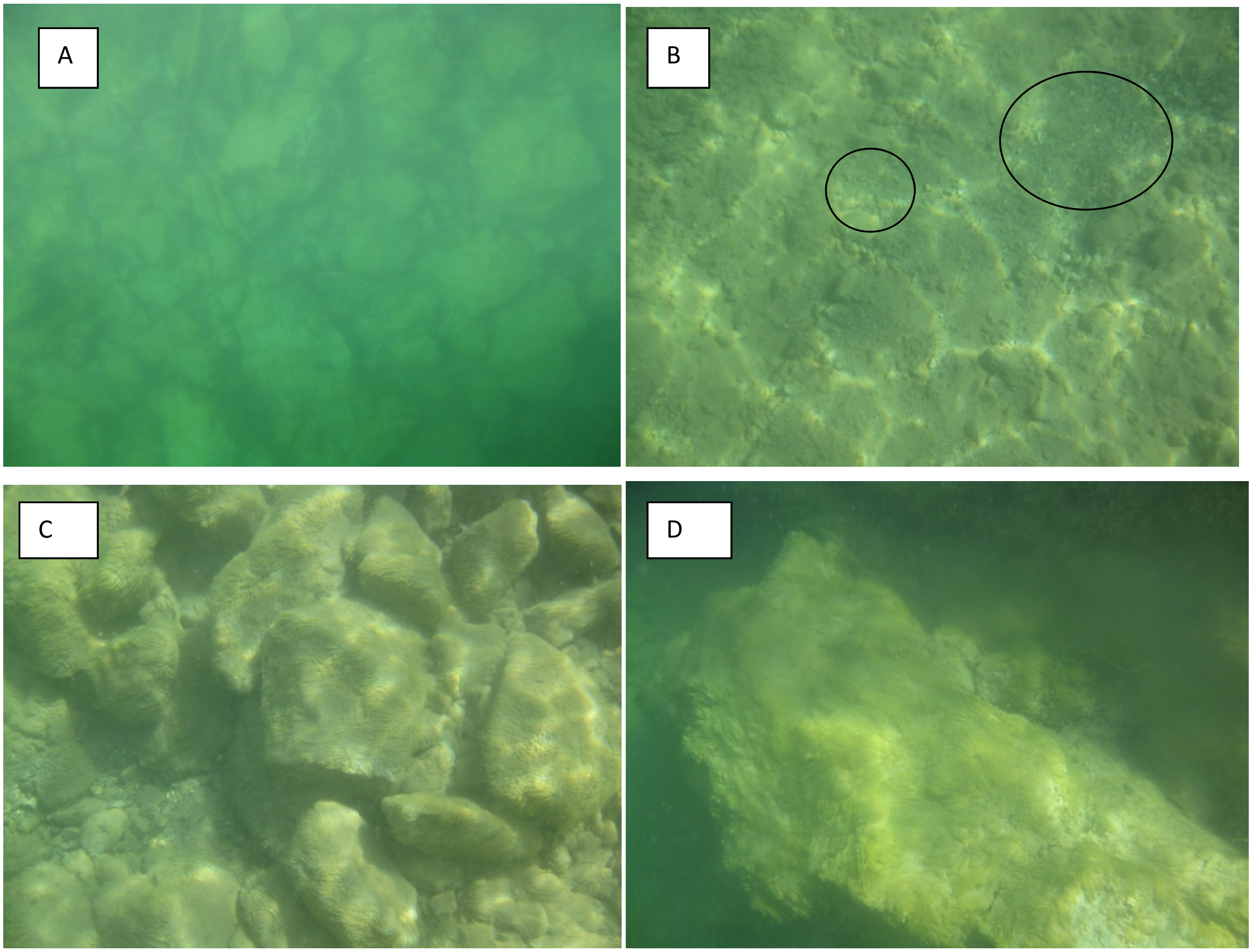


Figure 2.

A: Site 2, cobble/small boulder/sand at about 8 feet deep, mid-site.

B: Site 3, possible bass nests in 4 feet of water (circled), upstream end of site.

C: Site 3, boulder/cobble/gravel/sand in 3 feet of water, mid-site.

D: Site 3, bedrock drop-offs at downstream end.

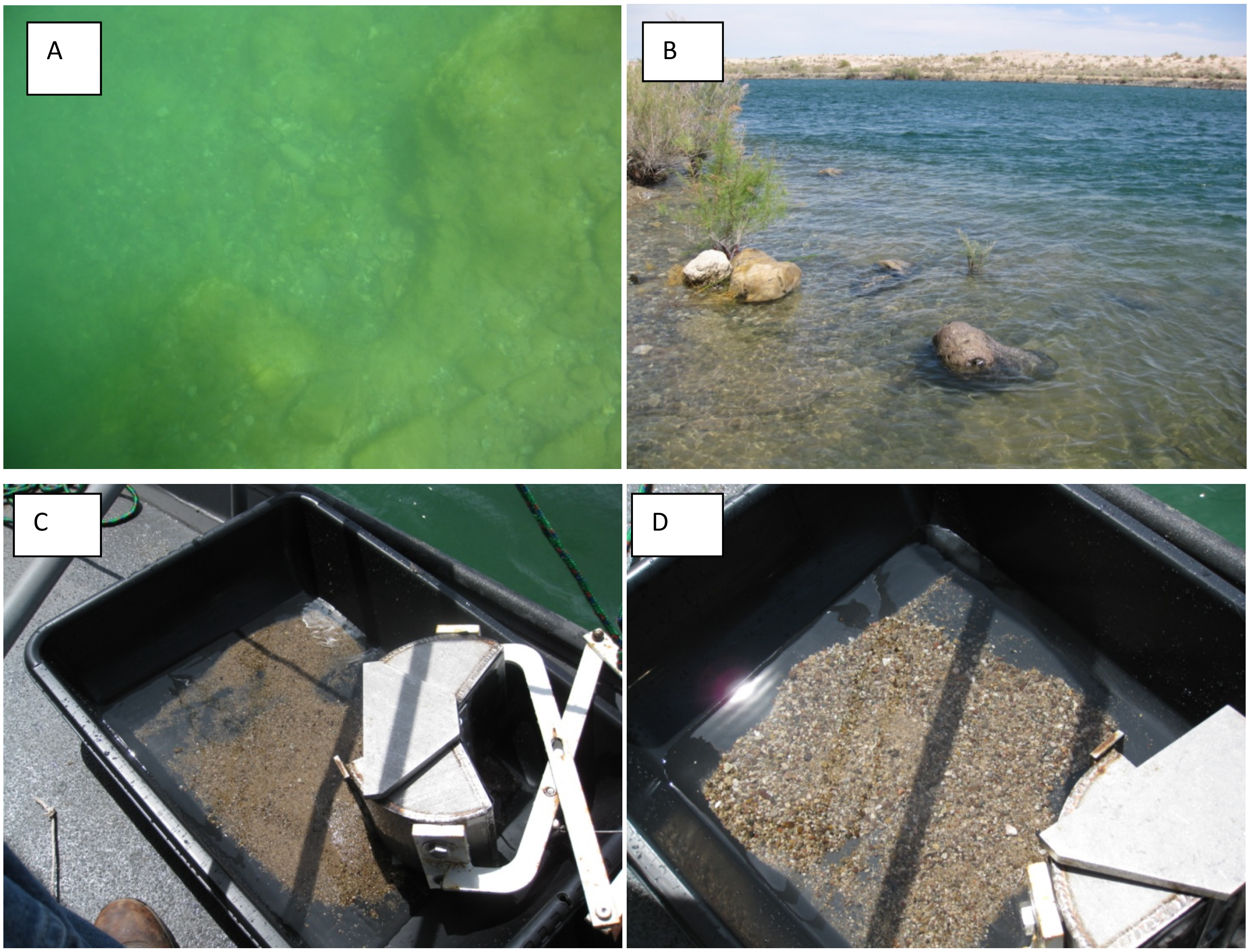


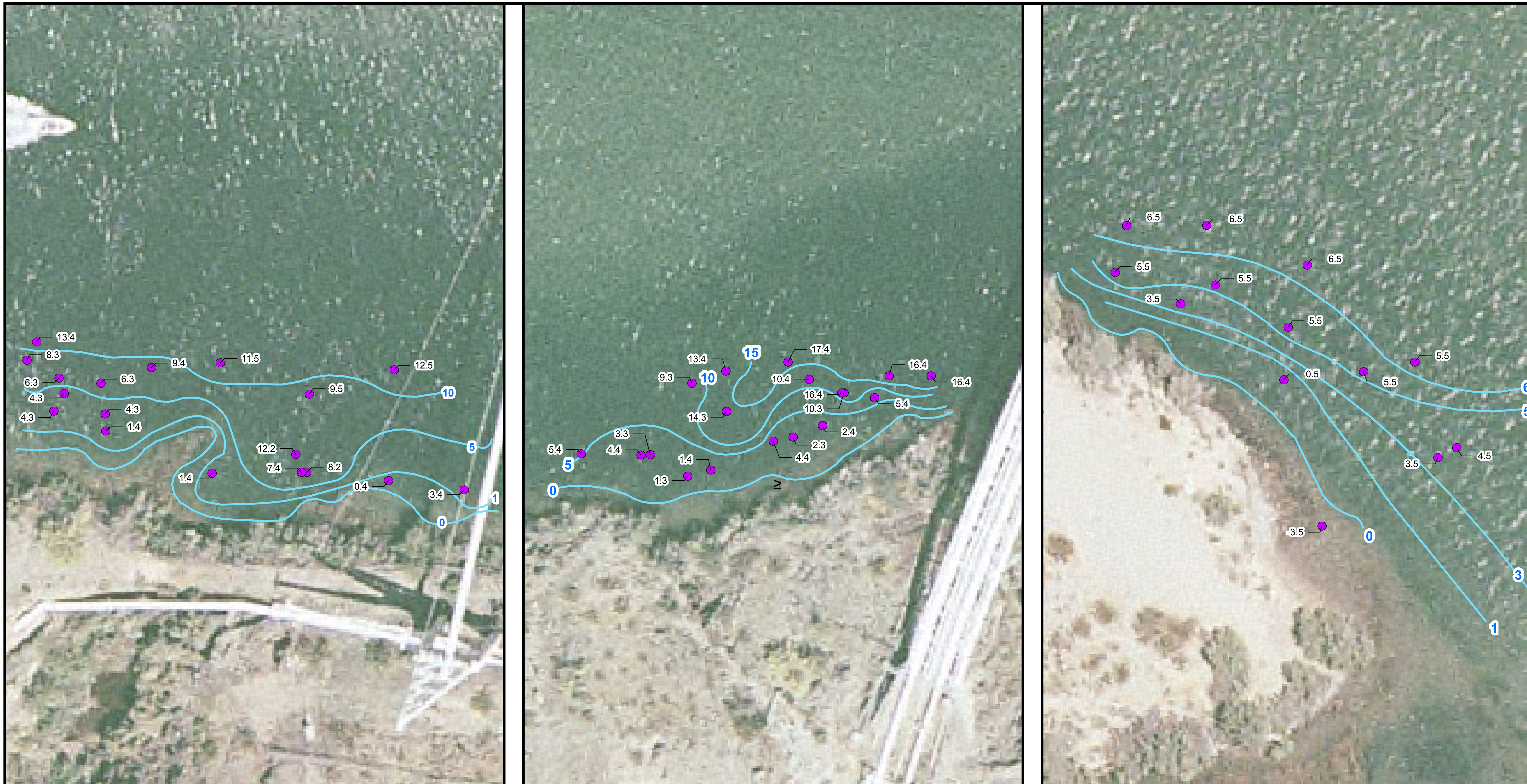
Figure 3. Site 4.

A: Bedrock grading to washed sand/gravel at about 5 feet depth, mid-site.

B: Shoreline view showing sand beach at downstream end.

C: Ponar dredge haul from 10+ feet depth showing clean sand substrate, upstream end of site.

D: Ponar dredge haul from 10+ feet depth showing clean sand, small gravel, and clam shell substrates, mid-site.



Potential River Intake Area 2	Potential River Intake Area 1	Potential River Intake Area 3	Potential River Intake Area 4

LEGEND

River Depth Measurement Point

River Depth Contour Line

0 37.5 75 150 Feet

N

Note:
Depth contours (feet) at each of the four sites using the low water value of 450.4 AMSL as water surface elevation; 6.6 feet lower than the day of the survey on April 4, 2012. Note that this choice of surface elevation results in some negative depths near the shoreline

FIGURE 4
RIVER DEPTH CONTOURS
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\CMS\FishHabitat\Bathemetry.mxd Date Saved: 5/17/2012 11:46:04 AM

Appendix A7
Topock Groundwater Remediation Project
Ethnobotanical Survey Reports
(*on CD-ROM only*)

Topock Project Executive Abstract

Document Title: Topock Groundwater Remediation Revised Ethnobotany Survey Report (PGE20140115C) Submitting Agency: DTSC, DOI Final Document? ☒ Yes ☐ No	Date of Document: January 15, 2014 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 measure 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 measure CUL-1a-5, PG&E conducted a comprehensive ethnobotanical survey for the presence of plants with cultural significance (plants listed in Appendix PLA of the EIR) in the Topock Groundwater Remediation Project Area, with field efforts in August, October and November 2011, March 2012, and March 2013. Incidental data to support this report 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 summarized the 2011 and 2012 ethnobotanical survey results. This revised final report includes the 2013 survey results, and detailed maps of the occurrence of plants of cultural significance, as well as appendices of photographs and GPS data. The data presented with this report have been considered in the groundwater remedy design.

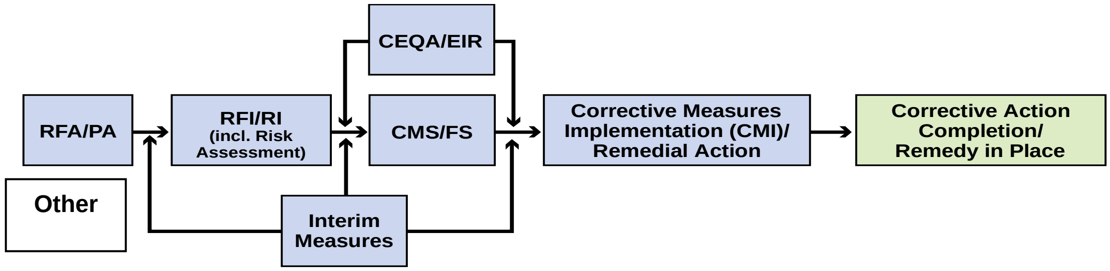
Written by: PG&E

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 Ethnobotanical Survey collected data for compliance with EIR mitigation measure CUL-1a-5.

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

Yvonne J. Meeks
Manager

Environmental Remediation

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January 15, 2014

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

Subject: *Topock Groundwater Remediation Project Revised Ethnobotany Survey Report*
(Document ID: PGE20140115C)

Dear Mr. Yue:

Enclosed is the *Topock Groundwater Remediation Project Revised Ethnobotany Survey Report*. This revised report presents Ethnobotanical data that was collected in compliance with the requirements of EIR mitigation measure CUL-1a-5. This report expanded upon the last report published in March 2013, and includes the spring 2013 survey results as well as detailed maps of the occurrence of plants of cultural significance (those listed in Appendix PLA of the EIR) in the Project Area. This information has 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 this report.

Sincerely,

Yvonne Meeks

Yvonne Meeks
Topock Project Manager

Enclosure
Topock Groundwater Remediation Project Revised Ethnobotanical Survey Report

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

REVISED FINAL

Topock Groundwater Remediation Project Ethnobotany Survey Report

Document ID: PGE20140115C

Prepared for

Pacific Gas and Electric Company

January 2014

Prepared by:

Garcia and Associates (GANDA)

and

CH2M HILL

Contents

Appendices

Acronyms and Abbreviations

ADA	Arizona Department of Agriculture
BN&SF	Burlington Northern and Santa Fe
BLM	Bureau of Land Management
CDNPA	California Desert Native Plants Act
CEQA	California Environmental Quality Act
CDFW	California Department of Fish and Wildlife
DTSC	California Department of Toxic Substance Control
EIR	Environmental Impact Report
ethnoplants	culturally significant plants
GPS	Global Positioning System
I-40	Interstate 40
PG&E	Pacific Gas and Electric Company
Project Area	PG&E Topock Groundwater Remediation Project Area
TCS	Topock Compressor Station
USFWS	U.S. Fish and Wildlife Service

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. 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 (2011) prepared and certified an Environmental Impact Report (EIR) that evaluated and prescribed mitigation measures to lessen the potential environmental impacts of the final groundwater remedy. The EIR Mitigation Measure CUL-1a-5 requires PG&E to avoid, protect, and encourage the regeneration of the culturally significant plants listed in Appendix PLA of the EIR. The purpose of this report is to establish a comprehensive list of potentially culturally significant plant species that occur in the PG&E Topock Groundwater Remediation Project Area (Project Area). The list of potential culturally significant plants or "ethnoplants" is derived from the Appendix PLA of the January 2011 EIR (DTSC, 2011), which in turn is derived principally from Castetter (1935) and Minnis (2000). According to those sources, these plants have played an important role in the lives of tribes, and it is therefore important to document their presence and distribution in the Project Area.

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). 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 the entrance to Moabi Regional Park, the roadway connects to National Trails Highway, which extends eastward and then southward for approximately one mile along the Colorado River to the TCS.

1.2 Project Area

The approximately 1,057-acre Project Area includes the 780-acre Project Area covered in the EIR as well as an additional 277 acres associated with potential freshwater well locations along Oatman-Topock Highway in Arizona. Of the 277 acres surveyed for the freshwater well locations, only 74.5 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 arbitrarily divided the Project Area into twelve survey segments designated A—L (Figure 2). One of these, Survey Segment K, contains the evaporation ponds for the TCS. While the existing evaporation ponds may be used for wastewater from the final remedy this survey segment was later excluded due to the limited existing vegetation within the fenced area. Of the remaining 11 survey 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). Survey 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 Survey 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, Survey Segment F and most of Survey Segment G are part of the USFWS Havasu National Wildlife Refuge, and land in Survey Segment J and a portion of Survey Segment G are privately owned.

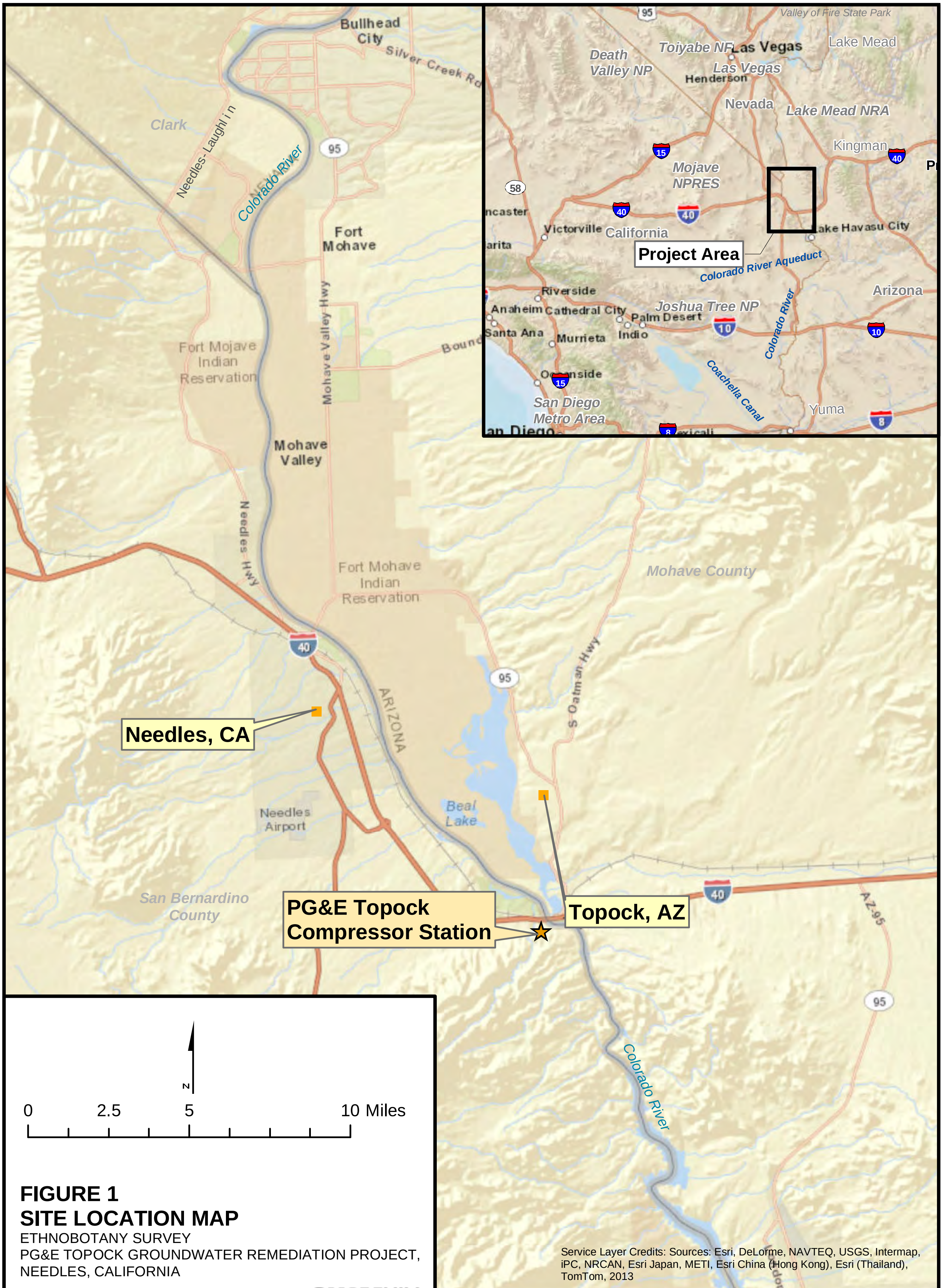


FIGURE 1
SITE LOCATION MAP
ETHNOBOTANY SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2014\VEGETATION\ETHNOBOTANY_SURVEYREPORT\FIG1_SITELOCATION.MXD ECLARK1 1/14/2014 11:57:02 AM

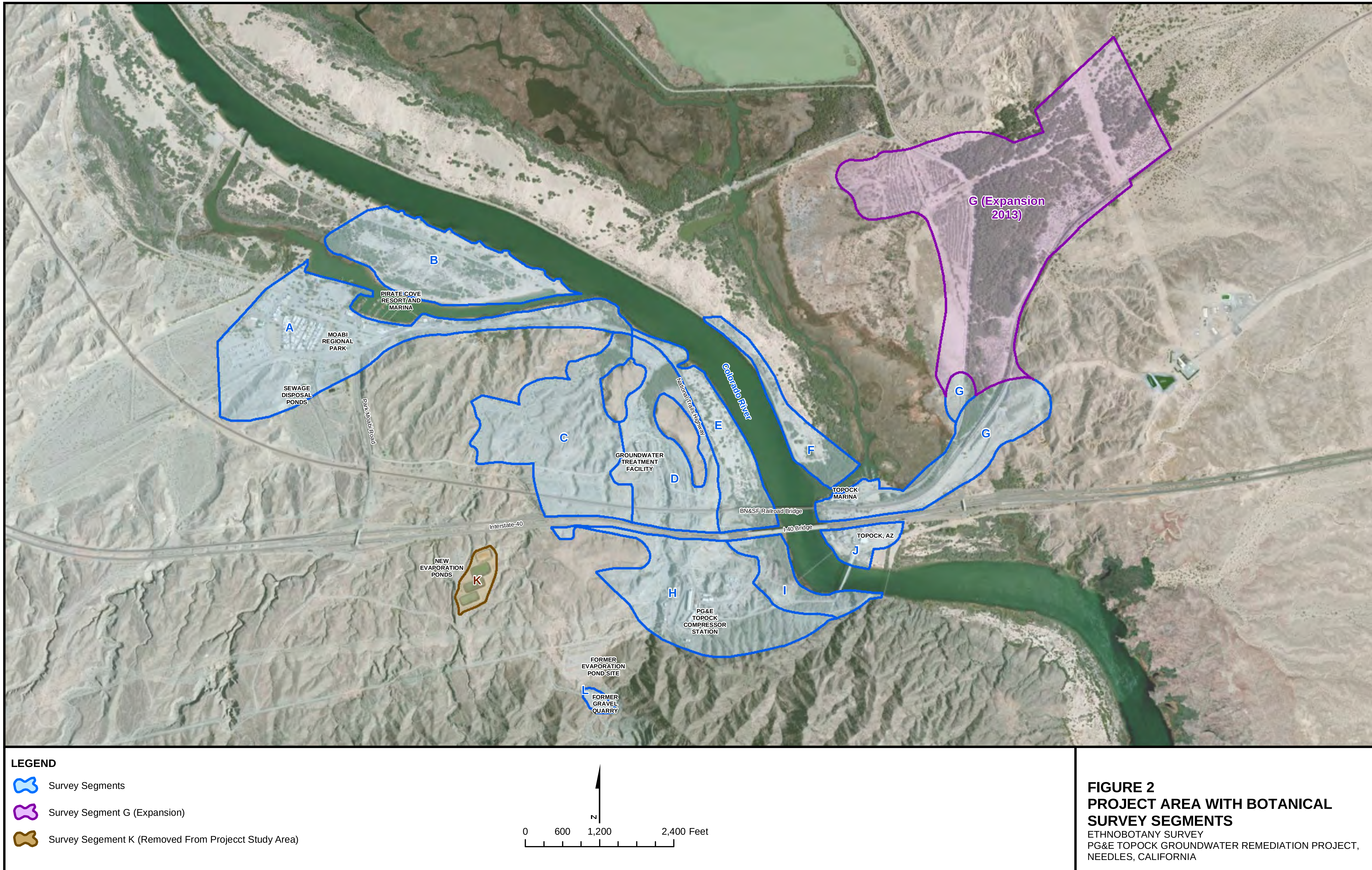


FIGURE 2
PROJECT AREA WITH BOTANICAL SURVEY SEGMENTS
ETHNOBOTANY SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

CH2MHILL

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, foothill palo verde scrub, allscale scrub, quailbush scrub, western honey mesquite bosque, and screwbean mesquite bosque (Sawyer et al., 2009). 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 Survey Segments A and B (Appendix C, Plate 3, E-1 and E-2, Plate 4, G-2). This vegetation type, characterized by the non-native and invasive salt cedar (*Tamarix ramosissima*), is also found near the terminus of the larger ephemeral washes associated with the dissected terraces south of the Colorado River in Survey Segments A, C, and D (Appendix C, Plate 3, D-2). In more upland locations (e.g. Survey Segment G) this vegetation type is characterized by dense stands of 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, and F-1). Arrow weed is the sole dominant shrub species occurring on the sandy terraces, 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 inter-digitates 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 of the dissected alluvial terraces south of the Colorado River (Appendix C, Plate 3, and

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 (*Ambrosia 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 occupies a portion of a broad flat wash in south of the National Trails Highway (Appendix C, Plate 2, C-1) where it occurs with creosote bush. This alliance also occurs at other scattered locations along the National Trails Highway south of the Colorado River.

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). This community 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.

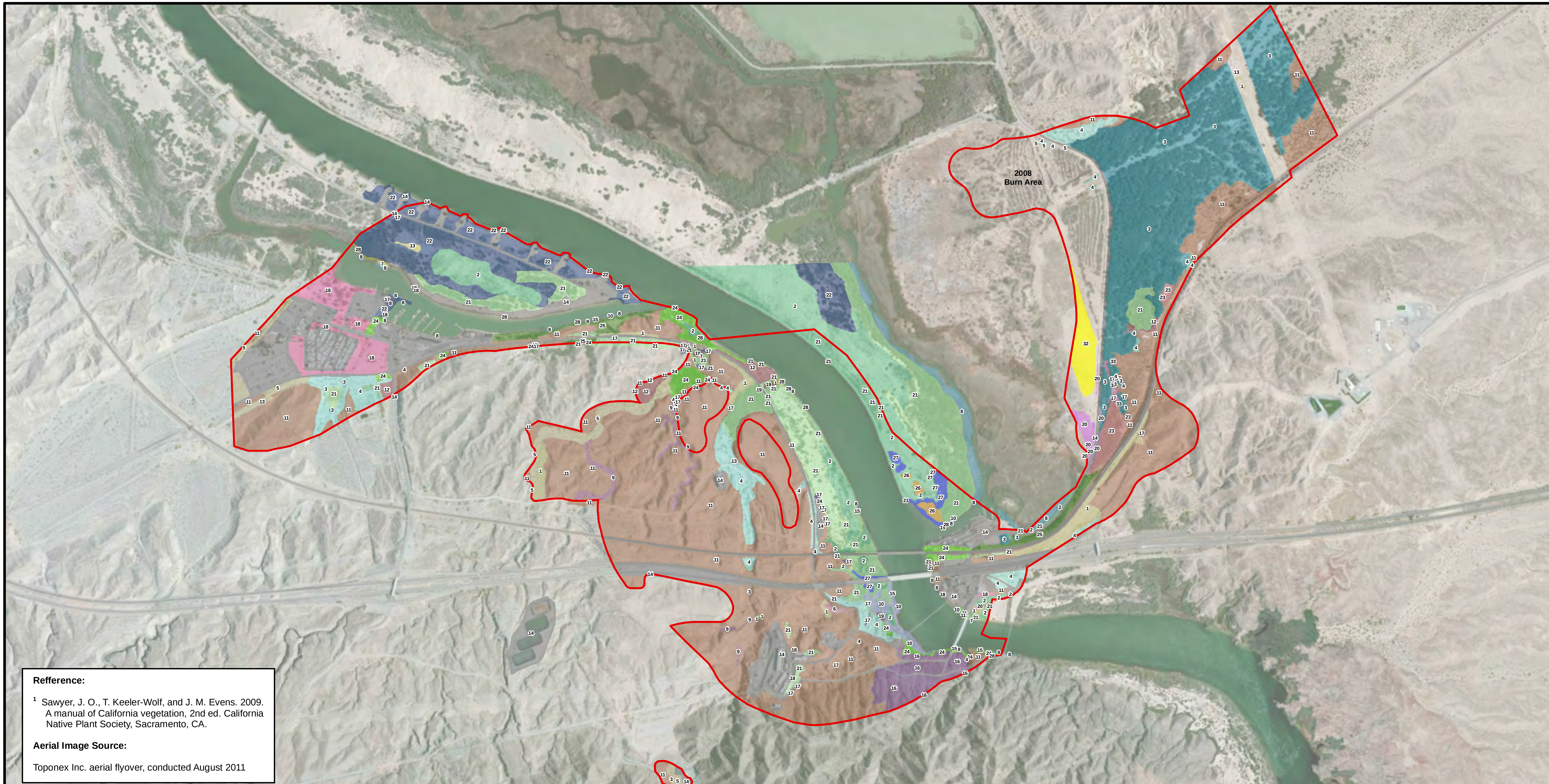
2.1.10 Screwbean Mesquite Bosque

Screwbean Mesquite bosque is largely restricted to the low terraces along the Colorado River where it is concentrated in three relatively small areas of Survey 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). In Survey Segment E, it is common on the California side of the Colorado River near the BN&SF railroad bridge. In Survey Segment A, this community is most common in the panhandle shaped part of the survey segment along Park Moabi Slough. 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 Survey Segment I (Appendix C, Plate 6, I-1), whereas the bulrush marshes occur just offshore in standing water in all survey segments of the Project Area that include shoreline. California bulrush is also the sole dominant species in the portion of the Topock Marsh along the west side of the Oatman-Topock Highway in Survey Segment G. It is likely that the common reed species in the Project Area is an invasive, non-indigenous form of *Phragmites australis*.



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

- 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]
- Desert smoke tree[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]
- Salt Cedar/Screwbean Mesquite[26]
- Screwbean Mesquite[27]
- Screwbean Mesquite (MCV2: Screwbean mesquite bosque)[27]
- Wetland [28]
- Restoration Area[32]
- Bush Seepweed Scrub[33]

FIGURE 3
VEGETATION COMMUNITIES IN PROJECT AREA
ETHNOBOTANY SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT, NEEDLES, CALIFORNIA

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Path: \\Zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS\MapFiles\2014\Vegetation\EthnoBotany_SurveyReport\FIG3_VegCommunities_11X17.mxd Date Saved: 1/15/2014 9:33:40 AM

SECTION 3

Survey Segments in the Project Area

The Project Area was divided into twelve Survey Segments designated A—L (Figure 2). Survey Segment K, which contains the evaporation ponds for the Topock Compressor Station, was later excluded from the survey due to the limited amount of vegetation present within the fenced area. Following the initial botanical surveys, an additional 277 acres, associated with potential freshwater well locations, were added onto Survey 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.

Survey Segment A: The western portion of Survey 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 Survey 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.

Survey Segment B: This survey 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).

Survey Segment C: This survey 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.

Survey Segment D: This survey segment is similar to Survey 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).

Survey Segment E: This survey 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 survey 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 survey 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).

Survey Segment F: This survey segment is in Arizona, directly across the Colorado River from Survey Segment E. Similar to Survey 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 Survey Segment E, this entire survey 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).

Survey 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 survey segment. A small portion of the Topock marsh, dominated by California bulrush, is present in this survey 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 Survey 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).

Survey Segment H: This survey segment is botanically diverse because it encompasses two areas of different geologic history that influence soils and vegetation. The northern two-thirds of the survey 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. Survey Segment H also includes part of Bat Cave Wash, a major dry wash system that starts in Survey Segment L and finishes in Survey 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.

Survey Segment I: Survey 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 survey segment is similar to Survey 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., A, C, D, G and E). Unlike Survey 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 survey 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.

Survey Segment J: This survey 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). Survey Segment J also contains a small area of partially degraded slopes at the east end of the survey segment south of I-40. These slopes are characterized by sparse creosote bush scrub and blue palo verde.

Survey Segment L. This survey 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 survey 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 Survey 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 Culturally Significant Plants

Pursuant to Mitigation Measure CUL-1a-5,

"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 ethnobotany survey is to comply with Mitigation Measure CUL-1a-5, by compiling a comprehensive inventory of culturally significant plant species that occur in the Project Area, and to ensure that such plants are detected, mapped and recorded. A plant species was considered culturally significant if it occurred on the list of Colorado River Indian Ethnobotany in the Appendix PLA in the EIR (DTSC, 2011). Each species on the list of Colorado River Indian Ethnobotany in the Appendix PLA of the EIR was carefully considered with respect to potential to occur in the Project Area. For each of the plants identified in Appendix PLA the potential to occur was based on the plant's known distribution, its elevation range and its habitat preference based on information from the Jepson Online Interchange (2011), the database of the Consortium of California Herbaria (2011), and in the Southwest Environmental Information Network (2011). A species was determined to have potential to occur within the Project Area if it's known or expected geographic range included the Project Area or vicinity, and if it's known or expected habitat was found within the Project Area.

In Appendix PLA of the EIR, staghorn cholla is listed as *Cylindropuntia echinocarpa* (=*Opuntia echinocarpa*), however, according to the Jepson Online Interchange (2011); the name staghorn cholla is not associated with this species. Instead, it notes that this common name has been associated with a variety of cholla species. CalFlora (2012) lists staghorn cholla as a common name for *Cylindropuntia echinocarpa*, but only as a less preferred secondary name. Searches of the common name staghorn cholla indicate that this name is most commonly associated with *Cylindropuntia* (*Opuntia*) *versicolor*, a species that is common in Arizona, but does not occur in California. Its succulent fruits have been recorded as an important food source for the indigenous tribes in Arizona (Castetter 1935). *Cylindropuntia echinocarpa*, alternatively, has a dry fruit that is not commonly eaten and this species is not mentioned as a food source of indigenous tribes by Castetter (1935). Therefore, it was concluded that an error was made in associating staghorn cholla with *Cylindropuntia echinocarpa* in the list of culturally significant plants that is in the Appendix PLA. This error was corrected in Appendix A of this report.

Appendix PLA in the EIR lists 53 ethnoplants that presumably 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 Project Area, are presented in Appendix A.

4.2 Field Surveys

Surveys for culturally significant plant species were conducted during the protocol-level floristic surveys that conform to the established guidelines and standards of the California Department of Fish and Wildlife (CDFW, 2009), the USFWS (2000), and the California Native Plant Society (2001). Floristic surveys were conducted in the fall of 2011 (Oct. 31 – Nov. 8), in the spring of 2012 (Mar. 12-20), and the spring of 2013 (Mar. 11–15). The main goal for the ethnobotany surveys was to generate a comprehensive list of all culturally significant plant species listed in Appendix PLA that occur in the Project Area and to census, map, photograph, and record habitat data for these species.

Additional field surveys conducted for other purposes also contributed some data to this report, including: the Mature Plants survey completed August 18-25, 2011 and limited vegetation surveys conducted during the wetland delineation surveys (February 13-17, 2012 and July 16-17, 2012). Carrie Cannon, the Ethnobotanist with the Hualapi Department of Cultural Resources, was present for many of the site surveys and provided additional technical expertise on culturally significant plants.

4.2.1 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. Jim Andre, a desert botanical specialist, 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 plants. Based on late summer and early fall rainfall in 2011 and discussion with Dr. Andre, 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 CH2M HILL 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.).

4.2.2 Field Methodology

The surveys used for determining the presence of culturally significant species were floristic and comprehensive in nature, meaning that all plants found in the Project Area 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).

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 of targeted plants on the Jepson Online Interchange (2011) prior to the floristic surveys. These materials supplemented the Jepson Manual (Baldwin et al., 2012) and Arizona Flora (Kearney and Peebles, 1973), the primary resources used to identify culturally significant plants.

Trimble GeoXT and GeoXH global positioning systems (GPS) units with sub-meter accuracy were used to collect location data on culturally significant plant species. The GPS units were also 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 at 50 feet, 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 or steep 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. In areas with dense vegetation, 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 Survey Segment G due to the dense tamarisk thickets that characterize the west side of the Oatman-Topock Highway and the extensive barren areas on the east side of the road in the previously burned area. Surveys on the east side of the road were completed by walking through all accessible pathways and opening in the dense tamarisk thickets and walking meandering transects in the more open areas outside of these areas. 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 comprehensive 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

Mature plant and vegetation mapping (Aug 18-26, 2011). A preliminary checklist of 84 vascular plant species was compiled by Kim Steiner and CH2M HILL ecologist Morgan King while mapping mature plants and vegetation in the EIR Project Area. During this survey a number of culturally significant plants including blue paloverde, western honey mesquite, screwbean mesquite, big salt bush, cattle saltbush, broadleaf cattail and common reed were identified and mapped as mature plants or as part of the vegetation mapping. Culturally significant spring annuals such as chia (*Salvia columbariae)* were observed only as dried skeletons at the time of this survey.

Fall plant survey (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. During the survey the locations of additional ethnobotanical species including hillside paloverde and desert tobacco were also mapped.

Wetland delineation (Feb 13-17, 2012). During a wetland delineation of the 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 suncups (*Chylismia* spp*.*). During this survey a single desert lily (*Hesperocallis undulata*) plant was found in Survey Segment G.

Spring survey (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. This survey added an additional 33 species to the checklist for the Project Area, but did not identify any new ethnobotanical species.

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. During the surveys one new ethnobotanical plant species, jimson weed (*Datura wrightii*), was observed in the previous burn area near the restoration site.

Spring plant survey – Additional 277 acres for Freshwater Evaluation for Survey Segment G and focused surveys with the EIR Project Area (March 11-15, 2013) This survey was conducted by Russell Huddleston and Michelle Balk. 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 few culturally significant herbaceous plants that were present in low numbers in the spring of 2012, including golden suncup (*Chylismia brevipes* ssp. *brevipes*) and desert lily, were more widespread and abundant, while other plants such as chia remained uncommon.

5.2 Culturally Significant Plants Identified in the Project Area

Of the 53 plant species listed in Appendix PLA (Colorado River Culture Ethnobotany), only about one fourth (14 of 53) were found to occur in the Project Area (Table 1; Appendices A and D). One reason for this may be that the original source of the list is a book about ethnobotanical plants in the American Southwest, with an emphasis on plants from Arizona, New Mexico, and northern Mexico (Castetter, 1935). Many of the plants discussed by Castetter (1935) are from upland areas at higher elevations in northern or eastern Arizona and do not occur in California or lowland western Arizona. The Appendix PLA list also includes a variety of cultivated food plants including beans, crookneck squash, field pumpkin, tepary beans, Sauwi, and Indian woodoats that would not be expected in uncultivated areas of vegetation such as those in the Project Area. The culturally significant plants identified in the Project Area included 5 trees, 3 shrubs and 6 herbaceous species (Table 1). Figure 4 shows the locations of the culturally significant trees and shrubs and Figure 5 shows the locations of the culturally significant herbaceous plants in the Project Area.

TABLE 1
Plants from the Ethnobotany List in the Appendix PLA Found in the Project Area

Common Name	Scientific Name	Flowering Period
Trees		
Blue palo verde	*Parkinsonia florida*	Apr–May
Hillside (Yellow) palo verde	*Parkinsonia microphylla*	Apr–May
Goodding's willow	*Salix gooddingii*	Mar–Apr
Screwbean mesquite	*Prosopis pubescens*	Apr–Sep
Western honey mesquite	*Prosopis glandulosa* var. *torreyana*	Apr–Aug
Shrubs		
Big Saltbush	*Atriplex lentiformis*	Jul–Oct
Cattle saltbush	*Atriplex polycarpa*	Jul–Oct
Desert tobacco	*Nicotiana obtusifolia* var. *obtusifolia*	Mar–Jun
Herbs		
Broadleaf cattail	*Typha latifolia*	Jun–Jul
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	Mar–May
Chia	*Salvia columbariae*	Mar–Jun
Common Reed	*Phragmites australis*	Jul–Nov
Desert lily	*Hesperocallis undulata*	Mar–May
Jimson Weed	*Datura wrightii*	May–Oct

5.2.1 Culturally Significant Trees

Five of the nine tree species listed in the PLA were found in the Project Area. These included hillside (yellow) palo verde, blue palo verde, western honey mesquite, screwbean mesquite and Gooding's willow (*Salix gooddingii*). Suitable habitat is present for the other two species, desert ironwood (*Olneya tessota*) and velvet mesquite (*Prosopis velutina*), but these species were not found during multiple surveys of the Project Area. The remaining two culturally significant trees were not expected to occur. Honey mesquite (*Prosopis glandulosa* var. *glandulosa*) doesn't occur in California or Arizona and singleleaf pinyon pine (*Pinus monophylla*) occurs at higher elevations than those present in the Project Area (Appendix A).

Hillside Palo Verde (*Parkinsonia microphylla*)

In the Project Area hillside palo verde is restricted to the pre-tertiary metamorphic/igneous bedrock along the slopes of the Chemehuevi Mountains (Figure 4). There are approximately 100 individuals within the limits of the Project Area, but the overall population in this area includes approximately 150 trees.

Blue Palo Verde (*Parkinsonia florida*)

Blue palo verde is common and widespread throughout the Project Area, where it frequently occurs within the large desert washes and on low terraces (Figure 4). This species is the most abundant native tree in the Project Area with a population of over 700 individuals.

Western honey mesquite (*Prosopis glandulosa* var. *torreyana*)

Western honey mesquite is most commonly found intermixed with salt cedar on the low terraces adjacent to the Colorado River (Figure 4). Around 200 individuals are estimated to occur in the Project Area.

Screwbean mesquite (*Prosopis pubescens*)

Screwbean mesquite occurs on the low terraces along the Colorado River and was also planted as part of the native vegetation restoration activities on the Havasu National Wildlife Refuge following the 2008 wildfire (Figure 4). Not including the restoration plantings, there are there are an estimated 150 or more individuals in the Project Area.

Black willow (*Salix gooddingii*)

Black willow is very uncommon in the Project Area and a total of three trees were found including two locations in Park Moabi and location in Bat Cave Wash (Figure 4).

5.2.2 Culturally Significant Shrubs

Three of the nineteen shrubs listed in the Appendix PLA occur in the Project Area: big saltbush, cattle saltbush and desert tobacco (*Nicotiana obtusifolia*). Suitable habitat is present for seven of the shrub species listed in Appendix PLA, including desert agave (*Agave deserti*), Fremont's desert thorn *(Lycium fremontii*), Iodine bush (*Allenrolfea occidentalis*), Lotebush (*Ziziphus obtusifolia* var*. canescens*), Mojave yucca (*Yucca schidigera*), mulefat (*Baccharis salicifolia*), and spiny chloracantha (*Chloracantha spinosa*). These seven species have reported occurrences in the regional vicinity but none of them were found in the Project Area during multiple surveys. Suitable habitat is also present for Jojoba (*Simmondsia chinensis*) and Indian rushpean (*Hoffmannseggia glauca*), but there are no reported occurrences of these species within 50 miles of the Project Area. The remaining seven shrubs have distributional ranges far removed from the Project Area and were not expected to occur (Appendix A).

Big saltbush (*Atriplex lentiformis*)

Big saltbush is generally uncommon in the Project Area and is most abundant localized dense patches in along the sides the Oatman-Topock Highway on the sandy alkaline soils east of the Topock Marsh on the Havasu National Wildlife Refuge (Figure 4). Individual plants were not counted, but it is estimated that more than 100 plants occur in the Project Area.

Cattle saltbush (*Atriplex polycarpa*)

Cattle saltbush is locally abundant in a few areas and scattered plants also occur throughout the Project Area (Figure 4). This species is most common in scatted locations along the National Trails Highway and in the upper reaches of a large wash system in the dissected alluvial terraces south of the Colorado River. In Arizona, scatted individuals are also present on the Havasu National Wildlife Refuge and on the east and west sides of the BN&SF railroad tracks. Individual plants were not counted, but it is estimated that more than 100 plants occur in the Project Area.

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

Desert tobacco is somewhat uncommon in the Project Area, with scattered individuals were observed throughout the Project Area (Figure 4). Fewer than 20 individuals were found during multiple surveys of the Project Area.

5.2.3 Culturally Significant Herbs

Six of the 25 herbs listed in the Appendix PLA were found in the Project Area including desert lily, Jimson weed, common reed, broadleaf cattail, chia and golden sun cup. Suitable habitat is present for fragrant flatsedge (*Cyperus odoratus)* and common sunflower (*Helianthus annuus*), but neither of these species was found during multiple surveys of the Project Area. Suitable habitat is also present for Mexican panic grass (*Panicum hirticaule*) and sandfood (*Pholisma sonorae*), but these species were considered unlikely to occur as there are no reported occurrences in the vicinity of the Project Area; none were found during the surveys. The remaining 15 species are associated with habitats that are not present or have distributional ranges far removed from the Project Area and were not expected to occur (Appendix A).

Desert Lily (*Hesperocallis undulata*)

Desert lily occurs on the rocky dissected terraces north of the TCS and also occurs along the west side of the BN&SF railroad tracks on the Havasu National Wildlife Refuge (Figure 5). Over 250 individuals were identified in the Project Area, including around 200 plants in Arizona and approximately 50 plants in California. Numerous other individuals were observed scattered throughout the Topock Maze area that was excluded from the Project Area.

Jimson Weed (*Datura wrightii*)

Jimson weed is uncommon in the Project Area and was only observed in Arizona on the Havasu National Wildlife Refuge (Figure 5). All of the plants were found in the largely barren area that was burned in a 2008 wildfire on the west side of the Oatman-Topock Highway.

Common Reed (*Phragmites australis*)

Within the Project Area common reed occurs in locally dense patches along the Colorado River, with the largest area located just south of the I-40 bridge on the west side of the river (Figure 5). This species spreads by below-ground rhizomes can result in dense clones; it is therefore difficult to estimate the number of individual plants. However, 1,000s of stems are present in the Project Area.

Broadleaf cattail (*Typha latifolia*)

Broadleaf cattail is somewhat uncommon in the Project Area where it typically occurs in small patches along the Colorado River and in two wetland areas at the north end of a broad wash along the National Trails Highway (Figure 5). As with common reed, this species spreads by below-ground rhizomes and forms dense clones. It is estimated that 1000s of stems are present in the Project Area.

Chia (*Salvia columbariae*)

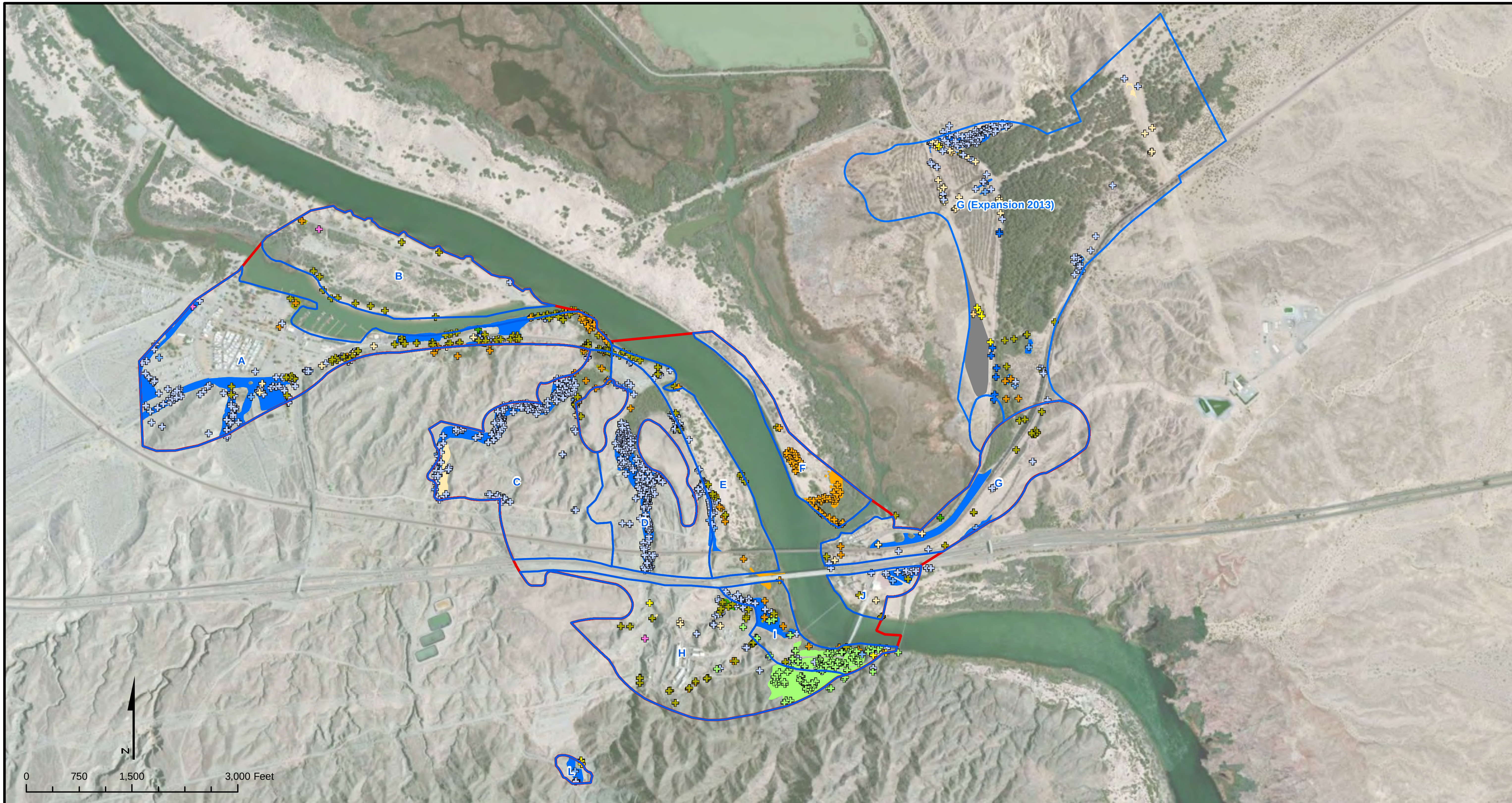
Chia is uncommon in the Project Area with scattered plants found mostly in the area along the Oatman-Topock Highway near the Sacramento Wash with a few scattered plants also found in Bat Cave Wash and in Park Moabi (Figure 5). Less than 20 individuals were found in the Project Area.

Golden Sun Cup (*Camissonia brevipes* ssp. *brevipes*)

During the spring 2013 plant surveys, golden sun cup was one of the most common and widespread annual plants in much of the Project Area (Figure 5). This species was particularly common on the rocky dissected terraces north of the TCS and south of Moabi Regional Park. This species is also common on the east side of the BN&SF railroad tracks in Arizona. Over 1000 individual plants are estimated to occur in the Project Area.

5.3 Occurrence of Culturally Significant Plants in the Project Area

The distributions of all ethnoplants in the Project Area are mapped in Figures 4 and 5 based either on point, polygon, or survey segment data. Tree species distributions, as well as distributions of desert tobacco chia, jimson weed and desert lily, are based on GPS point data. Distributions of the two saltbush shrubs, as well as cattail and common reed, are based on polygon data, whereas the distributions of the abundant annual species golden suncup is based on field observations and survey segment data from the Vascular Plant Checklist (Appendix B). Ethnoplants varied in their distribution across the survey segments in the Project Area. The average ethnoplant occurred in four different survey segments. Species such as blue palo verde,



LEGEND

Survey Segments

Project Area

Common Name - Scientific Name

- Big Saltbush - Atriplex lentiformis
- Blue Palo Verde - Parkinsonia florida
- Cattle Saltbush - Atriplex polycarpa
- Desert Tobacco - Nicotiana obtusifolia
- Goodding's Willow - Salix gooddingii
- Hillside Palo Verde - Parkinsonia microphylla
- Honey Mesquite - Prosopis glandulosa
- Screwbean Mesquite - Prosopis pubescens

Common Name - Scientific Name

- Blue Palo Verde - Parkinsonia florida
- Blue Paloverde/Honey Mesquite - Mixed
- Cattle Saltbush - Atriplex polycarpa
- Hillside Palo Verde - Parkinsonia florida
- Honey Mesquite - Prosopis glandulosa
- Screwbean Mesquite - Prosopis pubescens
- Restoration Area

FIGURE 4
CULTURALLY SIGNIFICANT TREES AND SHRUBS IN THE PROJECT AREA
ETHNOBOTANY SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

CH2MHILL

Document Path: \\Zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS\MapFiles\2014\Vegetation\EthnoBotany_SurveyReport\FIG4_Trees_Shrubs_Merge.mxd western honey mesquite, cattle saltbush, and common reed were widespread and found in up to 72% (i.e., 8 of 11) of the survey segments. Location data for culturally significant plants are presented in Appendix E.

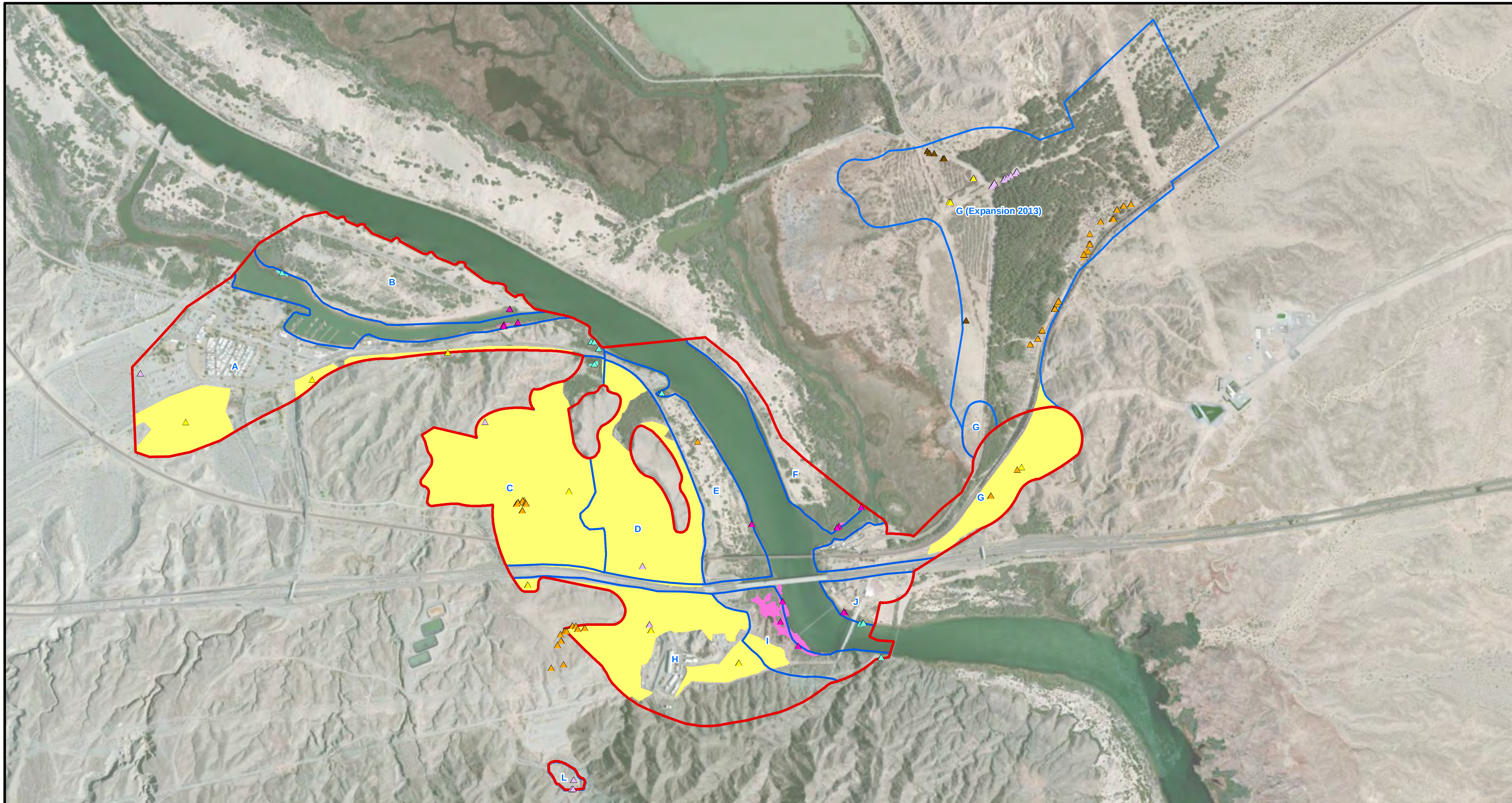
5.4 Probability of Missed Occurrences due to Below-average Rainfall

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" versus 4.5") and this lack of precipitation affected the germination and growth of annuals and herbaceous perennials in the Project Area. However, there are only two annuals on the PLA list that had a reasonable potential to occur in the Project Area that were not identified during any of the numerous surveys. One of these annuals, fragrant flatsedge, is a wetland plant and would be relatively unaffected by rainfall, because of the buffering effects of the Colorado River and common sunflower is a weedy species and is probably less susceptible to below average rainfall conditions. Furthermore, their dried skeletons can persist in the environment for over a year and no such skeletons were observed during the August 2011 or any subsequent surveys, despite identifying skeletons from other ethnoplants (e.g., chia and golden suncups) that had persisted since the spring of 2011.

Additional floristic surveys were also completed in the spring of 2013 that focused on areas where culturally significant herbaceous plant species were most likely to be present within the Project Area. The purpose of these surveys was to obtain a better estimate on the size of and distribution of culturally significant annuals and herbaceous perennials plant populations during a more favorable rainfall year.

5.5 Culturally Significant Plants Compared to Special-status Plants

Plants on the list in Appendix PLA of the EIR are protected first and foremost by virtue of their cultural significance to the Native American tribes, whether or not they have protection under any federal or state legislation. Most (9 of 14) of the ethnoplant species occurring in the Project Area have no special status under California or Arizona statutes and are not considered to be rare, endangered or threatened under federal laws. However, the remaining four species, blue palo verde, hillside palo verde, western honey mesquite, and screwbean mesquite, are protected under the California Desert Native Plants Act (CDNPA, 1981) and are listed as category C (Salvage Assessed) by the Arizona Department of Agriculture (ADA, 2012). The primary intent of these regulations is to protect native desert plants from unlawful harvesting for commercial use on both publicly and privately owned lands.



LEGEND

Project Area

Survey Segments

Herb

Common Name	Scientific Name
Broadleaf cattail	*Typha latifolia*
Chia	*Salvia columbariae*
Common reed	*Phragmites australis*
Desert lilly	*Hesperocallis undulata*
Golden suncup	*Camissonia brevipes* ssp. *brevipes*
Jimson weed	*Datura wrightii*

0 750 1,500 3,000 Feet

N

FIGURE 5
CULTURALLY SIGNIFICANT HERBS IN THE PROJECT AREA
ETHNOBOTANY SURVEY
PG&E TOPOCK GROUNDWATER REMEDIATION PROJECT,
NEEDLES, CALIFORNIA

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SECTION 6
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Appendix A
Target List of Culturally Significant Plant Species from Appendix PLA of the EIR 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	Presence or Potential to Occur[2]
TREES					
Blue palo verde	***Parkinsonia florida***	--/--/CDNPA/B	Apr–May	Creosote bush scrub; washes and floodplains	**Present.** This species is the most abundant native tree in the Project Area.
Desert ironwood	*Olneya tesota*	/--/--/CDNPA/--	Apr–May	Creosote bush scrub; desert washes	**Possible.** Suitable habitat for this tree occurs in the Project Area, but ironwood is not known to occur further north than the Whipple Mountains near Lake Havasu and it was not detected during the surveys.
Hillside (Yellow) palo verde	***Parkinsonia microphylla***	--/4.3/CDNPA/--	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 I and H.
Honey mesquite	*Prosopis glandulosa* var. *glandulosa*	NA	NA	NA	**None.** This variety of *Prosopis glandulosa* does not occur in California or Arizona.
Goodding's willow	***Salix gooddingii***	--/--/--/--	Mar–Apr	Streamside's, marshes, seepage areas, washes, meadows	**Present.** Uncommon large tree in Segment B of the Project Area.
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 highway and BN&SF bridges that cross the Colorado River, and on the Arizona side of the river opposite the Topock Marina.
Single leaf Pinyon (pinyon pine)	*Pinus monophylla*	--/--/--/--	Spring	Pinyon/juniper woodland	**None**. No suitable habitat in Project Area.
Velvet mesquite	*Prosopis velutina*	--/--/CDNPA/C-	Apr–Jun	Mojave desert scrub; sandy, rocky soils in canyons, washes; only naturalized in California, not native	**Unlikely.** A single occurrence of this tree is known from the Topock Marsh; however, it was not detected during multiple surveys of the Project Area.
Western honey mesquite	***Prosopis glandulosa var. torreyana***	--/--/CDNPA/B	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 the Project Area especially on the low sandy terraces along the Colorado River**.**

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SHRUBS					
American agave	*Agave americana*	--/--/--/--	Jun–Aug	Original habitat unknown; grows wild in Mexico on cultivated lands and pine woodlands	**None**. Leaf succulent shrub, long cultivated by indigenous tribes, commonly occurs on agricultural lands. Not native to California or Arizona.
Arizona desert-thorn	*Lycium exsertum*	--/--/--/--	Jan–Feb	In washes and on mountain slopes	**None.** Does not occur in California or in western Arizona at low elevations
Big saltbush	***Atriplex lentiformis***	-/--/--/--	Jul–Oct	Alkaline or saline washes, dry lakes, scrub	**Present.** Occurs in Survey Segments A, G, I, and J
Cactus apple	*Opuntia engelmannii*	--/--/--/B	Apr–Jun	Desert scrub, dry oak woodland	**None.** Does not occur in California or western Arizona
Candy barrel cactus	*Ferocactus wislizeni*	--/--/-/B	May–Jun	Low hills, flats and grasslands	**None**. Not found in California and occurs in central and southern Arizona at elevations over 1,000 feet.
Cattle saltbush	***Atriplex polycarpa***	--/--/--/--	Jul–Oct	Creosote bush scrub, shadscale scrub, sagebrush scrub, and alkali sink scrub; dry lakes	**Present**. Locally common along the National Trails Highway and intermixed with creosote bush scrub in some of the larger washes in the Project Area.
Desert agave	*Agave deserti*	--/--/CDNPA/B	May–Jul	Rocky slopes, washes in desert scrub	**Possible**. Suitable habit present, but the nearest occurrence is in the Whipple Mts. near Copper Basin, approximately 30 miles southwest of the Project Area.
Desert tobacco	***Nicotiana obtusifolia* var. *obtusifolia***	--/--/--/--	Mar–Jun	Creosote bush scrub and Joshua tree woodland; gravelly or rocky washes, slopes	**Present.** Scattered plants found throughout the Project Area – generally uncommon.

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Common Name	Scientific Name	Status[1] BLM/CRPR/CDNPA/ADA	Flowering Period	Habitat	Presence or Potential to Occur[2]
Fremont's desert thorn	*Lycium fremontii*	--/--/--/--	Mar–Apr	Alkaline soils, flats	**Possible.** Some suitable habitat present, but the nearest occurrences are in Whipple Mountains near Cupcake Butte and Parker, approximately 28 miles southwest of Project Area.
Jojoba	*Simmondsia chinensis*	--/--/--/--	Mar–May	Creosote bush scrub, Joshua tree woodland, chaparral	**Unlikely**. Suitable habitat present, but there are no reported occurrences within 75 miles of the Project Area.
Indian rushpea	*Hoffmannseggia glauca*	--/--/--/--	Apr–Jun	Dry, alkaline flats in deserts and disturbed areas	**Unlikely**. Some suitable habitat is present, but the nearest reported occurrences are approximately 52 miles northwest of Project Area.
Iodine bush	*Allenrolfea occidentalis*	--/--/--/--	Jun–Aug	Alkali sink scrub (saline soils), flats, bluffs.	**Possible**. Suitable habitat is present, but the nearest reported occurrence is near Earp, 40 miles south of Topock.
Lotebush	*Ziziphus obtusifolia* var. *canescens*	--/--/--/--	Apr–Jun	Desert scrub	**Possible.** Occurrences known from Chemehuevi Wash in the Whipple Mountains 14 miles SW of Project Area.
Mojave yucca	*Yucca schidigera*	--/--/CDNPA/B	Apr–May	Chaparral, creosote bush scrub	**Possible**. Nearest known occurrence is 10 miles south of Needles.
Mulefat	*Baccharis salicifolia*	--/--/--/--	All year	Coastal sage scrub, foothill woodland, valley grassland, moist stream sides, canyon bottoms, irrigation ditches	**Possible.** Known to occur in the Topock Marsh.
Parry's agave	*Agave parryi*	--/--/CDNPA/B	Jun–Aug	Rocky slopes, grasslands, oak woodland, pine forests, and chaparral	**None**. Not known from California or Mohave County, Arizona.
Scrub live oak	*Quercus turbinella*	--/--/--/--	Apr–Jun	Pinyon/juniper woodland	**None**. No suitable habitat; known only from higher elevations.

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Common Name	Scientific Name	Status[1] BLM/CRPR/CDNPA/ADA	Flowering Period	Habitat	Presence or Potential to Occur[2]
Spiny chloracantha	*Chloracantha spinosa*	--/--/--/--	Jun–Dec	Creosote bush scrub and alkali sink scrub; seeps, moist stream sides, ditches, sometimes saline or drier areas	**Possible.** Suitable habitat is present, but nearest reported occurrence is near Big River, approximately 40 miles south of the project area. .
Staghorn cholla	*Cylindropuntia versicolor*[3]	--/--/--/B	May–Jun	Creosote bush scrub; gravelly or rocky places	**None**. This species does not occur in California or in western Mojave County, Arizona.
HERBACEOUS PLANTS					
Bearded cupgrass	*Eriochloa aristata*	--/--/--/--	Jun–Nov	Wetlands; seasonal streams, riverbanks	**None**. Suitable habitat is present, but the nearest reported occurrence is over100 miles from the Project Area.
Beans	*Phaseolus vulgaris*	--/--/--/--	Summer	Cultivated lands	**None.** No suitable habitat, known only from cultivated lands.
Blunt tastymustard	*Descurainia obtusa*	--/--/--/--	May–Jun	Gravelly flats, open woods, lake margins	**None**. No suitable habitat
Broadleaf arrowhead	*Sagittaria latifolia*	--/--/--/--	Jul–Aug	Freshwater wetlands ponds, slow streams, ditches	**None.** Suitable habitat is present, but there are no reported occurrences in western Riverside or San Bernardino counties in California and is not reported from Mojave County, Arizona
Broadleaf cattail	***Typha latifolia***	--/--/--/--	Jun–Jul	Freshwater wetlands and marshes	**Present.** Perennial herb, known to occur in Segments A, C, E, and I of the Project Area.
Careless weed	*Amaranthus palmeri*	--/--/--/--	Aug–Nov	Creosote bush scrub, roadside ditches, fields, arroyos	**None.** Suitable habitat present, but there are no known occurrences within 90 miles of the Project Area.
Chia	***Salvia columbariae***	--/--/--/--	Mar–Jun	Creosote bush scrub chaparral, coastal sage scrub; dry, disturbed sites	**Present.** Annual herb that is present in Segments A and D (Bat Cave Wash) of the Project Area.
Common reed	***Phragmites australis***	--/--/--/--	Jul–Nov	Wetlands along rivers	**Present.** Along Colorado River in Segments A, E, I, F.

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Common Name	Scientific Name	Status[1] BLM/CRPR/CDNPA/ADA	Flowering Period	Habitat	Presence or Potential to Occur[2]
Common sunflower	*Helianthus annuus*	--/--/--/--	Jul–Oct	Disturbed areas in shrublands and many habitats	**Possible**. Suitable habitat is present, known occurrences from Parker Dam Road 18 miles south of the Project Area.
Crookneck squash	*Cucurbita moschata*	--/--/--/--	Jun-Aug	Cultivated lands	**None**. No suitable habitat, known only from cultivated lands.
Jimson weed (Datura)	***Datura wrightii***	--/--/--/--	Apr–Oct	Creosote bush scrub, coastal sage scrub, valley grassland, Joshua tree woodland, pinyon/juniper woodland; sandy or gravelly open areas	**Present.** Found in barren areas following 2008 wildfire and on the Havasu National Wildlife Refuge in Segment G
Desert lily	***Hesperocallis undulata***	--/--/--/B	Mar–May	Desert shrublands; sandy flats and washes	**Present.** Bulbous perennial, known to occur in sandy areas of Section G.
Fendler's ground cherry	*Physalis hederifolia* var. *fendleri*	--/--/--/--	May–Jul	Gravelly to rocky slopes	**None**. Not known to occur below 2900 feet elevation.
Field pumpkin	*Cucurbita pepo*	--/--/--/--	June–Aug	Cultivated lands	**None**. No suitable habitat, known only from cultivated lands.
Fragrant flatsedge	*Cyperus odoratus*	--/--/--/--	Jul–Oct	Wetlands; disturbed soils	**Possible**. Suitable habitat present, nearest occurrence reported occurrence is approximately 12 miles northwest of the Project Area near Needles.
Fremont's goosefoot	*Chenopodium fremontii*	--/--/--/--	Jun–Oct	Shaded places, shrubland, coniferous forests	**None**. No suitable habitat; Project Area considerably below elevation range of the species.
Golden suncup	***Chylismia brevipes* subsp. *brevipes***	--/--/--/--	Mar–May	Sandy slopes, washes, alluvial fans	**Present. Very common and widespread** in Segments A,C,D, G and H.
Indian woodoats	*Chasmanthium latifolium*	--/--/--/--	Jun–Aug	Woodlands; moist, fertile soils along creek and river banks	**None**. Very limited suitable habitat; no known occurrences in California or Mojave County, Arizona.

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Mexican lovegrass	*Eragrostis mexicana* ssp. *mexicana*	--/--/--/--	Jul–Oct	Disturbed areas; generally open sites	**None**. Species occurs in more mountainous areas at elevations between 4,000 and 8,500 feet...
Mexican panic grass	*Panicum hirticaule*	--/--/--/--	Jul–Oct	Creosote bush scrub; sandy soils, open sites	**Unlikely**. Suitable habitat present; however, typically occurs at higher elevations (>1,000 feet), nearest reported occurrence is over 50 miles northwest of the Project Area near Nipton, California.
New Mexico giant hyssop	*Agastache pallidiflora* ssp. *neomexicana* var. *neomexicana*	--/--/--/--	Jul-Oct	Moist canyons at middle elevations	**None.** No suitable habitat; not known from California or Mohave County, Arizona.
Valley redstem	*Ammannia coccinea*	--/--/--/--	Jun–Aug	Many plant communities; wet places, drying ponds, lake and creek margins	**None**. Some suitable habitat present, but there are no occurrences known within 100 miles of the Project Area.
Sandfood	*Pholisma sonorae*	S/1B.2/--/A	Apr–May	Dunes, sandy areas	**Unlikely.** Suitable sandy habitat present; nearest known location is dunes near Parker, Arizona, approximately 40 miles south of the Project Area
Sauwi	*Panicum sonorum* (syn. *P. hirticaule* ssp. *hirticaule*)	--/--/--/--	Jun–Aug	Domesticated, river flood plains	**None**. Cultivar of *P. hirticaule*; no known occurrences near the Project Area. Reported only from Yuma County in Arizona, nearest reported location is over 70 miles southwest of the Project Area near Clark's Pass along Highway 62.
Tepary bean	*Phaseolus acutifolius* var. *latifolius*	--/--/--/--	Jun—Aug	Cultivated lands	**None**. No suitable habitat, known only from cultivated lands.

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[1] Conservation status abbreviations:

BLM designations

S - The California State Director has also conferred sensitive status on California State Endangered, Threatened, and Rare species, or species on List 1B (plants rare and endangered in California and elsewhere) of the CNPS' Inventory of Rare and Endangered Plants of California

CPRP (California Rare Plant Ranks - formerly CNPS Lists)

1B.2 Plants rare, threatened or endangered in California and elsewhere and are considered to be fairly endangered in California.

4.3 Plants of limited distribution – a watch list; Not very endangered in California.

Department of Food and Agriculture designations:

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

ADA (Arizona Department of Agriculture) designations:

B. Salvage Restricted Protected Native Plants

C. Salvage Assessed Protected Native Plants

[2] Potential to occur definitions:

Present: Species observed in one or more of the survey segments of the Project Area.

Possible: Species not observed on the site, however conditions suitable for occurrence.

Unlikely: Species not observed on the site, conditions marginal for occurrence.

None: Species or suitable habitat not observed on the site during protocol-level surveys

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

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Scientific name	Common name	Survey Segments
GYMNOSPERMS		
EPHEDRACEAE	**ephedra family**	
Ephedra nevadensis	joint fir	H, I
ANGIOSPERMS-DICOTS		
AIZOACEAE	**ice plant family**	
Sesuvium verrucosum	*verrucose sea purslane*	G
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, K
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	desert broom	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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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	arrow weed	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
Cryptantha inaequata	Panamint cryptantha	D
Cryptantha maritima	Guadalupe cryptantha	A, C, D, E, F, G, H, I, J, L

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Scientific name	Common name	Survey Segments
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, G
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
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

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Opuntia basilaris var. *basilaris*	beavertail cactus	A, C, D, E, G, H, I, L
Mammillaria tetrancistra	corkseed mammillaria	A, E, C, D, 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
Chenopodium murale	nettle-leaf goosefoot	G
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
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

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
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*	western 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
LOASACEAE	**Blazing star family**	
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

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
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
OROBANCHACEAE	**broomrape family**	
Orobanche cooperi	Cooper’s broomrape	G, 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

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
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
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

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
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
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

APPENDIX B
Vascular Plant Species Observed in the Project Area

Scientific name	Common name	Survey Segments
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, J, I
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
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 the 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 SW 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.

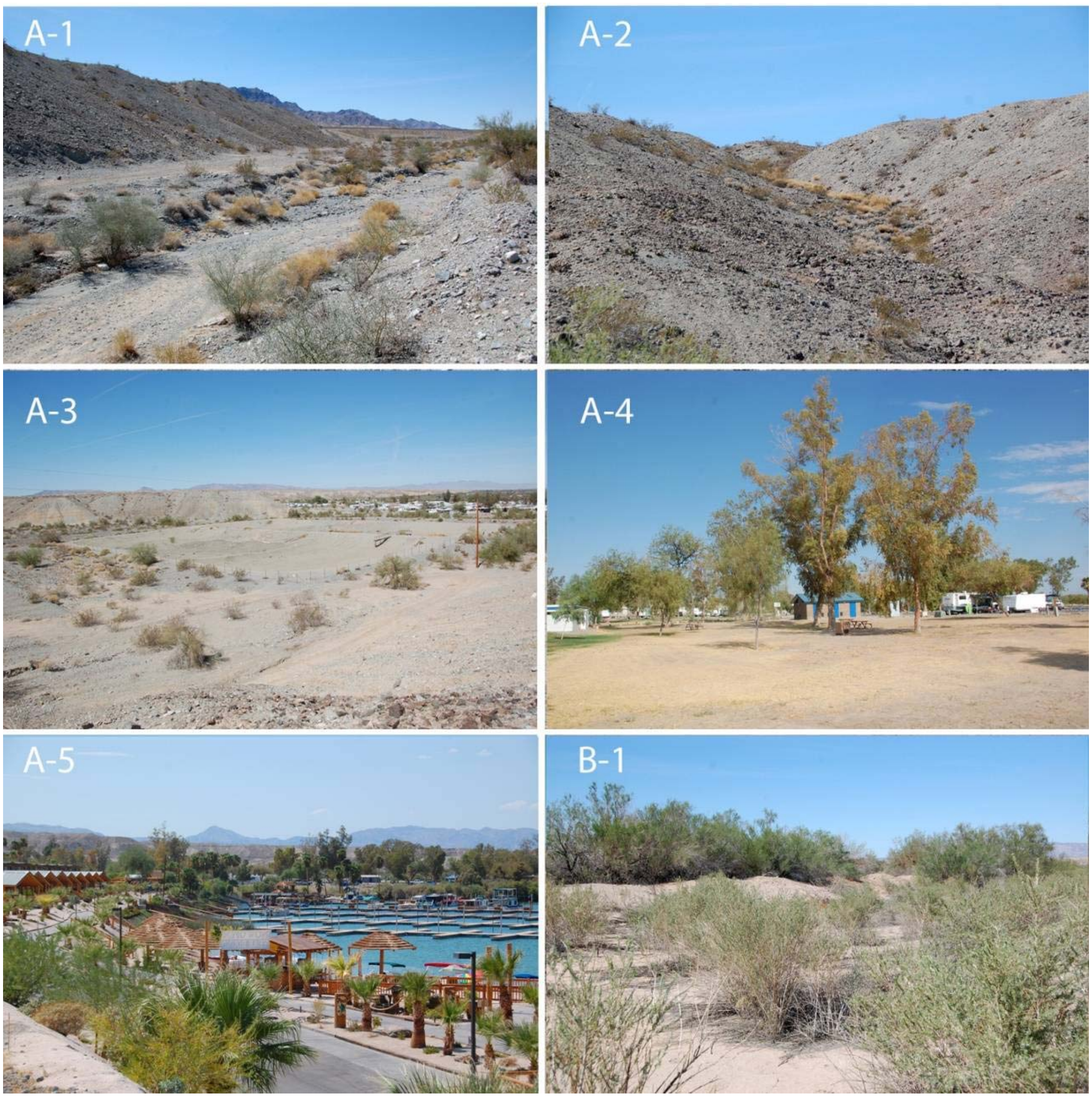


Plate 2. Segments B and C. (B-2) Camping pad on peninsula adjacent to Colorado River. (B-3) Maintained beach opposite Pirate's Cove Resort with western honey mesquite and salt cedar in background. (C-1) Broad wash at north end of Segment C with cattle saltbush and creosote bush. (C-2) Rocky slopes above 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.

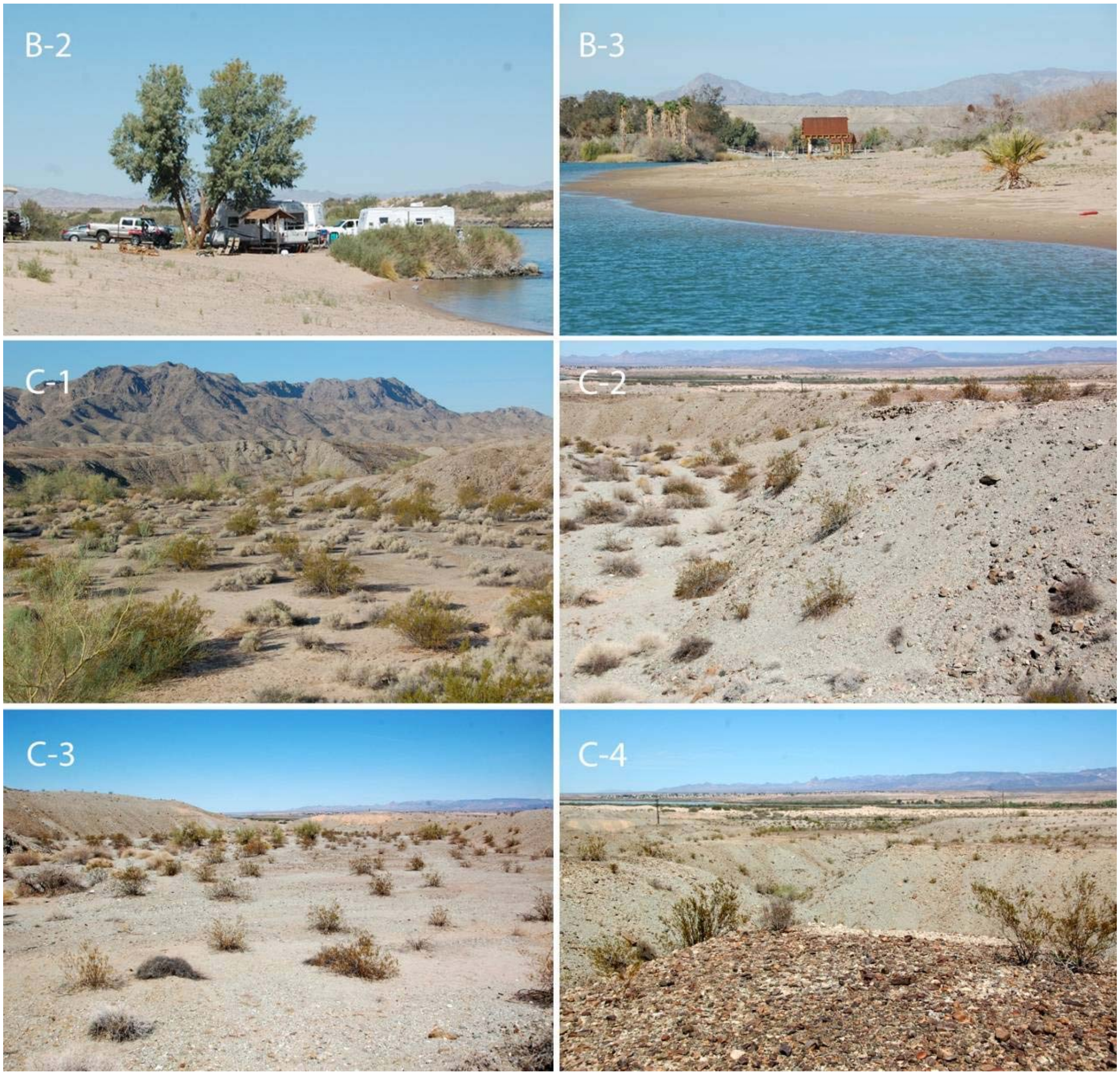


Plate 3. Segments D and E. D-1) Bat Cave Wash with blue palo verde woodland. (D-2). Tamarisk thicket mixed with western honey mesquite at north end of Bat Cave Wash south of National Trails Highway. (E-1) Colorado River and low terrace of dredged sands with tamarisk and arrow weed thickets. (E-2) Close-up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

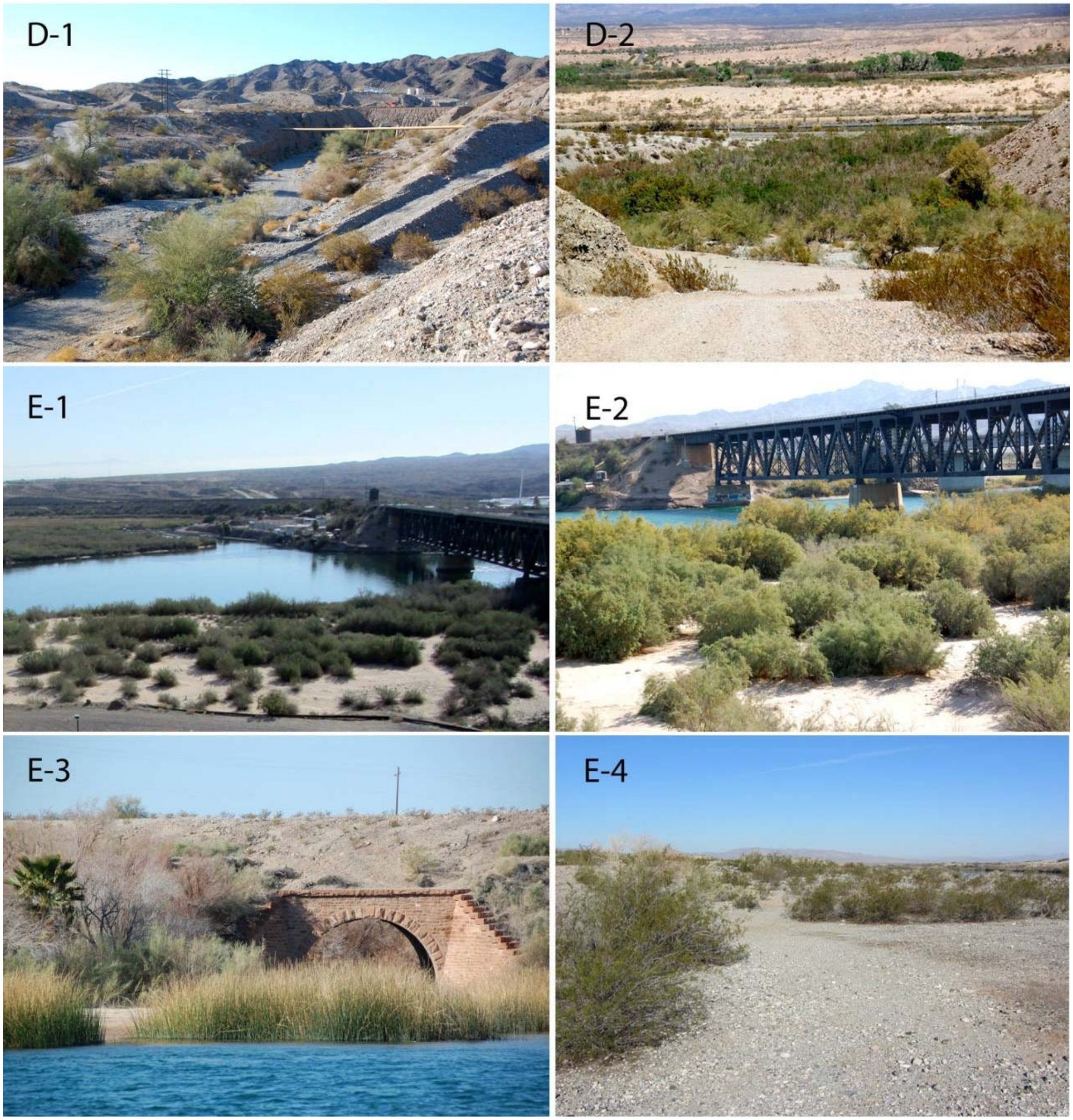


Plate 4. Segments F and G. (F-1) Arrow weed thicket on dredge sands looking north. (F-2) Western honey mesquite, screwbean and tamarisk thickets at southern end of Segment F with small wetland in the southeast corner of photo. (F-3) Close-up of wetland with common reed and sand-bar willow on drier land and California bulrush standing in water. (G-1) Edge of Topock Marsh next to Route 66; 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 Route 66. (G-3) Big saltbush on alkaline soils north of the Topock Marsh, west of County Road 10.

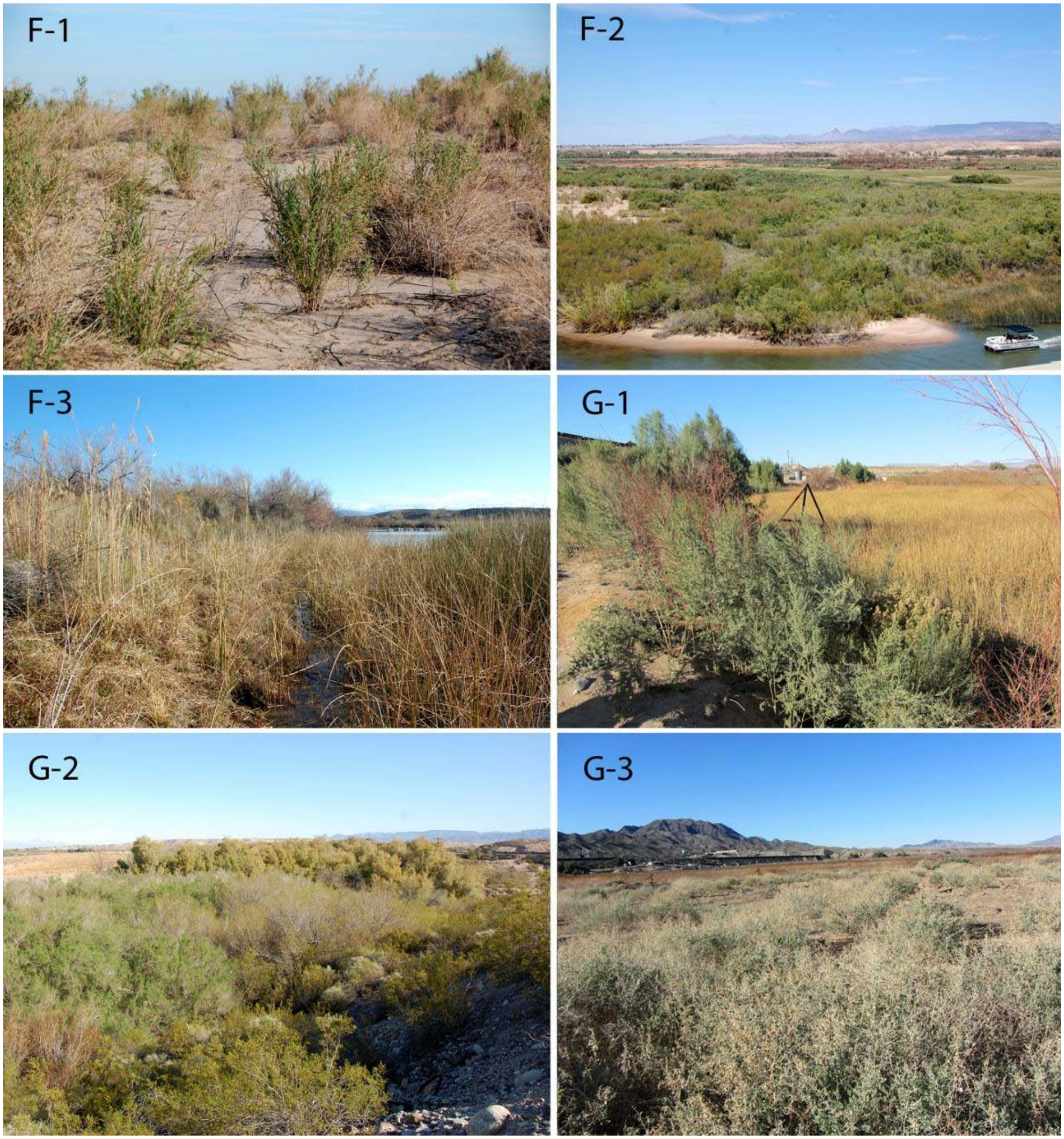


Plate 5. Segment G. (G-6) Native vegetation planting (screwbean mesquite) in burn area on the Havasu National Wildlife Refuge. (G-7) Barren area on west side of Oatman-Topock Highway in 2008 burn area on the Havasu National Wildlife Refuge. (G-8) Dense athel tamarix thicket and southern edge of blue 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 Survey Segment.

Plate 6. Segments G and H. (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. (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.

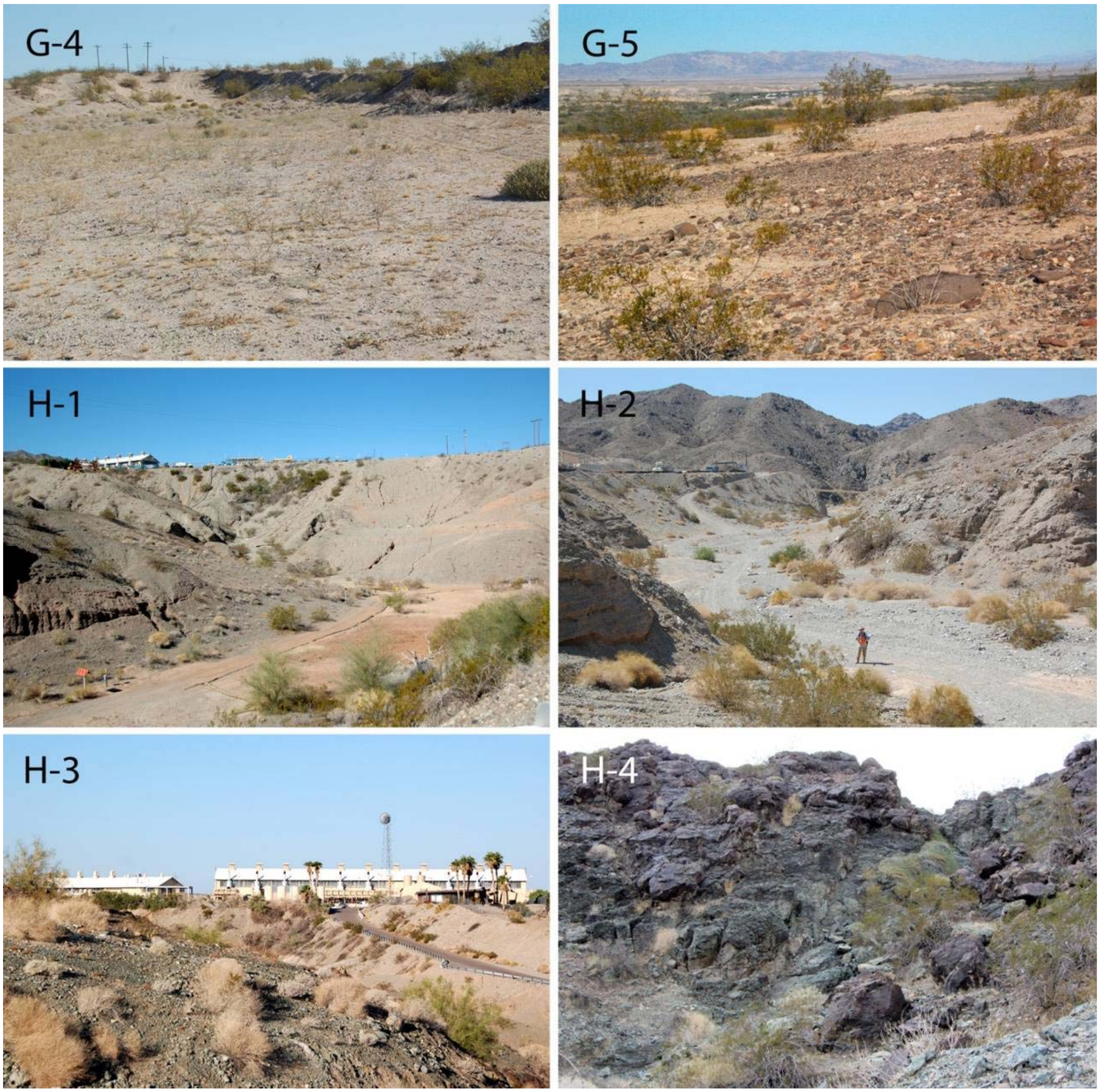
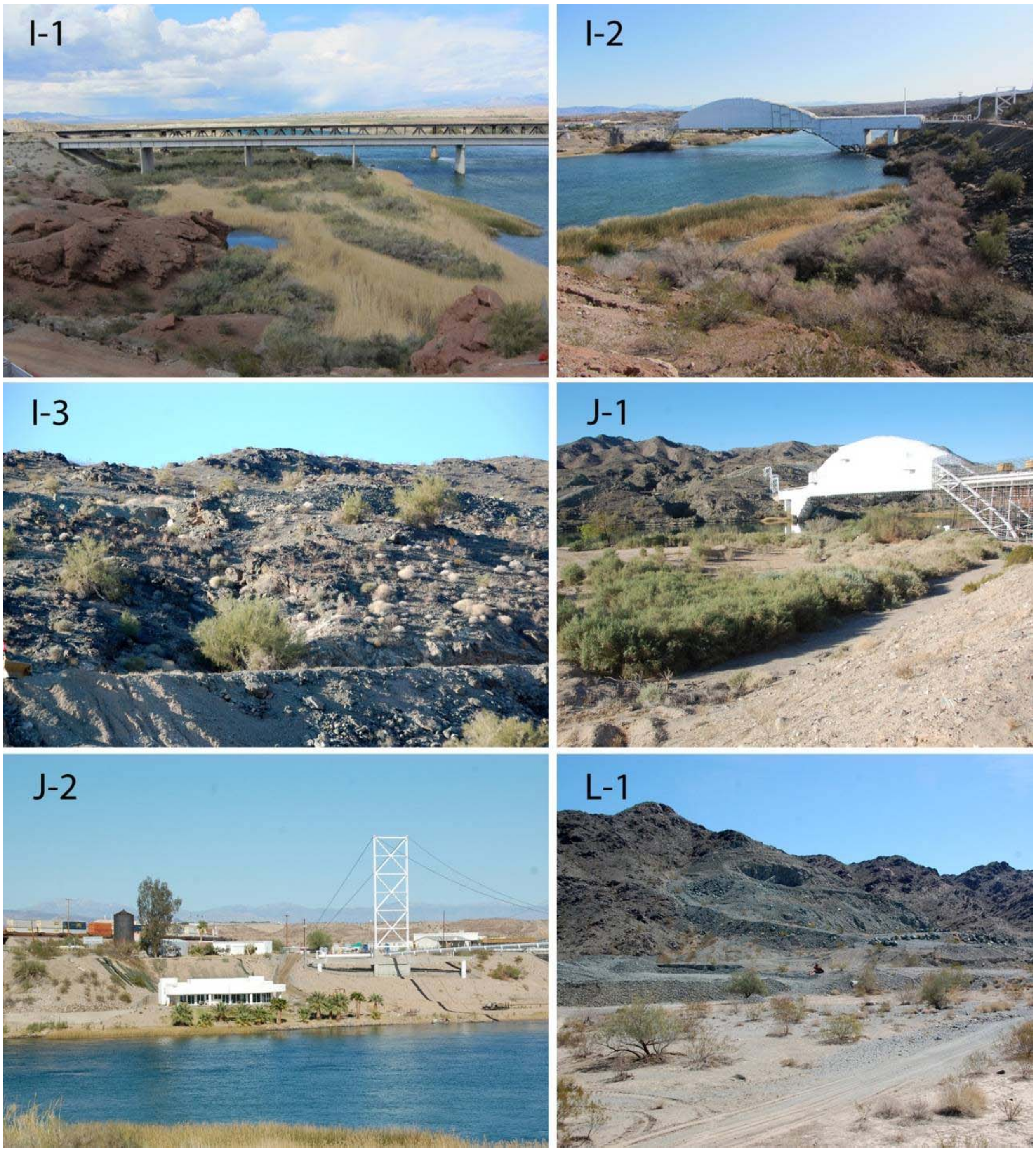


Plate 7. Segments I, J and L. (I-1) Common reed and California bulrush marshes at north end of Segment I with Miocene conglomerate outcrop in lower left of picture. (I-2) California bulrush marsh in river, honey mesquite at base of upland slope and hillside palo verde slightly higher up slope. (I-3) 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 Plants of Cultural Significance Found in the Project Area

APPENDIX D

Photographs of Plants of Cultural Significance Found in the Project Area

Plate 1. 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.

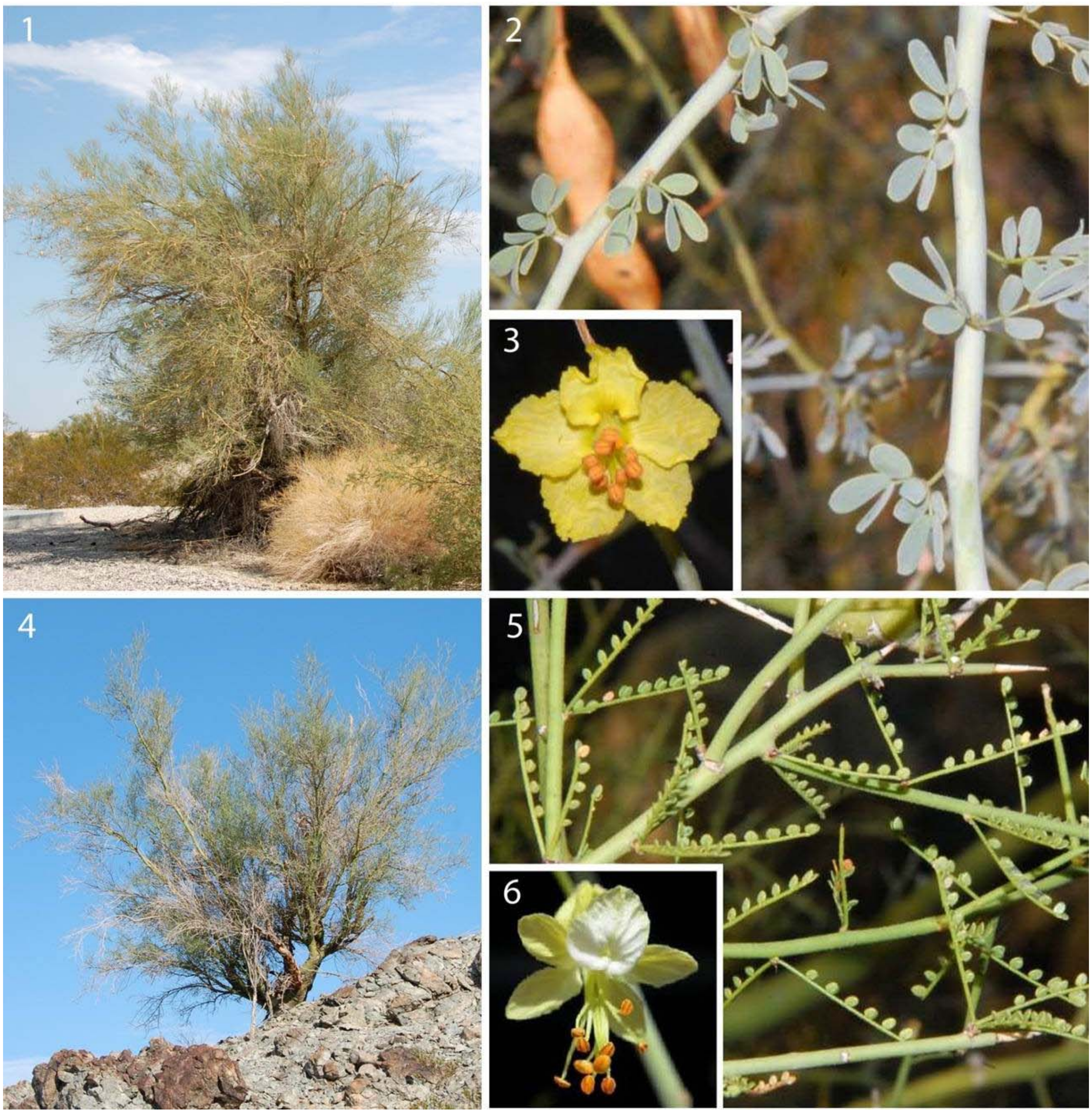


Plate 2. Ethnotrees: Mesquites and willow. 1) Western honey mesquite (*Prosopis glandulosa* var. *torreyana*) branches. (2) Close-up of western honey mesquite fruit. (3) Screwbean mesquite (*Prosopis pubescens*) branches, leaves and fruit. (4) Fruiting branch of Goodding's willow (*Salix gooddingii*). (5) Leaves of Goodding's willow.

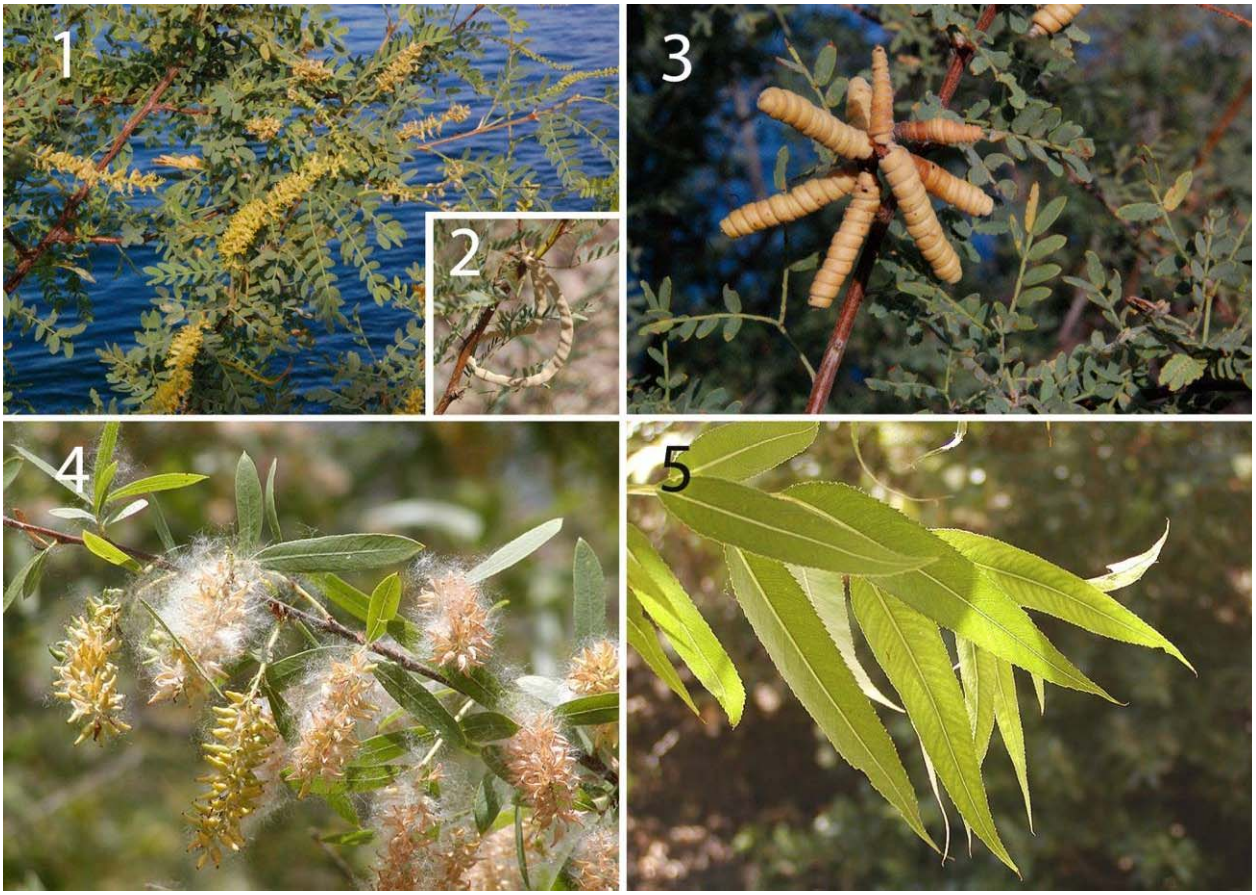


Plate 3. Ethnoshrubs. (1) Big saltbush (*Atriplex lentiformis*) population in Segment G. (2) Close-up of male big saltbush plant. (3) Habit of cattle saltbush (*Atriplex polycarpa*) in Segment G. (4) Close-up of branch of female cattle saltbush plant.

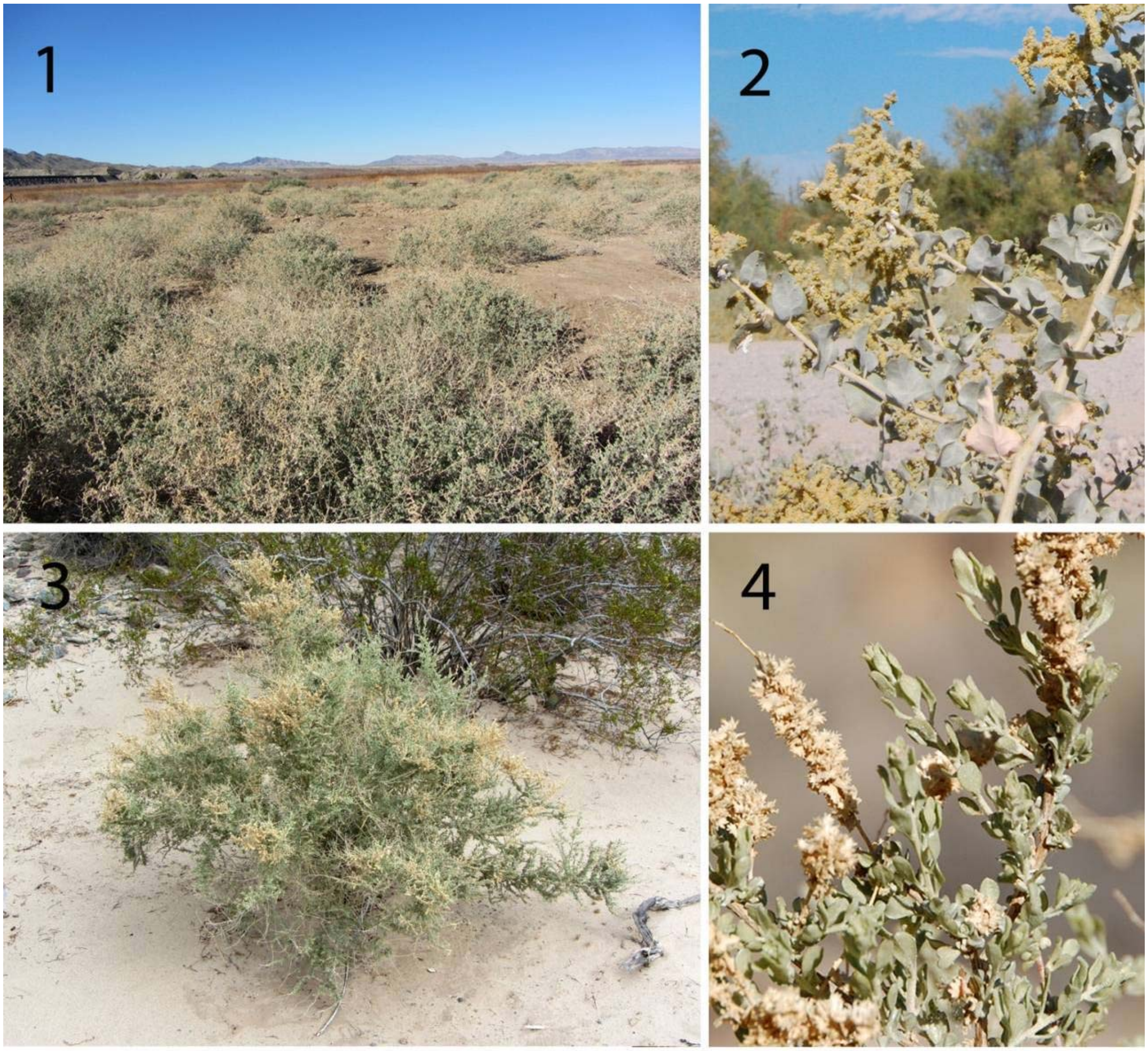


Plate 4. Herbs (1) Dry skeletons of chia (*Salvia columbariae*) from spring 2011. (2) Chia flowers. (3) Desert tobacco (*Nicotiana obtusifolia*). (4) Desert lily (*Hesperocallis undulata*) flowers. (5) Desert lily flower close-up. (6) Golden suncup (*Chylismia brevipes* subsp. *brevipes*).

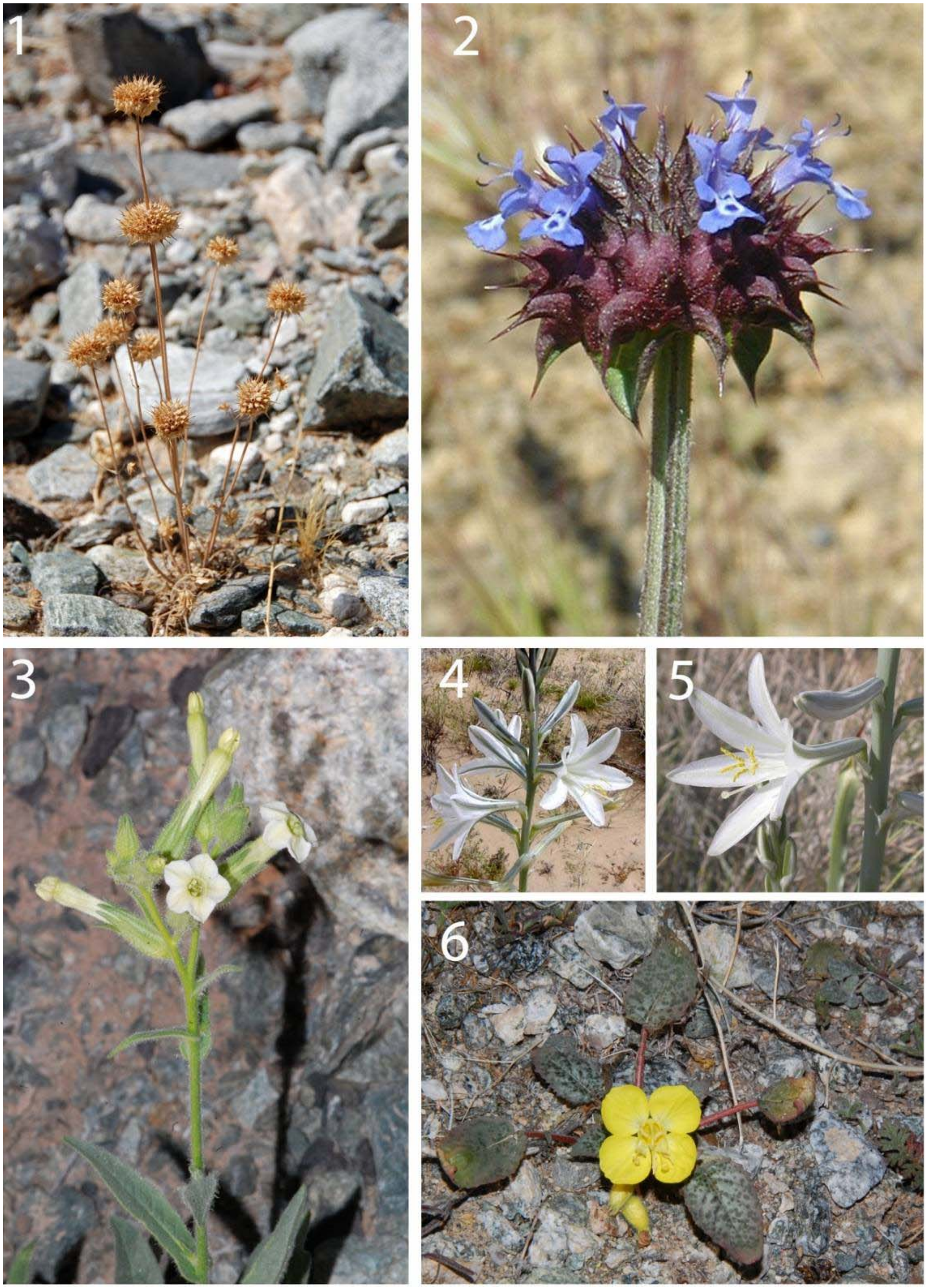


Plate 5. Herbs (1) Hill slopes north of the Topock Compressor Station with abundant golden sun cup in March 2013. (2) Jimson weed (*Datura wrightii*) near revegetation planting area on Havasu National Wildlife Refuge (3) Hill slopes north of the Topock Compressor Station with abundant golden sun cup in March 2013.

Plate 6. Wetland plants. (1) Broadleaf cattail (*Typha latifolia*) marsh in survey Segment C. (2) Close-up of broad-leaved cattail. (3) Common reed (*Phragmites australis*) marsh. (4) Close-up of common reed.

Appendix E
Locations for Culturally Significant Plants in the Project Area

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Trees				
Blue Palo Verde	*Parkinsonia florida*	7607704	2104843	Point
Blue Palo Verde	*Parkinsonia florida*	7607751	2104691	Point
Blue Palo Verde	*Parkinsonia florida*	7607756	2104238	Point
Blue Palo Verde	*Parkinsonia florida*	7607757	2104226	Point
Blue Palo Verde	*Parkinsonia florida*	7607766	2104868	Point
Blue Palo Verde	*Parkinsonia florida*	7607800	2104636	Point
Blue Palo Verde	*Parkinsonia florida*	7607820	2104151	Point
Blue Palo Verde	*Parkinsonia florida*	7607838	2103994	Point
Blue Palo Verde	*Parkinsonia florida*	7607859	2104564	Point
Blue Palo Verde	*Parkinsonia florida*	7607875	2105036	Point
Blue Palo Verde	*Parkinsonia florida*	7607877	2104582	Point
Blue Palo Verde	*Parkinsonia florida*	7607877	2104596	Point
Blue Palo Verde	*Parkinsonia florida*	7607892	2105104	Point
Blue Palo Verde	*Parkinsonia florida*	7607925	2104207	Point
Blue Palo Verde	*Parkinsonia florida*	7607943	2104408	Point
Blue Palo Verde	*Parkinsonia florida*	7607986	2103935	Point
Blue Palo Verde	*Parkinsonia florida*	7608003	2104259	Point
Blue Palo Verde	*Parkinsonia florida*	7608068	2104472	Point
Blue Palo Verde	*Parkinsonia florida*	7608092	2104332	Point
Blue Palo Verde	*Parkinsonia florida*	7608110	2104284	Point
Blue Palo Verde	*Parkinsonia florida*	7608130	2104339	Point
Blue Palo Verde	*Parkinsonia florida*	7608155	2104318	Point
Blue Palo Verde	*Parkinsonia florida*	7608159	2104405	Point
Blue Palo Verde	*Parkinsonia florida*	7608162	2104359	Point
Blue Palo Verde	*Parkinsonia florida*	7608172	2104428	Point
Blue Palo Verde	*Parkinsonia florida*	7608195	2104348	Point
Blue Palo Verde	*Parkinsonia florida*	7608200	2104449	Point
Blue Palo Verde	*Parkinsonia florida*	7608227	2104453	Point
Blue Palo Verde	*Parkinsonia florida*	7608236	2104477	Point
Blue Palo Verde	*Parkinsonia florida*	7608238	2104402	Point
Blue Palo Verde	*Parkinsonia florida*	7608255	2104367	Point
Blue Palo Verde	*Parkinsonia florida*	7608523	2105721	Point
Blue Palo Verde	*Parkinsonia florida*	7608526	2104396	Point
Blue Palo Verde	*Parkinsonia florida*	7608570	2104430	Point
Blue Palo Verde	*Parkinsonia florida*	7608571	2104431	Point
Blue Palo Verde	*Parkinsonia florida*	7608636	2104506	Point
Blue Palo Verde	*Parkinsonia florida*	7608649	2103840	Point
Blue Palo Verde	*Parkinsonia florida*	7608660	2104519	Point
Blue Palo Verde	*Parkinsonia florida*	7608858	2104415	Point
Blue Palo Verde	*Parkinsonia florida*	7608903	2103893	Point
Blue Palo Verde	*Parkinsonia florida*	7608905	2104034	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7608911	2103783	Point
Blue Palo Verde	*Parkinsonia florida*	7608914	2103806	Point
Blue Palo Verde	*Parkinsonia florida*	7608916	2103882	Point
Blue Palo Verde	*Parkinsonia florida*	7608949	2103979	Point
Blue Palo Verde	*Parkinsonia florida*	7608960	2103993	Point
Blue Palo Verde	*Parkinsonia florida*	7608969	2104413	Point
Blue Palo Verde	*Parkinsonia florida*	7608969	2104257	Point
Blue Palo Verde	*Parkinsonia florida*	7608970	2104225	Point
Blue Palo Verde	*Parkinsonia florida*	7608972	2104117	Point
Blue Palo Verde	*Parkinsonia florida*	7608975	2104373	Point
Blue Palo Verde	*Parkinsonia florida*	7608985	2104085	Point
Blue Palo Verde	*Parkinsonia florida*	7608995	2104101	Point
Blue Palo Verde	*Parkinsonia florida*	7608997	2104075	Point
Blue Palo Verde	*Parkinsonia florida*	7609012	2104376	Point
Blue Palo Verde	*Parkinsonia florida*	7609018	2104193	Point
Blue Palo Verde	*Parkinsonia florida*	7609023	2104183	Point
Blue Palo Verde	*Parkinsonia florida*	7609033	2104211	Point
Blue Palo Verde	*Parkinsonia florida*	7609071	2104001	Point
Blue Palo Verde	*Parkinsonia florida*	7609310	2104719	Point
Blue Palo Verde	*Parkinsonia florida*	7609351	2104446	Point
Blue Palo Verde	*Parkinsonia florida*	7609354	2104438	Point
Blue Palo Verde	*Parkinsonia florida*	7609386	2104491	Point
Blue Palo Verde	*Parkinsonia florida*	7609405	2104435	Point
Blue Palo Verde	*Parkinsonia florida*	7609425	2104396	Point
Blue Palo Verde	*Parkinsonia florida*	7609534	2104485	Point
Blue Palo Verde	*Parkinsonia florida*	7609561	2104511	Point
Blue Palo Verde	*Parkinsonia florida*	7609608	2104637	Point
Blue Palo Verde	*Parkinsonia florida*	7609608	2104504	Point
Blue Palo Verde	*Parkinsonia florida*	7609650	2104513	Point
Blue Palo Verde	*Parkinsonia florida*	7609693	2104638	Point
Blue Palo Verde	*Parkinsonia florida*	7609693	2105403	Point
Blue Palo Verde	*Parkinsonia florida*	7609712	2104477	Point
Blue Palo Verde	*Parkinsonia florida*	7609725	2104449	Point
Blue Palo Verde	*Parkinsonia florida*	7609772	2104346	Point
Blue Palo Verde	*Parkinsonia florida*	7609780	2104276	Point
Blue Palo Verde	*Parkinsonia florida*	7609784	2104353	Point
Blue Palo Verde	*Parkinsonia florida*	7609830	2104633	Point
Blue Palo Verde	*Parkinsonia florida*	7609843	2104592	Point
Blue Palo Verde	*Parkinsonia florida*	7609847	2104627	Point
Blue Palo Verde	*Parkinsonia florida*	7609869	2104620	Point
Blue Palo Verde	*Parkinsonia florida*	7609876	2104513	Point
Blue Palo Verde	*Parkinsonia florida*	7610026	2104734	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7610033	2104726	Point
Blue Palo Verde	*Parkinsonia florida*	7610040	2104727	Point
Blue Palo Verde	*Parkinsonia florida*	7610068	2104722	Point
Blue Palo Verde	*Parkinsonia florida*	7610307	2104837	Point
Blue Palo Verde	*Parkinsonia florida*	7610447	2104910	Point
Blue Palo Verde	*Parkinsonia florida*	7610534	2104931	Point
Blue Palo Verde	*Parkinsonia florida*	7610541	2104935	Point
Blue Palo Verde	*Parkinsonia florida*	7610553	2104935	Point
Blue Palo Verde	*Parkinsonia florida*	7610632	2104857	Point
Blue Palo Verde	*Parkinsonia florida*	7610677	2104886	Point
Blue Palo Verde	*Parkinsonia florida*	7610707	2104991	Point
Blue Palo Verde	*Parkinsonia florida*	7610715	2105000	Point
Blue Palo Verde	*Parkinsonia florida*	7610726	2104995	Point
Blue Palo Verde	*Parkinsonia florida*	7610740	2105005	Point
Blue Palo Verde	*Parkinsonia florida*	7611865	2103366	Point
Blue Palo Verde	*Parkinsonia florida*	7611866	2103238	Point
Blue Palo Verde	*Parkinsonia florida*	7611872	2103243	Point
Blue Palo Verde	*Parkinsonia florida*	7611879	2103314	Point
Blue Palo Verde	*Parkinsonia florida*	7611881	2103135	Point
Blue Palo Verde	*Parkinsonia florida*	7611897	2102945	Point
Blue Palo Verde	*Parkinsonia florida*	7611902	2103238	Point
Blue Palo Verde	*Parkinsonia florida*	7611911	2103517	Point
Blue Palo Verde	*Parkinsonia florida*	7611917	2103245	Point
Blue Palo Verde	*Parkinsonia florida*	7611918	2103654	Point
Blue Palo Verde	*Parkinsonia florida*	7611921	2103446	Point
Blue Palo Verde	*Parkinsonia florida*	7611923	2103669	Point
Blue Palo Verde	*Parkinsonia florida*	7611925	2102900	Point
Blue Palo Verde	*Parkinsonia florida*	7611944	2103309	Point
Blue Palo Verde	*Parkinsonia florida*	7611946	2103571	Point
Blue Palo Verde	*Parkinsonia florida*	7611946	2103431	Point
Blue Palo Verde	*Parkinsonia florida*	7611977	2103703	Point
Blue Palo Verde	*Parkinsonia florida*	7611979	2103807	Point
Blue Palo Verde	*Parkinsonia florida*	7611989	2102944	Point
Blue Palo Verde	*Parkinsonia florida*	7612020	2102983	Point
Blue Palo Verde	*Parkinsonia florida*	7612041	2103320	Point
Blue Palo Verde	*Parkinsonia florida*	7612057	2103330	Point
Blue Palo Verde	*Parkinsonia florida*	7612059	2103349	Point
Blue Palo Verde	*Parkinsonia florida*	7612064	2103355	Point
Blue Palo Verde	*Parkinsonia florida*	7612159	2103898	Point
Blue Palo Verde	*Parkinsonia florida*	7612163	2103860	Point
Blue Palo Verde	*Parkinsonia florida*	7612187	2103884	Point
Blue Palo Verde	*Parkinsonia florida*	7612231	2103895	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7612254	2103889	Point
Blue Palo Verde	*Parkinsonia florida*	7612427	2105196	Point
Blue Palo Verde	*Parkinsonia florida*	7612437	2103780	Point
Blue Palo Verde	*Parkinsonia florida*	7612497	2103806	Point
Blue Palo Verde	*Parkinsonia florida*	7612500	2105196	Point
Blue Palo Verde	*Parkinsonia florida*	7612505	2105153	Point
Blue Palo Verde	*Parkinsonia florida*	7612527	2105155	Point
Blue Palo Verde	*Parkinsonia florida*	7612615	2103715	Point
Blue Palo Verde	*Parkinsonia florida*	7612619	2102976	Point
Blue Palo Verde	*Parkinsonia florida*	7612622	2105162	Point
Blue Palo Verde	*Parkinsonia florida*	7612639	2102979	Point
Blue Palo Verde	*Parkinsonia florida*	7612667	2103826	Point
Blue Palo Verde	*Parkinsonia florida*	7612676	2103829	Point
Blue Palo Verde	*Parkinsonia florida*	7612687	2105167	Point
Blue Palo Verde	*Parkinsonia florida*	7612694	2103745	Point
Blue Palo Verde	*Parkinsonia florida*	7612703	2103868	Point
Blue Palo Verde	*Parkinsonia florida*	7612705	2103843	Point
Blue Palo Verde	*Parkinsonia florida*	7612705	2103988	Point
Blue Palo Verde	*Parkinsonia florida*	7612708	2102938	Point
Blue Palo Verde	*Parkinsonia florida*	7612722	2103894	Point
Blue Palo Verde	*Parkinsonia florida*	7612747	2102970	Point
Blue Palo Verde	*Parkinsonia florida*	7612753	2104153	Point
Blue Palo Verde	*Parkinsonia florida*	7612756	2103830	Point
Blue Palo Verde	*Parkinsonia florida*	7612759	2103803	Point
Blue Palo Verde	*Parkinsonia florida*	7612766	2105180	Point
Blue Palo Verde	*Parkinsonia florida*	7612771	2104038	Point
Blue Palo Verde	*Parkinsonia florida*	7612774	2102931	Point
Blue Palo Verde	*Parkinsonia florida*	7612778	2104073	Point
Blue Palo Verde	*Parkinsonia florida*	7612780	2104060	Point
Blue Palo Verde	*Parkinsonia florida*	7612782	2102951	Point
Blue Palo Verde	*Parkinsonia florida*	7612785	2103871	Point
Blue Palo Verde	*Parkinsonia florida*	7612785	2104016	Point
Blue Palo Verde	*Parkinsonia florida*	7612794	2103969	Point
Blue Palo Verde	*Parkinsonia florida*	7612800	2102872	Point
Blue Palo Verde	*Parkinsonia florida*	7612810	2105163	Point
Blue Palo Verde	*Parkinsonia florida*	7612813	2103891	Point
Blue Palo Verde	*Parkinsonia florida*	7612814	2104040	Point
Blue Palo Verde	*Parkinsonia florida*	7612814	2104003	Point
Blue Palo Verde	*Parkinsonia florida*	7612814	2104168	Point
Blue Palo Verde	*Parkinsonia florida*	7612821	2102876	Point
Blue Palo Verde	*Parkinsonia florida*	7612822	2103990	Point
Blue Palo Verde	*Parkinsonia florida*	7612824	2104046	Point

APPENDIX E
Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7612827	2104067	Point
Blue Palo Verde	*Parkinsonia florida*	7612835	2104239	Point
Blue Palo Verde	*Parkinsonia florida*	7612835	2103928	Point
Blue Palo Verde	*Parkinsonia florida*	7612836	2104216	Point
Blue Palo Verde	*Parkinsonia florida*	7612838	2102932	Point
Blue Palo Verde	*Parkinsonia florida*	7612846	2102922	Point
Blue Palo Verde	*Parkinsonia florida*	7612847	2104180	Point
Blue Palo Verde	*Parkinsonia florida*	7612928	2105987	Point
Blue Palo Verde	*Parkinsonia florida*	7612930	2102871	Point
Blue Palo Verde	*Parkinsonia florida*	7612934	2104251	Point
Blue Palo Verde	*Parkinsonia florida*	7612957	2104260	Point
Blue Palo Verde	*Parkinsonia florida*	7612973	2104145	Point
Blue Palo Verde	*Parkinsonia florida*	7612979	2104241	Point
Blue Palo Verde	*Parkinsonia florida*	7613012	2104241	Point
Blue Palo Verde	*Parkinsonia florida*	7613062	2104260	Point
Blue Palo Verde	*Parkinsonia florida*	7613063	2104244	Point
Blue Palo Verde	*Parkinsonia florida*	7613074	2104259	Point
Blue Palo Verde	*Parkinsonia florida*	7613102	2104208	Point
Blue Palo Verde	*Parkinsonia florida*	7613120	2104267	Point
Blue Palo Verde	*Parkinsonia florida*	7613152	2104208	Point
Blue Palo Verde	*Parkinsonia florida*	7613166	2104272	Point
Blue Palo Verde	*Parkinsonia florida*	7613174	2104221	Point
Blue Palo Verde	*Parkinsonia florida*	7613179	2104236	Point
Blue Palo Verde	*Parkinsonia florida*	7613180	2104173	Point
Blue Palo Verde	*Parkinsonia florida*	7613193	2104228	Point
Blue Palo Verde	*Parkinsonia florida*	7613210	2104221	Point
Blue Palo Verde	*Parkinsonia florida*	7613220	2104222	Point
Blue Palo Verde	*Parkinsonia florida*	7613220	2104186	Point
Blue Palo Verde	*Parkinsonia florida*	7613232	2104214	Point
Blue Palo Verde	*Parkinsonia florida*	7613282	2104158	Point
Blue Palo Verde	*Parkinsonia florida*	7613286	2104241	Point
Blue Palo Verde	*Parkinsonia florida*	7613303	2104117	Point
Blue Palo Verde	*Parkinsonia florida*	7613303	2104243	Point
Blue Palo Verde	*Parkinsonia florida*	7613318	2104147	Point
Blue Palo Verde	*Parkinsonia florida*	7613344	2104204	Point
Blue Palo Verde	*Parkinsonia florida*	7613365	2104197	Point
Blue Palo Verde	*Parkinsonia florida*	7613368	2104229	Point
Blue Palo Verde	*Parkinsonia florida*	7613383	2104185	Point
Blue Palo Verde	*Parkinsonia florida*	7613414	2105481	Point
Blue Palo Verde	*Parkinsonia florida*	7613421	2105471	Point
Blue Palo Verde	*Parkinsonia florida*	7613427	2104183	Point
Blue Palo Verde	*Parkinsonia florida*	7613432	2104159	Point

APPENDIX E
Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7613461	2104236	Point
Blue Palo Verde	*Parkinsonia florida*	7613461	2104299	Point
Blue Palo Verde	*Parkinsonia florida*	7613553	2104379	Point
Blue Palo Verde	*Parkinsonia florida*	7613564	2104323	Point
Blue Palo Verde	*Parkinsonia florida*	7613568	2104399	Point
Blue Palo Verde	*Parkinsonia florida*	7613571	2104358	Point
Blue Palo Verde	*Parkinsonia florida*	7613583	2104357	Point
Blue Palo Verde	*Parkinsonia florida*	7613587	2104297	Point
Blue Palo Verde	*Parkinsonia florida*	7613593	2104558	Point
Blue Palo Verde	*Parkinsonia florida*	7613594	2104618	Point
Blue Palo Verde	*Parkinsonia florida*	7613599	2104439	Point
Blue Palo Verde	*Parkinsonia florida*	7613641	2104544	Point
Blue Palo Verde	*Parkinsonia florida*	7613650	2104398	Point
Blue Palo Verde	*Parkinsonia florida*	7613652	2104364	Point
Blue Palo Verde	*Parkinsonia florida*	7613652	2104483	Point
Blue Palo Verde	*Parkinsonia florida*	7613655	2104617	Point
Blue Palo Verde	*Parkinsonia florida*	7613667	2104355	Point
Blue Palo Verde	*Parkinsonia florida*	7613669	2104444	Point
Blue Palo Verde	*Parkinsonia florida*	7613671	2103544	Point
Blue Palo Verde	*Parkinsonia florida*	7613674	2103542	Point
Blue Palo Verde	*Parkinsonia florida*	7613680	2104389	Point
Blue Palo Verde	*Parkinsonia florida*	7613681	2104345	Point
Blue Palo Verde	*Parkinsonia florida*	7613683	2104518	Point
Blue Palo Verde	*Parkinsonia florida*	7613702	2104487	Point
Blue Palo Verde	*Parkinsonia florida*	7613728	2104399	Point
Blue Palo Verde	*Parkinsonia florida*	7613728	2104580	Point
Blue Palo Verde	*Parkinsonia florida*	7613734	2104620	Point
Blue Palo Verde	*Parkinsonia florida*	7613737	2104513	Point
Blue Palo Verde	*Parkinsonia florida*	7613745	2104514	Point
Blue Palo Verde	*Parkinsonia florida*	7613765	2104418	Point
Blue Palo Verde	*Parkinsonia florida*	7613780	2104533	Point
Blue Palo Verde	*Parkinsonia florida*	7613786	2104544	Point
Blue Palo Verde	*Parkinsonia florida*	7613812	2104519	Point
Blue Palo Verde	*Parkinsonia florida*	7613830	2104586	Point
Blue Palo Verde	*Parkinsonia florida*	7613834	2104394	Point
Blue Palo Verde	*Parkinsonia florida*	7613835	2104458	Point
Blue Palo Verde	*Parkinsonia florida*	7613839	2103901	Point
Blue Palo Verde	*Parkinsonia florida*	7613841	2102751	Point
Blue Palo Verde	*Parkinsonia florida*	7613850	2104260	Point
Blue Palo Verde	*Parkinsonia florida*	7613851	2104397	Point
Blue Palo Verde	*Parkinsonia florida*	7613853	2104386	Point
Blue Palo Verde	*Parkinsonia florida*	7613854	2104367	Point

APPENDIX E
Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7613854	2103871	Point
Blue Palo Verde	*Parkinsonia florida*	7613857	2104527	Point
Blue Palo Verde	*Parkinsonia florida*	7613859	2104245	Point
Blue Palo Verde	*Parkinsonia florida*	7613861	2098901	Point
Blue Palo Verde	*Parkinsonia florida*	7613861	2102754	Point
Blue Palo Verde	*Parkinsonia florida*	7613866	2104269	Point
Blue Palo Verde	*Parkinsonia florida*	7613870	2098911	Point
Blue Palo Verde	*Parkinsonia florida*	7613874	2104278	Point
Blue Palo Verde	*Parkinsonia florida*	7613889	2104292	Point
Blue Palo Verde	*Parkinsonia florida*	7613894	2104089	Point
Blue Palo Verde	*Parkinsonia florida*	7613900	2104094	Point
Blue Palo Verde	*Parkinsonia florida*	7613910	2104090	Point
Blue Palo Verde	*Parkinsonia florida*	7614027	2104911	Point
Blue Palo Verde	*Parkinsonia florida*	7614031	2104922	Point
Blue Palo Verde	*Parkinsonia florida*	7614423	2103700	Point
Blue Palo Verde	*Parkinsonia florida*	7614423	2103700	Point
Blue Palo Verde	*Parkinsonia florida*	7614448	2103631	Point
Blue Palo Verde	*Parkinsonia florida*	7614448	2103631	Point
Blue Palo Verde	*Parkinsonia florida*	7614471	2103625	Point
Blue Palo Verde	*Parkinsonia florida*	7614471	2103625	Point
Blue Palo Verde	*Parkinsonia florida*	7614474	2103846	Point
Blue Palo Verde	*Parkinsonia florida*	7614474	2103846	Point
Blue Palo Verde	*Parkinsonia florida*	7614485	2103777	Point
Blue Palo Verde	*Parkinsonia florida*	7614485	2103777	Point
Blue Palo Verde	*Parkinsonia florida*	7614486	2103736	Point
Blue Palo Verde	*Parkinsonia florida*	7614486	2103736	Point
Blue Palo Verde	*Parkinsonia florida*	7614487	2103616	Point
Blue Palo Verde	*Parkinsonia florida*	7614487	2103616	Point
Blue Palo Verde	*Parkinsonia florida*	7614495	2103872	Point
Blue Palo Verde	*Parkinsonia florida*	7614495	2103872	Point
Blue Palo Verde	*Parkinsonia florida*	7614496	2103866	Point
Blue Palo Verde	*Parkinsonia florida*	7614496	2103866	Point
Blue Palo Verde	*Parkinsonia florida*	7614497	2103760	Point
Blue Palo Verde	*Parkinsonia florida*	7614497	2103760	Point
Blue Palo Verde	*Parkinsonia florida*	7614498	2103721	Point
Blue Palo Verde	*Parkinsonia florida*	7614498	2103721	Point
Blue Palo Verde	*Parkinsonia florida*	7614499	2103803	Point
Blue Palo Verde	*Parkinsonia florida*	7614499	2103803	Point
Blue Palo Verde	*Parkinsonia florida*	7614500	2103784	Point
Blue Palo Verde	*Parkinsonia florida*	7614500	2103784	Point
Blue Palo Verde	*Parkinsonia florida*	7614500	2103485	Point
Blue Palo Verde	*Parkinsonia florida*	7614500	2103485	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7614502	2103436	Point
Blue Palo Verde	*Parkinsonia florida*	7614502	2103436	Point
Blue Palo Verde	*Parkinsonia florida*	7614503	2103751	Point
Blue Palo Verde	*Parkinsonia florida*	7614503	2103751	Point
Blue Palo Verde	*Parkinsonia florida*	7614505	2103602	Point
Blue Palo Verde	*Parkinsonia florida*	7614505	2103602	Point
Blue Palo Verde	*Parkinsonia florida*	7614505	2103948	Point
Blue Palo Verde	*Parkinsonia florida*	7614505	2103994	Point
Blue Palo Verde	*Parkinsonia florida*	7614506	2103373	Point
Blue Palo Verde	*Parkinsonia florida*	7614506	2103373	Point
Blue Palo Verde	*Parkinsonia florida*	7614508	2103765	Point
Blue Palo Verde	*Parkinsonia florida*	7614508	2103765	Point
Blue Palo Verde	*Parkinsonia florida*	7614509	2103681	Point
Blue Palo Verde	*Parkinsonia florida*	7614509	2103681	Point
Blue Palo Verde	*Parkinsonia florida*	7614510	2103827	Point
Blue Palo Verde	*Parkinsonia florida*	7614510	2103827	Point
Blue Palo Verde	*Parkinsonia florida*	7614515	2103573	Point
Blue Palo Verde	*Parkinsonia florida*	7614515	2103573	Point
Blue Palo Verde	*Parkinsonia florida*	7614516	2103698	Point
Blue Palo Verde	*Parkinsonia florida*	7614516	2103698	Point
Blue Palo Verde	*Parkinsonia florida*	7614518	2103663	Point
Blue Palo Verde	*Parkinsonia florida*	7614518	2103663	Point
Blue Palo Verde	*Parkinsonia florida*	7614519	2103925	Point
Blue Palo Verde	*Parkinsonia florida*	7614519	2103925	Point
Blue Palo Verde	*Parkinsonia florida*	7614519	2102563	Point
Blue Palo Verde	*Parkinsonia florida*	7614520	2103695	Point
Blue Palo Verde	*Parkinsonia florida*	7614520	2103695	Point
Blue Palo Verde	*Parkinsonia florida*	7614524	2103713	Point
Blue Palo Verde	*Parkinsonia florida*	7614524	2103713	Point
Blue Palo Verde	*Parkinsonia florida*	7614525	2103408	Point
Blue Palo Verde	*Parkinsonia florida*	7614525	2103408	Point
Blue Palo Verde	*Parkinsonia florida*	7614527	2103851	Point
Blue Palo Verde	*Parkinsonia florida*	7614527	2103851	Point
Blue Palo Verde	*Parkinsonia florida*	7614528	2103904	Point
Blue Palo Verde	*Parkinsonia florida*	7614528	2103904	Point
Blue Palo Verde	*Parkinsonia florida*	7614528	2103894	Point
Blue Palo Verde	*Parkinsonia florida*	7614528	2103894	Point
Blue Palo Verde	*Parkinsonia florida*	7614531	2103873	Point
Blue Palo Verde	*Parkinsonia florida*	7614531	2103873	Point
Blue Palo Verde	*Parkinsonia florida*	7614535	2103387	Point
Blue Palo Verde	*Parkinsonia florida*	7614535	2103387	Point
Blue Palo Verde	*Parkinsonia florida*	7614540	2103433	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	**Scientific Name**	**UTM Easting**	**UTM Northing**	**Data Type**
Blue Palo Verde	*Parkinsonia florida*	7614540	2103433	Point
Blue Palo Verde	*Parkinsonia florida*	7614544	2103673	Point
Blue Palo Verde	*Parkinsonia florida*	7614544	2103673	Point
Blue Palo Verde	*Parkinsonia florida*	7614555	2103731	Point
Blue Palo Verde	*Parkinsonia florida*	7614558	2103975	Point
Blue Palo Verde	*Parkinsonia florida*	7614563	2103452	Point
Blue Palo Verde	*Parkinsonia florida*	7614565	2103714	Point
Blue Palo Verde	*Parkinsonia florida*	7614570	2103266	Point
Blue Palo Verde	*Parkinsonia florida*	7614571	2103435	Point
Blue Palo Verde	*Parkinsonia florida*	7614572	2103931	Point
Blue Palo Verde	*Parkinsonia florida*	7614575	2103895	Point
Blue Palo Verde	*Parkinsonia florida*	7614576	2103597	Point
Blue Palo Verde	*Parkinsonia florida*	7614578	2103817	Point
Blue Palo Verde	*Parkinsonia florida*	7614581	2103846	Point
Blue Palo Verde	*Parkinsonia florida*	7614587	2103881	Point
Blue Palo Verde	*Parkinsonia florida*	7614589	2103581	Point
Blue Palo Verde	*Parkinsonia florida*	7614591	2103639	Point
Blue Palo Verde	*Parkinsonia florida*	7614592	2103420	Point
Blue Palo Verde	*Parkinsonia florida*	7614594	2103537	Point
Blue Palo Verde	*Parkinsonia florida*	7614604	2104556	Point
Blue Palo Verde	*Parkinsonia florida*	7614605	2103830	Point
Blue Palo Verde	*Parkinsonia florida*	7614613	2103579	Point
Blue Palo Verde	*Parkinsonia florida*	7614618	2103363	Point
Blue Palo Verde	*Parkinsonia florida*	7614623	2103359	Point
Blue Palo Verde	*Parkinsonia florida*	7614623	2102557	Point
Blue Palo Verde	*Parkinsonia florida*	7614628	2103713	Point
Blue Palo Verde	*Parkinsonia florida*	7614629	2104845	Point
Blue Palo Verde	*Parkinsonia florida*	7614636	2103746	Point
Blue Palo Verde	*Parkinsonia florida*	7614637	2103647	Point
Blue Palo Verde	*Parkinsonia florida*	7614640	2103701	Point
Blue Palo Verde	*Parkinsonia florida*	7614643	2104521	Point
Blue Palo Verde	*Parkinsonia florida*	7614643	2104858	Point
Blue Palo Verde	*Parkinsonia florida*	7614664	2103614	Point
Blue Palo Verde	*Parkinsonia florida*	7614666	2103346	Point
Blue Palo Verde	*Parkinsonia florida*	7614667	2103744	Point
Blue Palo Verde	*Parkinsonia florida*	7614674	2103318	Point
Blue Palo Verde	*Parkinsonia florida*	7614683	2103745	Point
Blue Palo Verde	*Parkinsonia florida*	7614684	2104395	Point
Blue Palo Verde	*Parkinsonia florida*	7614697	2103769	Point
Blue Palo Verde	*Parkinsonia florida*	7614710	2102921	Point
Blue Palo Verde	*Parkinsonia florida*	7614717	2103480	Point
Blue Palo Verde	*Parkinsonia florida*	7614717	2103480	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7614742	2103219	Point
Blue Palo Verde	*Parkinsonia florida*	7614742	2103219	Point
Blue Palo Verde	*Parkinsonia florida*	7614744	2103087	Point
Blue Palo Verde	*Parkinsonia florida*	7614744	2103087	Point
Blue Palo Verde	*Parkinsonia florida*	7614746	2103412	Point
Blue Palo Verde	*Parkinsonia florida*	7614746	2103412	Point
Blue Palo Verde	*Parkinsonia florida*	7614747	2103079	Point
Blue Palo Verde	*Parkinsonia florida*	7614747	2103079	Point
Blue Palo Verde	*Parkinsonia florida*	7614750	2103152	Point
Blue Palo Verde	*Parkinsonia florida*	7614750	2103152	Point
Blue Palo Verde	*Parkinsonia florida*	7614751	2103404	Point
Blue Palo Verde	*Parkinsonia florida*	7614760	2103106	Point
Blue Palo Verde	*Parkinsonia florida*	7614760	2103106	Point
Blue Palo Verde	*Parkinsonia florida*	7614769	2103270	Point
Blue Palo Verde	*Parkinsonia florida*	7614769	2103270	Point
Blue Palo Verde	*Parkinsonia florida*	7614770	2103052	Point
Blue Palo Verde	*Parkinsonia florida*	7614770	2103052	Point
Blue Palo Verde	*Parkinsonia florida*	7614773	2103397	Point
Blue Palo Verde	*Parkinsonia florida*	7614775	2102634	Point
Blue Palo Verde	*Parkinsonia florida*	7614775	2102634	Point
Blue Palo Verde	*Parkinsonia florida*	7614775	2103097	Point
Blue Palo Verde	*Parkinsonia florida*	7614775	2103097	Point
Blue Palo Verde	*Parkinsonia florida*	7614777	2103357	Point
Blue Palo Verde	*Parkinsonia florida*	7614777	2103357	Point
Blue Palo Verde	*Parkinsonia florida*	7614786	2102969	Point
Blue Palo Verde	*Parkinsonia florida*	7614786	2102969	Point
Blue Palo Verde	*Parkinsonia florida*	7614791	2103321	Point
Blue Palo Verde	*Parkinsonia florida*	7614792	2103004	Point
Blue Palo Verde	*Parkinsonia florida*	7614792	2103004	Point
Blue Palo Verde	*Parkinsonia florida*	7614798	2103155	Point
Blue Palo Verde	*Parkinsonia florida*	7614798	2103155	Point
Blue Palo Verde	*Parkinsonia florida*	7614800	2103139	Point
Blue Palo Verde	*Parkinsonia florida*	7614800	2103139	Point
Blue Palo Verde	*Parkinsonia florida*	7614804	2103126	Point
Blue Palo Verde	*Parkinsonia florida*	7614804	2103126	Point
Blue Palo Verde	*Parkinsonia florida*	7614805	2103389	Point
Blue Palo Verde	*Parkinsonia florida*	7614805	2103389	Point
Blue Palo Verde	*Parkinsonia florida*	7614813	2103228	Point
Blue Palo Verde	*Parkinsonia florida*	7614813	2103228	Point
Blue Palo Verde	*Parkinsonia florida*	7614814	2103388	Point
Blue Palo Verde	*Parkinsonia florida*	7614817	2102288	Point
Blue Palo Verde	*Parkinsonia florida*	7614817	2102288	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7614817	2102225	Point
Blue Palo Verde	*Parkinsonia florida*	7614817	2102225	Point
Blue Palo Verde	*Parkinsonia florida*	7614823	2101942	Point
Blue Palo Verde	*Parkinsonia florida*	7614823	2103337	Point
Blue Palo Verde	*Parkinsonia florida*	7614823	2103337	Point
Blue Palo Verde	*Parkinsonia florida*	7614825	2102798	Point
Blue Palo Verde	*Parkinsonia florida*	7614825	2102798	Point
Blue Palo Verde	*Parkinsonia florida*	7614828	2102195	Point
Blue Palo Verde	*Parkinsonia florida*	7614828	2102195	Point
Blue Palo Verde	*Parkinsonia florida*	7614828	2103327	Point
Blue Palo Verde	*Parkinsonia florida*	7614828	2102782	Point
Blue Palo Verde	*Parkinsonia florida*	7614828	2102782	Point
Blue Palo Verde	*Parkinsonia florida*	7614830	2103034	Point
Blue Palo Verde	*Parkinsonia florida*	7614830	2103034	Point
Blue Palo Verde	*Parkinsonia florida*	7614832	2103023	Point
Blue Palo Verde	*Parkinsonia florida*	7614832	2103023	Point
Blue Palo Verde	*Parkinsonia florida*	7614835	2101900	Point
Blue Palo Verde	*Parkinsonia florida*	7614836	2103042	Point
Blue Palo Verde	*Parkinsonia florida*	7614836	2103042	Point
Blue Palo Verde	*Parkinsonia florida*	7614836	2101899	Point
Blue Palo Verde	*Parkinsonia florida*	7614837	2102114	Point
Blue Palo Verde	*Parkinsonia florida*	7614837	2103068	Point
Blue Palo Verde	*Parkinsonia florida*	7614837	2103068	Point
Blue Palo Verde	*Parkinsonia florida*	7614841	2101911	Point
Blue Palo Verde	*Parkinsonia florida*	7614848	2102688	Point
Blue Palo Verde	*Parkinsonia florida*	7614848	2102688	Point
Blue Palo Verde	*Parkinsonia florida*	7614856	2102106	Point
Blue Palo Verde	*Parkinsonia florida*	7614856	2102997	Point
Blue Palo Verde	*Parkinsonia florida*	7614856	2102997	Point
Blue Palo Verde	*Parkinsonia florida*	7614857	2102847	Point
Blue Palo Verde	*Parkinsonia florida*	7614857	2102847	Point
Blue Palo Verde	*Parkinsonia florida*	7614859	2102632	Point
Blue Palo Verde	*Parkinsonia florida*	7614859	2102632	Point
Blue Palo Verde	*Parkinsonia florida*	7614865	2102211	Point
Blue Palo Verde	*Parkinsonia florida*	7614866	2103021	Point
Blue Palo Verde	*Parkinsonia florida*	7614866	2103021	Point
Blue Palo Verde	*Parkinsonia florida*	7614866	2102890	Point
Blue Palo Verde	*Parkinsonia florida*	7614866	2102890	Point
Blue Palo Verde	*Parkinsonia florida*	7614868	2102537	Point
Blue Palo Verde	*Parkinsonia florida*	7614868	2102537	Point
Blue Palo Verde	*Parkinsonia florida*	7614871	2102852	Point
Blue Palo Verde	*Parkinsonia florida*	7614871	2102852	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7614871	2102273	Point
Blue Palo Verde	*Parkinsonia florida*	7614872	2103040	Point
Blue Palo Verde	*Parkinsonia florida*	7614872	2103040	Point
Blue Palo Verde	*Parkinsonia florida*	7614873	2102000	Point
Blue Palo Verde	*Parkinsonia florida*	7614874	2102315	Point
Blue Palo Verde	*Parkinsonia florida*	7614874	2102315	Point
Blue Palo Verde	*Parkinsonia florida*	7614874	2103173	Point
Blue Palo Verde	*Parkinsonia florida*	7614876	2102883	Point
Blue Palo Verde	*Parkinsonia florida*	7614876	2102883	Point
Blue Palo Verde	*Parkinsonia florida*	7614878	2103161	Point
Blue Palo Verde	*Parkinsonia florida*	7614880	2102928	Point
Blue Palo Verde	*Parkinsonia florida*	7614880	2102928	Point
Blue Palo Verde	*Parkinsonia florida*	7614881	2102917	Point
Blue Palo Verde	*Parkinsonia florida*	7614881	2102917	Point
Blue Palo Verde	*Parkinsonia florida*	7614882	2103302	Point
Blue Palo Verde	*Parkinsonia florida*	7614882	2103003	Point
Blue Palo Verde	*Parkinsonia florida*	7614882	2103003	Point
Blue Palo Verde	*Parkinsonia florida*	7614883	2102993	Point
Blue Palo Verde	*Parkinsonia florida*	7614883	2102993	Point
Blue Palo Verde	*Parkinsonia florida*	7614884	2101978	Point
Blue Palo Verde	*Parkinsonia florida*	7614885	2102611	Point
Blue Palo Verde	*Parkinsonia florida*	7614885	2102788	Point
Blue Palo Verde	*Parkinsonia florida*	7614886	2102903	Point
Blue Palo Verde	*Parkinsonia florida*	7614886	2102903	Point
Blue Palo Verde	*Parkinsonia florida*	7614886	2102920	Point
Blue Palo Verde	*Parkinsonia florida*	7614886	2102920	Point
Blue Palo Verde	*Parkinsonia florida*	7614886	2103133	Point
Blue Palo Verde	*Parkinsonia florida*	7614887	2102001	Point
Blue Palo Verde	*Parkinsonia florida*	7614889	2102966	Point
Blue Palo Verde	*Parkinsonia florida*	7614889	2102966	Point
Blue Palo Verde	*Parkinsonia florida*	7614890	2102476	Point
Blue Palo Verde	*Parkinsonia florida*	7614890	2102476	Point
Blue Palo Verde	*Parkinsonia florida*	7614890	2102595	Point
Blue Palo Verde	*Parkinsonia florida*	7614893	2102547	Point
Blue Palo Verde	*Parkinsonia florida*	7614893	2102547	Point
Blue Palo Verde	*Parkinsonia florida*	7614893	2102854	Point
Blue Palo Verde	*Parkinsonia florida*	7614894	2103088	Point
Blue Palo Verde	*Parkinsonia florida*	7614895	2101973	Point
Blue Palo Verde	*Parkinsonia florida*	7614896	2102526	Point
Blue Palo Verde	*Parkinsonia florida*	7614896	2102526	Point
Blue Palo Verde	*Parkinsonia florida*	7614898	2102318	Point
Blue Palo Verde	*Parkinsonia florida*	7614898	2102318	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7614898	2102453	Point
Blue Palo Verde	*Parkinsonia florida*	7614898	2102453	Point
Blue Palo Verde	*Parkinsonia florida*	7614899	2102038	Point
Blue Palo Verde	*Parkinsonia florida*	7614901	2102380	Point
Blue Palo Verde	*Parkinsonia florida*	7614901	2102380	Point
Blue Palo Verde	*Parkinsonia florida*	7614901	2102500	Point
Blue Palo Verde	*Parkinsonia florida*	7614901	2102500	Point
Blue Palo Verde	*Parkinsonia florida*	7614901	2102114	Point
Blue Palo Verde	*Parkinsonia florida*	7614902	2101948	Point
Blue Palo Verde	*Parkinsonia florida*	7614902	2102569	Point
Blue Palo Verde	*Parkinsonia florida*	7614904	2102063	Point
Blue Palo Verde	*Parkinsonia florida*	7614904	2103015	Point
Blue Palo Verde	*Parkinsonia florida*	7614904	2101952	Point
Blue Palo Verde	*Parkinsonia florida*	7614907	2101927	Point
Blue Palo Verde	*Parkinsonia florida*	7614908	2102463	Point
Blue Palo Verde	*Parkinsonia florida*	7614908	2102463	Point
Blue Palo Verde	*Parkinsonia florida*	7614911	2102950	Point
Blue Palo Verde	*Parkinsonia florida*	7614913	2102992	Point
Blue Palo Verde	*Parkinsonia florida*	7614923	2102047	Point
Blue Palo Verde	*Parkinsonia florida*	7614927	2103229	Point
Blue Palo Verde	*Parkinsonia florida*	7614929	2101951	Point
Blue Palo Verde	*Parkinsonia florida*	7614935	2103103	Point
Blue Palo Verde	*Parkinsonia florida*	7614941	2103016	Point
Blue Palo Verde	*Parkinsonia florida*	7614947	2103046	Point
Blue Palo Verde	*Parkinsonia florida*	7614954	2102111	Point
Blue Palo Verde	*Parkinsonia florida*	7614959	2103147	Point
Blue Palo Verde	*Parkinsonia florida*	7614973	2104629	Point
Blue Palo Verde	*Parkinsonia florida*	7614974	2102114	Point
Blue Palo Verde	*Parkinsonia florida*	7614980	2102981	Point
Blue Palo Verde	*Parkinsonia florida*	7615013	2103199	Point
Blue Palo Verde	*Parkinsonia florida*	7615014	2103224	Point
Blue Palo Verde	*Parkinsonia florida*	7615014	2103224	Point
Blue Palo Verde	*Parkinsonia florida*	7615020	2103247	Point
Blue Palo Verde	*Parkinsonia florida*	7615020	2103247	Point
Blue Palo Verde	*Parkinsonia florida*	7615031	2103208	Point
Blue Palo Verde	*Parkinsonia florida*	7615031	2103208	Point
Blue Palo Verde	*Parkinsonia florida*	7615033	2103181	Point
Blue Palo Verde	*Parkinsonia florida*	7615037	2104691	Point
Blue Palo Verde	*Parkinsonia florida*	7615040	2103198	Point
Blue Palo Verde	*Parkinsonia florida*	7615040	2103198	Point
Blue Palo Verde	*Parkinsonia florida*	7615054	2103224	Point
Blue Palo Verde	*Parkinsonia florida*	7615055	2104674	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7615056	2103166	Point
Blue Palo Verde	*Parkinsonia florida*	7615094	2103150	Point
Blue Palo Verde	*Parkinsonia florida*	7615094	2103150	Point
Blue Palo Verde	*Parkinsonia florida*	7615201	2104737	Point
Blue Palo Verde	*Parkinsonia florida*	7615209	2104102	Point
Blue Palo Verde	*Parkinsonia florida*	7615229	2104102	Point
Blue Palo Verde	*Parkinsonia florida*	7615231	2104094	Point
Blue Palo Verde	*Parkinsonia florida*	7615243	2104064	Point
Blue Palo Verde	*Parkinsonia florida*	7615246	2104095	Point
Blue Palo Verde	*Parkinsonia florida*	7615259	2104070	Point
Blue Palo Verde	*Parkinsonia florida*	7615261	2103893	Point
Blue Palo Verde	*Parkinsonia florida*	7615270	2103909	Point
Blue Palo Verde	*Parkinsonia florida*	7615281	2103965	Point
Blue Palo Verde	*Parkinsonia florida*	7615297	2104083	Point
Blue Palo Verde	*Parkinsonia florida*	7615312	2103945	Point
Blue Palo Verde	*Parkinsonia florida*	7615317	2103936	Point
Blue Palo Verde	*Parkinsonia florida*	7615329	2103928	Point
Blue Palo Verde	*Parkinsonia florida*	7615331	2103919	Point
Blue Palo Verde	*Parkinsonia florida*	7615337	2103983	Point
Blue Palo Verde	*Parkinsonia florida*	7615346	2103890	Point
Blue Palo Verde	*Parkinsonia florida*	7615466	2103752	Point
Blue Palo Verde	*Parkinsonia florida*	7615563	2102968	Point
Blue Palo Verde	*Parkinsonia florida*	7615563	2103025	Point
Blue Palo Verde	*Parkinsonia florida*	7615575	2100999	Point
Blue Palo Verde	*Parkinsonia florida*	7615580	2102948	Point
Blue Palo Verde	*Parkinsonia florida*	7615596	2103049	Point
Blue Palo Verde	*Parkinsonia florida*	7615598	2103317	Point
Blue Palo Verde	*Parkinsonia florida*	7615598	2103052	Point
Blue Palo Verde	*Parkinsonia florida*	7615613	2103330	Point
Blue Palo Verde	*Parkinsonia florida*	7615631	2102995	Point
Blue Palo Verde	*Parkinsonia florida*	7615654	2103109	Point
Blue Palo Verde	*Parkinsonia florida*	7615656	2103121	Point
Blue Palo Verde	*Parkinsonia florida*	7615668	2103123	Point
Blue Palo Verde	*Parkinsonia florida*	7615668	2103156	Point
Blue Palo Verde	*Parkinsonia florida*	7615670	2103167	Point
Blue Palo Verde	*Parkinsonia florida*	7615676	2103023	Point
Blue Palo Verde	*Parkinsonia florida*	7615676	2103150	Point
Blue Palo Verde	*Parkinsonia florida*	7615677	2103152	Point
Blue Palo Verde	*Parkinsonia florida*	7615680	2103137	Point
Blue Palo Verde	*Parkinsonia florida*	7615692	2103057	Point
Blue Palo Verde	*Parkinsonia florida*	7615721	2103024	Point
Blue Palo Verde	*Parkinsonia florida*	7615754	2102894	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7615763	2102866	Point
Blue Palo Verde	*Parkinsonia florida*	7615768	2102834	Point
Blue Palo Verde	*Parkinsonia florida*	7615770	2102794	Point
Blue Palo Verde	*Parkinsonia florida*	7615772	2102818	Point
Blue Palo Verde	*Parkinsonia florida*	7615778	2102775	Point
Blue Palo Verde	*Parkinsonia florida*	7615780	2102718	Point
Blue Palo Verde	*Parkinsonia florida*	7615780	2102733	Point
Blue Palo Verde	*Parkinsonia florida*	7615784	2102689	Point
Blue Palo Verde	*Parkinsonia florida*	7615794	2102555	Point
Blue Palo Verde	*Parkinsonia florida*	7615795	2102903	Point
Blue Palo Verde	*Parkinsonia florida*	7615800	2102855	Point
Blue Palo Verde	*Parkinsonia florida*	7615809	2101128	Point
Blue Palo Verde	*Parkinsonia florida*	7615814	2101142	Point
Blue Palo Verde	*Parkinsonia florida*	7615815	2101122	Point
Blue Palo Verde	*Parkinsonia florida*	7615821	2102713	Point
Blue Palo Verde	*Parkinsonia florida*	7615838	2101260	Point
Blue Palo Verde	*Parkinsonia florida*	7615863	2102887	Point
Blue Palo Verde	*Parkinsonia florida*	7615868	2102895	Point
Blue Palo Verde	*Parkinsonia florida*	7615882	2101277	Point
Blue Palo Verde	*Parkinsonia florida*	7615883	2101487	Point
Blue Palo Verde	*Parkinsonia florida*	7615890	2101460	Point
Blue Palo Verde	*Parkinsonia florida*	7615905	2100508	Point
Blue Palo Verde	*Parkinsonia florida*	7615922	2101285	Point
Blue Palo Verde	*Parkinsonia florida*	7615930	2101300	Point
Blue Palo Verde	*Parkinsonia florida*	7615990	2101598	Point
Blue Palo Verde	*Parkinsonia florida*	7616002	2101575	Point
Blue Palo Verde	*Parkinsonia florida*	7616105	2101505	Point
Blue Palo Verde	*Parkinsonia florida*	7616125	2101420	Point
Blue Palo Verde	*Parkinsonia florida*	7616132	2101490	Point
Blue Palo Verde	*Parkinsonia florida*	7616138	2101389	Point
Blue Palo Verde	*Parkinsonia florida*	7616157	2101554	Point
Blue Palo Verde	*Parkinsonia florida*	7616200	2101466	Point
Blue Palo Verde	*Parkinsonia florida*	7616206	2101482	Point
Blue Palo Verde	*Parkinsonia florida*	7616213	2101481	Point
Blue Palo Verde	*Parkinsonia florida*	7616218	2101464	Point
Blue Palo Verde	*Parkinsonia florida*	7616232	2101370	Point
Blue Palo Verde	*Parkinsonia florida*	7616238	2101359	Point
Blue Palo Verde	*Parkinsonia florida*	7616251	2101468	Point
Blue Palo Verde	*Parkinsonia florida*	7616262	2101393	Point
Blue Palo Verde	*Parkinsonia florida*	7616268	2100805	Point
Blue Palo Verde	*Parkinsonia florida*	7616283	2100802	Point
Blue Palo Verde	*Parkinsonia florida*	7616317	2101497	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7616318	2101443	Point
Blue Palo Verde	*Parkinsonia florida*	7616319	2101488	Point
Blue Palo Verde	*Parkinsonia florida*	7616408	2101432	Point
Blue Palo Verde	*Parkinsonia florida*	7616470	2100475	Point
Blue Palo Verde	*Parkinsonia florida*	7616546	2101342	Point
Blue Palo Verde	*Parkinsonia florida*	7616600	2100673	Point
Blue Palo Verde	*Parkinsonia florida*	7616635	2101305	Point
Blue Palo Verde	*Parkinsonia florida*	7616886	2100605	Point
Blue Palo Verde	*Parkinsonia florida*	7616894	2100979	Point
Blue Palo Verde	*Parkinsonia florida*	7616923	2100647	Point
Blue Palo Verde	*Parkinsonia florida*	7616961	2100619	Point
Blue Palo Verde	*Parkinsonia florida*	7616971	2100757	Point
Blue Palo Verde	*Parkinsonia florida*	7616995	2100997	Point
Blue Palo Verde	*Parkinsonia florida*	7616997	2100635	Point
Blue Palo Verde	*Parkinsonia florida*	7617012	2100596	Point
Blue Palo Verde	*Parkinsonia florida*	7617014	2100645	Point
Blue Palo Verde	*Parkinsonia florida*	7617250	2100596	Point
Blue Palo Verde	*Parkinsonia florida*	7617294	2100507	Point
Blue Palo Verde	*Parkinsonia florida*	7617355	2100465	Point
Blue Palo Verde	*Parkinsonia florida*	7617454	2101997	Point
Blue Palo Verde	*Parkinsonia florida*	7617484	2101930	Point
Blue Palo Verde	*Parkinsonia florida*	7617649	2100762	Point
Blue Palo Verde	*Parkinsonia florida*	7617740	2100771	Point
Blue Palo Verde	*Parkinsonia florida*	7617860	2100620	Point
Blue Palo Verde	*Parkinsonia florida*	7618052	2101860	Point
Blue Palo Verde	*Parkinsonia florida*	7618079	2100511	Point
Blue Palo Verde	*Parkinsonia florida*	7618083	2100713	Point
Blue Palo Verde	*Parkinsonia florida*	7618261	2101865	Point
Blue Palo Verde	*Parkinsonia florida*	7618271	2101833	Point
Blue Palo Verde	*Parkinsonia florida*	7618273	2100790	Point
Blue Palo Verde	*Parkinsonia florida*	7618427	2101872	Point
Blue Palo Verde	*Parkinsonia florida*	7618440	2102174	Point
Blue Palo Verde	*Parkinsonia florida*	7618546	2101898	Point
Blue Palo Verde	*Parkinsonia florida*	7618560	2101856	Point
Blue Palo Verde	*Parkinsonia florida*	7618591	2101846	Point
Blue Palo Verde	*Parkinsonia florida*	7618625	2101878	Point
Blue Palo Verde	*Parkinsonia florida*	7618652	2101912	Point
Blue Palo Verde	*Parkinsonia florida*	7618687	2101919	Point
Blue Palo Verde	*Parkinsonia florida*	7618690	2101883	Point
Blue Palo Verde	*Parkinsonia florida*	7618843	2101930	Point
Blue Palo Verde	*Parkinsonia florida*	7618863	2102193	Point
Blue Palo Verde	*Parkinsonia florida*	7618890	2107959	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7618894	2107689	Point
Blue Palo Verde	*Parkinsonia florida*	7618901	2101929	Point
Blue Palo Verde	*Parkinsonia florida*	7618904	2107967	Point
Blue Palo Verde	*Parkinsonia florida*	7618910	2107667	Point
Blue Palo Verde	*Parkinsonia florida*	7618917	2107951	Point
Blue Palo Verde	*Parkinsonia florida*	7618986	2107621	Point
Blue Palo Verde	*Parkinsonia florida*	7619070	2107240	Point
Blue Palo Verde	*Parkinsonia florida*	7619088	2107160	Point
Blue Palo Verde	*Parkinsonia florida*	7619477	2107726	Point
Blue Palo Verde	*Parkinsonia florida*	7619498	2107716	Point
Blue Palo Verde	*Parkinsonia florida*	7619767	2103063	Point
Blue Palo Verde	*Parkinsonia florida*	7619795	2103071	Point
Blue Palo Verde	*Parkinsonia florida*	7619910	2106884	Point
Blue Palo Verde	*Parkinsonia florida*	7620342	2103440	Point
Blue Palo Verde	*Parkinsonia florida*	7621645	2108877	Point
Blue Palo Verde	*Parkinsonia florida*	7621837	2108768	Point
Blue Palo Verde	*Parkinsonia florida*	7616544	2101247	Polygon
Blue Palo Verde	*Parkinsonia florida*	7617924	2100706	Polygon
Blue Palo Verde	*Parkinsonia florida*	7616422	2100943	Polygon
Blue Palo Verde	*Parkinsonia florida*	7614540	2104495	Polygon
Blue Palo Verde	*Parkinsonia florida*	7614727	2103216	Polygon
Blue Palo Verde	*Parkinsonia florida*	7614890	2102037	Polygon
Blue Palo Verde	*Parkinsonia florida*	7615594	2103057	Polygon
Blue Palo Verde	*Parkinsonia florida*	7613842	2104317	Polygon
Blue Palo Verde	*Parkinsonia florida*	7610082	2104728	Polygon
Blue Palo Verde	*Parkinsonia florida*	7609252	2104359	Polygon
Blue Palo Verde	*Parkinsonia florida*	7619542	2102499	Polygon
Blue Palo Verde	*Parkinsonia florida*	7618538	2101846	Polygon
Blue Palo Verde	*Parkinsonia florida*	7618361	2101749	Polygon
Blue Palo Verde	*Parkinsonia florida*	7615755	2102608	Polygon
Blue Palo Verde	*Parkinsonia florida*	7615821	2102500	Polygon
Blue Palo Verde	*Parkinsonia florida*	7614321	2104602	Polygon
Blue Palo Verde	*Parkinsonia florida*	7614444	2104525	Polygon
Blue Palo Verde	*Parkinsonia florida*	7613863	2104225	Polygon
Blue Palo Verde	*Parkinsonia florida*	7613870	2104257	Polygon
Blue Palo Verde	*Parkinsonia florida*	7620094	2104522	Polygon
Blue Palo Verde	*Parkinsonia florida*	7619996	2104614	Polygon
Blue Palo Verde	*Parkinsonia florida*	7620255	2105236	Polygon
Blue Palo Verde	*Parkinsonia florida*	7620291	2105065	Polygon
Blue Palo Verde	*Parkinsonia florida*	7621015	2106247	Polygon
Blue Palo Verde	*Parkinsonia florida*	7621042	2106144	Polygon
Blue Palo Verde	*Parkinsonia florida*	7619384	2108013	Polygon

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Blue Palo Verde	*Parkinsonia florida*	7619667	2107394	Polygon
Blue Palo Verde	*Parkinsonia florida*	7619671	2107270	Polygon
Blue Palo Verde	*Parkinsonia florida*	7607873	2105035	Point
Blue Palo Verde	*Parkinsonia florida*	7612796	2103996	Point
Blue Palo Verde	*Parkinsonia florida*	7613087	2104206	Point
Blue Palo Verde	*Parkinsonia florida*	7612777	2103979	Polygon
Blue Palo Verde	*Parkinsonia florida*	7607948	2104917	Polygon
Blue Palo Verde	*Parkinsonia florida*	7608220	2104375	Polygon
Blue Palo Verde	*Parkinsonia florida*	7613852	2099045	Polygon
Blue Palo Verde	*Parkinsonia florida*	7611860	2103045	Polygon
Blue Palo Verde	*Parkinsonia florida*	7611896	2103547	Polygon
Blue Palo Verde/ W. Honey Mesquite	*P. florida/P. glandulosa var. torreyana*	7612541	2105131	Polygon
Blue Palo Verde/ W. Honey Mesquite	*P. florida/P. glandulosa var. torreyana*	7612474	2105319	Polygon
Blue Palo Verde/ W. Honey Mesquite	*P. florida/P. glandulosa var. torreyana*	7619036	2102646	Polygon
Hillside Palo Verde	*Parkinsonia microphylla*	7615864	2100498	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616236	2101093	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616432	2100933	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616606	2101178	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616612	2100688	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616669	2101198	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616672	2100310	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616681	2100386	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616698	2100321	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616705	2100369	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616707	2100287	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616718	2100416	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616721	2100387	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616747	2100452	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616822	2100019	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616822	2100315	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616826	2100289	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616841	2100053	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616867	2100457	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616883	2100485	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616894	2100485	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616901	2100515	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616905	2100049	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616908	2100979	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616930	2100648	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616936	2100640	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7616976	2100753	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617013	2100605	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Hillside Palo Verde	*Parkinsonia microphylla*	7617041	2100339	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617048	2100394	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617064	2100393	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617065	2100395	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617091	2100302	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617104	2100527	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617110	2100536	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617110	2100283	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617119	2100290	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617125	2100215	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617182	2100202	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617192	2100243	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617214	2100298	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617228	2100245	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617241	2100277	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617267	2100324	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617309	2100511	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617311	2100608	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617316	2100646	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617321	2100573	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617324	2100634	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617327	2100551	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617336	2100494	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617337	2100495	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617342	2100530	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617349	2100546	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617351	2100538	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617366	2100478	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617409	2100544	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617431	2100725	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617460	2100218	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617473	2100584	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617476	2100716	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617476	2100589	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617483	2100224	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617491	2100619	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617502	2100724	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617503	2100547	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617538	2100739	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617540	2100732	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617543	2100521	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617544	2100523	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Hillside Palo Verde	*Parkinsonia microphylla*	7617568	2100557	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617571	2100559	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617572	2100600	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617576	2100560	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617607	2100588	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617621	2100587	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617635	2100738	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617642	2100733	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617652	2100752	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617665	2100360	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617679	2100380	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617680	2100571	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617680	2100579	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617713	2100478	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617722	2100794	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617750	2100774	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617777	2100662	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617801	2100699	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617804	2100631	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617815	2100654	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617827	2100748	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617846	2100751	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617870	2100619	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7617872	2100579	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618008	2100748	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618021	2100794	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618075	2100783	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618077	2100457	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618154	2100773	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618174	2100800	Point
Hillside Palo Verde	*Parkinsonia microphylla*	7618435	2100732	Point
Screw Bean Mesquite	*Prosopis pubescens*	7618950	2107938	Point
Screwbean Mesquite	*Prosopis pubescens*	7617243	2103078	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7617083	2103253	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7617431	2102765	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7613219	2105485	Point
Screwbean Mesquite	*Prosopis pubescens*	7613718	2105560	Point
Screwbean Mesquite	*Prosopis pubescens*	7613936	2105542	Point
Screwbean Mesquite	*Prosopis pubescens*	7613939	2105455	Point
Screwbean Mesquite	*Prosopis pubescens*	7613954	2105483	Point
Screwbean Mesquite	*Prosopis pubescens*	7613988	2105421	Point
Screwbean Mesquite	*Prosopis pubescens*	7614031	2105359	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Screwbean Mesquite	*Prosopis pubescens*	7614058	2105397	Point
Screwbean Mesquite	*Prosopis pubescens*	7614067	2105381	Point
Screwbean Mesquite	*Prosopis pubescens*	7614077	2105473	Point
Screwbean Mesquite	*Prosopis pubescens*	7614110	2105393	Point
Screwbean Mesquite	*Prosopis pubescens*	7614112	2105360	Point
Screwbean Mesquite	*Prosopis pubescens*	7614115	2105345	Point
Screwbean Mesquite	*Prosopis pubescens*	7614120	2105389	Point
Screwbean Mesquite	*Prosopis pubescens*	7614215	2105262	Point
Screwbean Mesquite	*Prosopis pubescens*	7614250	2105227	Point
Screwbean Mesquite	*Prosopis pubescens*	7614293	2105157	Point
Screwbean Mesquite	*Prosopis pubescens*	7615318	2104496	Point
Screwbean Mesquite	*Prosopis pubescens*	7616747	2103919	Point
Screwbean Mesquite	*Prosopis pubescens*	7616754	2101759	Point
Screwbean Mesquite	*Prosopis pubescens*	7616926	2103583	Point
Screwbean Mesquite	*Prosopis pubescens*	7616978	2103549	Point
Screwbean Mesquite	*Prosopis pubescens*	7616989	2103517	Point
Screwbean Mesquite	*Prosopis pubescens*	7616997	2103480	Point
Screwbean Mesquite	*Prosopis pubescens*	7617043	2103441	Point
Screwbean Mesquite	*Prosopis pubescens*	7617066	2103410	Point
Screwbean Mesquite	*Prosopis pubescens*	7617187	2102889	Point
Screwbean Mesquite	*Prosopis pubescens*	7617503	2102886	Point
Screwbean Mesquite	*Prosopis pubescens*	7617628	2102554	Point
Screwbean Mesquite	*Prosopis pubescens*	7617641	2102561	Point
Screwbean Mesquite	*Prosopis pubescens*	7617650	2102579	Point
Screwbean Mesquite	*Prosopis pubescens*	7616566	2101699	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7616527	2101851	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7616950	2103451	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7617448	2103299	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7617479	2102944	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7617482	2103083	Polygon
Screwbean Mesquite	*Prosopis pubescens*	7617408	2103237	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7608969	2104393	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7608974	2104506	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7609760	2104381	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7609808	2105761	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610139	2106144	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610222	2106064	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610273	2105876	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610390	2105757	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610401	2104892	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610404	2104861	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610450	2104913	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610469	2104883	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610478	2105763	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610686	2104941	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610733	2105689	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610758	2105002	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610769	2105013	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610948	2105652	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611149	2105582	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611288	2105106	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611388	2106556	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611391	2105199	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611394	2105155	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611418	2105116	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611432	2105115	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611600	2105125	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611818	2105091	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611825	2105137	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611833	2105099	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611871	2105493	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611919	2106412	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612010	2105238	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612056	2105116	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612061	2105112	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612065	2105246	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612078	2105120	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612096	2105259	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612167	2105273	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612205	2105124	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612213	2105133	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612482	2105160	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612566	2105125	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612567	2105247	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612582	2105159	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612721	2105166	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612738	2105170	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612746	2105151	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612795	2105175	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612934	2105174	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612974	2105232	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613033	2105232	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613052	2105189	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613237	2105496	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613322	2105506	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613406	2105509	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613452	2105528	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613483	2105475	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613496	2105513	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613518	2105512	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613562	2105539	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613587	2105541	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613612	2105498	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613676	2105563	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613846	2104251	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613931	2104086	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614010	2105089	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614026	2105084	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614032	2105123	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614034	2105080	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614179	2105234	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614190	2105044	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614210	2105036	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614268	2105023	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614305	2105009	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614331	2104999	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614360	2104978	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614380	2104991	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614479	2104945	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614497	2101108	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614630	2101103	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614766	2100299	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614770	2100369	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614770	2100379	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614943	2101216	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615023	2104781	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615027	2104684	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615030	2104776	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615181	2100186	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615199	2100192	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615264	2104510	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615274	2100015	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615275	2104128	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615332	2103901	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615719	2100361	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615733	2100373	Point

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Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615734	2103118	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615802	2102982	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615905	2101308	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615921	2101353	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615936	2101424	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615944	2101448	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615983	2102683	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616023	2101380	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616086	2101419	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616125	2100611	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616199	2103241	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616207	2103267	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616262	2103160	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616276	2101215	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616282	2101244	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616310	2101345	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616362	2100854	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616379	2100863	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616380	2100871	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616673	2101286	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616711	2103926	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616835	2100595	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617697	2100808	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617884	2101549	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7618195	2101234	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7618207	2101246	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7618394	2102676	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7618575	2101778	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7619103	2102250	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7619507	2102719	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620112	2103610	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620156	2104022	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620231	2104041	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620384	2103882	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620408	2103852	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620474	2104149	Point
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616242	2102060	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616541	2101466	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616535	2101232	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615463	2100217	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615558	2100306	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616098	2100609	Polygon

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615977	2102590	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615963	2102664	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615921	2102778	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615900	2102800	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614638	2104197	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613891	2104347	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614259	2104994	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614230	2104766	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613971	2105011	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613017	2105164	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611902	2105076	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7609973	2106859	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7609886	2105693	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620359	2103845	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615841	2102964	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613970	2105066	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613894	2104280	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611889	2105048	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7619968	2104331	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620142	2104339	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7620034	2104615	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7619953	2104583	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7616804	2101107	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617165	2100816	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617597	2100804	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617870	2100774	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7615858	2102901	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614002	2104590	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614051	2105310	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7610616	2104930	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612179	2104939	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611848	2104986	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612639	2105015	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7609658	2105355	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7609787	2104632	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617617	2102239	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7617621	2102117	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7618233	2100775	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7611850	2105059	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7612639	2105106	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613847	2104700	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614310	2104586	Polygon

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7614144	2104482	Polygon
Western Honey Mesquite	*Prosopis glandulosa* var. *torreyana*	7613856	2105590	Polygon
Gooding's Willow	*Salix gooddingii*	2386756	12617249	Point
Gooding's Willow	*Salix gooddingii*	2388562	12618329	Point
Gooding's Willow	*Salix gooddingii*	2393133	12612472	Point
Shrubs				
Big Saltbush	*Atriplex lentiformis*	7612512	2105240	point
Big Saltbush	*Atriplex lentiformis*	7619753	2104945	point
Big Saltbush	*Atriplex lentiformis*	7619773	2105057	point
Big Saltbush	*Atriplex lentiformis*	7619795	2104318	point
Big Saltbush	*Atriplex lentiformis*	7619802	2104395	point
Big Saltbush	*Atriplex lentiformis*	7619821	2104645	point
Big Saltbush	*Atriplex lentiformis*	7619830	2104770	point
Big Saltbush	*Atriplex lentiformis*	7619873	2106701	point
Big Saltbush	*Atriplex lentiformis*	7619873	2106677	point
Cattle Saltbush	*Atriplex polycarpa*	7621749	2108720	polygon
Cattle Saltbush	*Atriplex polycarpa*	7615006	2101254	polygon
Cattle Saltbush	*Atriplex polycarpa*	7612380	2103368	polygon
Cattle Saltbush	*Atriplex polycarpa*	7613484	2104454	polygon
Cattle Saltbush	*Atriplex polycarpa*	7614976	2104733	polygon
Cattle Saltbush	*Atriplex polycarpa*	7609838	2104453	polygon
Cattle Saltbush	*Atriplex polycarpa*	7613493	2104577	polygon
Cattle Saltbush	*Atriplex polycarpa*	7613308	2104412	polygon
Cattle Saltbush	*Atriplex polycarpa*	7620387	2105328	polygon
Desert Tobacco	*Nicotiana obtusifolia*	7613934	2099201	point
Desert Tobacco	*Nicotiana obtusifolia*	7613938	2099193	point
Desert Tobacco	*Nicotiana obtusifolia*	7613944	2099150	point
Desert Tobacco	*Nicotiana obtusifolia*	7614910	2101436	point
Desert Tobacco	*Nicotiana obtusifolia*	7616665	2101247	point
Desert Tobacco	*Nicotiana obtusifolia*	7616665	2101190	point
Desert Tobacco	*Nicotiana obtusifolia*	7616667	2101192	point
Desert Tobacco	*Nicotiana obtusifolia*	7618082	2100693	point
Desert Tobacco	*Nicotiana obtusifolia*	7618262	2100734	point
Desert Tobacco	*Nicotiana obtusifolia*	7619017	2107920	point
Desert Tobacco	*Nicotiana obtusifolia*	7619042	2107879	point
Desert Tobacco	*Nicotiana obtusifolia*	7619088	2107136	point
Herbs				
Broad-leaved Cattail	*Typha latifolia*	7617995	2101230	Polygon
Broad-leaved Cattail	*Typha latifolia*	7609791	2106207	Polygon
Broad-leaved Cattail	*Typha latifolia*	7614223	2104914	Polygon
Broad-leaved Cattail	*Typha latifolia*	7614180	2105232	Point
Broad-leaved Cattail	*Typha latifolia*	7614225	2105228	Point

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Broad-leaved Cattail	*Typha latifolia*	7614287	2105132	Point
Broad-leaved Cattail	*Typha latifolia*	7615181	2104503	Point
Broad-leaved Cattail	*Typha latifolia*	7618034	2101240	Point
Broad-leaved Cattail	*Typha latifolia*	7618044	2101242	Point
Broad-leaved Cattail	*Typha latifolia*	7618297	2100757	Point
Chia	*Salvia columbariae*	7607781	2104781	Point
Chia	*Salvia columbariae*	7612669	2104092	Point
Chia	*Salvia columbariae*	7613901	2098879	Point
Chia	*Salvia columbariae*	7613923	2098883	Point
Chia	*Salvia columbariae*	7613930	2099013	Point
Chia	*Salvia columbariae*	7614906	2102045	Point
Chia	*Salvia columbariae*	7615006	2101218	Point
Chia	*Salvia columbariae*	7619872	2107440	Point
Chia	*Salvia columbariae*	7619885	2107465	Point
Chia	*Salvia columbariae*	7619901	2107487	Point
Chia	*Salvia columbariae*	7620034	2107533	Point
Chia	*Salvia columbariae*	7620046	2107543	Point
Chia	*Salvia columbariae*	7620049	2107549	Point
Chia	*Salvia columbariae*	7620092	2107569	Point
Chia	*Salvia columbariae*	7620134	2107601	Point
Chia	*Salvia columbariae*	7620198	2107622	Point
Chia	*Salvia columbariae*	7620220	2107651	Point
Common Reed	*Phragmites australis*	7617118	2100913	Polygon
Common Reed	*Phragmites australis*	7616865	2101260	Polygon
Common Reed	*Phragmites australis*	7612942	2105474	Polygon
Common Reed	*Phragmites australis*	7616897	2101545	Polygon
Common Reed	*Phragmites australis*	7617696	2102615	Polygon
Common Reed	*Phragmites australis*	7617781	2101388	Polygon
Common Reed	*Phragmites australis*	7612936	2105455	Point
Common Reed	*Phragmites australis*	7613024	2105694	Point
Common Reed	*Phragmites australis*	7613139	2105507	Point
Common Reed	*Phragmites australis*	7616458	2102646	Point
Common Reed	*Phragmites australis*	7617672	2102594	Point
Common Reed	*Phragmites australis*	7617765	2101401	Point
Common Reed	*Phragmites australis*	7618011	2102884	Point
Desert Lilly	*Hesperocallis undulata*	7620416	2105191	Polygon
Desert Lilly	*Hesperocallis undulata*	7620583	2105392	Polygon
Desert Lilly	*Hesperocallis undulata*	7620766	2105699	Polygon
Desert Lilly	*Hesperocallis undulata*	7620790	2105763	Polygon
Desert Lilly	*Hesperocallis undulata*	7620819	2105810	Polygon
Desert Lilly	*Hesperocallis undulata*	7621177	2106465	Polygon
Desert Lilly	*Hesperocallis undulata*	7621248	2106618	Polygon

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Desert Lilly	*Hesperocallis undulata*	7621234	2106513	Polygon
Desert Lilly	*Hesperocallis undulata*	7613228	2102976	Polygon
Desert lilly	*Hesperocallis undulata*	7613121	2102931	Point
Desert lilly	*Hesperocallis undulata*	7613141	2102949	Point
Desert lilly	*Hesperocallis undulata*	7613202	2102838	Point
Desert lilly	*Hesperocallis undulata*	7613207	2102978	Point
Desert lilly	*Hesperocallis undulata*	7613245	2102948	Point
Desert lilly	*Hesperocallis undulata*	7613255	2102933	Point
Desert lilly	*Hesperocallis undulata*	7613609	2100603	Point
Desert lilly	*Hesperocallis undulata*	7613703	2100925	Point
Desert lilly	*Hesperocallis undulata*	7613740	2101077	Point
Desert lilly	*Hesperocallis undulata*	7613753	2100988	Point
Desert lilly	*Hesperocallis undulata*	7613788	2100650	Point
Desert lilly	*Hesperocallis undulata*	7613794	2101119	Point
Desert lilly	*Hesperocallis undulata*	7613809	2101125	Point
Desert lilly	*Hesperocallis undulata*	7613832	2101124	Point
Desert lilly	*Hesperocallis undulata*	7613913	2101201	Point
Desert lilly	*Hesperocallis undulata*	7613964	2101196	Point
Desert lilly	*Hesperocallis undulata*	7613988	2101154	Point
Desert lilly	*Hesperocallis undulata*	7614089	2101168	Point
Desert lilly	*Hesperocallis undulata*	7615692	2103817	Point
Desert lilly	*Hesperocallis undulata*	7619851	2103045	Point
Desert lilly	*Hesperocallis undulata*	7620228	2103414	Point
Desert lilly	*Hesperocallis undulata*	7620521	2105272	Point
Desert lilly	*Hesperocallis undulata*	7621257	2106764	Point
Desert lilly	*Hesperocallis undulata*	7621262	2106625	Point
Desert lilly	*Hesperocallis undulata*	7621410	2106936	Point
Desert lilly	*Hesperocallis undulata*	7621576	2106973	Point
Desert lilly	*Hesperocallis undulata*	7621594	2106973	Point
Desert lilly	*Hesperocallis undulata*	7621644	2107108	Point
Desert lilly	*Hesperocallis undulata*	7621736	2107163	Point
Desert lilly	*Hesperocallis undulata*	7621841	2107187	Point
Desert lilly	*Hesperocallis undulata*	7620759	2105701	Point
Desert lilly	*Hesperocallis undulata*	7620813	2105802	Point
Desert lilly	*Hesperocallis undulata*	7621170	2106470	Point
Desert lilly	*Hesperocallis undulata*	7620583	2105395	Point
Desert lilly	*Hesperocallis undulata*	7620412	2105194	Point
Desert lilly	*Hesperocallis undulata*	7621256	2106616	Point
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	*7608421*	2104089	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7610218	2104691	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7612146	2105074	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7613861	2103110	Polygon

APPENDIX E

Locations for Culturally Significant Plants in the Survey Area

Common Name	Scientific Name	UTM Easting	UTM Northing	Data Type
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7613279	2101780	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7615029	2101138	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7616277	2100676	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7620290	2103450	Polygon
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7619604	2107554	Point
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7619258	2107217	Point
Golden suncup	*Chylismia brevipes* ssp. *brevipes*	7619280	2107213	Point
Jimson Weed	*Datura wrightii*	7618979	2107912	Point
Jimson Weed	*Datura wrightii*	7619049	2107906	Point
Jimson Weed	*Datura wrightii*	7619173	2107832	Point
Jimson Weed	*Datura wrightii*	7619190	2107835	Point
Jimson Weed	*Datura wrightii*	7619502	2105534	Point
Jimson Weed	*Datura wrightii*	7618950	2107938	Point

Topock Project Executive Abstract

Document Title: Supplemental Ethnobotanical Plant Surveys Submitting Agency: DTSC, DOI Final Document? ☒ Yes ☐ No	Date of Document: February 28, 2014 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? The field survey and this report were conducted pursuant to the resolution on 60% design comment RTC #311 DOI-140. If this work was not performed, it would constitute a non-compliance with the subject resolution.	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 measure CUL-1a-5, PG&E conducted a comprehensive ethnobotanical survey for the presence of plants with cultural significance (plants listed in Appendix PLA of the EIR) in the Topock Groundwater Remediation Project Area, with field efforts in August, October and November 2011, March 2012, and March 2013, with incidental data to support this effort also collected during the February 2012 Wetlands surveys performed under mitigation measure BIO-1. On March 29, 2013, PG&E submitted a report that summarized the 2011 and 2012 ethnobotanical survey results, and the Revised Final Topock Groundwater Remediation Ethnobotany Survey Report was submitted on January 15, 2014.

This Technical Memorandum includes the results of a December 2013 survey for two ethnobotanical plant species, Lycium and Arrowweed, conducted pursuant to the resolution on 60% design comment RTC #311 DOI-140. The Technical Memorandum includes a detailed map of Lycium and Arrowweed occurrence. The data presented with this report will be used in the groundwater remedy design and inform the risk assessment.

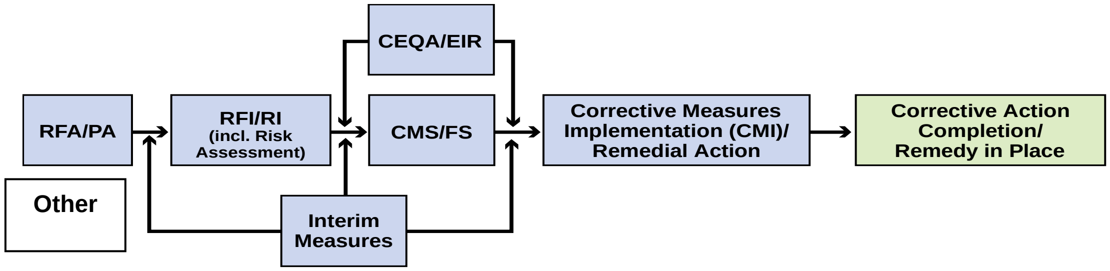
Written by: PG&E

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.

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

Yvonne J. Meeks
Manager

Environmental Remediation

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February 28, 2014

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

Subject: *Supplemental Ethnobotanical Plant Surveys for the PG&E Topock Compressor Station*

Dear Mr. Yue:

Enclosed is the Technical Memorandum reporting *Supplemental Ethnobotanical Plant Surveys for the Pacific Gas and Electric Company's Topock Compressor Station.* This Technical Memorandum presents data that was collected from a survey for two ethnobotanical plant species, Lycium and Arrowweed, conducted in December 2013 pursuant to the resolution of the 60% Basis or Design comment RTC #311 DOI-140.

This Technical Memorandum is a supplement to the January 2014 *Topock Groundwater Remediation Project Revised Ethnobotany Survey Report*. This information will be used in the groundwater remedy design and inform the risk assessment.

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

Sincerely,

Yvonne Meeks

Yvonne Meeks
Topock Project Manager

Enclosure

Supplemental Ethnobotanical Plant Surveys Technical Memorandum

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

Supplemental Ethnobotanical Plant Surveys for the Pacific Gas and Electric Company's Topock Compressor Station, San Bernardino County, California

TO:	Pacific Gas and Electric Company
COPIES:	Marjorie Eisert, CH2M HILL
FROM:	Russell Huddleston, E2 Consulting Engineers, Inc.
DATE:	February 28, 2014

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. 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 (2011) prepared and certified an Environmental Impact Report (EIR) that evaluated and prescribed mitigation measures to lessen the potential environmental impacts of the final groundwater remedy. The EIR Mitigation Measure CUL-1a-5 requires PG&E to avoid, protect, and encourage the regeneration of the culturally-significant plants to the extent feasible.

A number of botanical surveys were conducted between August 2011 and March 2013 to characterize the vegetation communities and document the flora of the project area. As part of the botanical surveys all of the ethnobotanically sensitive plants that were included in Appendix PLA of the final Environmental Impact Report (DTSC, 2011) were identified and mapped. These survey results were reported in the Revised Final Ethnobotany Survey Report (CH2M HILL, 2014).

During the November 2013 Resources Agency Meeting, the Department of the Interior requested the additional mapping of two additional ethnobotanically-significant plants arrowweed (*Pluchea sericea*) and *Lycium* spp. within the project area. This memorandum includes the methods and the results of the December 2013 mapping efforts for these two additional plants.

Methods

The location of arrowweed within the project area was primarily documented during the August 18 to 26, 2011 vegetation community mapping and mature plants surveys. During this survey, field mapping was conducted using a combination of Global Positioning System (GPS) data collection and survey or notations recorded on aerial photographs. Additional surveys to map the locations of *Lycium* and arrowweed were conducted on December 16 and 17, 2013. During the survey the locations of *Lycium* shrubs as well as any additional locations of arrowweed (not included in the 2011 vegetation maps) were mapped in the field using a hand-held GPS unit.

Results

Arrowweed thicket is most common on the low sandy terraces along the Colorado River and Park Moabi Slough (Figure 1). Arrowweed is the sole dominant shrub species with individuals widely scattered or aggregated into dense, nearly impenetrable stands. Arrowweed is often intermixed with tamarisk thickets in the Park Moabi Campground area. Arrowweed is also present in some areas, intermixed with the Western Honey Mesquite and Screwbean Mesquite habitats that were included in the original ethnobotanical survey maps; therefore these areas are not included in the supplemental map.

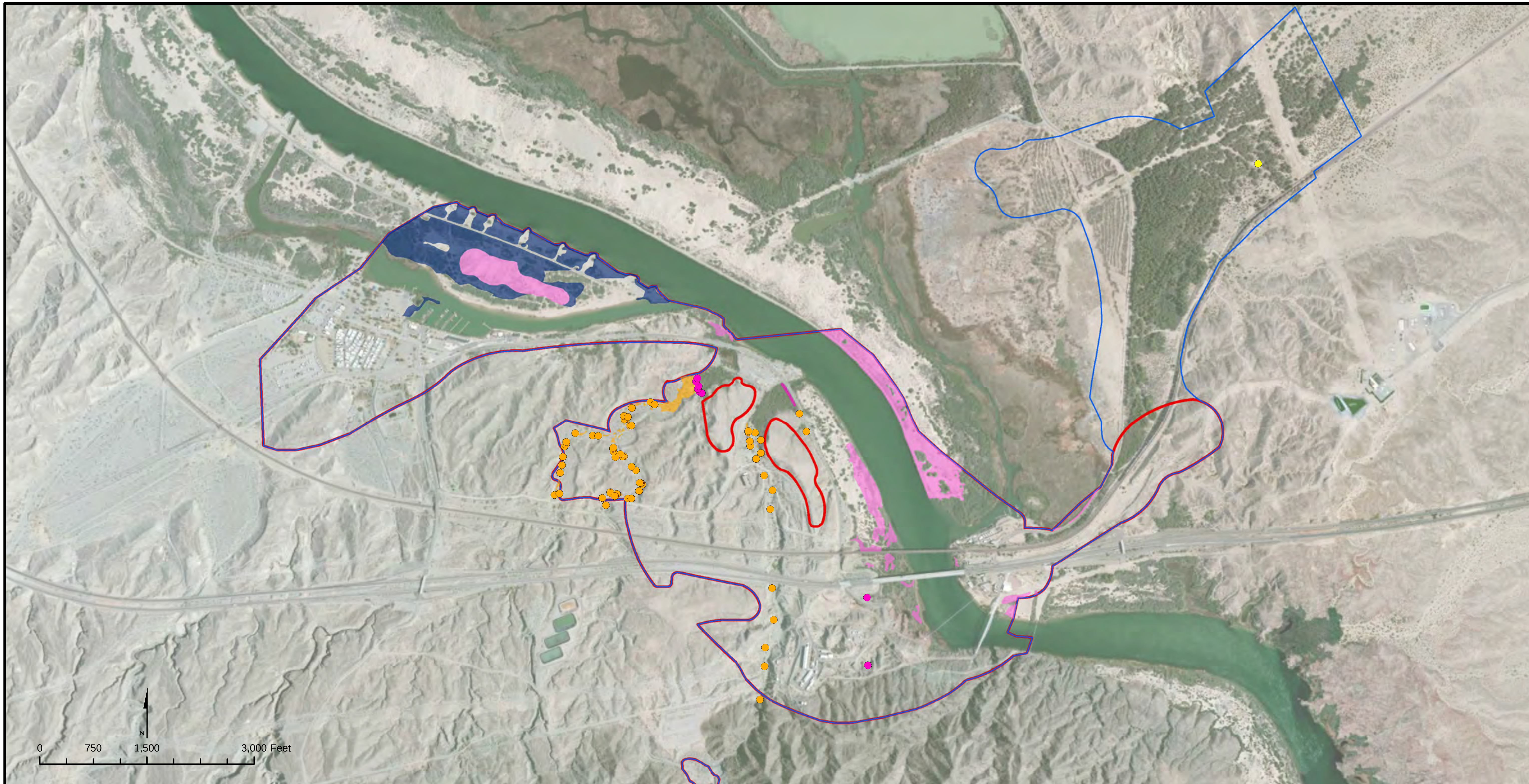
Two species of Lycium have been identified in the survey area. The most common species is peach thorn (*Lycium andersonii*) which occurs along the channel bottoms of the larger ephemeral washes of the dissected alluvial terraces south of the Colorado River (Figure 1). This species is commonly associated with species such as blue palo verde (*Parkinsonia florida*), desert lavender (*Hyptis emoryi*), catclaw acacia (*Senegalia greggii*), brittlebush (*Encelia farinosa*), sweetbush (*Bebbia juncea* var. *aspera*), and cheesebush (*Hymenoclea salsola*).

A single shrub of Anderson's desert thorn (*Lycium cooperi*) was identified south of the Sacramento Wash in Arizona, in an open area surrounded by Athel tamarisk (*Tamarix aphylla*).

References

California Department of Toxic Control Substances. 2011. Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project. January. Available on line at: http://www.dtsc-topock.com/

CH2M HILL. 2014. Revised Final Topock Groundwater Remediation Project Ethnobotany Survey Report. January.



LEGEND

- Vegetation Survey Area
- EIR Project Area
- Arrow Weed (MCV2: Arrow weed thickets)[2]
- Salt Cedar/Arrow Weed (MCV2: Tamarisk/Arrow weed thickets)[22]
- Anderson's desert thorn (*Lycium andersonii*)
- Peach Thorn (*Lycium cooperi*)
- Arrowweed (*Pluchea sericea*)
- Anderson's desert thorn (*Lycium andersonii*)
- Arrowweed (Pluchea sericea)

FIGURE 1
ADDITIONAL ETHNO-BOTANICAL PLANT LOCATIONS
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2014\EC_WORKING\FIG1_ADDL_ETHNOBOT_PLANT.MXD ECLARK1 2/25/2014 10:33:44 AM

Appendix A8
Supplemental Baseline Sound Level Measurement Technical Memorandum and Responses to Comments
(*on CD-ROM only*)

PG&E Topock Groundwater Remediation Project

Supplemental Baseline Sound Level Measurement

PREPARED FOR: Pacific Gas and Electric

PREPARED BY: Mark Bastasch, P.E., INCE/CH2M HILL

DATE: March 18, 2013

As part of the continued effort to establish baseline site conditions to support implementation of the groundwater remedy, supplemental sound level measurements were conducted at three locations from August 2 through 16, 2012, and December 5, 2012, through January 17, 2013[1]. The two monitoring events were scheduled to capture the summer and winter conditions. The sound measurement locations were selected near the short-term measurement locations in the Final Environmental Impact Report (FEIR) (DTSC, 2011) (shown in Exhibit 4.9-2 as ST-1, ST-2, and ST-3) (see Figure 1). Photographs of the monitoring location are included in Appendix A.

Methodology

As discussed in the November 8, 2012, *PG&E Topock Groundwater Remediation Project Sound Level Measurements Protocol* (included as Appendix B), sound level measurements were collected using Larson Davis Model 831 and 820 American National Standards Institute (ANSI) S1.4 Type 1 (precision) sound level meters. Meters were field calibrated with a Larson Davis CAL200 field calibrator (94 dB at 1,000 Hz). Precise monitoring locations were selected in the field by a Licensed Professional Acoustical Engineer (P.E.)[2] to minimize the influence of atypical sounds (i.e., water features or areas with unusually high insect activity) and to ensure equipment was reasonably secure. All field work was conducted under the supervision of the Acoustical P.E.

Windscreens were used to limit the creation of wind-induced self noise, as wind may result in increased measured sound levels because of vegetative noise (rustling of leaves), as well as pseudo wind noise, which is also known as wind-induced self noise across the microphone. Wind-induced self noise may be substantial at high wind speeds. This is the noise one may hear when a TV weatherperson reports during a storm or home videos are recorded under windy conditions. Wind-induced noise is minimal when measurements are conducted in wind speeds under approximately 10 miles per hour (mph).

Summary Results

During the monitoring events, average and statistical sound level metrics (L_{eq}, L_{50}, and L_{90}) were continuously collected, as were onsite meteorological data (microphone height wind speed and precipitation). Table 1 presents the range in average hourly (L_{eq}) sound levels for each monitoring location during both the daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods. Given the influence wind speed may have on the measurements, the corresponding wind speed is also presented. Note that although the wind speeds occasionally exceeded the ideal noise measurement conditions (10 mph or less) during the monitoring events, the maximum measured sound levels are considered to be reflective of the range in ambient noise conditions at the site.

Table 2 presents the range in sound levels measured at each location during the summer and winter 2012/2013 sound monitoring events as well as the short-term measurements presented in the EIR. The short-term measurements conducted for the EIR are within the range of the longer-term 2012 measurements.

[1] Note that the battery life during the winter event varied. The precise measurement duration at each monitoring location is provided in the referenced appendices.

[2] Oregon is the only state that issues a Professional Engineering license in Acoustics.

TABLE 1
Range in Hourly Average (L_{eq}) Sound Levels for Each Monitoring Location

		Daytime		Nighttime	
Date	**Location**	**Max Hourly L_{eq} (dBA)/ Wind Speed (mph)**	**Min Hourly L_{eq} (dBA) /Wind Speed (mph)**	**Max Hourly L_{eq} (dBA)/Wind Speed (mph)**	**Min Hourly L_{eq} (dBA)/ Wind Speed (mph)**
August 2012	ST-1	63 dBA/13 mph[a]	39 dBA/1 mph	61 dBA/15 mph[a]	40 dBA/1 mph
	ST-2	70 dBA/21 mph[a]	40 dBA/3 mph	62 dBA/20 mph[b]	37 dBA/1 mph
	ST-3	76 dBA/10 mph[a]	51 dBA/1 mph	64 dBA/2 mph[a]	50 dBA/1 mph
December 2012–January 2013	ST-1	63 dBA/21 mph[b]	42 dBA/1 mph	61 dBA/7 mph[b]	42 dBA/1 mph
	ST-2	75 dBA/18 mph[b]	39 dBA/1 mph	73 dBA/17 mph[b]	39 dBA/1 mph
	ST-3	69 dBA/2 mph[b]	40 dBA/1 mph	60 dBA/1 mph[b]	34 dBA/1 mph

[a] **August:**

Daytime. When the August daytime sound levels were highest at ST-1 (63 dBA) and ST-3 (76 dBA), the wind speeds were 13 mph and 10 mph, respectively. It is CH2M HILL's experience that under these conditions wind-induced self noise across the microphone is less than the measured sound levels of 63 to 76 dBA; therefore, the sound level values likely reflect a true ambient sound level condition (i.e., are not affected by wind). At ST-2, the maximum of 70 dBA occurred in 21 mph winds—this level may have been influenced by wind.

Nighttime. The August nighttime maximum level at ST-1 was similar to the daytime maximum in terms of level (61 dBA at night compared to 63 dBA during the day) and wind speed (15 mph at night compared to 13 mph during the day). These results are reasonable and not expected to have been adversely influenced by wind-induced self noise. At ST-2, the maximum of 62 dBA occurred when the winds were 20 mph which may have affected the measurements. The nighttime wind speed at ST-3 was less than 10 mph and would not be adversely impacted by wind-induced self noise.

[b] **December:**

Daytime. The December daytime maximum sound levels at ST-1 is the same (63 dBA) as the August maximum sound level, though the wind speed was substantially higher (21 mph compared to 13 mph in August). At ST-2, the maximum (75 dBA) occurred under a similar wind speed (18 mph) as the August maximum though the measured sound level was slightly louder (75 dBA) than the August measurements. At ST-3, the maximum (69 dBA) occurred under a low wind speed (2 mph) would not be adversely impacted by wind-induced self noise.

***Nighttime*.** The nighttime maximums during the December-January event at ST-1 (61 dBA) is the same as the August nighttime maximum, but occurred in slightly lower winds (7 mph). The nighttime maximum of 73 dBA at ST-2 both occurred in 17 mph winds which is noticeably louder than the nighttime maximum of 62 dBA reported in August under slightly stronger winds. There is no reason to expect louder sound levels under lower winds, therefore, the 73 dBA reported at ST-2 is likely reflective of the true ambient condition at that time. The nighttime wind sound level of 60 dBA at ST-3 of 1 mph and would not be adversely impacted by wind noise given 1 mph winds.

Detailed tabular and graphical results for each monitoring location are included in Appendix C (Location ST-1, August), Appendix D (Location ST-1, December), Appendix E (Location ST-2, August), Appendix F (Location ST-2, December), Appendix G (Location ST-3, August), and Appendix H (Location ST-3, December). There were a few brief periods of measureable precipitation during the December monitoring event as follows and were excluded from the above summaries:

14:00 on December 13 through 09:00 on December 14
21:00 to 23:00 on December 14
04:00 to 07:00 on December 15
15:00 to 16:00 on December 18

dBA = decibels (A-weighted).
L_{eq} = hourly average.
mph = miles per hour.

TABLE 2
Comparison of Average (L_{eq}) Sound Levels for Each Monitoring Location and EIR Measurements

		Daytime		Nighttime		EIR Data December 2008[a]
Date	**Location**	**Max Hourly L_{eq} (dBA)**	**Min Hourly L_{eq} (dBA)**	**Max Hourly L_{eq} (dBA)**	**Min Hourly L_{eq} (dBA)**	**$L_{eq\ (15\ min)}$ dBA**
August 2012	ST-1	63 dBA	39 dBA	61 dBA	40 dBA	47 dBA
	ST-2	70 dBA	40 dBA	62 dBA	37 dBA	41 dBA
	ST-3	76 dBA	51 dBA	64 dBA	50 dBA	58 dBA
December 2012–January 2013	ST-1	63 dBA	42 dBA	61 dBA	42 dBA	47 dBA
	ST-2	75 dBA	39 dBA	73 dBA	39 dBA	41 dBA
	ST-3	69 dBA	40 dBA	60 dBA	34 dBA	58 dBA

[a] A single 15-minute measurement was collected at these locations in December 2008 for the EIR (DTSC 2011).

dBA = decibels (A-weighted).
L_{eq} = hourly average.

Reference

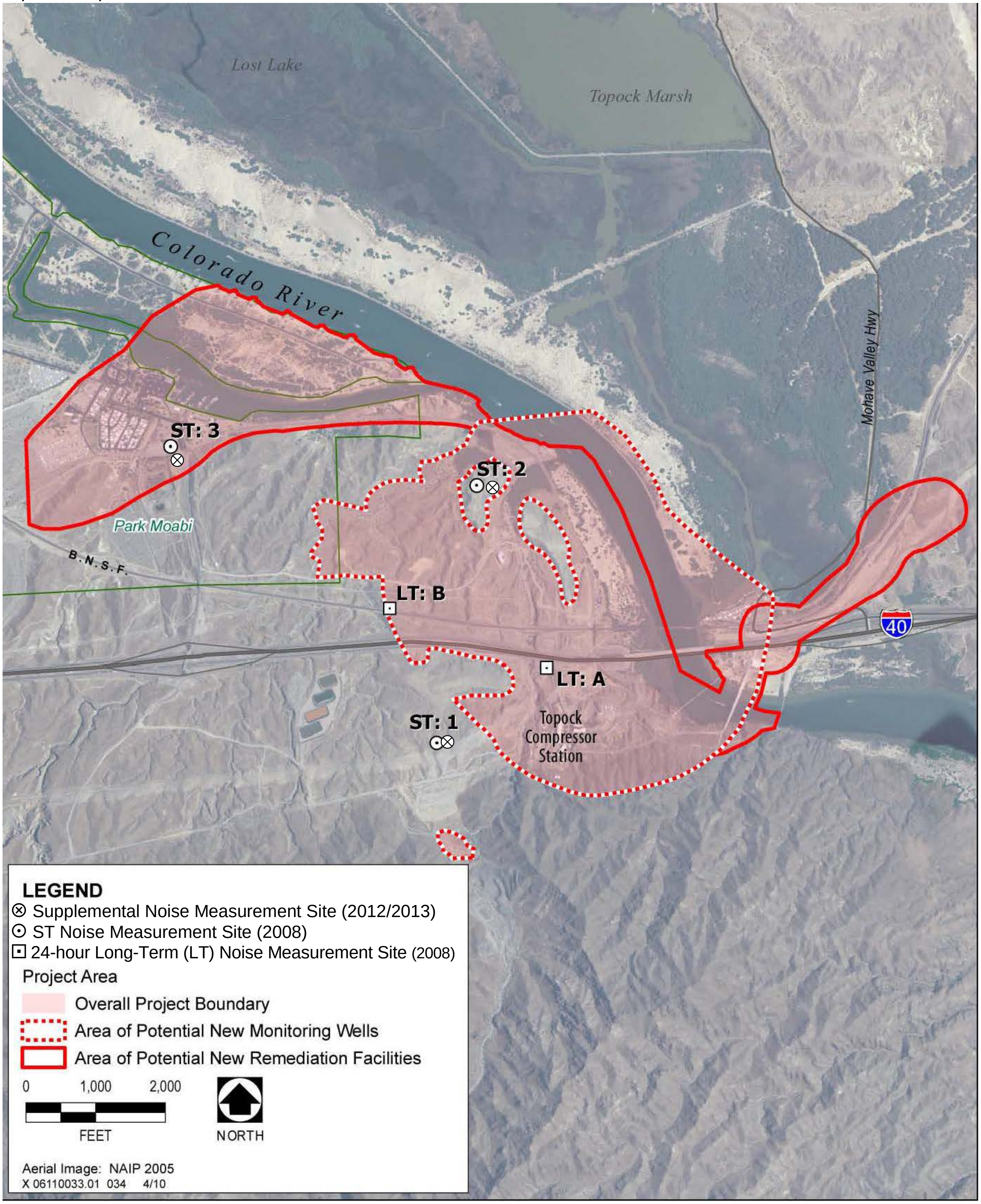
California Department of Toxic Substances Control (DTSC). 2011. *Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project*. January.

Figure

FIGURE 1

Noise Measurement Locations

Topock Compressor Station



Adapted by CH2M HILL, 2013

Source: Exhibit 4.9-2, California Department of Toxic Substances Control, *Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project,* January 2011.

Appendix A
Photographs of the Monitoring Location

Photo Log

ST-1 Looking East

ST-1 Looking North

ST-1 Looking West

ST-1 Panoramic View 1

ST-1 Panoramic View 2

ST-2 Looking East

ST-2 Looking West

ST-2 Looking West View 2

ST-2 Panoramic View 1

ST-2 Panoramic View 2

ST-2 December 2012 View 1

ST-2 December 2012 View 2

ST-3 Detail View

ST-3 South View 1

ST-3 South View 2

ST-3 South View 3

ST-3 West View

ST-3 Panoramic View 1

ST-3 Panoramic View 2

ST-3 South View 4

Appendix B
PG&E Topock Groundwater Remediation Project Sound Level Measurements Protocol

MEMORANDUM CH2MHILL

PG&E Topock Groundwater Remediation Project Sound Level Measurements Protocol

TO: Pacific Gas and Electric

FROM: Mark Bastasch, P.E., INCE/CH2M HILL

DATE: November 8, 2012

As part of the continued effort to establish baseline site conditions to support implementation of the groundwater remedy, supplemental sound level measurements were conducted at three locations from August 2 through 16, 2012. The sound measurement locations were selected near the short term noise measurement locations in the Environmental Impact Report (EIR) (DTSC, 2011) (shown in Exhibit 4.9-2 as ST-1, ST-2, and ST-3).

Sound level measurements were collected using Larson Davis Model 831 and 820 American National Standards Institute (ANSI) S1.4 Type 1 (precision) sound level meters (see photos below). Meters were field calibrated with a Larson Davis CAL200 field calibrator (94 dBA at 1000 Hz). Precise monitoring locations were selected in the field by a Licensed Professional Acoustical Engineer (P.E.) to minimize the influence of atypical sounds (i.e., water features or areas with unusually high insect activity) and to ensure equipment was reasonably secure. All field work was conducted under the supervision of the Acoustical P.E. Average and statistical sound level metrics (L_{eq}, L_{50} and L_{90}) were continuously collected as was on-site meteorological data (microphone height wind speed and precipitation).

Additional measurements are planned for late 2012, the supplemental data will be combined with the existing noise data (collected as part of the certified EIR) and summarized in future reports.

Reference:

California Department of Toxic Substances Control (DTSC). 2011. *Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project*. January.

Photograph 1: Temporary Noise Monitoring Station set up in proximity to ST-3 noise measurement location in the certified EIR (DTSC, 2011), taken August 2012.

Photograph 2: Temporary Noise Monitoring Station set up in proximity to ST-1 noise measurement location in the certified EIR (DTSC, 2011), taken August 2012.

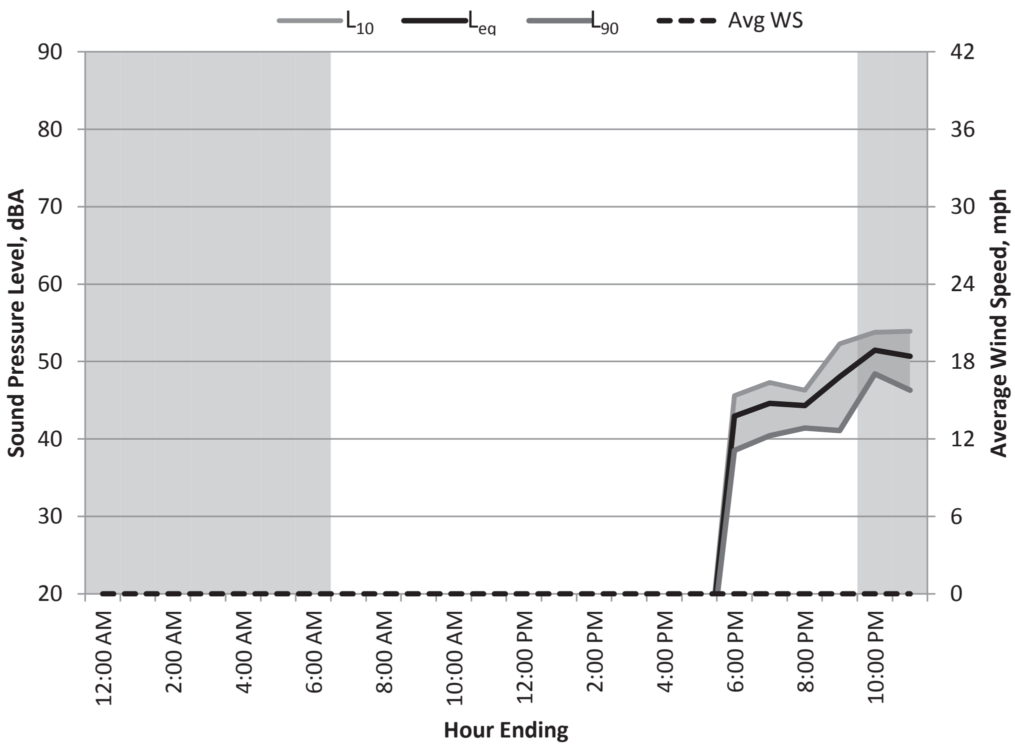
Appendix C
ST-1 August Measurements

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/2/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



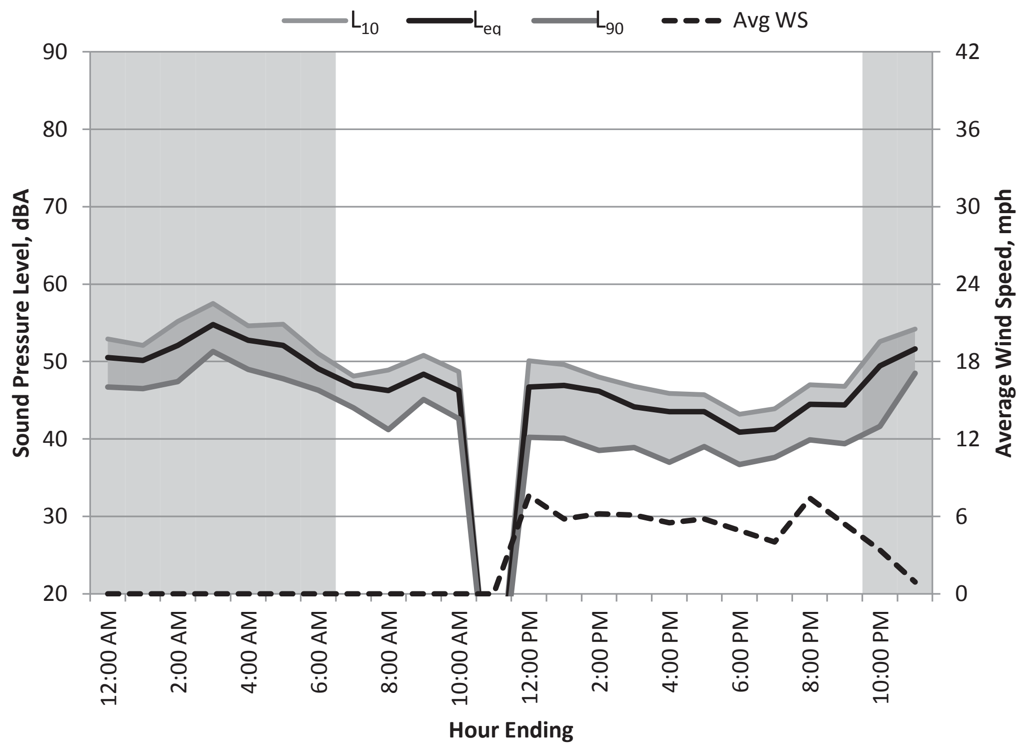
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	--	--	--	--	--	--	--	--
1:00	Night	--	--	--	--	--	--	--	--
2:00	Night	--	--	--	--	--	--	--	--
3:00	Night	--	--	--	--	--	--	--	--
4:00	Night	--	--	--	--	--	--	--	--
5:00	Night	--	--	--	--	--	--	--	--
6:00	Night	--	--	--	--	--	--	--	--
7:00	Day	--	--	--	--	--	--	--	--
8:00	Day	--	--	--	--	--	--	--	--
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	--	--	--	--	--	--	--	--
14:00	Day	--	--	--	--	--	--	--	--
15:00	Day	--	--	--	--	--	--	--	--
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	--	--	--	--	--	--	--	--
18:00	Day	43	58	36	51	46	41	39	--
19:00	Day	45	52	37	50	47	44	40	--
20:00	Day	44	53	39	50	46	44	41	--
21:00	Day	48	59	37	56	52	45	41	--
22:00	Night	51	58	47	56	54	51	48	--
23:00	Night	51	60	44	56	54	49	46	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	--	--	--	--	--	--	--	--
10pm-7am	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/3/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



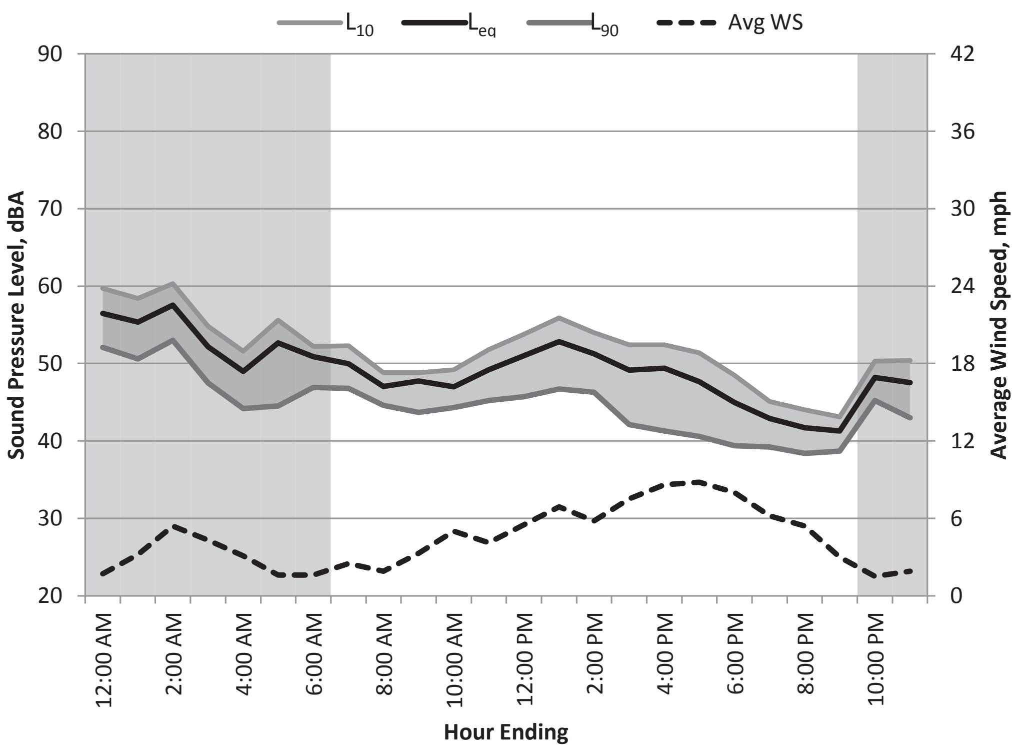
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	62	44	57	53	49	47	--
1:00	Night	50	61	44	55	52	50	47	--
2:00	Night	52	60	43	57	55	51	47	--
3:00	Night	55	60	49	60	58	54	51	--
4:00	Night	53	57	47	56	55	53	49	--
5:00	Night	52	66	46	57	55	51	48	--
6:00	Night	49	59	44	55	51	48	46	--
7:00	Day	47	57	41	52	48	47	44	--
8:00	Day	46	54	38	51	49	46	41	--
9:00	Day	48	55	42	53	51	48	45	--
10:00	Day	46	56	39	52	49	45	43	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	47	62	36	55	50	44	40	8
13:00	Day	47	57	36	53	50	46	40	6
14:00	Day	46	66	35	54	48	43	39	6
15:00	Day	44	57	35	51	47	43	39	6
16:00	Day	44	61	32	53	46	41	37	6
17:00	Day	44	58	36	52	46	41	39	6
18:00	Day	41	54	34	47	43	40	37	5
19:00	Day	41	53	34	48	44	40	38	4
20:00	Day	44	56	35	52	47	43	40	7
21:00	Day	44	58	35	53	47	43	39	5
22:00	Night	49	60	36	57	53	48	42	3
23:00	Night	52	58	45	57	54	51	49	1
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	55	66	49	60	58	54	51	--
10pm-7am	Median	52	60	44	57	54	51	47	--
	Min	49	57	36	55	51	48	42	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/4/2012

24hr Summary

L_{DN} = 60 dBA | C_{NEL} = 60 dBA | $L_{eq(24hr)}$ = 51 dBA



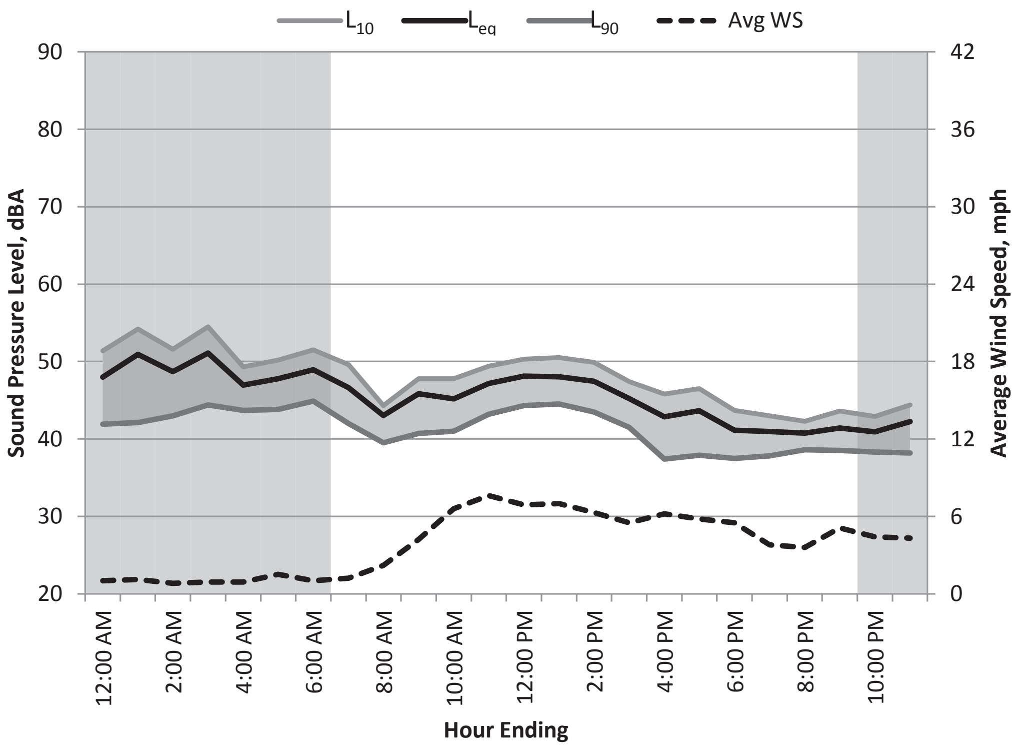
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	56	64	49	62	60	55	52	2
1:00	Night	55	63	45	61	58	54	51	3
2:00	Night	58	65	49	63	60	56	53	5
3:00	Night	52	64	44	59	55	51	48	4
4:00	Night	49	57	40	54	52	48	44	3
5:00	Night	53	63	37	60	56	52	45	2
6:00	Night	51	65	44	59	52	50	47	2
7:00	Day	50	60	45	56	52	49	47	3
8:00	Day	47	56	42	53	49	46	45	2
9:00	Day	48	64	42	58	49	46	44	3
10:00	Day	47	55	42	52	49	46	44	5
11:00	Day	49	57	42	55	52	48	45	4
12:00	Day	51	66	43	59	54	49	46	6
13:00	Day	53	62	43	59	56	52	47	7
14:00	Day	51	61	42	57	54	50	46	6
15:00	Day	49	61	37	58	52	47	42	8
16:00	Day	49	64	38	60	52	46	41	9
17:00	Day	48	61	36	57	51	45	41	9
18:00	Day	45	57	36	52	49	43	39	8
19:00	Day	43	54	37	49	45	42	39	6
20:00	Day	42	50	36	47	44	41	38	5
21:00	Day	41	47	35	46	43	41	39	3
22:00	Night	48	58	39	54	50	48	45	2
23:00	Night	48	56	39	54	50	46	43	2
Overall	Max	58	66	49	63	60	56	53	9
	Median	49	61	42	57	52	48	45	4
	Min	41	47	35	46	43	41	38	2
Daytime	Max	53	66	45	60	56	52	47	9
7am-10pm	Median	48	60	42	56	51	46	44	6
	Min	41	47	35	46	43	41	38	2
Nighttime	Max	58	65	49	63	60	56	53	5
10pm-7am	Median	52	63	44	59	55	51	47	2
	Min	48	56	37	54	50	46	43	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/5/2012

24hr Summary

L_{DN} = 54 dBA | C_{NEL} = 54 dBA | $L_{eq(24hr)}$ = 47 dBA



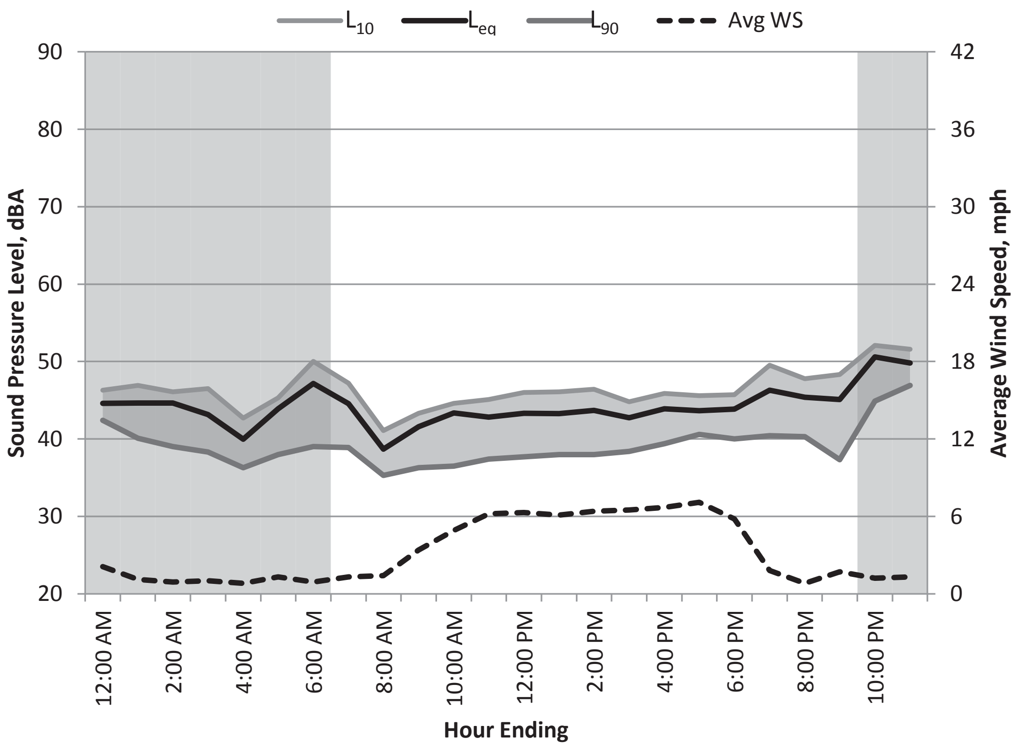
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	62	39	57	51	45	42	1
1:00	Night	51	62	39	59	54	49	42	1
2:00	Night	49	58	41	56	52	47	43	1
3:00	Night	51	61	41	58	55	50	44	1
4:00	Night	47	57	41	52	49	46	44	1
5:00	Night	48	59	41	53	50	47	44	2
6:00	Night	49	61	43	57	52	47	45	1
7:00	Day	47	59	40	55	50	44	42	1
8:00	Day	43	58	37	52	44	41	40	2
9:00	Day	46	63	39	55	48	43	41	4
10:00	Day	45	56	37	51	48	44	41	7
11:00	Day	47	58	40	54	49	46	43	8
12:00	Day	48	61	41	55	50	47	44	7
13:00	Day	48	58	42	54	51	47	45	7
14:00	Day	47	58	41	54	50	46	44	6
15:00	Day	45	57	38	52	47	44	42	6
16:00	Day	43	55	35	51	46	41	37	6
17:00	Day	44	60	34	51	47	42	38	6
18:00	Day	41	51	35	47	44	40	38	6
19:00	Day	41	50	34	47	43	40	38	4
20:00	Day	41	47	36	45	42	40	39	4
21:00	Day	41	50	36	47	44	41	39	5
22:00	Night	41	51	35	45	43	40	38	4
23:00	Night	42	52	36	49	44	41	38	4
Overall	Max	51	63	43	59	55	50	45	8
	Median	46	58	39	53	49	44	42	4
	Min	41	47	34	45	42	40	37	1
Daytime	Max	48	63	42	55	51	47	45	8
7am-10pm	Median	45	58	37	52	47	43	41	6
	Min	41	47	34	45	42	40	37	1
Nighttime	Max	51	62	43	59	55	50	45	4
10pm-7am	Median	48	59	41	56	51	47	43	1
	Min	41	51	35	45	43	40	38	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/6/2012

24hr Summary

L_{DN} = 53 dBA C_{NEL} = 53 dBA $L_{eq(24hr)}$ = 45 dBA



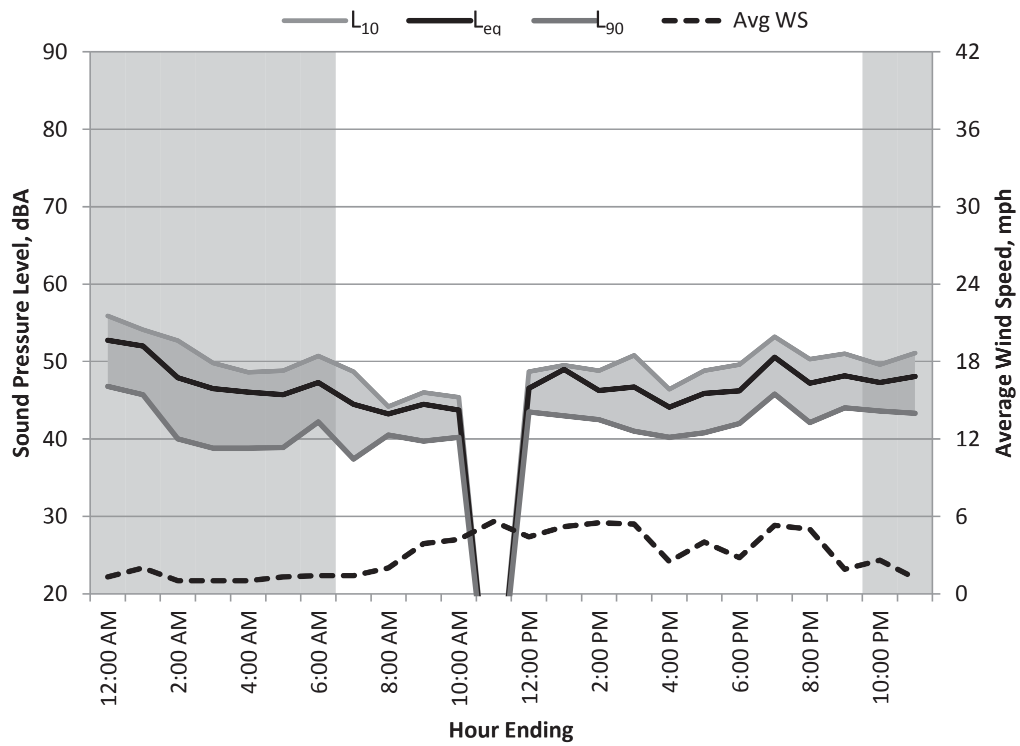
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	51	40	48	46	44	42	2
1:00	Night	45	53	36	49	47	44	40	1
2:00	Night	45	59	33	55	46	41	39	1
3:00	Night	43	52	36	51	47	41	38	1
4:00	Night	40	49	34	45	43	39	36	1
5:00	Night	44	58	34	55	45	41	38	1
6:00	Night	47	60	32	58	50	44	39	1
7:00	Day	45	59	36	53	47	43	39	1
8:00	Day	39	45	33	44	41	38	35	1
9:00	Day	42	57	33	51	43	39	36	3
10:00	Day	43	64	33	54	45	40	37	5
11:00	Day	43	61	33	51	45	41	37	6
12:00	Day	43	58	34	52	46	41	38	6
13:00	Day	43	56	35	53	46	41	38	6
14:00	Day	44	60	34	52	46	41	38	6
15:00	Day	43	56	36	51	45	41	38	7
16:00	Day	44	58	37	53	46	42	39	7
17:00	Day	44	52	36	49	46	43	41	7
18:00	Day	44	58	37	52	46	42	40	6
19:00	Day	46	60	37	56	50	43	40	2
20:00	Day	45	60	36	53	48	44	40	1
21:00	Day	45	57	31	53	48	43	37	2
22:00	Night	51	68	40	60	52	48	45	1
23:00	Night	50	60	44	55	52	49	47	1
Overall	Max	51	68	44	60	52	49	47	7
	Median	44	58	35	53	46	42	39	2
	Min	39	45	31	44	41	38	35	1
Daytime	Max	46	64	37	56	50	44	41	7
7am-10pm	Median	44	58	35	52	46	41	38	6
	Min	39	45	31	44	41	38	35	1
Nighttime	Max	51	68	44	60	52	49	47	2
10pm-7am	Median	45	58	36	55	47	44	39	1
	Min	40	49	32	45	43	39	36	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/7/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



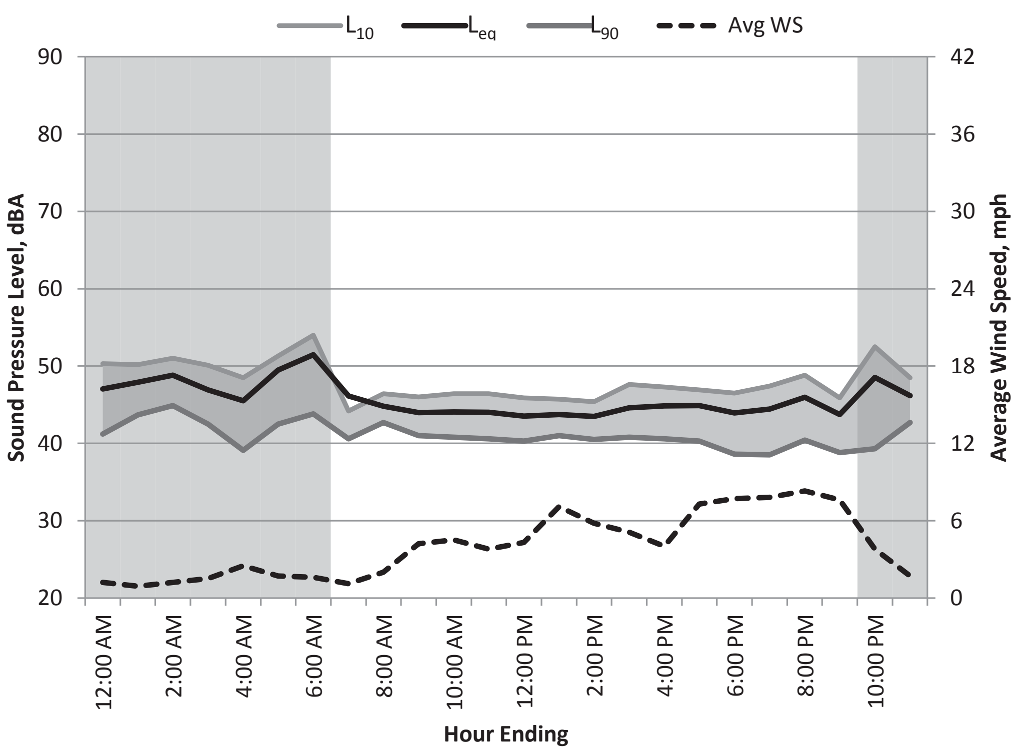
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	64	44	62	56	51	47	1
1:00	Night	52	65	42	60	54	51	46	2
2:00	Night	48	58	36	56	53	45	40	1
3:00	Night	47	61	36	56	50	43	39	1
4:00	Night	46	60	35	56	49	44	39	1
5:00	Night	46	56	35	53	49	44	39	1
6:00	Night	47	60	38	54	51	45	42	1
7:00	Day	44	60	34	54	49	40	37	1
8:00	Day	43	59	38	51	44	42	41	2
9:00	Day	44	64	36	54	46	42	40	4
10:00	Day	44	58	38	52	45	42	40	4
11:00	Day	--	--	--	--	--	--	--	6
12:00	Day	47	55	41	52	49	46	44	4
13:00	Day	49	71	40	61	50	46	43	5
14:00	Day	46	56	40	53	49	45	43	6
15:00	Day	47	57	38	55	51	44	41	5
16:00	Day	44	54	37	50	46	43	40	3
17:00	Day	46	57	39	53	49	44	41	4
18:00	Day	46	58	39	54	50	44	42	3
19:00	Day	51	58	43	56	53	50	46	5
20:00	Day	47	55	37	53	50	46	42	5
21:00	Day	48	57	41	54	51	47	44	2
22:00	Night	47	57	40	52	50	47	44	3
23:00	Night	48	58	38	54	51	47	43	1
Overall	Max	--	--	--	--	--	--	--	6
	Median	--	--	--	--	--	--	--	3
	Min	--	--	--	--	--	--	--	1
Daytime 7am-10pm	Max	--	--	--	--	--	--	--	6
	Median	--	--	--	--	--	--	--	4
	Min	--	--	--	--	--	--	--	1
Nighttime 10pm-7am	Max	53	65	44	62	56	51	47	3
	Median	47	60	38	56	51	45	42	1
	Min	46	56	35	52	49	43	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/8/2012

24hr Summary

L_{DN} = 54 dBA C_{NEL} = 55 dBA $L_{eq(24hr)}$ = 46 dBA



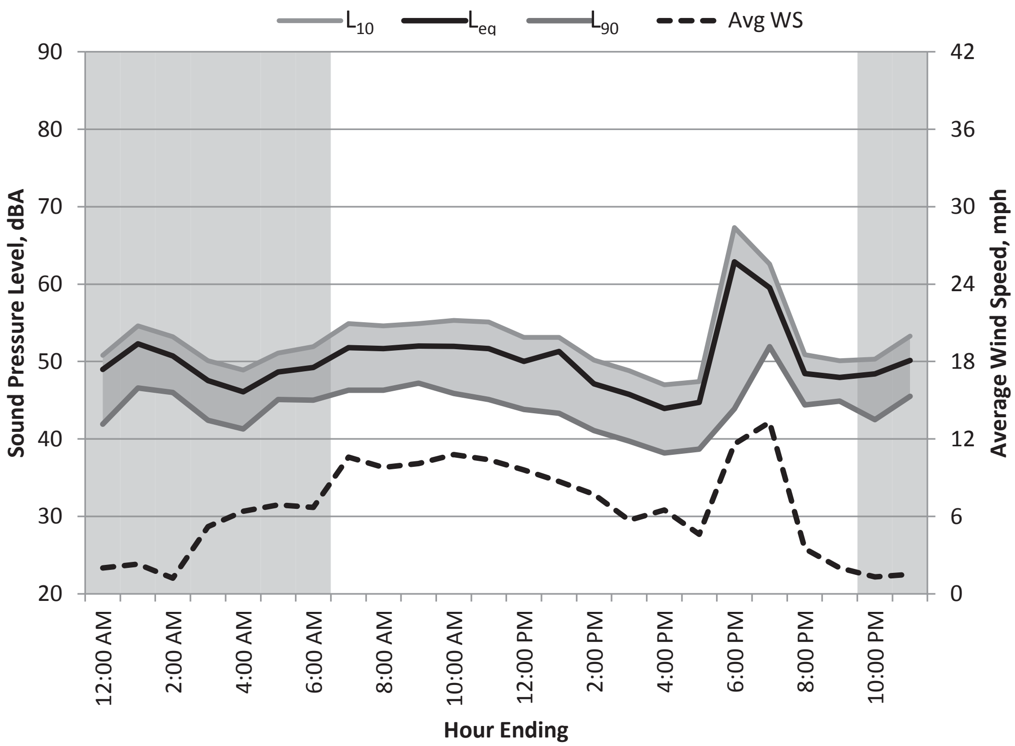
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	61	37	55	50	45	41	1
1:00	Night	48	57	41	52	50	48	44	1
2:00	Night	49	55	40	54	51	48	45	1
3:00	Night	47	54	39	52	50	45	43	2
4:00	Night	46	58	34	51	49	44	39	3
5:00	Night	49	68	40	59	51	47	43	2
6:00	Night	51	68	39	60	54	49	44	2
7:00	Day	46	64	38	60	44	42	41	1
8:00	Day	45	50	41	48	46	45	43	2
9:00	Day	44	51	39	49	46	43	41	4
10:00	Day	44	51	38	49	46	43	41	5
11:00	Day	44	53	38	50	46	43	41	4
12:00	Day	44	53	37	49	46	43	40	4
13:00	Day	44	51	37	49	46	43	41	7
14:00	Day	43	54	37	48	45	43	41	6
15:00	Day	45	54	38	51	48	43	41	5
16:00	Day	45	54	36	51	47	44	41	4
17:00	Day	45	60	35	53	47	43	40	7
18:00	Day	44	56	33	52	47	42	39	8
19:00	Day	44	56	31	52	47	43	39	8
20:00	Day	46	60	33	55	49	44	40	8
21:00	Day	44	59	33	51	46	43	39	8
22:00	Night	49	61	35	57	53	45	39	4
23:00	Night	46	55	41	51	49	45	43	2
Overall	Max	51	68	41	60	54	49	45	8
	Median	45	56	38	52	47	44	41	4
	Min	43	50	31	48	44	42	39	1
Daytime	Max	46	64	41	60	49	45	43	8
7am-10pm	Median	44	54	37	51	46	43	41	5
	Min	43	50	31	48	44	42	39	1
Nighttime	Max	51	68	41	60	54	49	45	4
10pm-7am	Median	48	58	39	54	50	45	43	2
	Min	46	54	34	51	49	44	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/9/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 53 dBA

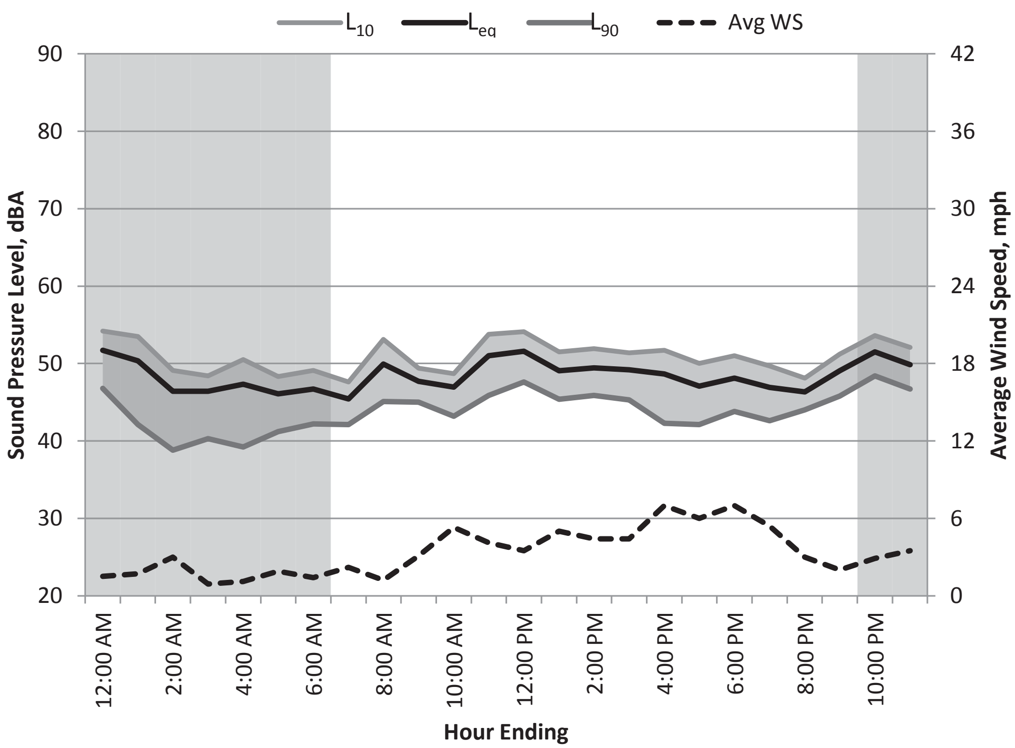


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	66	38	58	51	47	42	2
1:00	Night	52	65	40	62	55	50	47	2
2:00	Night	51	62	40	58	53	50	46	1
3:00	Night	48	58	38	53	50	47	42	5
4:00	Night	46	59	38	54	49	44	41	6
5:00	Night	49	57	42	54	51	48	45	7
6:00	Night	49	59	41	56	52	48	45	7
7:00	Day	52	65	41	59	55	50	46	11
8:00	Day	52	65	43	58	55	50	46	10
9:00	Day	52	63	43	59	55	51	47	10
10:00	Day	52	63	41	59	55	50	46	11
11:00	Day	52	63	41	60	55	50	45	10
12:00	Day	50	65	39	59	53	48	44	10
13:00	Day	51	74	39	61	53	48	43	9
14:00	Day	47	62	36	55	50	45	41	8
15:00	Day	46	60	36	52	49	44	40	6
16:00	Day	44	61	35	52	47	41	38	7
17:00	Day	45	58	35	53	47	43	39	5
18:00	Day	63	80	41	74	67	49	44	12
19:00	Day	60	74	47	70	63	56	52	13
20:00	Day	48	58	41	55	51	47	44	4
21:00	Day	48	55	42	54	50	47	45	2
22:00	Night	48	66	38	58	50	46	43	1
23:00	Night	50	61	41	57	53	48	46	2
Overall	Max	63	80	47	74	67	56	52	13
	Median	50	63	40	58	53	48	45	7
	Min	44	55	35	52	47	41	38	1
Daytime	Max	63	80	47	74	67	56	52	13
7am-10pm	Median	51	63	41	59	53	48	44	10
	Min	44	55	35	52	47	41	38	2
Nighttime	Max	52	66	42	62	55	50	47	7
10pm-7am	Median	49	61	40	57	51	48	45	2
	Min	46	57	38	53	49	44	41	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-1
DATE:	8/10/2012

24hr Summary

L_{DN} = 55 dBA　　C_{NEL} = 56 dBA　　$L_{eq(24hr)}$ = 49 dBA



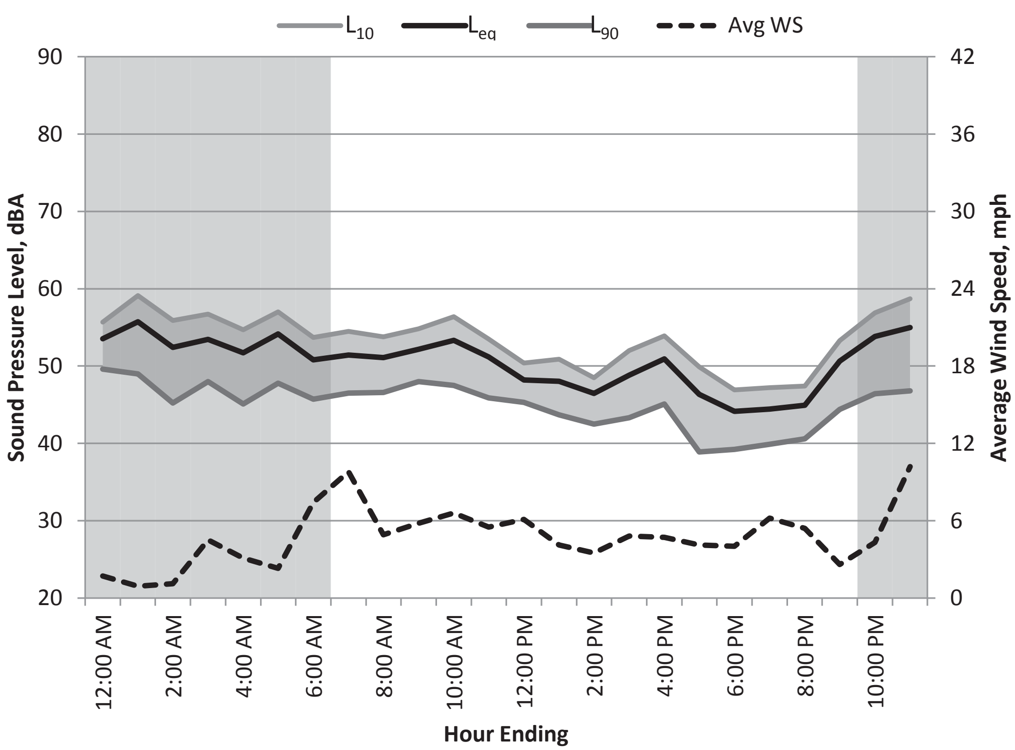
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	52	61	44	57	54	51	47	2
1:00	Night	50	62	36	57	54	49	42	2
2:00	Night	46	62	34	56	49	44	39	3
3:00	Night	46	62	37	57	48	44	40	1
4:00	Night	47	62	34	58	51	44	39	1
5:00	Night	46	61	36	54	48	45	41	2
6:00	Night	47	60	39	54	49	45	42	1
7:00	Day	45	56	39	51	48	45	42	2
8:00	Day	50	60	42	59	53	47	45	1
9:00	Day	48	59	43	54	49	47	45	3
10:00	Day	47	60	40	55	49	45	43	5
11:00	Day	51	60	41	57	54	50	46	4
12:00	Day	52	60	44	57	54	51	48	4
13:00	Day	49	57	43	55	52	48	45	5
14:00	Day	49	57	43	55	52	49	46	4
15:00	Day	49	65	42	57	51	48	45	4
16:00	Day	49	59	39	55	52	47	42	7
17:00	Day	47	57	39	54	50	46	42	6
18:00	Day	48	59	41	55	51	47	44	7
19:00	Day	47	56	39	53	50	46	43	5
20:00	Day	46	54	41	51	48	46	44	3
21:00	Day	49	61	44	54	51	48	46	2
22:00	Night	52	57	46	56	54	51	48	3
23:00	Night	50	56	43	55	52	49	47	4
Overall	Max	52	65	46	59	54	51	48	7
	Median	48	60	41	55	51	47	44	3
	Min	45	54	34	51	48	44	39	1
Daytime 7am-10pm	Max	52	65	44	59	54	51	48	7
	Median	49	59	41	55	51	47	45	4
	Min	45	54	39	51	48	45	42	1
Nighttime 10pm-7am	Max	52	62	46	58	54	51	48	4
	Median	47	61	37	56	51	45	42	2
	Min	46	56	34	54	48	44	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/11/2012

24hr Summary

L_{DN} = 60 dBA | C_{NEL} = 60 dBA | $L_{eq(24hr)}$ = 52 dBA



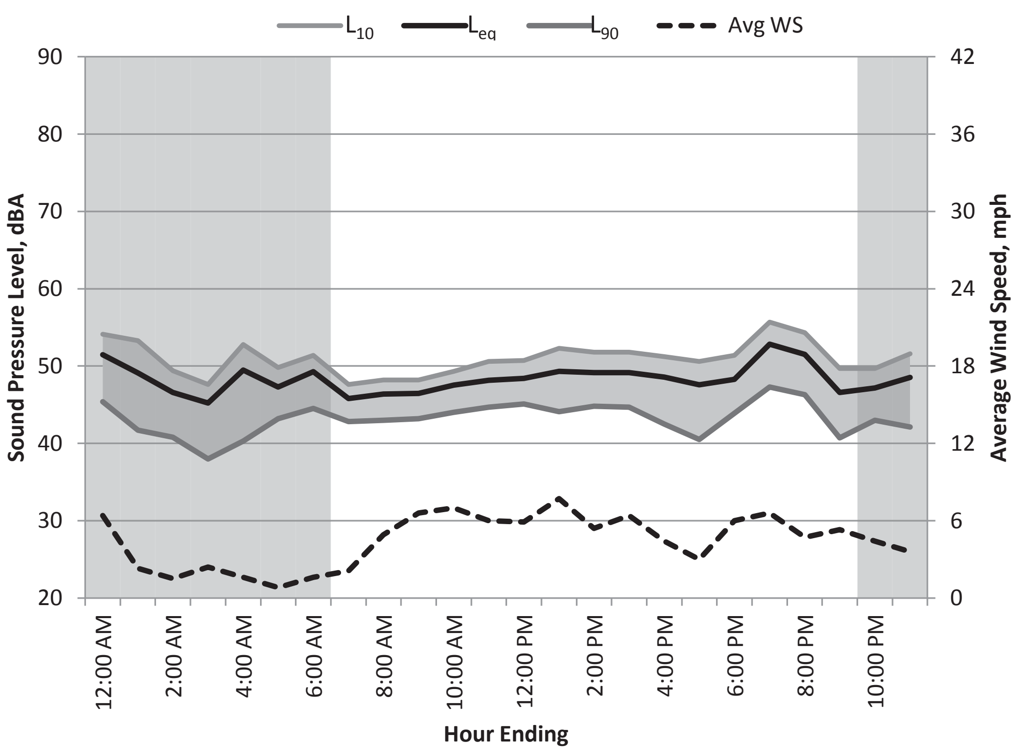
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	54	61	45	58	56	53	50	2
1:00	Night	56	64	46	62	59	54	49	1
2:00	Night	52	61	40	59	56	50	45	1
3:00	Night	53	61	44	60	57	52	48	5
4:00	Night	52	65	42	59	55	50	45	3
5:00	Night	54	63	43	59	57	54	48	2
6:00	Night	51	62	41	58	54	49	46	7
7:00	Day	51	62	42	59	55	50	47	10
8:00	Day	51	61	43	57	54	50	47	5
9:00	Day	52	62	45	58	55	51	48	6
10:00	Day	53	62	42	60	56	52	48	7
11:00	Day	51	66	42	62	54	49	46	6
12:00	Day	48	55	43	53	50	48	45	6
13:00	Day	48	61	41	54	51	47	44	4
14:00	Day	46	61	40	55	49	45	43	4
15:00	Day	49	61	41	56	52	47	43	5
16:00	Day	51	60	41	57	54	50	45	5
17:00	Day	46	57	36	54	50	44	39	4
18:00	Day	44	56	37	51	47	43	39	4
19:00	Day	44	52	36	50	47	44	40	6
20:00	Day	45	55	33	50	47	44	41	5
21:00	Day	51	60	36	56	53	50	44	3
22:00	Night	54	66	42	60	57	53	46	4
23:00	Night	55	68	42	64	59	52	47	10
Overall	Max	56	68	46	64	59	54	50	10
	Median	51	61	42	58	54	50	46	5
	Min	44	52	33	50	47	43	39	1
Daytime	Max	53	66	45	62	56	52	48	10
7am-10pm	Median	49	61	41	56	52	48	44	5
	Min	44	52	33	50	47	43	39	3
Nighttime	Max	56	68	46	64	59	54	50	10
10pm-7am	Median	54	63	42	59	57	52	47	3
	Min	51	61	40	58	54	49	45	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/12/2012

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 55 dBA | $L_{eq(24hr)}$ = 49 dBA



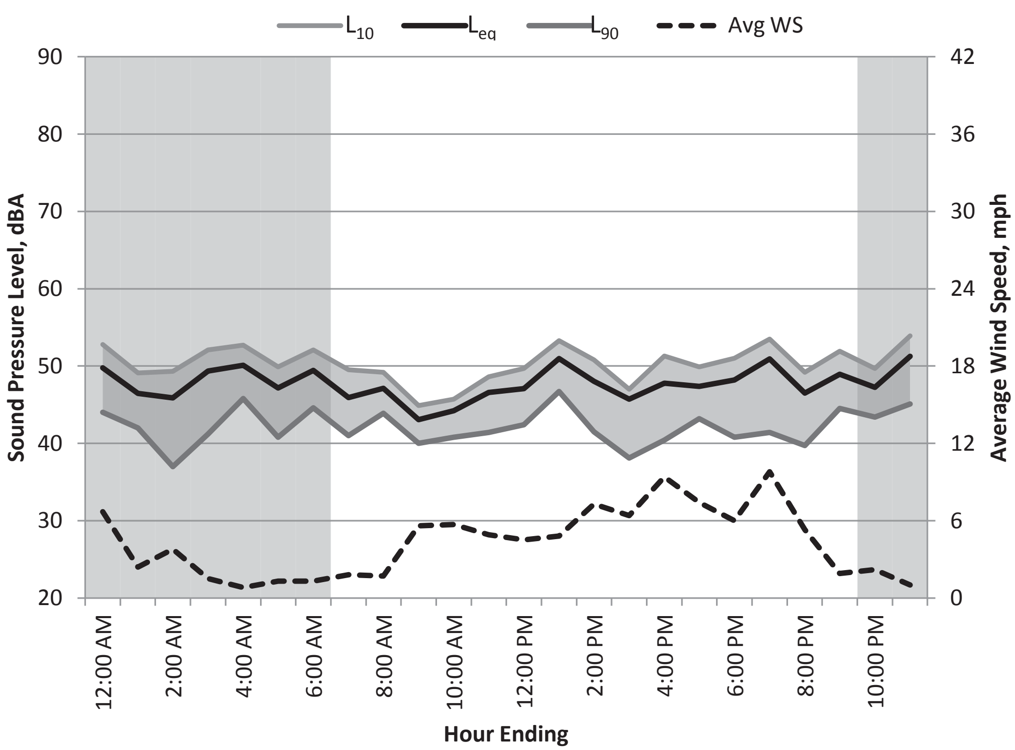
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	66	42	60	54	50	45	6
1:00	Night	49	59	38	57	53	46	42	2
2:00	Night	47	58	37	54	49	45	41	2
3:00	Night	45	58	34	52	48	45	38	2
4:00	Night	49	61	34	57	53	48	40	2
5:00	Night	47	61	42	55	50	46	43	1
6:00	Night	49	64	43	59	51	47	45	2
7:00	Day	46	54	41	53	48	45	43	2
8:00	Day	46	58	40	54	48	45	43	5
9:00	Day	46	60	39	52	48	46	43	7
10:00	Day	48	61	41	56	49	46	44	7
11:00	Day	48	58	43	55	51	47	45	6
12:00	Day	48	59	42	54	51	48	45	6
13:00	Day	49	59	41	56	52	48	44	8
14:00	Day	49	59	40	56	52	48	45	5
15:00	Day	49	58	41	55	52	48	45	6
16:00	Day	49	63	39	55	51	48	43	4
17:00	Day	48	58	37	55	51	46	41	3
18:00	Day	48	61	40	54	51	47	44	6
19:00	Day	53	62	42	59	56	52	47	7
20:00	Day	51	61	41	57	54	51	46	5
21:00	Day	47	60	36	55	50	44	41	5
22:00	Night	47	56	39	53	50	46	43	4
23:00	Night	49	60	38	55	52	47	42	4
Overall	Max	53	66	43	60	56	52	47	8
	Median	48	60	40	55	51	47	43	5
	Min	45	54	34	52	48	44	38	1
Daytime	Max	53	63	43	59	56	52	47	8
7am-10pm	Median	48	59	41	55	51	47	44	6
	Min	46	54	36	52	48	44	41	2
Nighttime	Max	51	66	43	60	54	50	45	6
10pm-7am	Median	49	60	38	55	51	46	42	2
	Min	45	56	34	52	48	45	38	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/13/2012

24hr Summary

L_{DN} = 55 dBA C_{NEL} = 55 dBA $L_{eq(24hr)}$ = 48 dBA



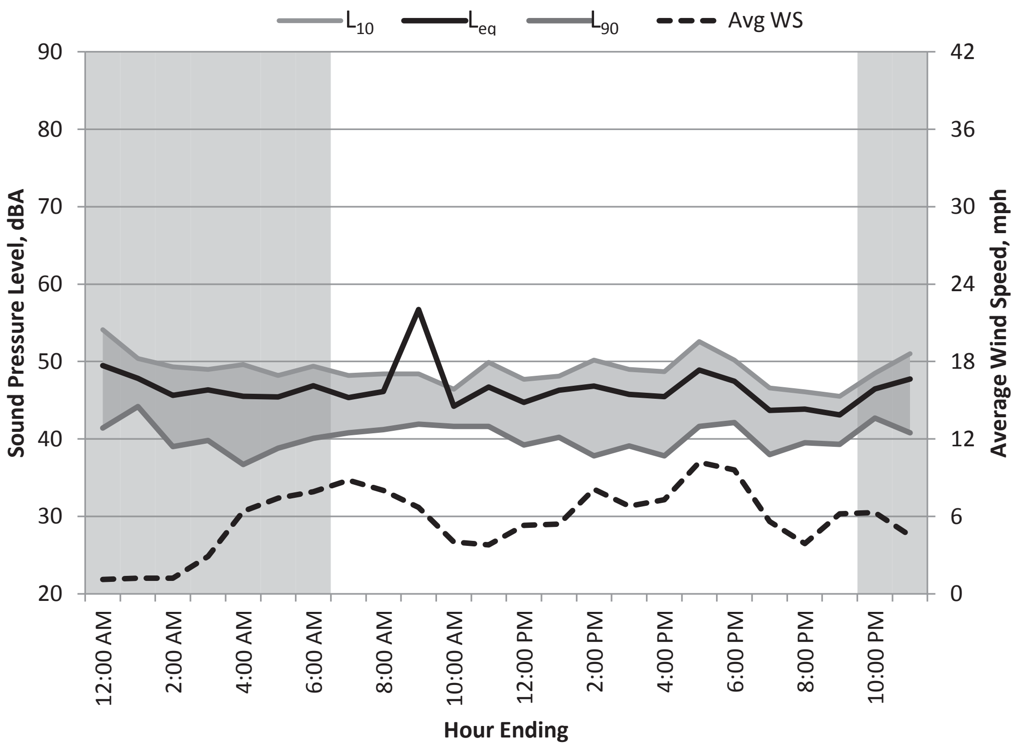
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	60	40	57	53	48	44	7
1:00	Night	46	57	37	52	49	46	42	2
2:00	Night	46	60	31	57	49	41	37	4
3:00	Night	49	63	38	59	52	47	41	2
4:00	Night	50	61	44	57	53	49	46	1
5:00	Night	47	58	37	54	50	46	41	1
6:00	Night	49	64	42	56	52	48	45	1
7:00	Day	46	57	37	53	50	44	41	2
8:00	Day	47	57	40	53	49	46	44	2
9:00	Day	43	55	37	50	45	42	40	6
10:00	Day	44	59	38	52	46	43	41	6
11:00	Day	47	62	38	54	49	46	41	5
12:00	Day	47	60	39	54	50	46	42	5
13:00	Day	51	67	42	57	53	50	47	5
14:00	Day	48	60	36	56	51	47	42	7
15:00	Day	46	64	36	57	47	42	38	6
16:00	Day	48	60	34	56	51	45	40	9
17:00	Day	47	59	37	55	50	46	43	7
18:00	Day	48	66	36	58	51	44	41	6
19:00	Day	51	71	35	60	54	47	41	10
20:00	Day	46	58	34	55	49	45	40	5
21:00	Day	49	57	41	54	52	48	45	2
22:00	Night	47	59	42	54	50	46	43	2
23:00	Night	51	64	40	60	54	49	45	1
Overall	Max	51	71	44	60	54	50	47	10
	Median	47	60	38	55	50	46	41	5
	Min	43	55	31	50	45	41	37	1
Daytime 7am-10pm	Max	51	71	42	60	54	50	47	10
	Median	47	60	37	55	50	46	41	6
	Min	43	55	34	50	45	42	38	2
Nighttime 10pm-7am	Max	51	64	44	60	54	49	46	7
	Median	49	60	40	57	52	47	43	2
	Min	46	57	31	52	49	41	37	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/14/2012

24hr Summary

L_{DN} = 54 dBA | C_{NEL} = 54 dBA | $L_{eq(24hr)}$ = 48 dBA

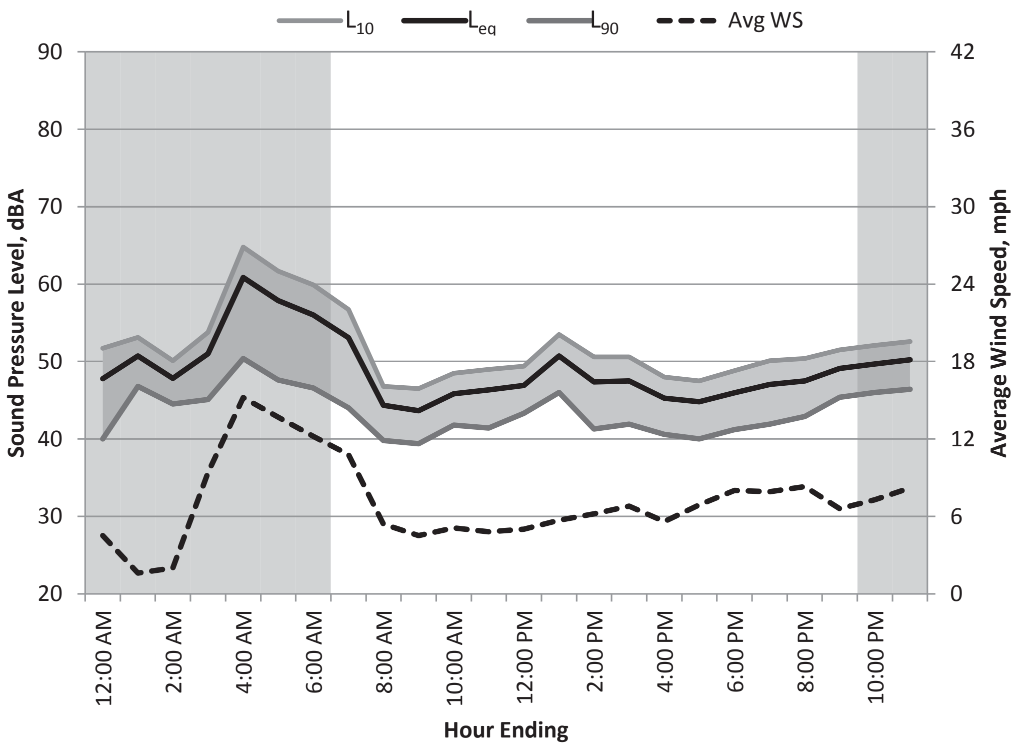


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	61	38	57	54	46	41	1
1:00	Night	48	57	38	53	50	47	44	1
2:00	Night	46	55	36	51	49	44	39	1
3:00	Night	46	62	34	55	49	44	40	3
4:00	Night	46	57	32	54	50	43	37	6
5:00	Night	45	63	33	54	48	43	39	7
6:00	Night	47	61	35	56	49	45	40	8
7:00	Day	45	55	36	51	48	45	41	9
8:00	Day	46	62	36	55	48	44	41	8
9:00	Day	57	85	39	64	48	45	42	7
10:00	Day	44	50	39	49	46	44	42	4
11:00	Day	47	56	39	53	50	45	42	4
12:00	Day	45	55	37	52	48	43	39	5
13:00	Day	46	63	36	58	48	43	40	5
14:00	Day	47	63	34	57	50	42	38	8
15:00	Day	46	58	35	55	49	43	39	7
16:00	Day	45	59	33	55	49	43	38	7
17:00	Day	49	62	36	57	53	46	42	10
18:00	Day	47	59	38	56	50	46	42	10
19:00	Day	44	52	31	50	47	43	38	6
20:00	Day	44	57	35	51	46	43	40	4
21:00	Day	43	54	36	49	46	42	39	6
22:00	Night	46	58	39	54	49	45	43	6
23:00	Night	48	59	36	56	51	45	41	5
Overall	Max	57	85	39	64	54	47	44	10
	Median	46	59	36	54	49	44	40	6
	Min	43	50	31	49	46	42	37	1
Daytime	Max	57	85	39	64	53	46	42	10
7am-10pm	Median	46	58	36	55	48	43	40	7
	Min	43	50	31	49	46	42	38	4
Nighttime	Max	49	63	39	57	54	47	44	8
10pm-7am	Median	46	59	36	54	49	45	40	5
	Min	45	55	32	51	48	43	37	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 8/15/2012

24hr Summary

L_{DN} = 61 dBA | C_{NEL} = 61 dBA | $L_{eq(24hr)}$ = 52 dBA

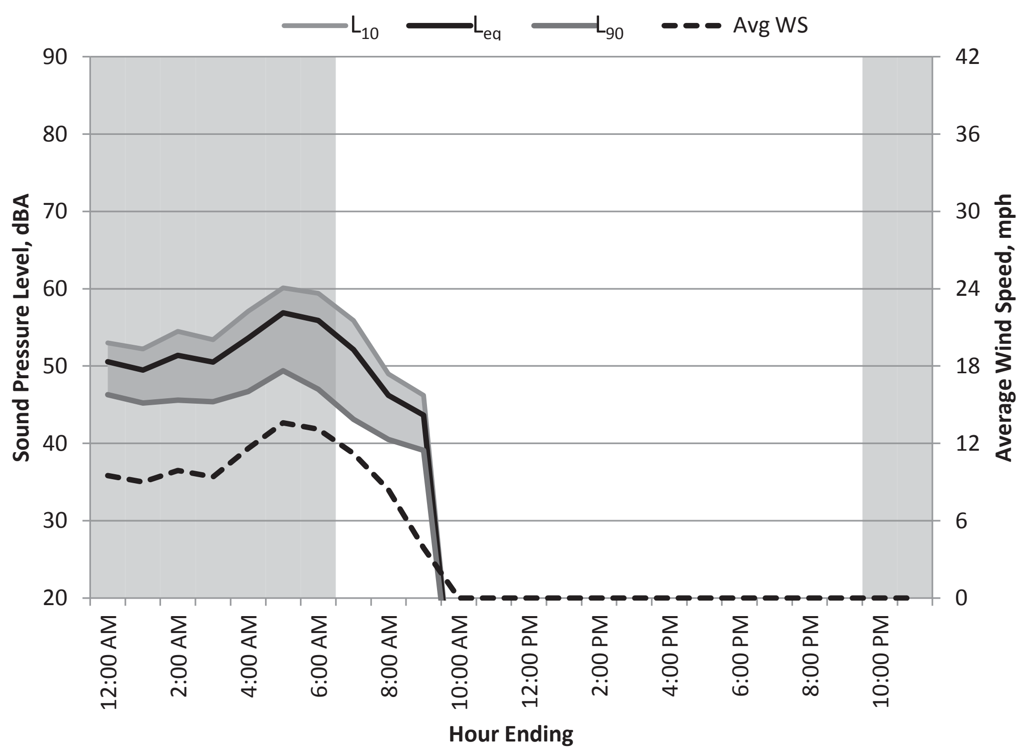


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	57	36	54	52	46	40	5
1:00	Night	51	56	43	55	53	50	47	2
2:00	Night	48	53	41	52	50	47	45	2
3:00	Night	51	67	41	60	54	49	45	9
4:00	Night	61	74	44	70	65	58	50	15
5:00	Night	58	73	40	67	62	55	48	14
6:00	Night	56	71	42	65	60	52	47	12
7:00	Day	53	66	40	63	57	50	44	11
8:00	Day	44	55	36	52	47	43	40	5
9:00	Day	44	54	36	50	47	42	39	5
10:00	Day	46	54	37	52	49	45	42	5
11:00	Day	46	58	39	53	49	45	41	5
12:00	Day	47	56	40	52	49	46	43	5
13:00	Day	51	62	41	57	54	50	46	6
14:00	Day	47	61	37	55	51	46	41	6
15:00	Day	47	58	37	54	51	46	42	7
16:00	Day	45	56	37	52	48	44	41	6
17:00	Day	45	55	36	51	48	44	40	7
18:00	Day	46	57	38	53	49	45	41	8
19:00	Day	47	60	37	55	50	45	42	8
20:00	Day	47	57	39	54	50	46	43	8
21:00	Day	49	57	40	55	52	49	45	7
22:00	Night	50	59	43	55	52	49	46	7
23:00	Night	50	60	43	56	53	49	46	8
Overall	Max	61	74	44	70	65	58	50	15
	Median	48	58	40	54	51	46	43	7
	Min	44	53	36	50	47	42	39	2
Daytime	Max	53	66	41	63	57	50	46	11
7am-10pm	Median	47	57	37	53	49	45	42	6
	Min	44	54	36	50	47	42	39	5
Nighttime	Max	61	74	44	70	65	58	50	15
10pm-7am	Median	51	60	42	56	53	49	46	8
	Min	48	53	36	52	50	46	40	2

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-1
DATE:	8/16/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



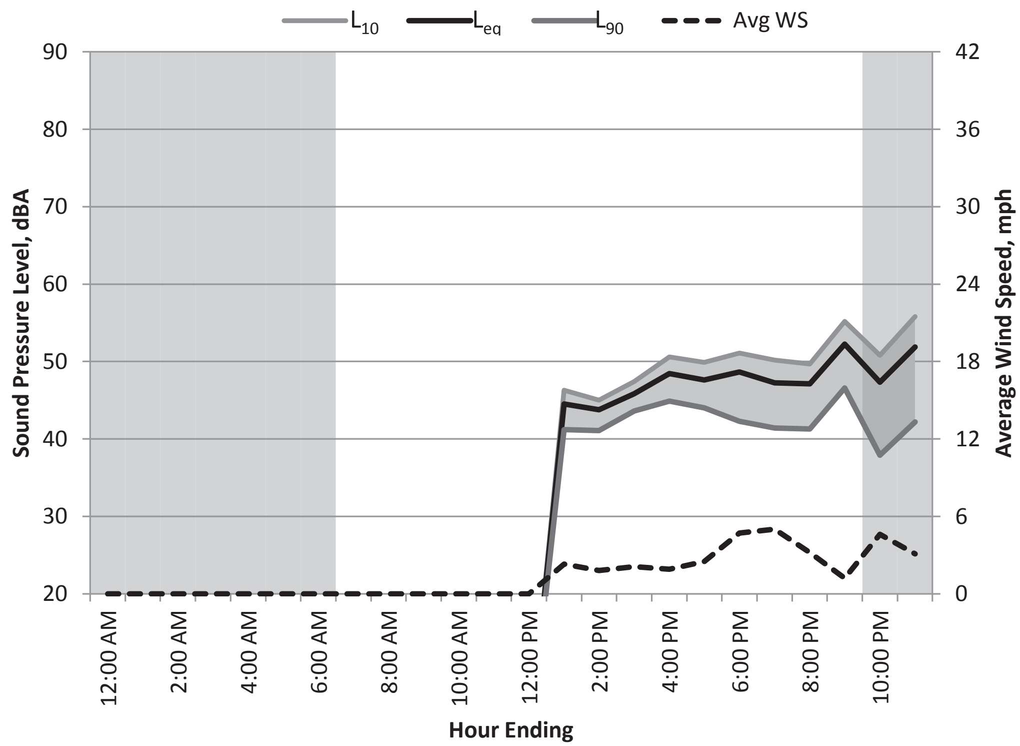
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	65	42	57	53	49	46	10
1:00	Night	49	61	41	56	52	48	45	9
2:00	Night	51	65	42	60	55	49	46	10
3:00	Night	51	64	42	59	53	48	45	9
4:00	Night	54	67	42	62	57	51	47	12
5:00	Night	57	74	43	65	60	55	49	14
6:00	Night	56	70	41	65	59	53	47	13
7:00	Day	52	67	38	61	56	49	43	11
8:00	Day	46	61	37	55	49	44	41	8
9:00	Day	44	65	36	51	46	42	39	4
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	--	--	--	--	--	--	--	--
14:00	Day	--	--	--	--	--	--	--	--
15:00	Day	--	--	--	--	--	--	--	--
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	--	--	--	--	--	--	--	--
18:00	Day	--	--	--	--	--	--	--	--
19:00	Day	--	--	--	--	--	--	--	--
20:00	Day	--	--	--	--	--	--	--	--
21:00	Day	--	--	--	--	--	--	--	--
22:00	Night	--	--	--	--	--	--	--	--
23:00	Night	--	--	--	--	--	--	--	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	--	--	--	--	--	--	--	--
10pm-7am	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

Appendix D
ST-1 December Measurements

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-1
DATE:	12/5/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



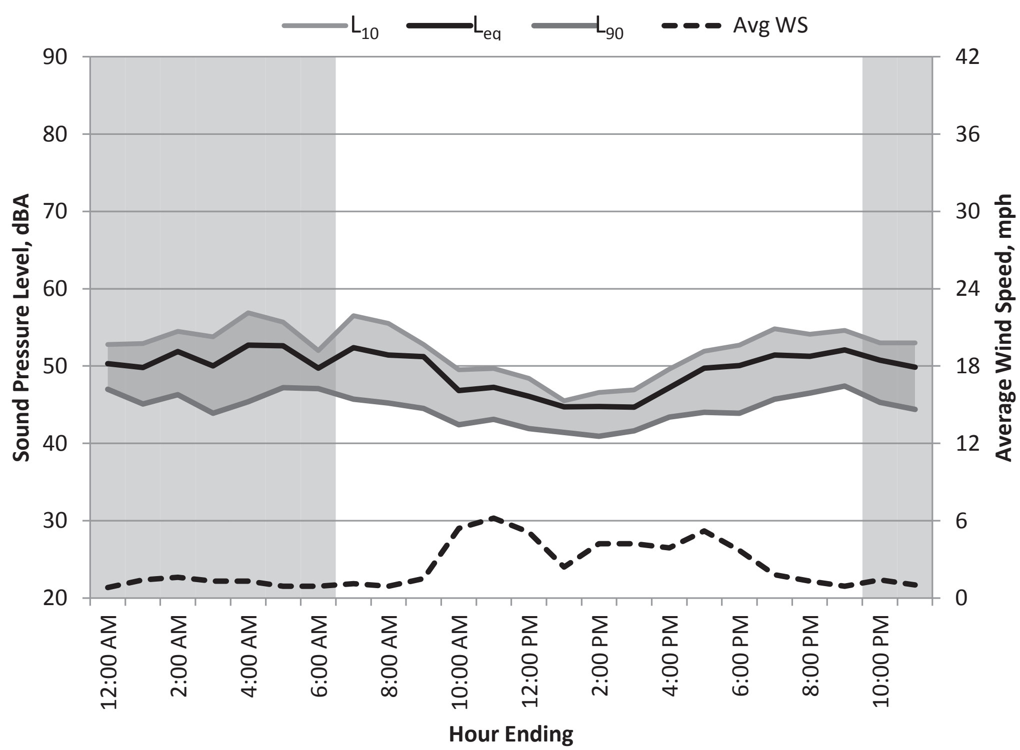
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	--	--	--	--	--	--	--	--
1:00	Night	--	--	--	--	--	--	--	--
2:00	Night	--	--	--	--	--	--	--	--
3:00	Night	--	--	--	--	--	--	--	--
4:00	Night	--	--	--	--	--	--	--	--
5:00	Night	--	--	--	--	--	--	--	--
6:00	Night	--	--	--	--	--	--	--	--
7:00	Day	--	--	--	--	--	--	--	--
8:00	Day	--	--	--	--	--	--	--	--
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	45	56	39	52	46	43	41	2
14:00	Day	44	56	39	52	45	43	41	2
15:00	Day	46	55	42	52	47	45	44	2
16:00	Day	48	60	41	56	51	47	45	2
17:00	Day	48	55	41	53	50	47	44	3
18:00	Day	49	64	38	59	51	47	42	5
19:00	Day	47	57	35	54	50	46	41	5
20:00	Day	47	63	36	55	50	45	41	3
21:00	Day	52	60	42	58	55	51	47	1
22:00	Night	47	62	33	56	51	45	38	5
23:00	Night	52	61	34	59	56	50	42	3
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime 7am-10pm	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime 10pm-7am	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/6/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 50 dBA



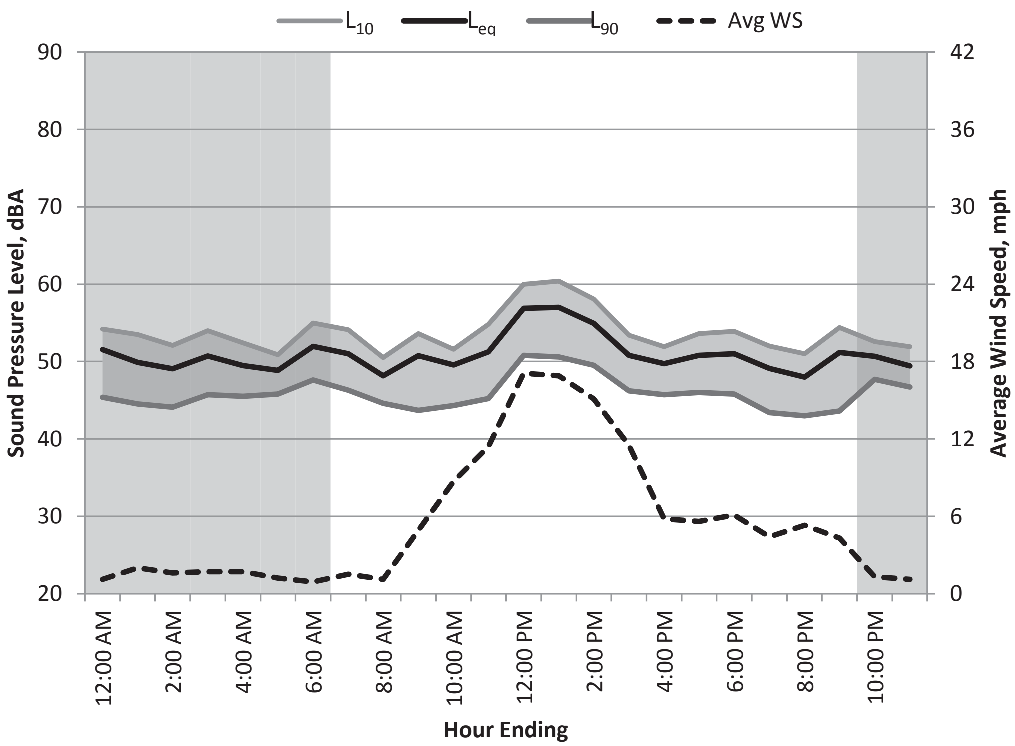
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	59	45	56	53	49	47	1
1:00	Night	50	62	42	58	53	48	45	1
2:00	Night	52	64	42	61	55	50	46	2
3:00	Night	50	59	41	57	54	48	44	1
4:00	Night	53	63	42	60	57	50	45	1
5:00	Night	53	63	44	60	56	51	47	1
6:00	Night	50	59	46	54	52	49	47	1
7:00	Day	52	65	44	61	57	50	46	1
8:00	Day	51	63	43	60	56	47	45	1
9:00	Day	51	71	43	62	53	46	45	2
10:00	Day	47	57	39	54	50	45	42	5
11:00	Day	47	59	39	54	50	46	43	6
12:00	Day	46	59	38	54	48	45	42	5
13:00	Day	45	62	39	53	46	43	41	2
14:00	Day	45	57	37	53	47	44	41	4
15:00	Day	45	52	38	49	47	44	42	4
16:00	Day	47	57	38	53	50	47	43	4
17:00	Day	50	64	38	59	52	48	44	5
18:00	Day	50	68	36	57	53	49	44	4
19:00	Day	51	63	39	59	55	49	46	2
20:00	Day	51	60	43	58	54	50	47	1
21:00	Day	52	65	44	60	55	51	47	1
22:00	Night	51	65	42	59	53	50	45	1
23:00	Night	50	62	41	57	53	48	44	1
Overall	Max	53	71	46	62	57	51	47	6
	Median	50	62	41	57	53	48	45	1
	Min	45	52	36	49	46	43	41	1
Daytime	Max	52	71	44	62	57	51	47	6
7am-10pm	Median	50	62	39	57	52	47	44	4
	Min	45	52	36	49	46	43	41	1
Nighttime	Max	53	65	46	61	57	51	47	2
10pm-7am	Median	50	62	42	58	53	49	45	1
	Min	50	59	41	54	52	48	44	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/7/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 52 dBA



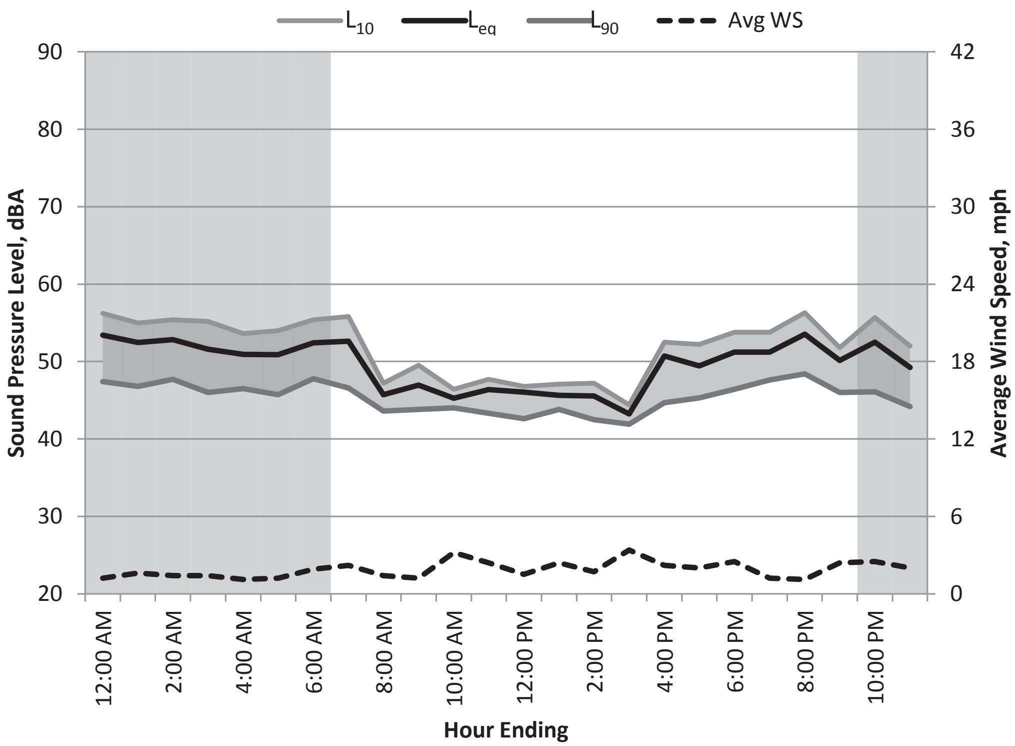
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	52	64	42	60	54	50	45	1
1:00	Night	50	62	42	57	54	47	45	2
2:00	Night	49	63	41	57	52	47	44	2
3:00	Night	51	62	43	59	54	48	46	2
4:00	Night	49	61	43	57	52	48	46	2
5:00	Night	49	63	43	55	51	48	46	1
6:00	Night	52	62	45	59	55	50	48	1
7:00	Day	51	64	44	59	54	49	46	2
8:00	Day	48	62	42	56	51	46	45	1
9:00	Day	51	67	38	61	54	48	44	5
10:00	Day	50	67	40	59	52	48	44	9
11:00	Day	51	62	41	59	55	49	45	11
12:00	Day	57	70	44	64	60	55	51	17
13:00	Day	57	68	44	64	60	55	51	17
14:00	Day	55	68	44	63	58	53	50	15
15:00	Day	51	61	42	57	53	50	46	12
16:00	Day	50	59	40	56	52	49	46	6
17:00	Day	51	61	42	57	54	50	46	6
18:00	Day	51	64	41	57	54	50	46	6
19:00	Day	49	64	39	55	52	48	43	4
20:00	Day	48	56	34	54	51	47	43	5
21:00	Day	51	64	37	60	54	48	44	4
22:00	Night	51	63	46	58	53	50	48	1
23:00	Night	49	58	45	55	52	49	47	1
Overall	Max	57	70	46	64	60	55	51	17
	Median	51	63	42	58	54	49	46	4
	Min	48	56	34	54	51	46	43	1
Daytime	Max	57	70	44	64	60	55	51	17
7am-10pm	Median	51	64	41	59	54	49	46	6
	Min	48	56	34	54	51	46	43	1
Nighttime	Max	52	64	46	60	55	50	48	2
10pm-7am	Median	50	62	43	57	53	48	46	1
	Min	49	58	41	55	51	47	44	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/8/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 50 dBA

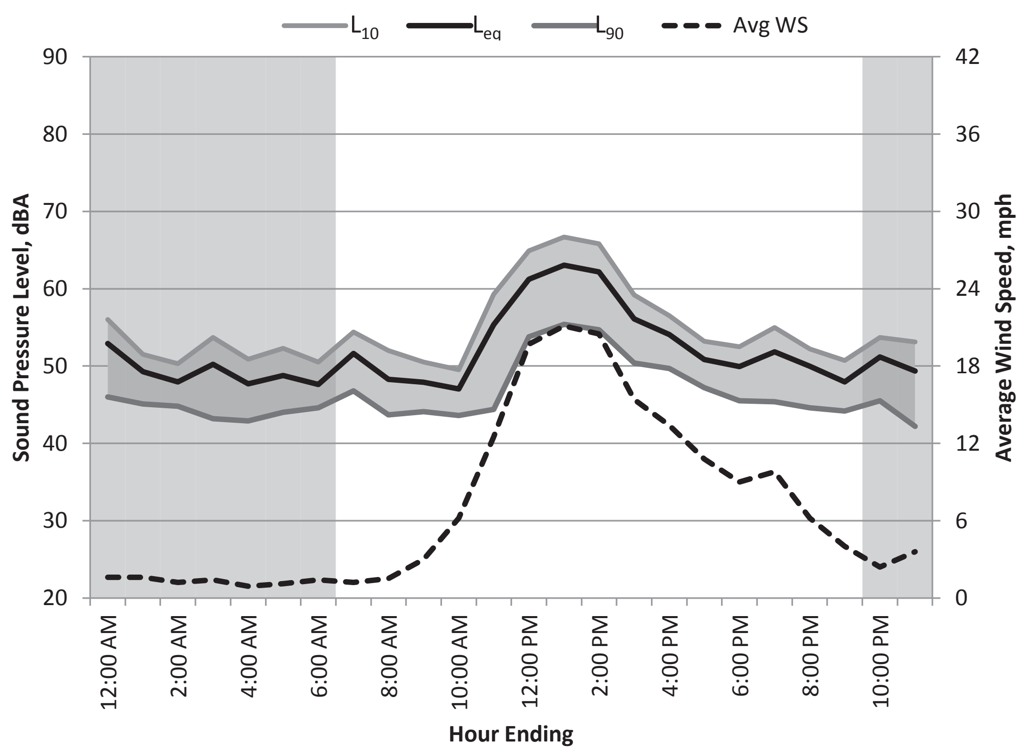


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	65	45	62	56	52	47	1
1:00	Night	52	67	44	60	55	51	47	2
2:00	Night	53	65	43	62	55	51	48	1
3:00	Night	52	63	43	59	55	49	46	1
4:00	Night	51	61	44	57	54	50	47	1
5:00	Night	51	64	43	59	54	49	46	1
6:00	Night	52	62	45	60	55	51	48	2
7:00	Day	53	63	43	61	56	51	47	2
8:00	Day	46	57	42	51	47	45	44	1
9:00	Day	47	56	42	54	50	45	44	1
10:00	Day	45	55	42	49	46	45	44	3
11:00	Day	46	63	41	54	48	45	43	2
12:00	Day	46	63	41	56	47	44	43	2
13:00	Day	46	59	42	51	47	45	44	2
14:00	Day	46	69	41	52	47	44	43	2
15:00	Day	43	49	40	46	44	43	42	3
16:00	Day	51	73	41	59	53	48	45	2
17:00	Day	49	62	43	55	52	48	45	2
18:00	Day	51	61	43	57	54	50	46	3
19:00	Day	51	59	45	56	54	50	48	1
20:00	Day	54	65	46	63	56	51	48	1
21:00	Day	50	64	43	59	52	49	46	2
22:00	Night	52	65	43	62	56	50	46	3
23:00	Night	49	63	42	58	52	47	44	2
Overall	Max	54	73	46	63	56	52	48	3
	Median	51	63	43	57	53	49	46	2
	Min	43	49	40	46	44	43	42	1
Daytime	Max	54	73	46	63	56	51	48	3
7am-10pm	Median	47	62	42	55	50	45	44	2
	Min	43	49	40	46	44	43	42	1
Nighttime	Max	53	67	45	62	56	52	48	3
10pm-7am	Median	52	64	43	60	55	50	47	1
	Min	49	61	42	57	52	47	44	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/9/2012

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 55 dBA



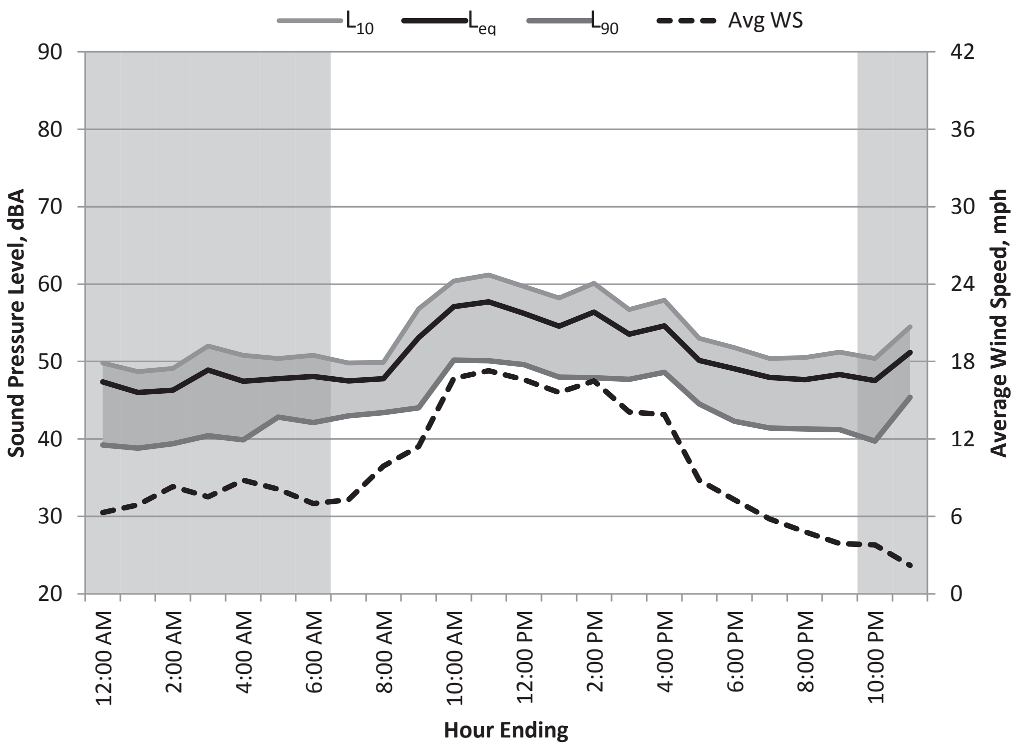
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	67	43	62	56	50	46	2
1:00	Night	49	61	43	57	52	48	45	2
2:00	Night	48	60	41	54	50	47	45	1
3:00	Night	50	60	41	58	54	47	43	1
4:00	Night	48	63	41	55	51	45	43	1
5:00	Night	49	57	42	56	52	46	44	1
6:00	Night	48	57	43	53	51	46	45	1
7:00	Day	52	64	43	60	54	49	47	1
8:00	Day	48	58	42	56	52	46	44	2
9:00	Day	48	60	42	55	51	47	44	3
10:00	Day	47	58	40	53	50	46	44	6
11:00	Day	55	73	40	65	59	49	44	13
12:00	Day	61	72	47	69	65	59	54	20
13:00	Day	63	72	47	70	67	61	55	21
14:00	Day	62	71	47	69	66	60	55	21
15:00	Day	56	71	46	64	59	54	50	15
16:00	Day	54	64	44	61	57	53	50	13
17:00	Day	51	61	42	56	53	50	47	11
18:00	Day	50	63	40	56	53	49	46	9
19:00	Day	52	63	41	60	55	50	45	10
20:00	Day	50	63	40	59	52	48	45	6
21:00	Day	48	57	41	55	51	46	44	4
22:00	Night	51	64	42	60	54	49	46	2
23:00	Night	49	63	37	58	53	46	42	4
Overall	Max	63	73	47	70	67	61	55	21
	Median	50	63	42	58	53	49	45	4
	Min	47	57	37	53	50	45	42	1
Daytime	Max	63	73	47	70	67	61	55	21
7am-10pm	Median	52	63	42	60	54	49	46	10
	Min	47	57	40	53	50	46	44	1
Nighttime	Max	53	67	43	62	56	50	46	4
10pm-7am	Median	49	61	42	57	52	47	45	1
	Min	48	57	37	53	50	45	42	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/10/2012

CH2MHILL

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 52 dBA



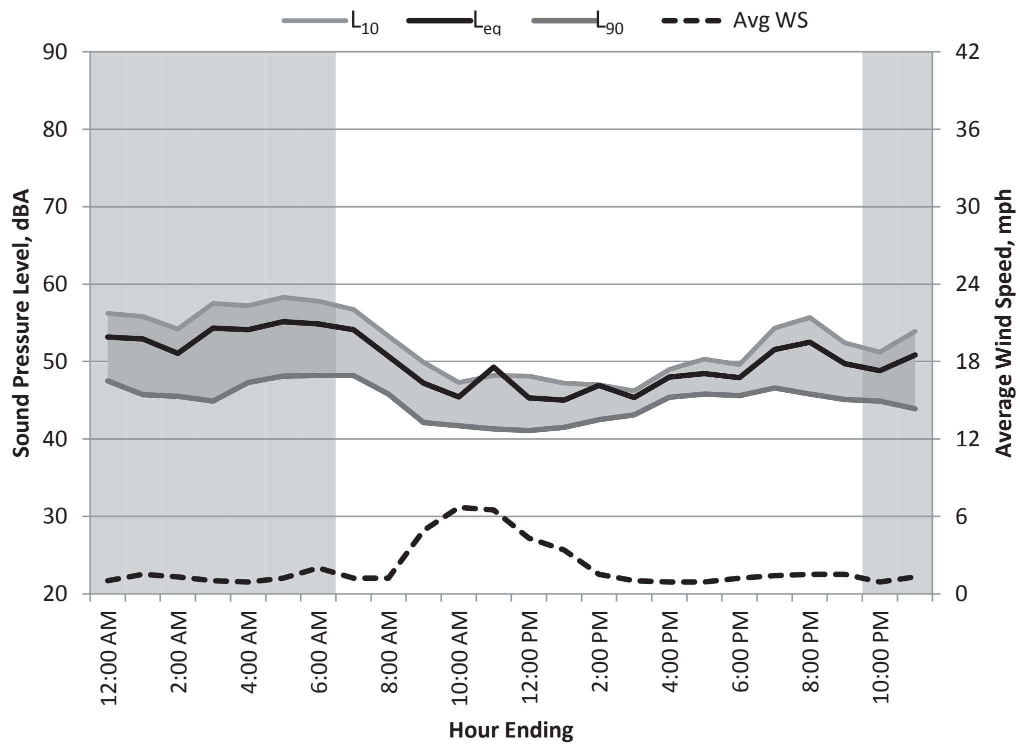
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	64	35	58	50	43	39	6
1:00	Night	46	62	35	56	49	44	39	7
2:00	Night	46	64	35	55	49	44	39	8
3:00	Night	49	63	36	59	52	45	40	8
4:00	Night	47	61	36	56	51	45	40	9
5:00	Night	48	59	38	56	50	46	43	8
6:00	Night	48	63	38	58	51	46	42	7
7:00	Day	47	61	40	54	50	46	43	7
8:00	Day	48	62	39	56	50	46	43	10
9:00	Day	53	69	41	64	57	48	44	11
10:00	Day	57	70	44	64	60	56	50	17
11:00	Day	58	70	45	65	61	56	50	17
12:00	Day	56	68	44	64	60	54	50	17
13:00	Day	55	65	42	62	58	53	48	16
14:00	Day	56	68	40	64	60	54	48	17
15:00	Day	54	65	42	61	57	52	48	14
16:00	Day	55	68	44	62	58	52	49	14
17:00	Day	50	62	39	58	53	49	45	9
18:00	Day	49	63	36	59	52	47	42	7
19:00	Day	48	64	34	56	50	46	41	6
20:00	Day	48	63	37	56	51	46	41	5
21:00	Day	48	63	36	56	51	47	41	4
22:00	Night	48	62	34	57	50	45	40	4
23:00	Night	51	62	42	58	55	49	45	2
Overall	Max	58	70	45	65	61	56	50	17
	Median	49	63	39	58	52	46	43	8
	Min	46	59	34	54	49	43	39	2
Daytime	Max	58	70	45	65	61	56	50	17
7am-10pm	Median	53	65	40	61	57	49	45	11
	Min	47	61	34	54	50	46	41	4
Nighttime	Max	51	64	42	59	55	49	45	9
10pm-7am	Median	48	62	36	57	50	45	40	7
	Min	46	59	34	55	49	43	39	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/11/2012

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 51 dBA



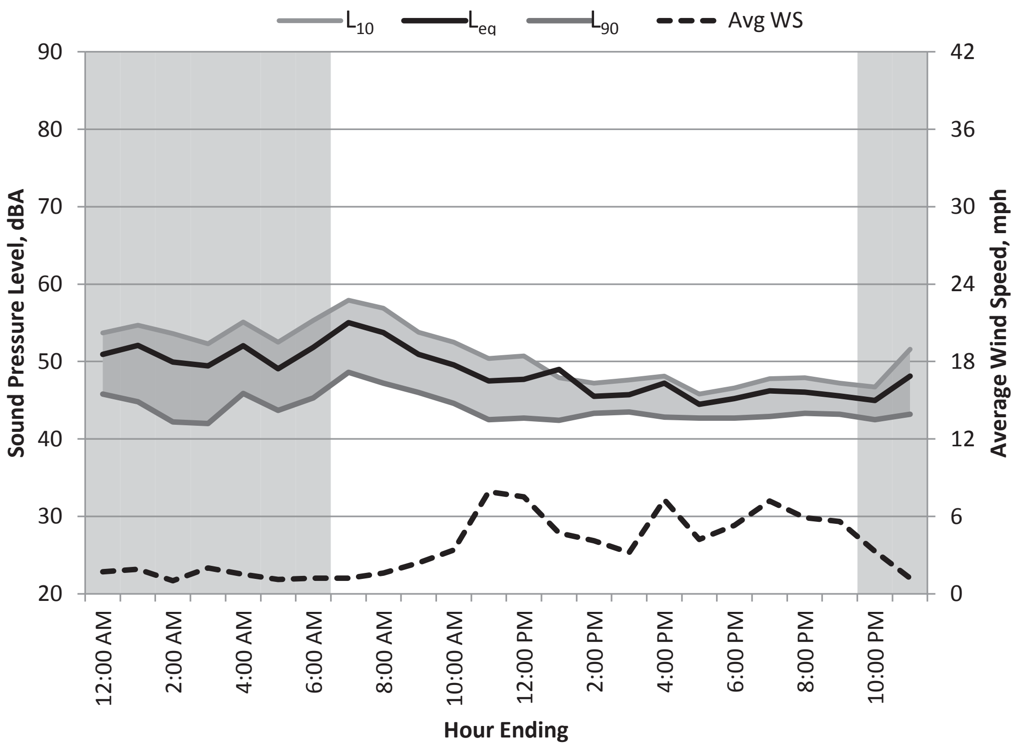
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	65	44	61	56	51	48	1
1:00	Night	53	68	42	63	56	50	46	2
2:00	Night	51	60	41	58	54	50	46	1
3:00	Night	54	72	41	66	58	49	45	1
4:00	Night	54	67	43	63	57	51	47	1
5:00	Night	55	72	43	62	58	53	48	1
6:00	Night	55	70	40	62	58	53	48	2
7:00	Day	54	70	44	61	57	52	48	1
8:00	Day	51	63	43	60	53	49	46	1
9:00	Day	47	61	38	54	50	46	42	5
10:00	Day	45	60	37	53	47	44	42	7
11:00	Day	49	69	38	63	48	44	41	7
12:00	Day	45	57	37	54	48	44	41	4
13:00	Day	45	55	37	51	47	44	42	3
14:00	Day	47	65	41	58	47	44	43	2
15:00	Day	45	57	42	53	46	44	43	1
16:00	Day	48	61	44	56	49	47	45	1
17:00	Day	48	58	44	55	50	48	46	1
18:00	Day	48	56	44	52	50	47	46	1
19:00	Day	52	63	43	60	54	50	47	1
20:00	Day	53	66	41	61	56	50	46	2
21:00	Day	50	61	43	58	52	48	45	2
22:00	Night	49	59	42	56	51	47	45	1
23:00	Night	51	64	41	58	54	49	44	1
Overall	Max	55	72	44	66	58	53	48	7
	Median	50	63	42	58	53	48	45	1
	Min	45	55	37	51	46	44	41	1
Daytime	Max	54	70	44	63	57	52	48	7
7am-10pm	Median	48	61	42	56	50	47	45	2
	Min	45	55	37	51	46	44	41	1
Nighttime	Max	55	72	44	66	58	53	48	2
10pm-7am	Median	53	67	42	62	56	50	46	1
	Min	49	59	40	56	51	47	44	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/12/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA

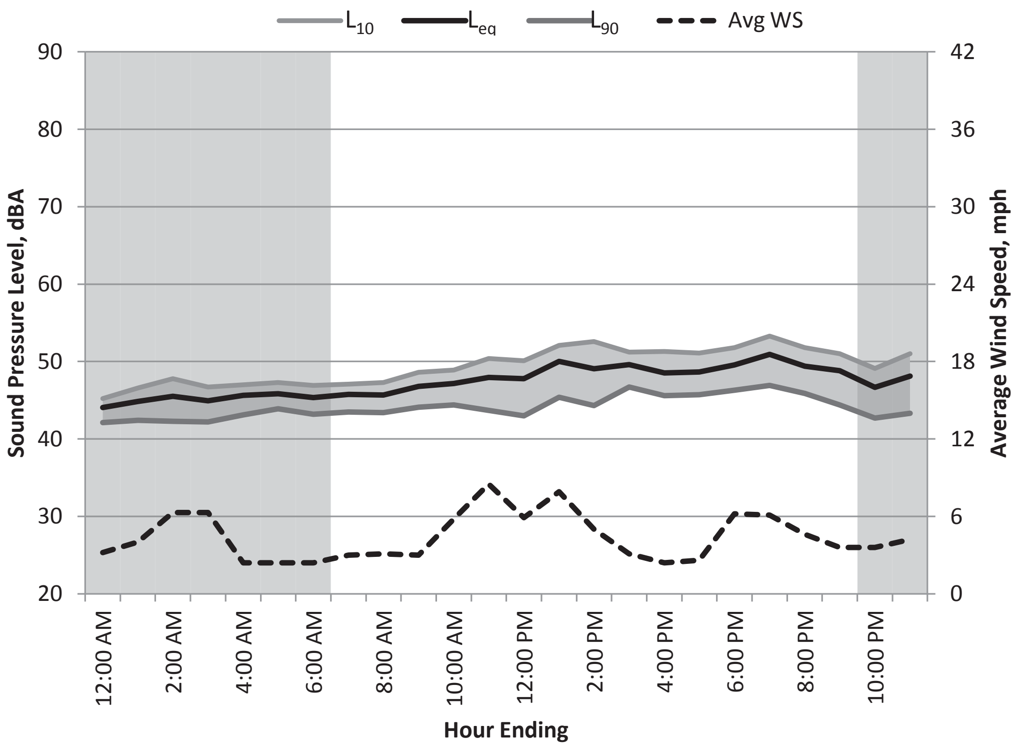


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	62	41	56	54	50	46	2
1:00	Night	52	68	41	63	55	49	45	2
2:00	Night	50	64	39	59	54	47	42	1
3:00	Night	49	62	39	59	52	47	42	2
4:00	Night	52	63	42	60	55	50	46	2
5:00	Night	49	63	41	57	53	47	44	1
6:00	Night	52	65	41	59	55	50	45	1
7:00	Day	55	66	43	63	58	54	49	1
8:00	Day	54	66	44	62	57	52	47	2
9:00	Day	51	66	44	59	54	49	46	2
10:00	Day	50	65	42	58	53	47	45	3
11:00	Day	48	62	38	56	50	45	43	8
12:00	Day	48	61	40	54	51	46	43	8
13:00	Day	49	76	40	55	48	45	42	5
14:00	Day	45	53	41	49	47	45	43	4
15:00	Day	46	53	42	50	48	45	44	3
16:00	Day	47	73	40	56	48	45	43	7
17:00	Day	44	56	39	49	46	44	43	4
18:00	Day	45	58	40	53	47	44	43	5
19:00	Day	46	60	39	55	48	45	43	7
20:00	Day	46	55	40	53	48	45	43	6
21:00	Day	46	54	40	51	47	45	43	6
22:00	Night	45	54	39	50	47	44	43	3
23:00	Night	48	59	41	56	52	46	43	1
Overall	Max	55	76	44	63	58	54	49	8
	Median	49	62	40	56	51	46	43	3
	Min	44	53	38	49	46	44	42	1
Daytime	Max	55	76	44	63	58	54	49	8
7am-10pm	Median	47	61	40	55	48	45	43	5
	Min	44	53	38	49	46	44	42	1
Nighttime	Max	52	68	42	63	55	50	46	3
10pm-7am	Median	50	63	41	59	54	47	44	2
	Min	45	54	39	50	47	44	42	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/13/2012

24hr Summary

L_{DN} = 53 dBA | C_{NEL} = 53 dBA | $L_{eq(24hr)}$ = 48 dBA



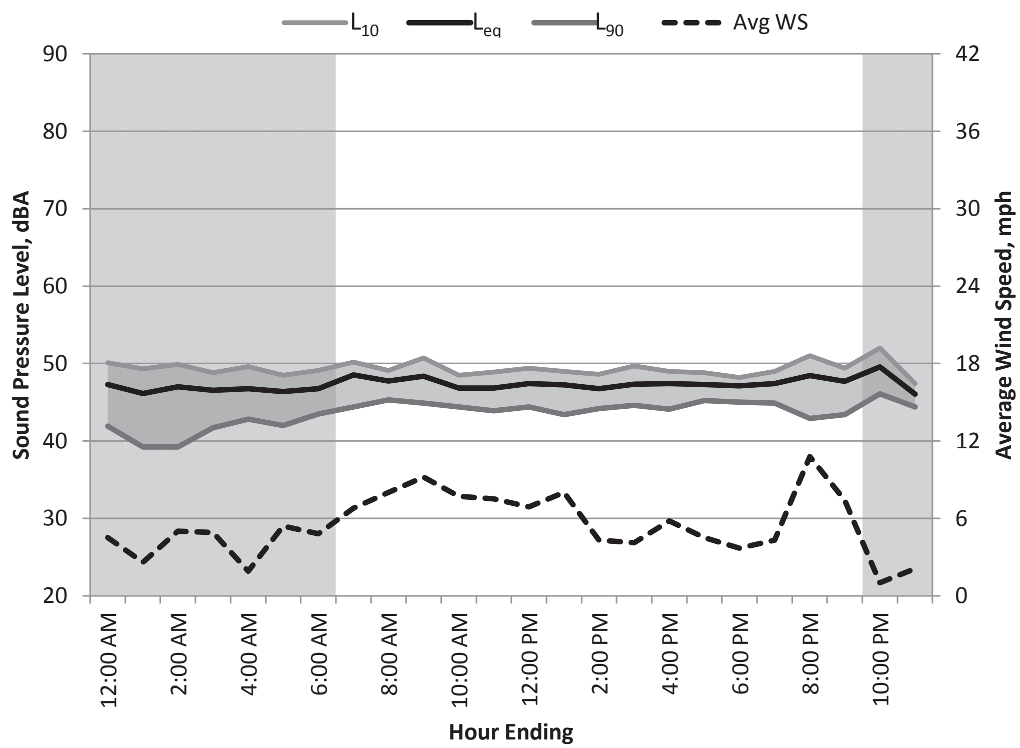
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	44	53	40	50	45	44	42	3
1:00	Night	45	53	40	50	47	44	42	4
2:00	Night	45	53	39	51	48	45	42	6
3:00	Night	45	57	40	51	47	44	42	6
4:00	Night	46	57	40	53	47	45	43	2
5:00	Night	46	50	41	49	47	46	44	2
6:00	Night	45	55	41	50	47	45	43	2
7:00	Day	46	58	41	52	47	45	44	3
8:00	Day	46	59	42	51	47	45	43	3
9:00	Day	47	56	41	53	49	46	44	3
10:00	Day	47	58	42	53	49	46	44	6
11:00	Day	48	62	40	56	50	46	44	9
12:00	Day	48	64	40	56	50	46	43	6
13:00	Day	50	64	42	59	52	48	45	8
14:00	Day	49	64	42	57	53	46	44	5
15:00	Day	50	59	43	56	51	49	47	3
16:00	Day	49	62	42	55	51	47	46	2
17:00	Day	49	56	39	54	51	48	46	3
18:00	Day	50	59	41	54	52	49	46	6
19:00	Day	51	62	43	58	53	50	47	6
20:00	Day	49	57	40	54	52	49	46	5
21:00	Day	49	63	41	57	51	47	44	4
22:00	Night	47	63	40	52	49	46	43	4
23:00	Night	48	59	39	55	51	47	43	4
Overall	Max	51	64	43	59	53	50	47	9
	Median	47	58	41	54	50	46	44	4
	Min	44	50	39	49	45	44	42	2
Daytime	Max	51	64	43	59	53	50	47	9
7am-10pm	Median	49	59	41	55	51	47	44	5
	Min	46	56	39	51	47	45	43	2
Nighttime	Max	48	63	41	55	51	47	44	6
10pm-7am	Median	45	55	40	51	47	45	43	4
	Min	44	50	39	49	45	44	42	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/14/2012

24hr Summary

L_{DN} = 54 dBA | C_{NEL} = 54 dBA | $L_{eq(24hr)}$ = 47 dBA



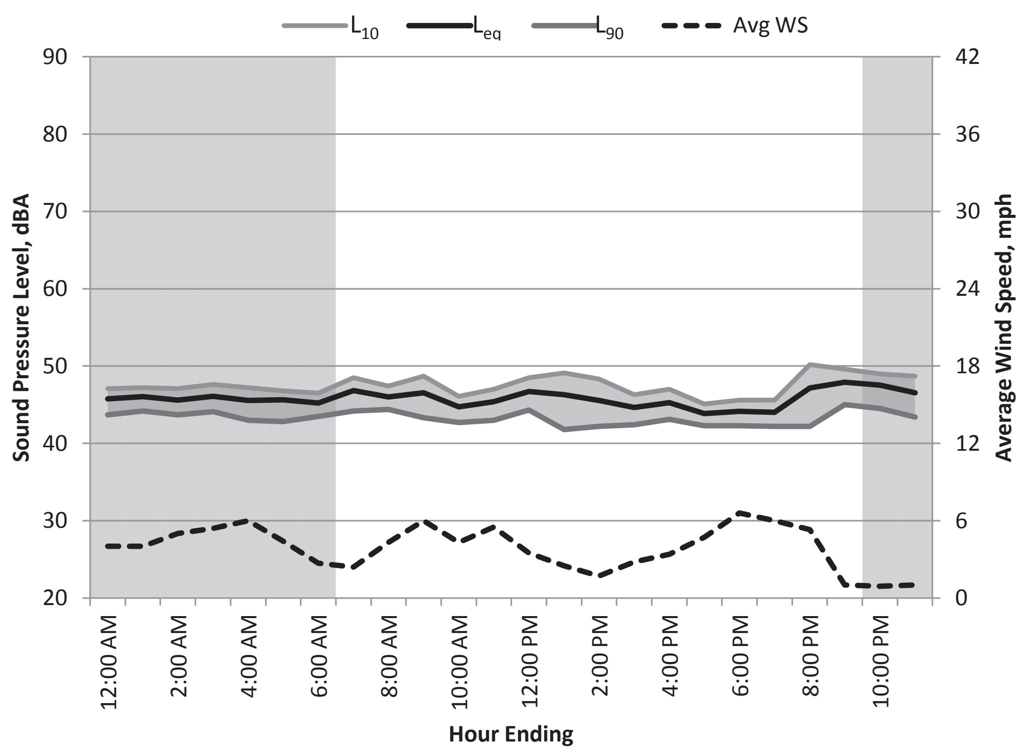
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	55	38	54	50	46	42	5
1:00	Night	46	62	37	55	49	43	39	3
2:00	Night	47	60	35	56	50	45	39	5
3:00	Night	47	63	38	55	49	45	42	5
4:00	Night	47	58	40	55	50	45	43	2
5:00	Night	46	58	38	54	49	45	42	5
6:00	Night	47	57	39	53	49	46	44	5
7:00	Day	49	68	42	56	50	47	44	7
8:00	Day	48	61	42	54	49	47	45	8
9:00	Day	48	60	42	55	51	47	45	9
10:00	Day	47	55	41	51	49	46	44	8
11:00	Day	47	55	40	53	49	46	44	8
12:00	Day	47	60	40	54	49	46	44	7
13:00	Day	47	61	40	56	49	46	43	8
14:00	Day	47	60	42	53	49	46	44	4
15:00	Day	47	60	42	54	50	46	45	4
16:00	Day	47	61	41	56	49	46	44	6
17:00	Day	47	55	42	53	49	47	45	5
18:00	Day	47	60	43	53	48	47	45	4
19:00	Day	47	63	41	53	49	47	45	4
20:00	Day	48	63	39	58	51	46	43	11
21:00	Day	48	74	38	53	49	47	43	7
22:00	Night	50	60	43	57	52	48	46	1
23:00	Night	46	49	43	48	47	46	44	2
Overall	Max	50	74	43	58	52	48	46	11
	Median	47	60	40	54	49	46	44	5
	Min	46	49	35	48	47	43	39	1
Daytime 7am-10pm	Max	49	74	43	58	51	47	45	11
	Median	47	60	41	54	49	46	44	7
	Min	47	55	38	51	48	46	43	4
Nighttime 10pm-7am	Max	50	63	43	57	52	48	46	5
	Median	47	58	38	55	49	45	42	5
	Min	46	49	35	48	47	43	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/15/2012

24hr Summary

L_{DN} = 52 dBA C_{NEL} = 53 dBA $L_{eq(24hr)}$ = 46 dBA

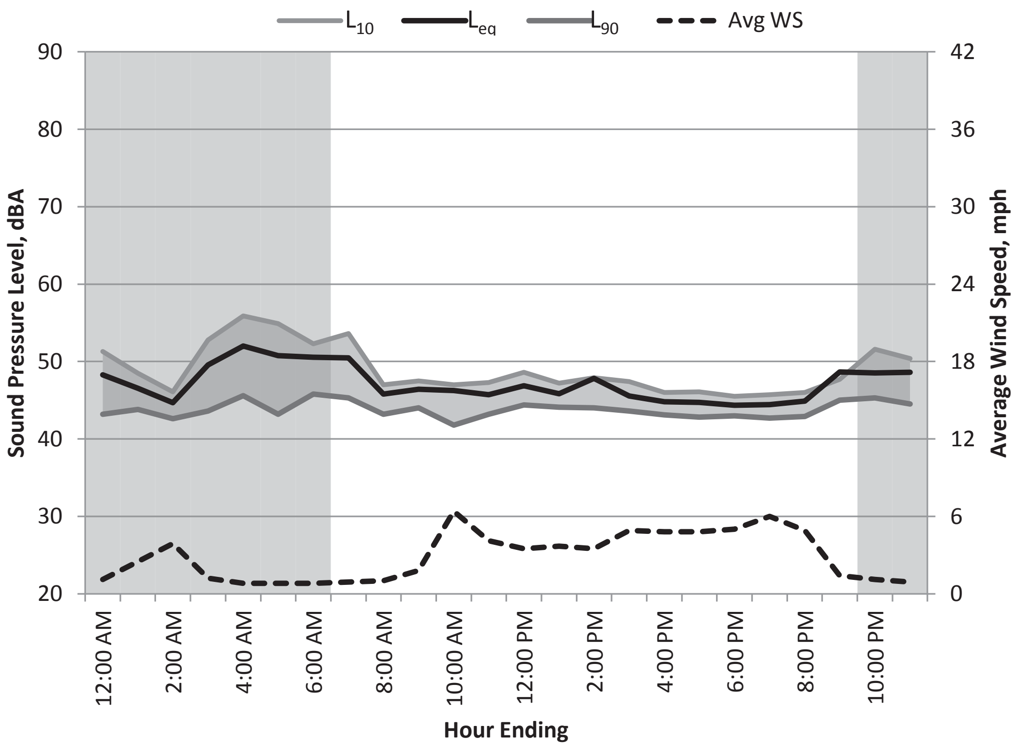


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	54	41	50	47	46	44	4
1:00	Night	46	55	41	52	47	46	44	4
2:00	Night	46	50	42	49	47	45	44	5
3:00	Night	46	56	41	51	48	46	44	5
4:00	Night	46	56	41	51	47	45	43	6
5:00	Night	46	60	39	54	47	45	43	4
6:00	Night	45	56	40	49	47	45	44	3
7:00	Day	47	59	41	53	49	46	44	2
8:00	Day	46	52	42	49	47	46	44	4
9:00	Day	47	56	41	51	49	46	43	6
10:00	Day	45	53	40	48	46	45	43	4
11:00	Day	45	55	40	50	47	45	43	6
12:00	Day	47	54	42	52	49	46	44	4
13:00	Day	46	54	39	52	49	45	42	3
14:00	Day	46	56	39	50	48	45	42	2
15:00	Day	45	51	39	49	46	44	42	3
16:00	Day	45	54	41	51	47	44	43	3
17:00	Day	44	50	40	46	45	44	42	5
18:00	Day	44	49	40	47	46	44	42	7
19:00	Day	44	49	39	47	46	44	42	6
20:00	Day	47	62	39	56	50	44	42	5
21:00	Day	48	58	42	53	50	48	45	1
22:00	Night	48	62	42	55	49	46	45	1
23:00	Night	47	56	41	52	49	46	43	1
Overall	Max	48	62	42	56	50	48	45	7
	Median	46	55	41	51	47	45	43	4
	Min	44	49	39	46	45	44	42	1
Daytime 7am-10pm	Max	48	62	42	56	50	48	45	7
	Median	46	54	40	50	47	45	43	4
	Min	44	49	39	46	45	44	42	1
Nighttime 10pm-7am	Max	48	62	42	55	49	46	45	6
	Median	46	56	41	51	47	46	44	4
	Min	45	50	39	49	47	45	43	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/16/2012

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 48 dBA

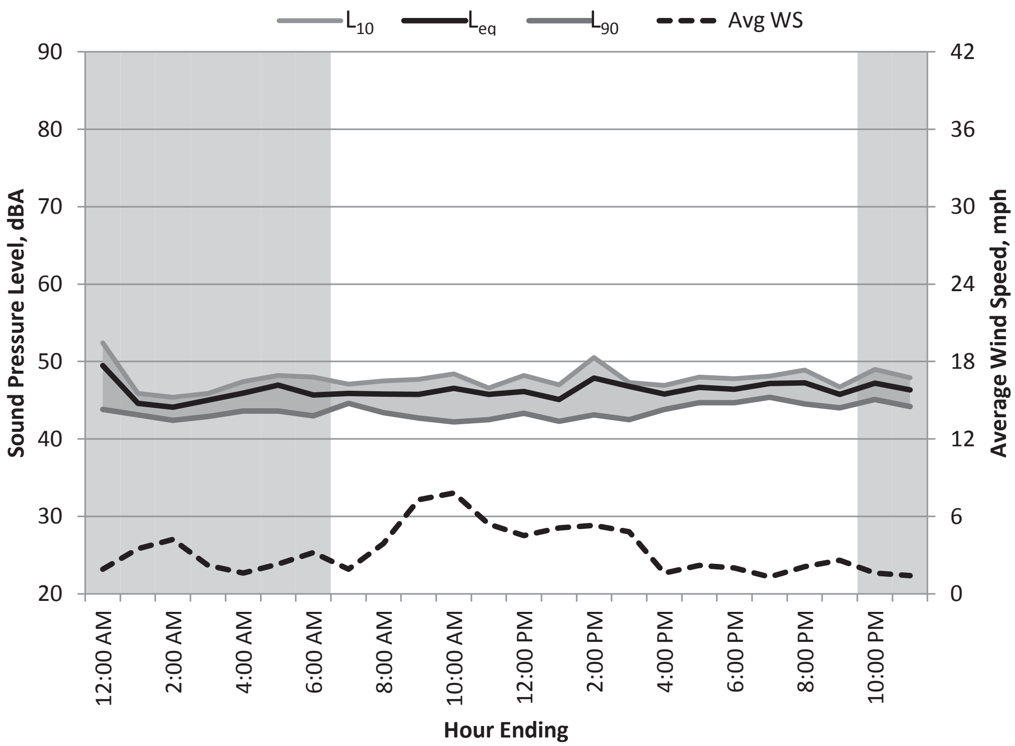


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	62	40	56	51	46	43	1
1:00	Night	47	54	41	51	49	46	44	3
2:00	Night	45	54	40	50	46	44	43	4
3:00	Night	50	65	41	59	53	46	44	1
4:00	Night	52	65	43	61	56	48	46	1
5:00	Night	51	66	39	60	55	47	43	1
6:00	Night	51	64	43	60	52	48	46	1
7:00	Day	50	62	43	58	54	49	45	1
8:00	Day	46	59	42	53	47	45	43	1
9:00	Day	46	58	39	54	48	46	44	2
10:00	Day	46	64	39	56	47	44	42	6
11:00	Day	46	53	40	51	47	45	43	4
12:00	Day	47	58	42	53	49	46	44	4
13:00	Day	46	56	42	50	47	46	44	4
14:00	Day	48	66	42	59	48	46	44	4
15:00	Day	46	53	41	49	47	45	44	5
16:00	Day	45	53	41	50	46	44	43	5
17:00	Day	45	53	41	49	46	44	43	5
18:00	Day	44	48	41	47	46	44	43	5
19:00	Day	44	53	41	49	46	44	43	6
20:00	Day	45	56	41	51	46	44	43	5
21:00	Day	49	67	43	59	48	46	45	1
22:00	Night	49	58	43	55	52	47	45	1
23:00	Night	49	63	42	58	50	46	45	1
Overall	Max	52	67	43	61	56	49	46	6
	Median	46	58	41	54	48	46	44	3
	Min	44	48	39	47	46	44	42	1
Daytime	Max	50	67	43	59	54	49	45	6
7am-10pm	Median	46	56	41	51	47	45	43	4
	Min	44	48	39	47	46	44	42	1
Nighttime	Max	52	66	43	61	56	48	46	4
10pm-7am	Median	49	63	41	58	52	46	44	1
	Min	45	54	39	50	46	44	43	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/17/2012

24hr Summary

L_{DN} = 53 dBA | C_{NEL} = 53 dBA | $L_{eq(24hr)}$ = 46 dBA

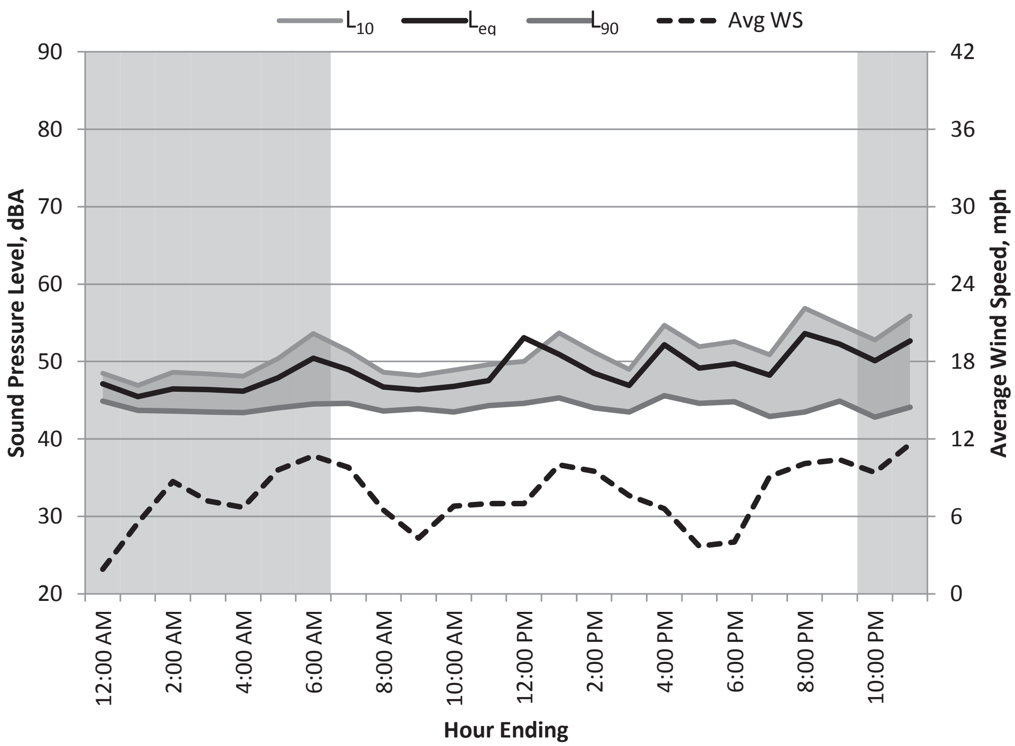


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	60	41	58	52	47	44	2
1:00	Night	45	52	40	48	46	44	43	4
2:00	Night	44	52	39	48	45	44	42	4
3:00	Night	45	59	41	52	46	44	43	2
4:00	Night	46	57	42	52	47	45	44	2
5:00	Night	47	58	41	54	48	46	44	2
6:00	Night	46	56	41	51	48	45	43	3
7:00	Day	46	53	44	49	47	46	45	2
8:00	Day	46	55	41	51	48	45	43	4
9:00	Day	46	58	39	53	48	45	43	7
10:00	Day	47	64	39	54	48	45	42	8
11:00	Day	46	63	39	54	47	44	43	5
12:00	Day	46	53	41	52	48	45	43	5
13:00	Day	45	52	39	49	47	45	42	5
14:00	Day	48	70	40	56	51	46	43	5
15:00	Day	47	67	39	55	47	44	43	5
16:00	Day	46	57	41	52	47	45	44	2
17:00	Day	47	59	43	53	48	46	45	2
18:00	Day	46	54	43	51	48	46	45	2
19:00	Day	47	60	43	54	48	47	45	1
20:00	Day	47	57	42	54	49	46	45	2
21:00	Day	46	55	42	51	47	45	44	3
22:00	Night	47	53	43	51	49	47	45	2
23:00	Night	46	55	41	51	48	46	44	1
Overall	Max	49	70	44	58	52	47	45	8
	Median	46	57	41	52	48	45	44	2
	Min	44	52	39	48	45	44	42	1
Daytime	Max	48	70	44	56	51	47	45	8
7am-10pm	Median	46	57	41	53	48	45	43	4
	Min	45	52	39	49	47	44	42	1
Nighttime	Max	49	60	43	58	52	47	45	4
10pm-7am	Median	46	56	41	51	48	45	44	2
	Min	44	52	39	48	45	44	42	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/18/2012

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 50 dBA



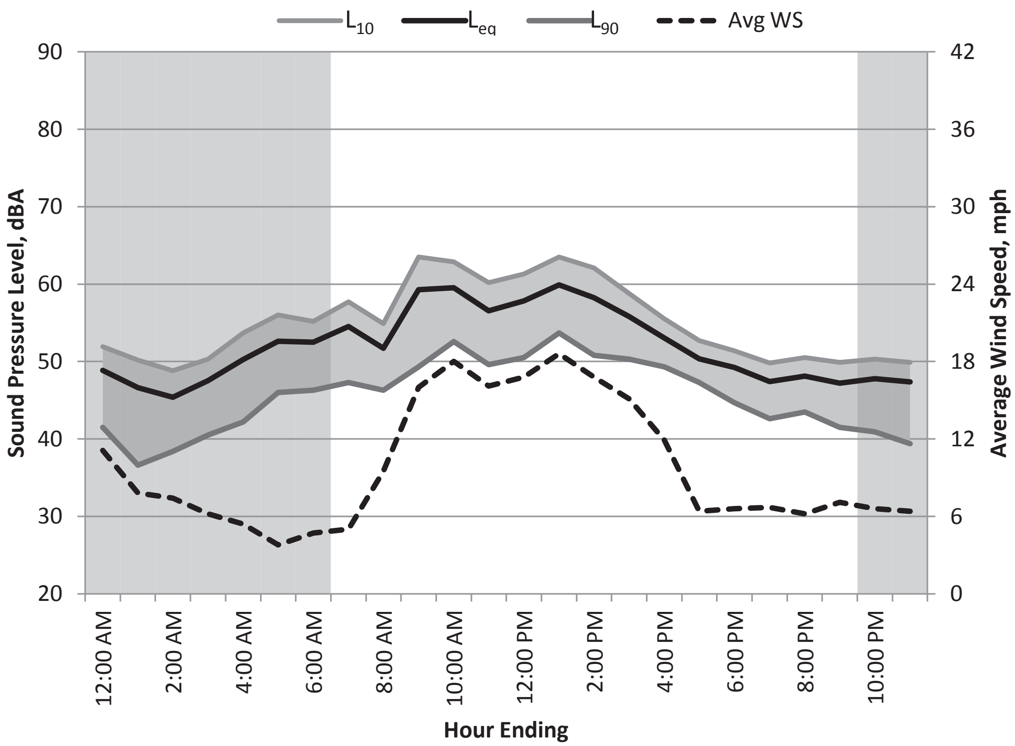
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	59	42	53	49	47	45	2
1:00	Night	45	50	41	49	47	45	44	6
2:00	Night	46	55	41	52	49	46	44	9
3:00	Night	46	58	41	52	48	46	44	7
4:00	Night	46	59	41	51	48	46	43	7
5:00	Night	48	58	40	55	50	47	44	10
6:00	Night	50	62	41	59	54	48	45	11
7:00	Day	49	61	41	56	51	47	45	10
8:00	Day	47	59	41	54	49	46	44	7
9:00	Day	46	53	42	51	48	46	44	4
10:00	Day	47	59	41	52	49	46	44	7
11:00	Day	48	58	42	54	50	47	44	7
12:00	Day	53	78	40	60	50	47	45	7
13:00	Day	51	67	42	60	54	48	45	10
14:00	Day	49	63	40	57	51	47	44	10
15:00	Day	47	62	41	53	49	46	44	8
16:00	Day	52	67	43	63	55	49	46	7
17:00	Day	49	60	41	56	52	48	45	4
18:00	Day	50	61	41	57	53	48	45	4
19:00	Day	48	61	38	55	51	47	43	9
20:00	Day	54	71	35	65	57	49	44	10
21:00	Day	52	67	37	62	55	49	45	10
22:00	Night	50	65	38	59	53	48	43	9
23:00	Night	53	67	37	62	56	50	44	12
Overall	Max	54	78	43	65	57	50	46	12
	Median	48	61	41	56	51	47	44	7
	Min	45	50	35	49	47	45	43	2
Daytime	Max	54	78	43	65	57	49	46	10
7am-10pm	Median	49	61	41	56	51	47	44	7
	Min	46	53	35	51	48	46	43	4
Nighttime	Max	53	67	42	62	56	50	45	12
10pm-7am	Median	47	59	41	53	49	47	44	9
	Min	45	50	37	49	47	45	43	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/19/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 54 dBA



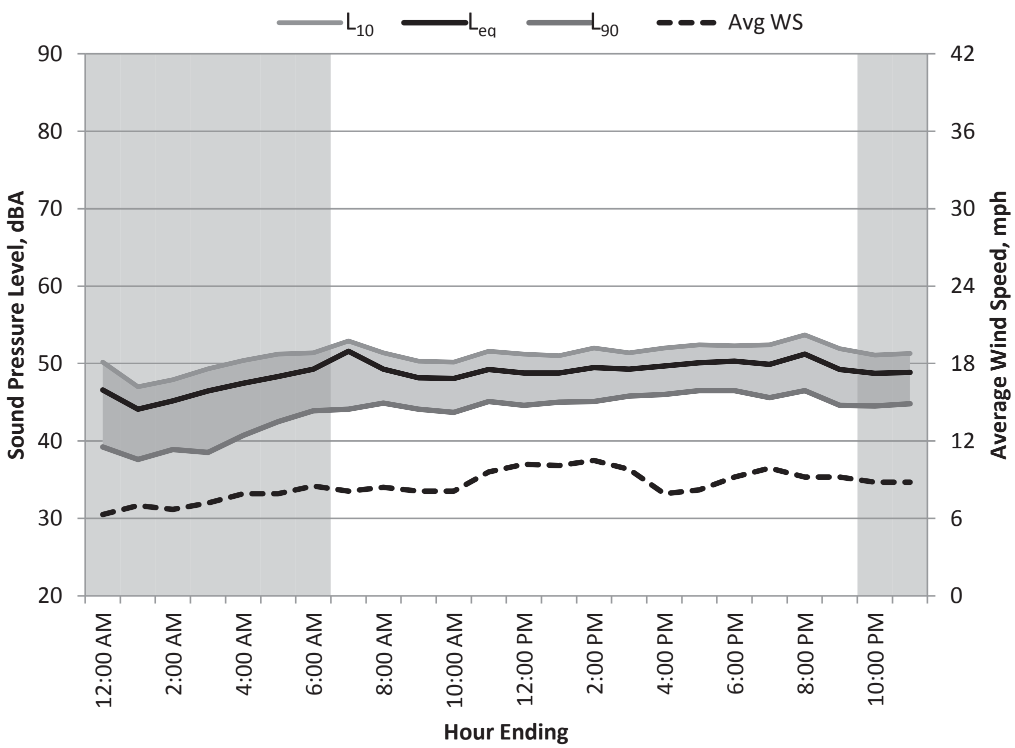
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	63	36	57	52	47	42	11
1:00	Night	47	57	30	54	50	45	37	8
2:00	Night	45	55	33	52	49	44	38	7
3:00	Night	48	62	36	55	50	46	41	6
4:00	Night	50	64	37	59	54	48	42	5
5:00	Night	53	65	41	61	56	51	46	4
6:00	Night	52	67	41	61	55	50	46	5
7:00	Day	55	69	42	64	58	52	47	5
8:00	Day	52	65	41	59	55	50	46	10
9:00	Day	59	75	45	69	64	55	49	16
10:00	Day	60	70	46	66	63	58	53	18
11:00	Day	57	68	41	64	60	54	50	16
12:00	Day	58	70	46	66	61	56	51	17
13:00	Day	60	68	48	66	64	58	54	19
14:00	Day	58	71	46	66	62	56	51	17
15:00	Day	56	67	43	63	59	54	50	15
16:00	Day	53	61	44	58	56	52	49	12
17:00	Day	50	58	43	54	53	50	47	6
18:00	Day	49	65	41	56	51	48	45	7
19:00	Day	47	60	36	54	50	46	43	7
20:00	Day	48	61	38	55	51	47	44	6
21:00	Day	47	63	36	54	50	46	42	7
22:00	Night	48	61	35	57	50	46	41	7
23:00	Night	47	66	32	57	50	45	39	6
Overall	Max	60	75	48	69	64	58	54	19
	Median	51	65	41	58	54	50	46	7
	Min	45	55	30	52	49	44	37	4
Daytime 7am-10pm	Max	60	75	48	69	64	58	54	19
	Median	55	67	43	63	58	52	49	12
	Min	47	58	36	54	50	46	42	5
Nighttime 10pm-7am	Max	53	67	41	61	56	51	46	11
	Median	48	63	36	57	50	46	41	6
	Min	45	55	30	52	49	44	37	4

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/20/2012

24hr Summary

L_{DN} = 54 dBA | C_{NEL} = 55 dBA | $L_{eq(24hr)}$ = 49 dBA



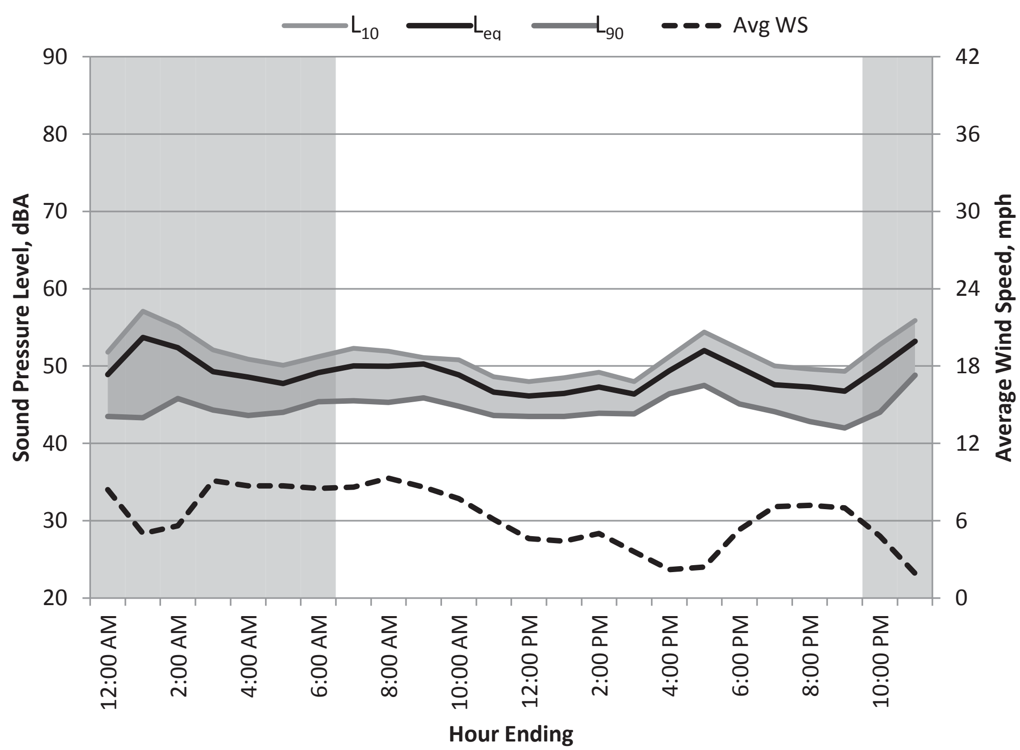
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	57	33	54	50	45	39	6
1:00	Night	44	57	32	52	47	42	38	7
2:00	Night	45	61	35	53	48	43	39	7
3:00	Night	46	62	32	55	49	44	39	7
4:00	Night	47	61	37	56	50	45	41	8
5:00	Night	48	61	36	57	51	47	43	8
6:00	Night	49	63	38	58	51	48	44	9
7:00	Day	52	78	37	60	53	48	44	8
8:00	Day	49	65	40	58	51	48	45	8
9:00	Day	48	60	39	55	50	47	44	8
10:00	Day	48	64	39	57	50	46	44	8
11:00	Day	49	62	40	56	52	48	45	10
12:00	Day	49	60	40	55	51	48	45	10
13:00	Day	49	60	41	55	51	48	45	10
14:00	Day	49	61	40	56	52	48	45	11
15:00	Day	49	61	38	55	51	49	46	10
16:00	Day	50	60	40	54	52	49	46	8
17:00	Day	50	61	43	56	52	49	47	8
18:00	Day	50	65	43	58	52	49	47	9
19:00	Day	50	63	42	56	52	49	46	10
20:00	Day	51	64	43	59	54	50	47	9
21:00	Day	49	62	41	56	52	48	45	9
22:00	Night	49	64	39	55	51	47	45	9
23:00	Night	49	60	41	55	51	48	45	9
Overall	Max	52	78	43	60	54	50	47	11
	Median	49	61	40	56	51	48	45	8
	Min	44	57	32	52	47	42	38	6
Daytime	Max	52	78	43	60	54	50	47	11
7am-10pm	Median	49	62	40	56	52	48	45	9
	Min	48	60	37	54	50	46	44	8
Nighttime	Max	49	64	41	58	51	48	45	9
10pm-7am	Median	47	61	36	55	50	45	41	8
	Min	44	57	32	52	47	42	38	6

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/21/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA



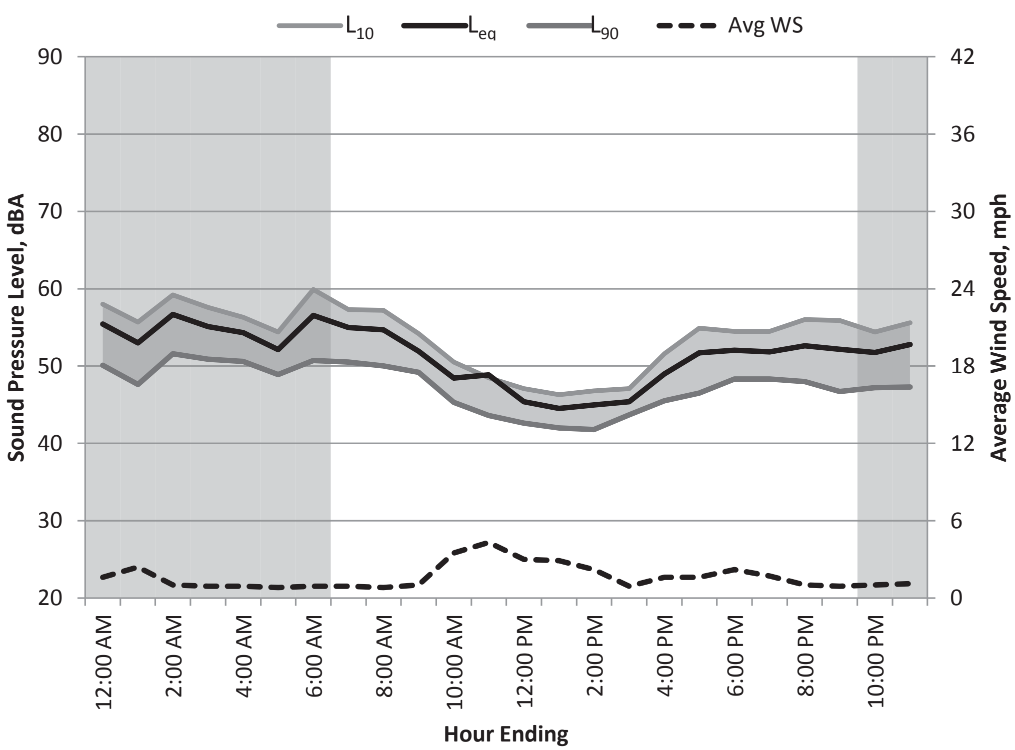
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	61	39	57	52	47	44	8
1:00	Night	54	62	37	59	57	53	43	5
2:00	Night	52	61	39	58	55	52	46	6
3:00	Night	49	61	40	57	52	48	44	9
4:00	Night	49	62	40	56	51	47	44	9
5:00	Night	48	58	39	53	50	47	44	9
6:00	Night	49	62	42	56	51	48	45	9
7:00	Day	50	62	42	58	52	49	46	9
8:00	Day	50	68	41	59	52	48	45	9
9:00	Day	50	75	42	58	51	48	46	9
10:00	Day	49	62	42	57	51	48	45	8
11:00	Day	47	60	40	53	49	46	44	6
12:00	Day	46	57	40	51	48	46	44	5
13:00	Day	46	55	41	51	49	46	44	4
14:00	Day	47	59	41	54	49	46	44	5
15:00	Day	46	58	41	51	48	46	44	4
16:00	Day	49	61	43	56	51	49	46	2
17:00	Day	52	64	43	60	54	50	48	2
18:00	Day	50	62	40	58	52	49	45	5
19:00	Day	48	58	40	53	50	47	44	7
20:00	Day	47	61	38	54	50	46	43	7
21:00	Day	47	54	36	52	49	46	42	7
22:00	Night	50	60	37	56	53	49	44	5
23:00	Night	53	65	46	59	56	52	49	2
Overall	Max	54	75	46	60	57	53	49	9
	Median	49	61	40	56	51	48	44	7
	Min	46	54	36	51	48	46	42	2
Daytime	Max	52	75	43	60	54	50	48	9
7am-10pm	Median	48	61	41	54	50	47	44	6
	Min	46	54	36	51	48	46	42	2
Nighttime	Max	54	65	46	59	57	53	49	9
10pm-7am	Median	49	61	39	57	52	48	44	8
	Min	48	58	37	53	50	47	43	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/22/2012

24hr Summary

L_{DN} = 61 dBA | C_{NEL} = 61 dBA | $L_{eq(24hr)}$ = 53 dBA



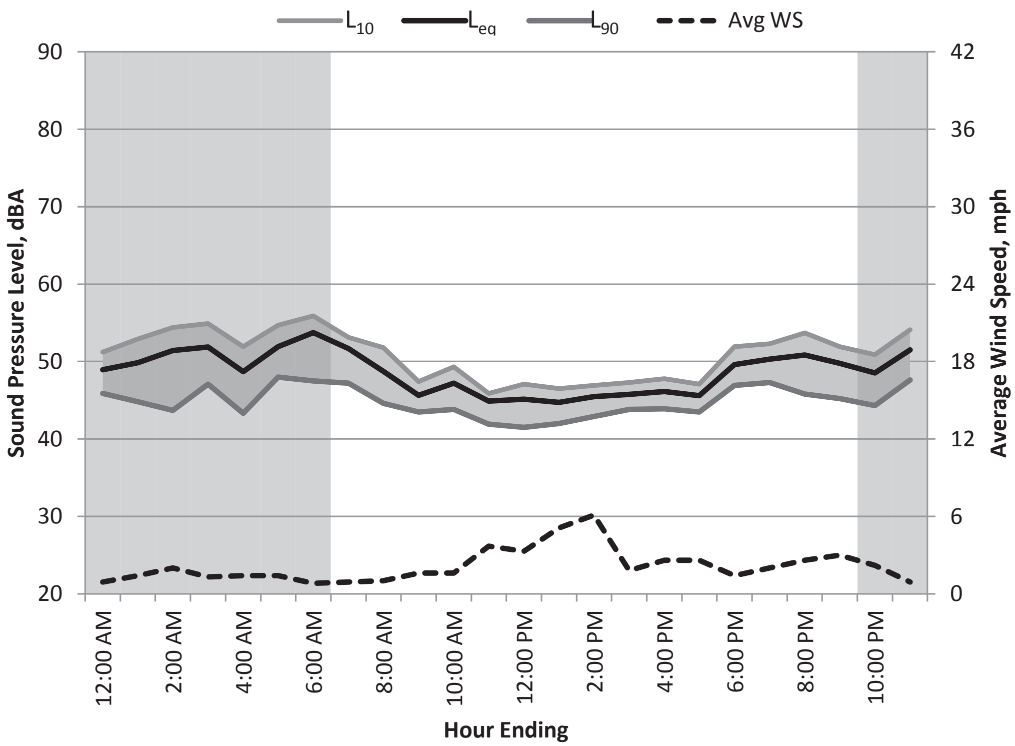
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	55	70	48	63	58	54	50	2
1:00	Night	53	61	42	59	56	52	48	2
2:00	Night	57	69	47	64	59	55	52	1
3:00	Night	55	65	48	61	58	54	51	1
4:00	Night	54	64	47	62	56	53	51	1
5:00	Night	52	61	47	58	54	51	49	1
6:00	Night	57	70	48	65	60	54	51	1
7:00	Day	55	69	46	62	57	54	51	1
8:00	Day	55	67	47	62	57	53	50	1
9:00	Day	52	60	47	56	54	51	49	1
10:00	Day	48	58	43	54	51	48	45	4
11:00	Day	49	74	40	56	49	46	44	4
12:00	Day	45	57	41	52	47	45	43	3
13:00	Day	45	56	40	50	46	44	42	3
14:00	Day	45	59	39	52	47	44	42	2
15:00	Day	45	50	42	49	47	45	44	1
16:00	Day	49	65	42	55	52	47	46	2
17:00	Day	52	64	44	59	55	50	47	2
18:00	Day	52	61	45	58	55	51	48	2
19:00	Day	52	58	46	57	55	51	48	2
20:00	Day	53	65	44	60	56	51	48	1
21:00	Day	52	64	44	61	56	49	47	1
22:00	Night	52	61	44	57	54	51	47	1
23:00	Night	53	66	44	62	56	51	47	1
Overall	Max	57	74	48	65	60	55	52	4
	Median	52	64	44	58	55	51	48	1
	Min	45	50	39	49	46	44	42	1
Daytime	Max	55	74	47	62	57	54	51	4
7am-10pm	Median	52	61	44	56	54	49	47	2
	Min	45	50	39	49	46	44	42	1
Nighttime	Max	57	70	48	65	60	55	52	2
10pm-7am	Median	54	65	47	62	56	53	50	1
	Min	52	61	42	57	54	51	47	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/23/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 49 dBA



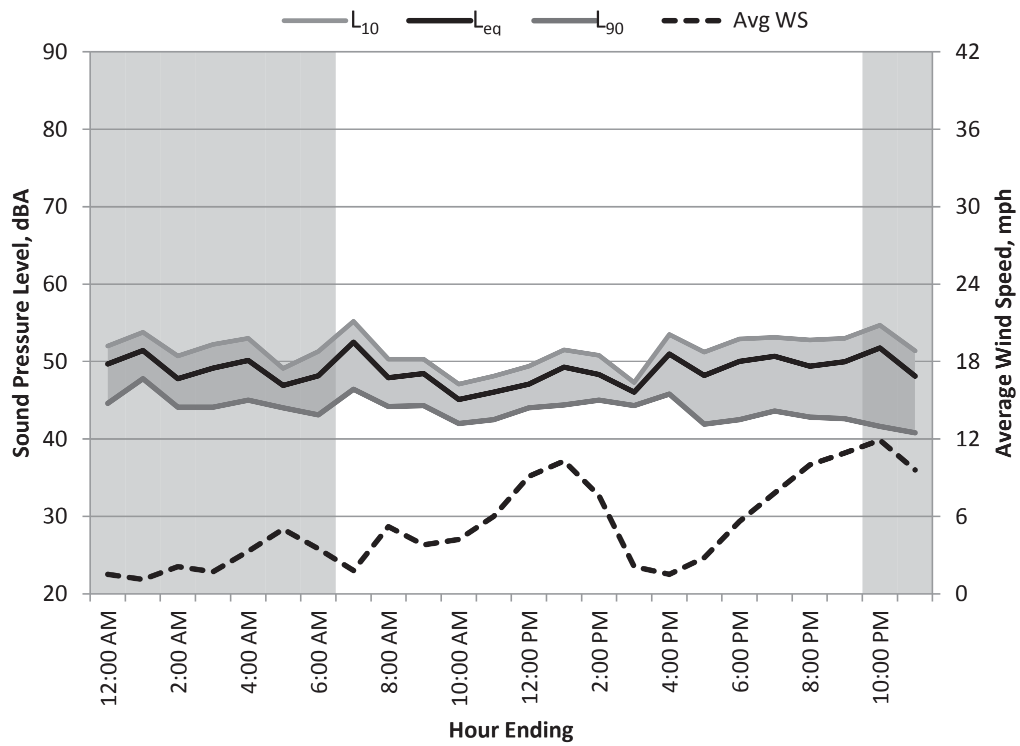
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	55	42	53	51	49	46	1
1:00	Night	50	61	42	58	53	48	45	1
2:00	Night	51	66	40	60	54	49	44	2
3:00	Night	52	62	43	59	55	50	47	1
4:00	Night	49	61	41	56	52	46	43	1
5:00	Night	52	63	44	59	55	50	48	1
6:00	Night	54	69	45	64	56	51	48	1
7:00	Day	52	66	45	62	53	50	47	1
8:00	Day	49	60	43	56	52	47	45	1
9:00	Day	46	54	42	51	47	45	44	2
10:00	Day	47	56	40	54	49	46	44	2
11:00	Day	45	59	40	53	46	44	42	4
12:00	Day	45	58	39	53	47	44	42	3
13:00	Day	45	54	40	50	47	44	42	5
14:00	Day	45	58	40	53	47	45	43	6
15:00	Day	46	54	42	50	47	45	44	2
16:00	Day	46	54	42	50	48	46	44	3
17:00	Day	46	55	41	51	47	45	44	3
18:00	Day	50	57	45	55	52	49	47	1
19:00	Day	50	64	45	58	52	49	47	2
20:00	Day	51	62	43	58	54	49	46	3
21:00	Day	50	57	40	54	52	50	45	3
22:00	Night	49	56	40	54	51	48	44	2
23:00	Night	52	62	45	59	54	50	48	1
Overall	Max	54	69	45	64	56	51	48	6
	Median	49	58	42	54	52	48	44	2
	Min	45	54	39	50	46	44	42	1
Daytime	Max	52	66	45	62	54	50	47	6
7am-10pm	Median	46	57	42	53	48	46	44	3
	Min	45	54	39	50	46	44	42	1
Nighttime	Max	54	69	45	64	56	51	48	2
10pm-7am	Median	51	62	42	59	54	49	46	1
	Min	49	55	40	53	51	46	43	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/24/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 49 dBA



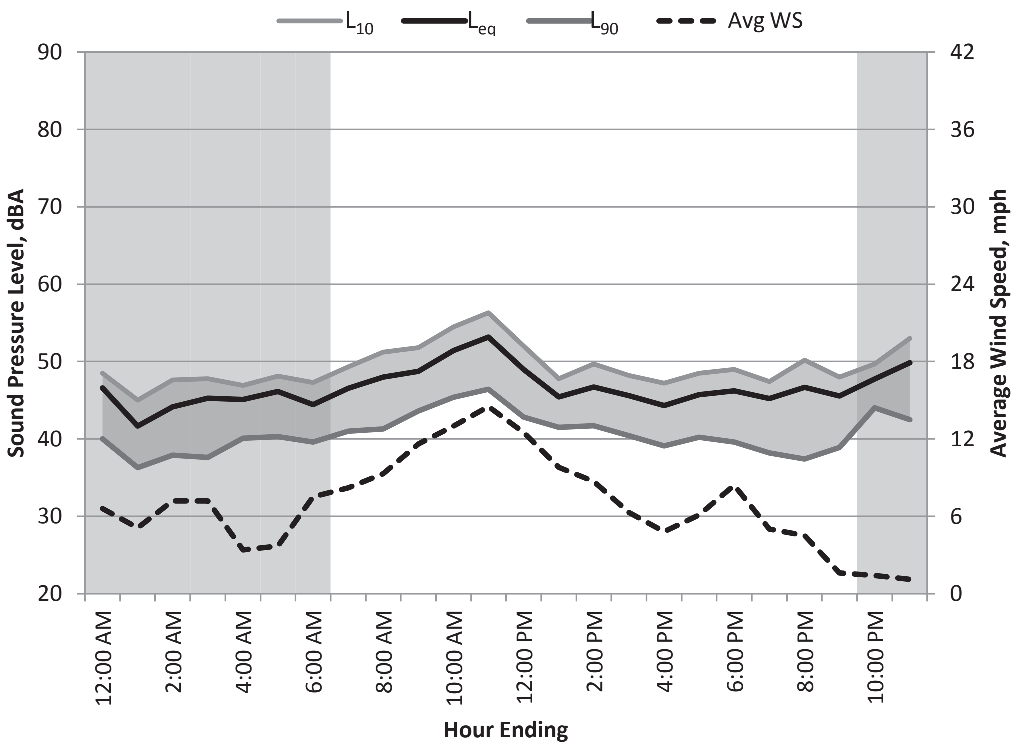
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	62	41	58	52	48	45	2
1:00	Night	51	60	45	56	54	51	48	1
2:00	Night	48	55	41	53	51	46	44	2
3:00	Night	49	61	40	57	52	47	44	2
4:00	Night	50	58	41	56	53	49	45	3
5:00	Night	47	55	41	52	49	46	44	5
6:00	Night	48	59	38	55	51	47	43	4
7:00	Day	52	70	39	61	55	50	46	2
8:00	Day	48	60	40	54	50	47	44	5
9:00	Day	48	61	41	55	50	48	44	4
10:00	Day	45	54	39	50	47	45	42	4
11:00	Day	46	61	39	53	48	45	43	6
12:00	Day	47	56	41	53	49	46	44	9
13:00	Day	49	67	40	57	52	47	44	10
14:00	Day	48	61	42	55	51	47	45	8
15:00	Day	46	53	43	49	47	46	44	2
16:00	Day	51	63	40	60	54	49	46	2
17:00	Day	48	60	38	56	51	46	42	3
18:00	Day	50	64	38	61	53	47	43	6
19:00	Day	51	67	39	61	53	48	44	8
20:00	Day	49	63	39	58	53	47	43	10
21:00	Day	50	66	37	59	53	47	43	11
22:00	Night	52	67	38	63	55	47	42	12
23:00	Night	48	64	38	57	51	45	41	10
Overall	Max	52	70	45	63	55	51	48	12
	Median	49	61	40	56	51	47	44	5
	Min	45	53	37	49	47	45	41	1
Daytime	Max	52	70	43	61	55	50	46	11
7am-10pm	Median	48	61	39	56	51	47	44	6
	Min	45	53	37	49	47	45	42	2
Nighttime	Max	52	67	45	63	55	51	48	12
10pm-7am	Median	49	60	41	56	52	47	44	3
	Min	47	55	38	52	49	45	41	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/25/2012

24hr Summary

L_{DN} = 53 dBA C_{NEL} = 53 dBA $L_{eq(24hr)}$ = 47 dBA



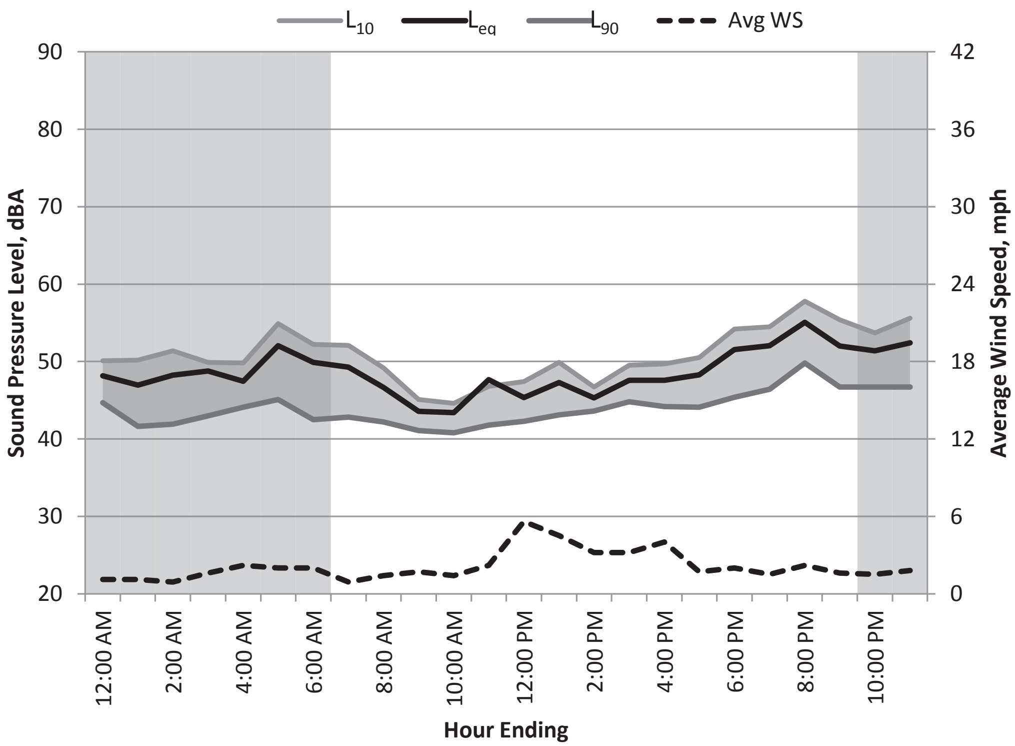
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	63	36	57	49	43	40	7
1:00	Night	42	55	34	49	45	39	36	5
2:00	Night	44	56	34	53	48	41	38	7
3:00	Night	45	62	34	56	48	41	38	7
4:00	Night	45	62	37	55	47	42	40	3
5:00	Night	46	62	37	56	48	44	40	4
6:00	Night	44	55	36	51	47	43	40	8
7:00	Day	47	62	36	54	49	45	41	8
8:00	Day	48	61	36	57	51	46	41	9
9:00	Day	49	60	38	56	52	47	44	12
10:00	Day	51	64	40	59	55	50	45	13
11:00	Day	53	65	40	61	56	51	46	15
12:00	Day	49	59	36	56	52	48	43	13
13:00	Day	45	59	38	51	48	45	42	10
14:00	Day	47	60	36	55	50	45	42	9
15:00	Day	46	60	37	55	48	44	40	6
16:00	Day	44	54	32	50	47	43	39	5
17:00	Day	46	59	35	55	49	44	40	6
18:00	Day	46	61	35	56	49	44	40	8
19:00	Day	45	63	34	55	47	42	38	5
20:00	Day	47	63	32	56	50	43	37	5
21:00	Day	46	58	34	52	48	45	39	2
22:00	Night	48	60	42	56	50	46	44	1
23:00	Night	50	64	39	57	53	48	43	1
Overall	Max	53	65	42	61	56	51	46	15
	Median	46	60	36	55	49	44	40	7
	Min	42	54	32	49	45	39	36	1
Daytime	Max	53	65	40	61	56	51	46	15
7am-10pm	Median	47	60	36	55	49	45	41	8
	Min	44	54	32	50	47	42	37	2
Nighttime	Max	50	64	42	57	53	48	44	8
10pm-7am	Median	45	62	36	56	48	43	40	5
	Min	42	55	34	49	45	39	36	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/26/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA



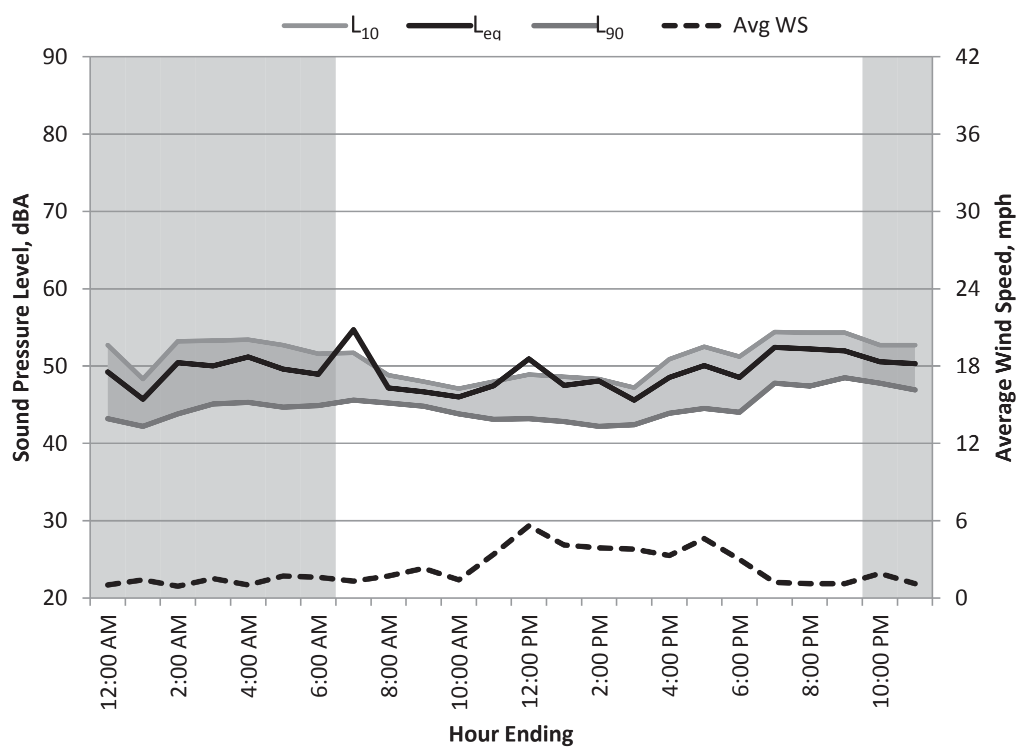
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	64	42	56	50	47	45	1
1:00	Night	47	58	39	53	50	46	42	1
2:00	Night	48	62	38	57	51	46	42	1
3:00	Night	49	66	40	59	50	45	43	2
4:00	Night	47	55	42	52	50	47	44	2
5:00	Night	52	63	41	61	55	50	45	2
6:00	Night	50	65	39	61	52	46	43	2
7:00	Day	49	61	41	58	52	47	43	1
8:00	Day	47	58	40	55	49	45	42	1
9:00	Day	44	52	38	47	45	43	41	2
10:00	Day	43	56	39	50	45	43	41	1
11:00	Day	48	68	39	60	47	43	42	2
12:00	Day	45	53	39	50	47	45	42	6
13:00	Day	47	59	38	55	50	46	43	5
14:00	Day	45	52	41	49	47	45	44	3
15:00	Day	48	63	42	53	50	47	45	3
16:00	Day	48	58	41	52	50	47	44	4
17:00	Day	48	61	42	56	51	47	44	2
18:00	Day	52	66	41	60	54	49	45	2
19:00	Day	52	64	43	57	55	52	46	2
20:00	Day	55	65	47	62	58	54	50	2
21:00	Day	52	62	44	58	55	51	47	2
22:00	Night	51	63	43	59	54	50	47	2
23:00	Night	52	63	44	60	56	51	47	2
Overall	Max	55	68	47	62	58	54	50	6
	Median	48	62	41	56	50	47	44	2
	Min	43	52	38	47	45	43	41	1
Daytime 7am-10pm	Max	55	68	47	62	58	54	50	6
	Median	48	61	41	55	50	47	44	2
	Min	43	52	38	47	45	43	41	1
Nighttime 10pm-7am	Max	52	66	44	61	56	51	47	2
	Median	49	63	41	59	51	47	44	2
	Min	47	55	38	52	50	45	42	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/27/2012

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 50 dBA

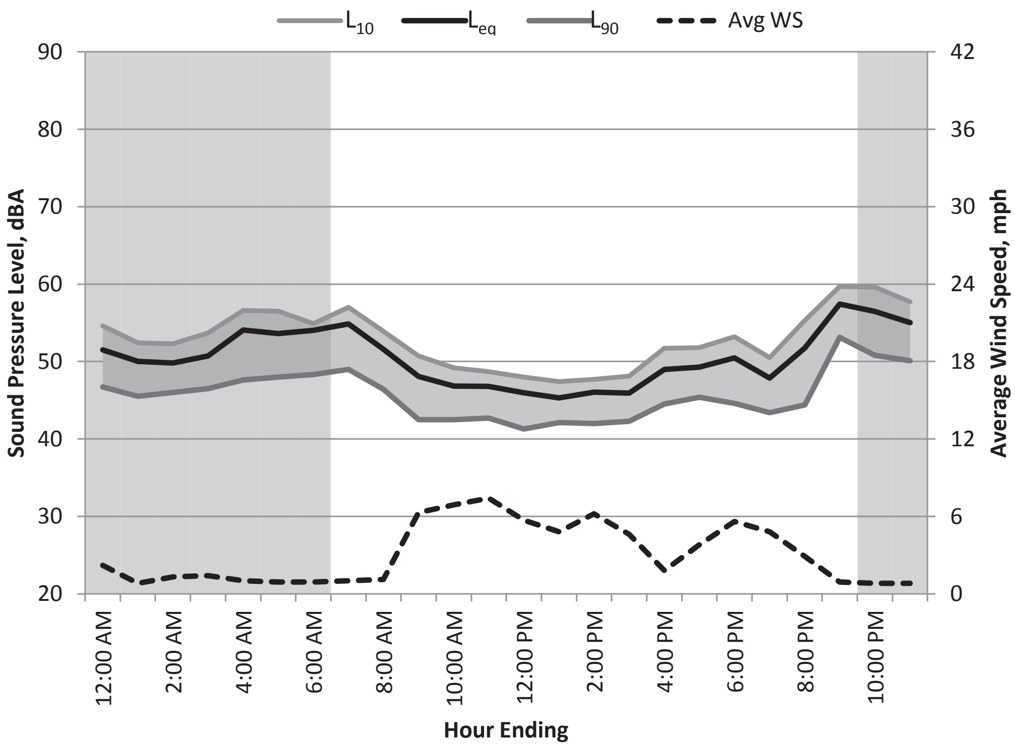


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	63	41	58	53	46	43	1
1:00	Night	46	55	39	51	48	45	42	1
2:00	Night	50	67	41	59	53	47	44	1
3:00	Night	50	61	42	56	53	49	45	2
4:00	Night	51	67	42	62	53	48	45	1
5:00	Night	50	62	41	56	53	48	45	2
6:00	Night	49	60	41	54	52	48	45	2
7:00	Day	55	81	43	55	52	50	46	1
8:00	Day	47	57	43	53	49	47	45	2
9:00	Day	47	54	43	52	48	46	45	2
10:00	Day	46	61	42	52	47	45	44	1
11:00	Day	47	73	40	54	48	45	43	3
12:00	Day	51	73	40	64	49	46	43	6
13:00	Day	47	72	40	56	49	45	43	4
14:00	Day	48	69	39	60	48	44	42	4
15:00	Day	46	66	39	52	47	45	42	4
16:00	Day	49	58	40	56	51	47	44	3
17:00	Day	50	62	40	59	53	49	45	5
18:00	Day	49	56	39	54	51	48	44	3
19:00	Day	52	66	44	62	54	50	48	1
20:00	Day	52	69	44	61	54	50	47	1
21:00	Day	52	59	45	57	54	51	49	1
22:00	Night	51	62	46	56	53	50	48	2
23:00	Night	50	57	45	55	53	50	47	1
Overall	Max	55	81	46	64	54	51	49	6
	Median	49	62	41	56	52	47	45	2
	Min	46	54	39	51	47	44	42	1
Daytime	Max	55	81	45	64	54	51	49	6
7am-10pm	Median	49	66	40	56	49	47	44	3
	Min	46	54	39	52	47	44	42	1
Nighttime	Max	51	67	46	62	53	50	48	2
10pm-7am	Median	50	62	41	56	53	48	45	1
	Min	46	55	39	51	48	45	42	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/28/2012

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 60 dBA $L_{eq(24hr)}$ = 52 dBA



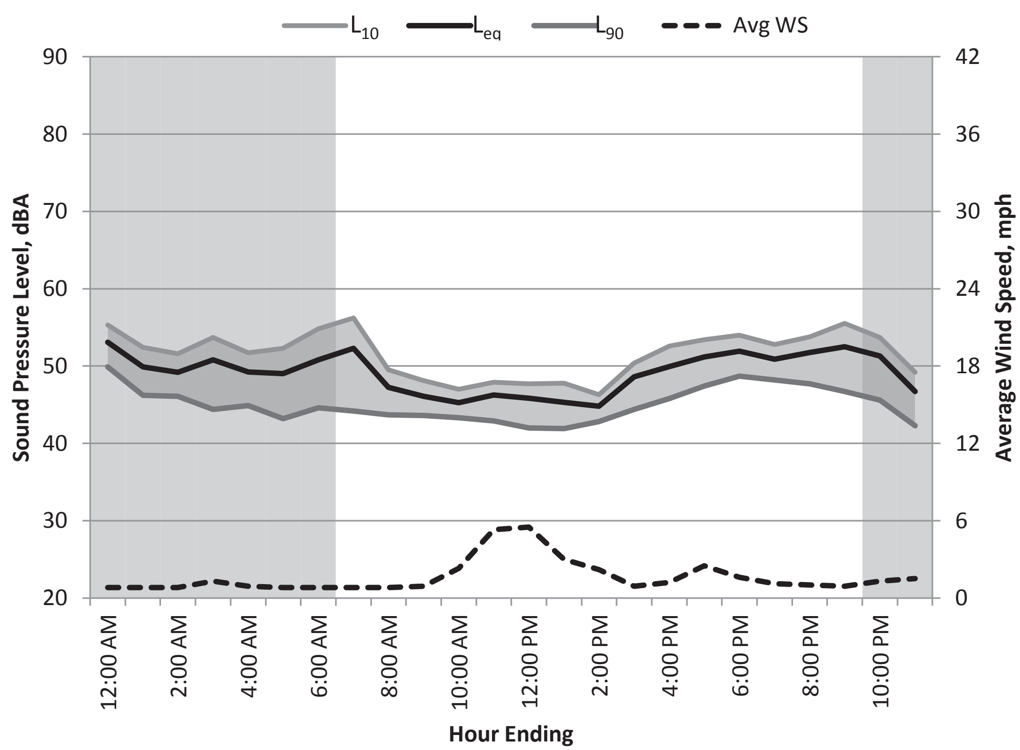
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	64	45	60	55	49	47	2
1:00	Night	50	65	43	60	52	47	46	1
2:00	Night	50	60	43	56	52	49	46	1
3:00	Night	51	62	43	58	54	49	47	1
4:00	Night	54	68	44	64	57	52	48	1
5:00	Night	54	68	45	62	57	52	48	1
6:00	Night	54	72	46	64	55	52	48	1
7:00	Day	55	70	45	64	57	53	49	1
8:00	Day	52	64	39	60	54	50	46	1
9:00	Day	48	62	38	56	51	46	43	6
10:00	Day	47	60	38	54	49	46	43	7
11:00	Day	47	59	39	54	49	46	43	7
12:00	Day	46	61	37	54	48	44	41	6
13:00	Day	45	56	38	50	47	45	42	5
14:00	Day	46	61	38	55	48	45	42	6
15:00	Day	46	58	38	52	48	45	42	5
16:00	Day	49	59	40	55	52	48	45	2
17:00	Day	49	56	41	54	52	49	45	4
18:00	Day	50	64	40	59	53	49	45	6
19:00	Day	48	59	40	54	51	47	43	5
20:00	Day	52	62	39	58	55	50	44	3
21:00	Day	57	72	50	64	60	56	53	1
22:00	Night	56	64	45	63	60	55	51	1
23:00	Night	55	68	48	60	58	54	50	1
Overall	Max	57	72	50	64	60	56	53	7
	Median	50	62	41	58	53	49	45	2
	Min	45	56	37	50	47	44	41	1
Daytime	Max	57	72	50	64	60	56	53	7
7am-10pm	Median	48	61	39	55	51	47	43	5
	Min	45	56	37	50	47	44	41	1
Nighttime	Max	56	72	48	64	60	55	51	2
10pm-7am	Median	54	65	45	60	55	52	48	1
	Min	50	60	43	56	52	47	46	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/29/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA



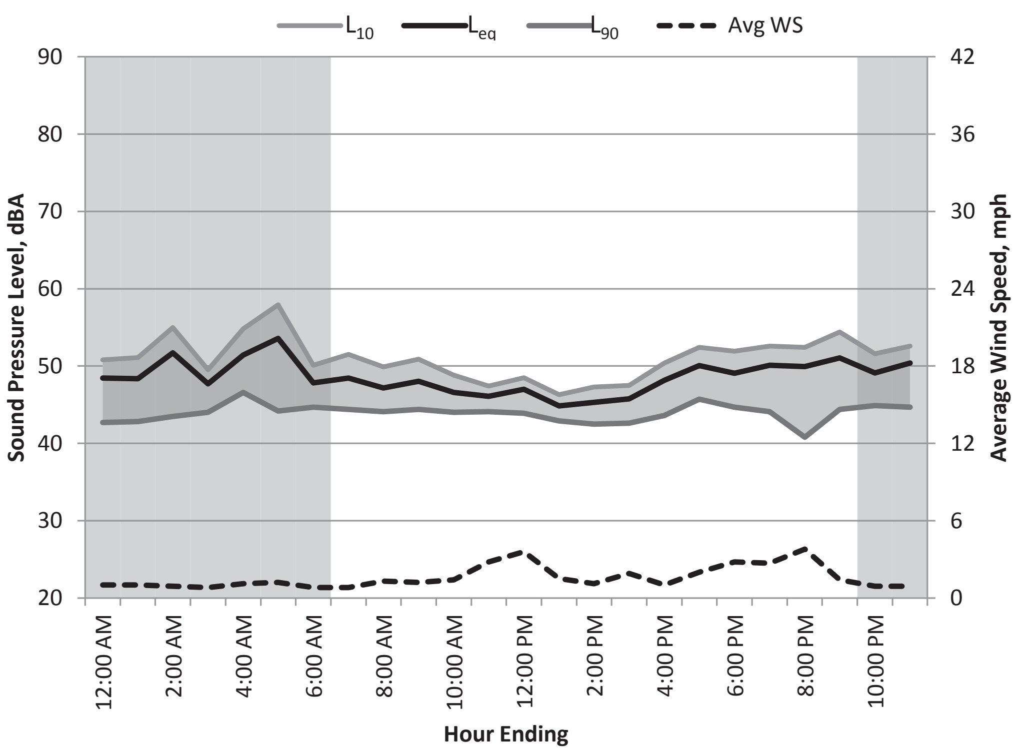
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	59	46	57	55	53	50	1
1:00	Night	50	61	44	56	52	49	46	1
2:00	Night	49	57	44	53	52	49	46	1
3:00	Night	51	60	40	57	54	50	44	1
4:00	Night	49	59	40	55	52	48	45	1
5:00	Night	49	59	41	56	52	47	43	1
6:00	Night	51	64	42	59	55	47	45	1
7:00	Day	52	67	41	60	56	49	44	1
8:00	Day	47	57	42	55	50	46	44	1
9:00	Day	46	57	42	53	48	45	44	1
10:00	Day	45	52	41	49	47	45	43	2
11:00	Day	46	62	39	53	48	45	43	5
12:00	Day	46	59	39	53	48	45	42	6
13:00	Day	45	58	40	52	48	44	42	3
14:00	Day	45	54	41	50	46	44	43	2
15:00	Day	49	65	43	56	50	46	44	1
16:00	Day	50	59	44	56	53	49	46	1
17:00	Day	51	61	43	56	53	51	47	3
18:00	Day	52	62	44	57	54	51	49	2
19:00	Day	51	62	46	57	53	50	48	1
20:00	Day	52	62	44	58	54	51	48	1
21:00	Day	53	64	44	62	56	50	47	1
22:00	Night	51	67	41	60	54	49	46	1
23:00	Night	47	57	39	54	49	46	42	2
Overall	Max	53	67	46	62	56	53	50	6
	Median	50	60	42	56	52	48	45	1
	Min	45	52	39	49	46	44	42	1
Daytime	Max	53	67	46	62	56	51	49	6
7am-10pm	Median	49	61	42	56	50	46	44	1
	Min	45	52	39	49	46	44	42	1
Nighttime	Max	53	67	46	60	55	53	50	2
10pm-7am	Median	50	59	41	56	52	49	45	1
	Min	47	57	39	53	49	46	42	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/30/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 49 dBA



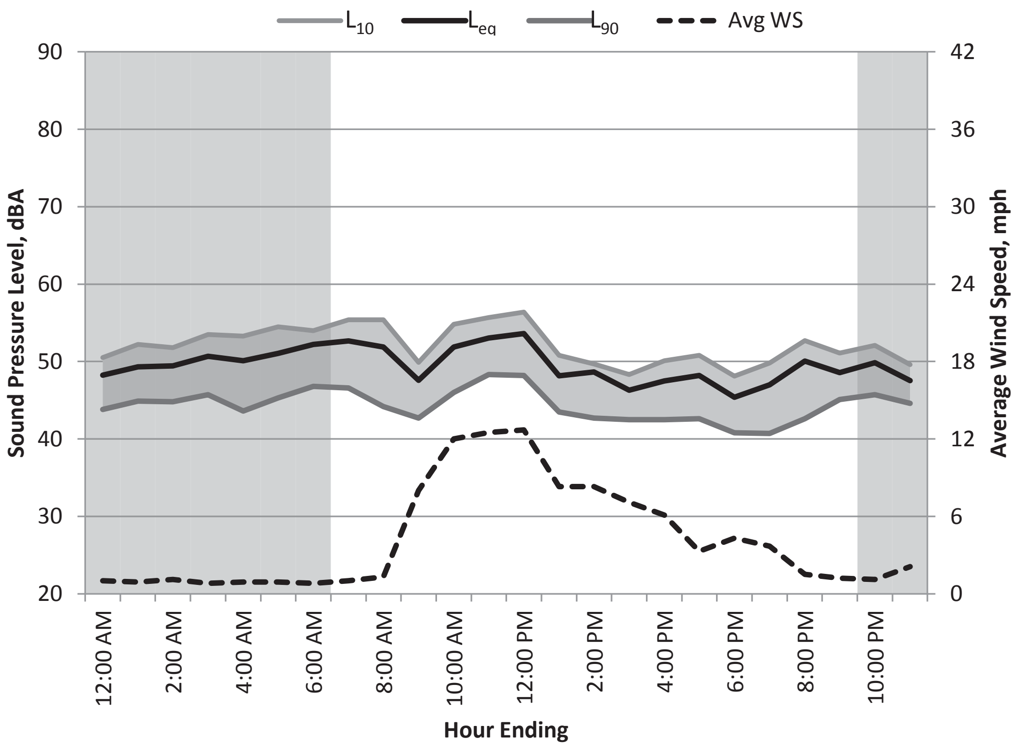
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	64	40	58	51	46	43	1
1:00	Night	48	64	40	56	51	46	43	1
2:00	Night	52	68	42	64	55	45	44	1
3:00	Night	48	62	42	56	50	46	44	1
4:00	Night	51	66	43	60	55	49	47	1
5:00	Night	54	65	39	62	58	49	44	1
6:00	Night	48	56	41	54	50	47	45	1
7:00	Day	48	64	42	55	52	46	44	1
8:00	Day	47	61	42	54	50	46	44	1
9:00	Day	48	62	43	56	51	46	44	1
10:00	Day	47	58	43	53	49	46	44	1
11:00	Day	46	57	41	51	47	46	44	3
12:00	Day	47	62	41	55	49	46	44	4
13:00	Day	45	55	41	50	46	44	43	2
14:00	Day	45	58	41	52	47	44	43	1
15:00	Day	46	59	40	54	48	44	43	2
16:00	Day	48	64	41	56	50	46	44	1
17:00	Day	50	63	42	58	52	49	46	2
18:00	Day	49	57	40	55	52	48	45	3
19:00	Day	50	63	39	58	53	49	44	3
20:00	Day	50	66	34	60	52	47	41	4
21:00	Day	51	61	39	58	54	49	44	1
22:00	Night	49	62	42	57	52	47	45	1
23:00	Night	50	64	43	60	53	47	45	1
Overall	Max	54	68	43	64	58	49	47	4
	Median	48	62	41	56	51	46	44	1
	Min	45	55	34	50	46	44	41	1
Daytime	Max	51	66	43	60	54	49	46	4
7am-10pm	Median	48	61	41	55	50	46	44	2
	Min	45	55	34	50	46	44	41	1
Nighttime	Max	54	68	43	64	58	49	47	1
10pm-7am	Median	49	64	42	58	52	47	44	1
	Min	48	56	39	54	50	45	43	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 12/31/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA



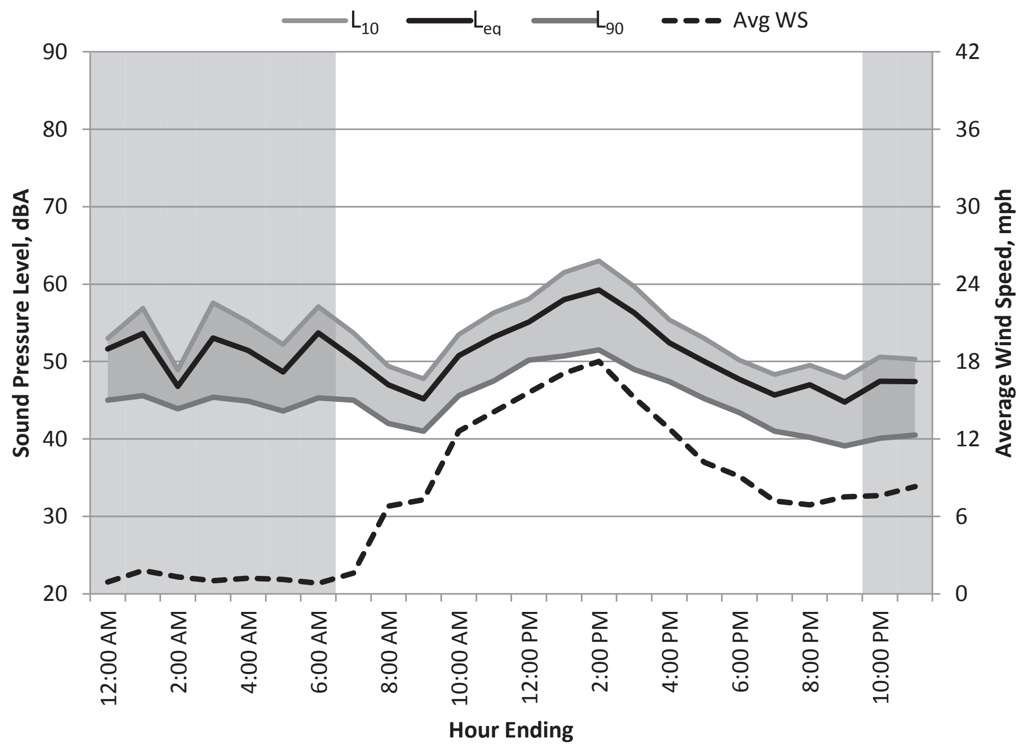
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	60	41	56	51	47	44	1
1:00	Night	49	62	43	57	52	48	45	1
2:00	Night	49	61	41	58	52	48	45	1
3:00	Night	51	63	43	57	54	50	46	1
4:00	Night	50	63	40	59	53	47	44	1
5:00	Night	51	61	42	57	55	49	45	1
6:00	Night	52	68	43	62	54	50	47	1
7:00	Day	53	67	44	63	55	50	47	1
8:00	Day	52	62	38	59	55	50	44	1
9:00	Day	48	64	39	55	50	46	43	8
10:00	Day	52	64	42	60	55	50	46	12
11:00	Day	53	65	44	60	56	52	48	13
12:00	Day	54	66	40	62	56	52	48	13
13:00	Day	48	59	40	56	51	47	44	8
14:00	Day	49	66	39	58	50	45	43	8
15:00	Day	46	58	39	54	48	45	43	7
16:00	Day	47	60	39	54	50	46	43	6
17:00	Day	48	61	38	57	51	47	43	3
18:00	Day	45	59	37	52	48	44	41	4
19:00	Day	47	63	37	55	50	45	41	4
20:00	Day	50	65	37	61	53	47	43	2
21:00	Day	49	59	43	55	51	47	45	1
22:00	Night	50	59	42	56	52	49	46	1
23:00	Night	48	55	41	53	50	47	45	2
Overall	Max	54	68	44	63	56	52	48	13
	Median	49	62	41	57	52	47	44	2
	Min	45	55	37	52	48	44	41	1
Daytime	Max	54	67	44	63	56	52	48	13
7am-10pm	Median	49	63	39	57	51	47	43	6
	Min	45	58	37	52	48	44	41	1
Nighttime	Max	52	68	43	62	55	50	47	2
10pm-7am	Median	50	61	42	57	52	48	45	1
	Min	48	55	40	53	50	47	44	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/1/2013

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 53 dBA



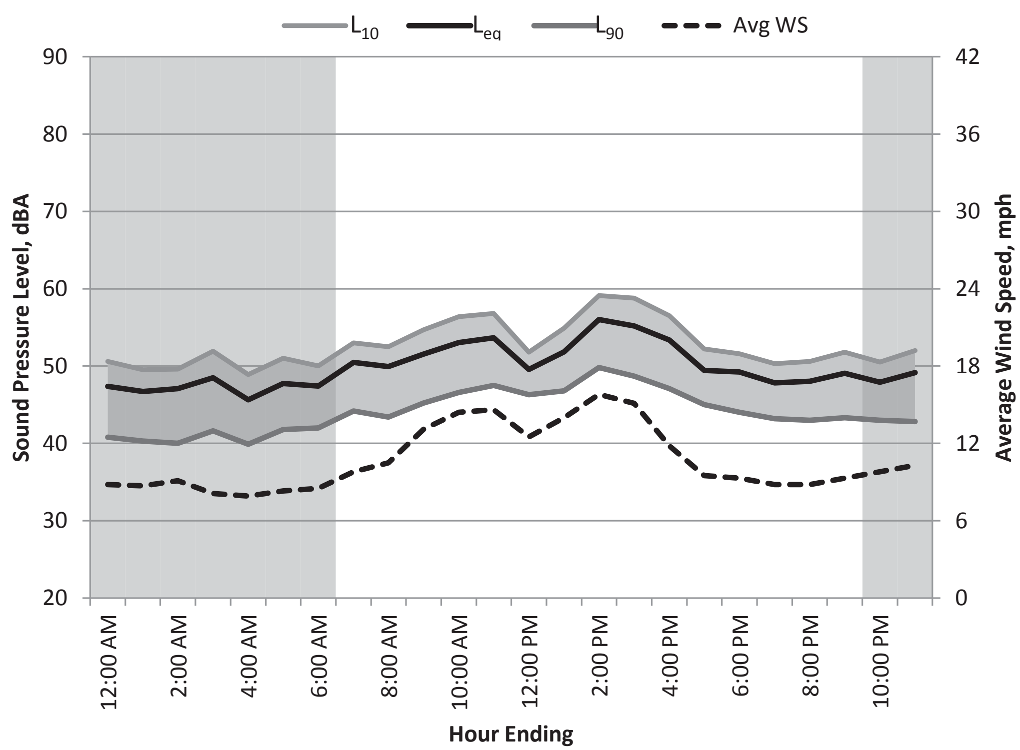
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	52	69	42	62	53	48	45	1
1:00	Night	54	68	44	64	57	48	46	2
2:00	Night	47	57	42	53	49	46	44	1
3:00	Night	53	68	43	63	58	48	45	1
4:00	Night	51	62	42	59	55	48	45	1
5:00	Night	49	62	42	58	52	45	44	1
6:00	Night	54	70	42	62	57	50	45	1
7:00	Day	50	63	40	57	54	49	45	2
8:00	Day	47	63	37	54	49	45	42	7
9:00	Day	45	57	35	51	48	44	41	7
10:00	Day	51	62	41	58	54	50	46	13
11:00	Day	53	65	43	60	56	51	48	14
12:00	Day	55	65	45	62	58	54	50	16
13:00	Day	58	70	45	66	62	56	51	17
14:00	Day	59	70	45	67	63	57	52	18
15:00	Day	56	68	43	64	60	55	49	15
16:00	Day	52	64	43	59	55	51	47	13
17:00	Day	50	60	39	56	53	49	45	10
18:00	Day	48	56	39	53	50	47	43	9
19:00	Day	46	55	36	51	48	45	41	7
20:00	Day	47	62	35	57	50	44	40	7
21:00	Day	45	60	34	51	48	43	39	8
22:00	Night	47	60	35	57	51	44	40	8
23:00	Night	47	64	35	57	50	45	41	8
Overall	Max	59	70	45	67	63	57	52	18
	Median	51	63	42	58	53	48	45	7
	Min	45	55	34	51	48	43	39	1
Daytime	Max	59	70	45	67	63	57	52	18
7am-10pm	Median	50	63	40	57	54	49	45	10
	Min	45	55	34	51	48	43	39	2
Nighttime	Max	54	70	44	64	58	50	46	8
10pm-7am	Median	51	64	42	59	53	48	45	1
	Min	47	57	35	53	49	44	40	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/2/2013

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 55 dBA | $L_{eq(24hr)}$ = 51 dBA



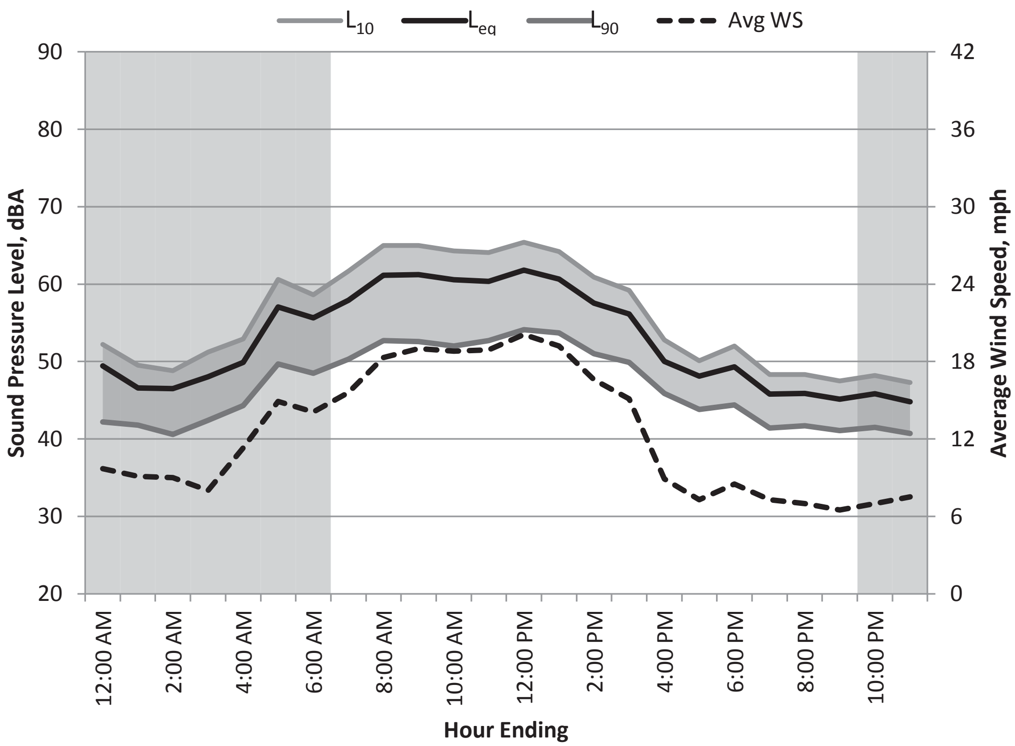
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	60	35	55	51	46	41	9
1:00	Night	47	58	34	56	50	45	40	9
2:00	Night	47	66	35	57	50	44	40	9
3:00	Night	48	61	37	57	52	46	42	8
4:00	Night	46	58	36	52	49	44	40	8
5:00	Night	48	62	36	56	51	46	42	8
6:00	Night	47	63	37	56	50	45	42	9
7:00	Day	50	68	40	59	53	48	44	10
8:00	Day	50	64	38	59	53	48	43	11
9:00	Day	52	65	40	60	55	50	45	13
10:00	Day	53	66	41	60	56	51	47	14
11:00	Day	54	64	42	62	57	52	48	15
12:00	Day	50	59	43	55	52	49	46	13
13:00	Day	52	66	42	59	55	50	47	14
14:00	Day	56	67	44	64	59	54	50	16
15:00	Day	55	67	44	63	59	53	49	15
16:00	Day	53	69	43	63	57	50	47	12
17:00	Day	49	63	41	55	52	48	45	10
18:00	Day	49	65	40	57	52	48	44	9
19:00	Day	48	61	39	55	50	47	43	9
20:00	Day	48	60	39	56	51	47	43	9
21:00	Day	49	65	39	57	52	47	43	9
22:00	Night	48	60	38	55	51	47	43	10
23:00	Night	49	64	38	58	52	47	43	10
Overall	Max	56	69	44	64	59	54	50	16
	Median	49	64	39	57	52	47	43	10
	Min	46	58	34	52	49	44	40	8
Daytime	Max	56	69	44	64	59	54	50	16
7am-10pm	Median	50	65	41	59	53	49	45	12
	Min	48	59	38	55	50	47	43	9
Nighttime	Max	49	66	38	58	52	47	43	10
10pm-7am	Median	47	61	36	56	51	46	42	9
	Min	46	58	34	52	49	44	40	8

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/3/2013

24hr Summary

L_{DN} = 60 dBA C_{NEL} = 60 dBA $L_{eq(24hr)}$ = 57 dBA

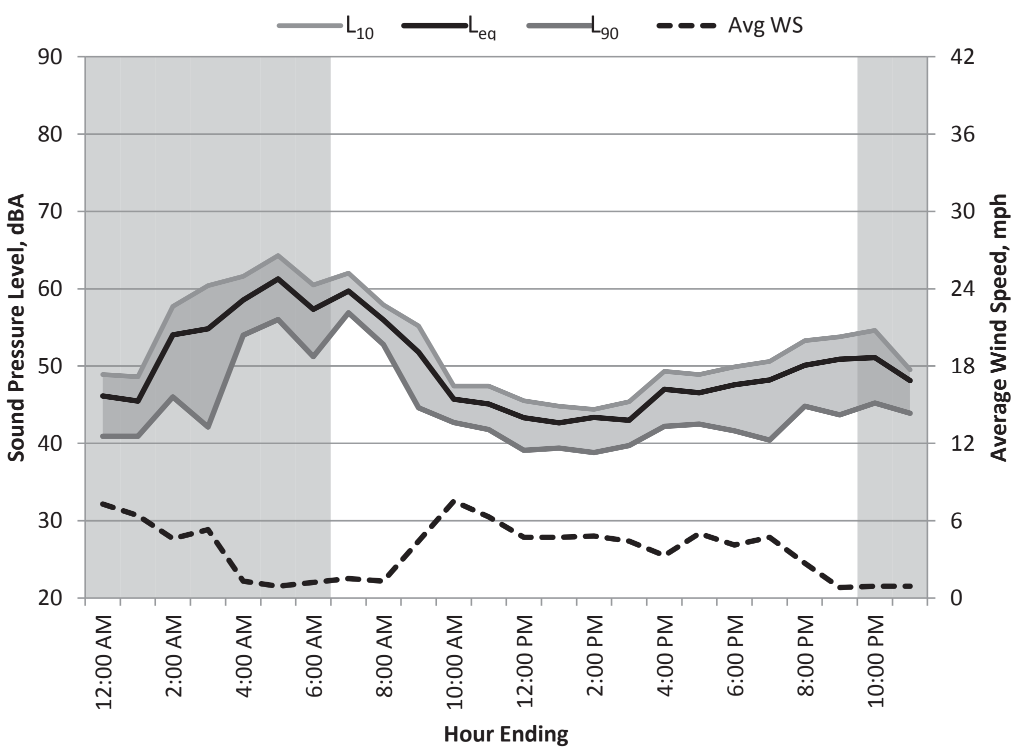


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	66	38	59	52	46	42	10
1:00	Night	47	57	38	53	50	45	42	9
2:00	Night	47	68	36	55	49	44	41	9
3:00	Night	48	60	39	55	51	46	42	8
4:00	Night	50	64	40	57	53	48	44	11
5:00	Night	57	70	44	66	61	54	50	15
6:00	Night	56	74	43	65	59	53	49	14
7:00	Day	58	70	44	66	62	55	50	16
8:00	Day	61	75	48	70	65	58	53	18
9:00	Day	61	72	48	69	65	59	53	19
10:00	Day	61	70	47	68	64	59	52	19
11:00	Day	60	72	45	67	64	58	53	19
12:00	Day	62	74	48	69	65	60	54	20
13:00	Day	61	71	47	67	64	59	54	19
14:00	Day	58	69	46	65	61	55	51	17
15:00	Day	56	68	46	65	59	54	50	15
16:00	Day	50	60	43	57	53	49	46	9
17:00	Day	48	62	41	57	50	47	44	7
18:00	Day	49	63	41	58	52	48	44	9
19:00	Day	46	61	37	51	48	45	41	7
20:00	Day	46	61	39	51	48	45	42	7
21:00	Day	45	58	37	51	48	44	41	7
22:00	Night	46	59	37	53	48	45	42	7
23:00	Night	45	55	37	50	47	44	41	8
Overall	Max	62	75	48	70	65	60	54	20
	Median	50	67	42	59	53	48	45	11
	Min	45	55	36	50	47	44	41	7
Daytime	Max	62	75	48	70	65	60	54	20
7am-10pm	Median	58	69	45	65	61	55	50	16
	Min	45	58	37	51	48	44	41	7
Nighttime	Max	57	74	44	66	61	54	50	15
10pm-7am	Median	48	64	38	55	51	46	42	9
	Min	45	55	36	50	47	44	41	7

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/4/2013

24hr Summary

L_{DN} = 62 dBA | C_{NEL} = 62 dBA | $L_{eq(24hr)}$ = 54 dBA



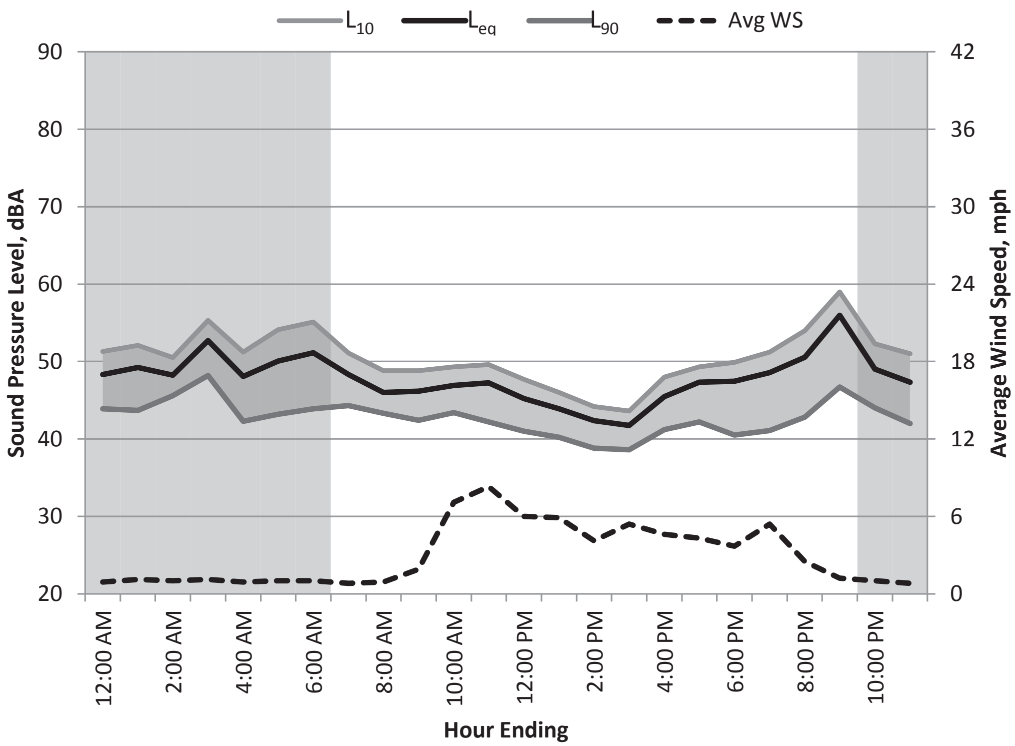
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	58	37	54	49	44	41	7
1:00	Night	45	55	38	52	49	44	41	6
2:00	Night	54	63	42	60	58	53	46	5
3:00	Night	55	65	38	64	60	48	42	5
4:00	Night	59	72	51	65	62	57	54	1
5:00	Night	61	71	53	67	64	60	56	1
6:00	Night	57	68	47	64	61	56	51	1
7:00	Day	60	64	53	64	62	59	57	2
8:00	Day	56	72	51	64	58	55	53	1
9:00	Day	52	61	41	57	55	50	45	4
10:00	Day	46	59	40	51	47	45	43	8
11:00	Day	45	56	39	51	47	44	42	6
12:00	Day	43	57	35	51	46	42	39	5
13:00	Day	43	54	36	49	45	42	39	5
14:00	Day	43	59	34	54	44	42	39	5
15:00	Day	43	54	35	49	45	42	40	4
16:00	Day	47	61	39	55	49	45	42	3
17:00	Day	47	55	38	52	49	46	43	5
18:00	Day	48	67	36	55	50	46	42	4
19:00	Day	48	66	37	59	51	45	40	5
20:00	Day	50	59	41	56	53	49	45	3
21:00	Day	51	61	41	57	54	50	44	1
22:00	Night	51	62	41	58	55	49	45	1
23:00	Night	48	60	40	58	50	46	44	1
Overall	Max	61	72	53	67	64	60	57	8
	Median	48	61	40	57	50	46	43	4
	Min	43	54	34	49	44	42	39	1
Daytime 7am-10pm	Max	60	72	53	64	62	59	57	8
	Median	47	59	39	55	49	45	42	4
	Min	43	54	34	49	44	42	39	1
Nighttime 10pm-7am	Max	61	72	53	67	64	60	56	7
	Median	54	63	41	60	58	49	45	1
	Min	45	55	37	52	49	44	41	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/5/2013

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 49 dBA



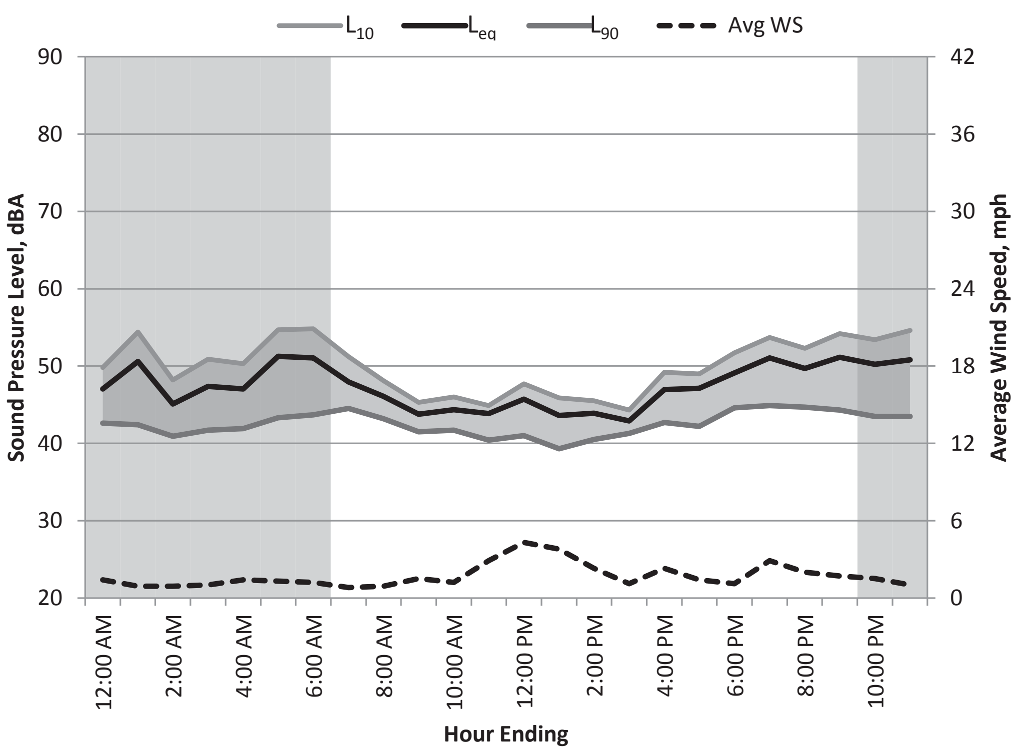
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	59	43	56	51	46	44	1
1:00	Night	49	60	41	58	52	47	44	1
2:00	Night	48	55	44	52	51	48	46	1
3:00	Night	53	60	46	57	55	52	48	1
4:00	Night	48	59	39	58	51	45	42	1
5:00	Night	50	62	40	58	54	47	43	1
6:00	Night	51	64	41	60	55	47	44	1
7:00	Day	48	59	42	55	51	47	44	1
8:00	Day	46	53	41	51	49	45	43	1
9:00	Day	46	60	40	54	49	44	42	2
10:00	Day	47	57	40	53	49	46	43	7
11:00	Day	47	61	38	57	50	45	42	8
12:00	Day	45	56	38	53	48	44	41	6
13:00	Day	44	56	37	51	46	43	40	6
14:00	Day	42	57	36	48	44	42	39	4
15:00	Day	42	53	34	48	44	41	39	5
16:00	Day	45	58	37	52	48	44	41	5
17:00	Day	47	64	38	55	49	46	42	4
18:00	Day	47	61	33	57	50	45	41	4
19:00	Day	49	64	33	58	51	46	41	5
20:00	Day	51	62	36	57	54	49	43	3
21:00	Day	56	73	41	66	59	52	47	1
22:00	Night	49	60	40	57	52	47	44	1
23:00	Night	47	58	38	54	51	45	42	1
Overall	Max	56	73	46	66	59	52	48	8
	Median	48	59	39	56	51	46	43	2
	Min	42	53	33	48	44	41	39	1
Daytime	Max	56	73	42	66	59	52	47	8
7am-10pm	Median	47	59	38	54	49	45	42	4
	Min	42	53	33	48	44	41	39	1
Nighttime	Max	53	64	46	60	55	52	48	1
10pm-7am	Median	49	60	41	57	52	47	44	1
	Min	47	55	38	52	51	45	42	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/6/2013

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 48 dBA

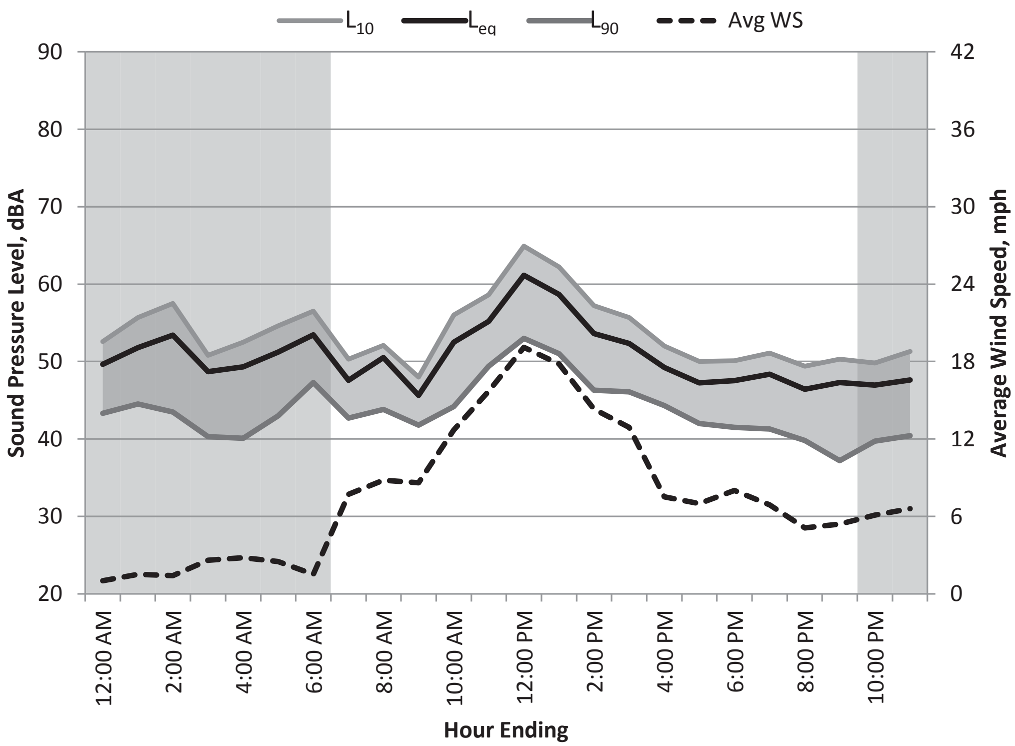


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	60	36	54	50	45	43	1
1:00	Night	51	64	40	61	54	46	42	1
2:00	Night	45	57	39	53	48	43	41	1
3:00	Night	47	63	40	55	51	45	42	1
4:00	Night	47	58	40	55	50	45	42	1
5:00	Night	51	66	38	61	55	48	43	1
6:00	Night	51	66	39	60	55	48	44	1
7:00	Day	48	60	43	55	51	46	45	1
8:00	Day	46	57	42	52	48	45	43	1
9:00	Day	44	58	40	48	45	43	42	2
10:00	Day	44	60	40	52	46	43	42	1
11:00	Day	44	59	37	53	45	42	40	3
12:00	Day	46	60	38	56	48	43	41	4
13:00	Day	44	57	37	52	46	42	39	4
14:00	Day	44	59	38	53	46	42	41	2
15:00	Day	43	49	39	47	44	42	41	1
16:00	Day	47	59	38	55	49	46	43	2
17:00	Day	47	61	38	56	49	45	42	1
18:00	Day	49	61	41	55	52	48	45	1
19:00	Day	51	66	40	60	54	49	45	3
20:00	Day	50	64	42	57	52	48	45	2
21:00	Day	51	64	40	61	54	48	44	2
22:00	Night	50	63	40	59	53	47	44	2
23:00	Night	51	65	41	61	55	47	44	1
Overall	Max	51	66	43	61	55	49	45	4
	Median	47	60	40	55	50	45	43	1
	Min	43	49	36	47	44	42	39	1
Daytime	Max	51	66	43	61	54	49	45	4
7am-10pm	Median	46	60	40	55	48	45	42	2
	Min	43	49	37	47	44	42	39	1
Nighttime	Max	51	66	41	61	55	48	44	2
10pm-7am	Median	50	63	40	59	53	46	43	1
	Min	45	57	36	53	48	43	41	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/7/2013

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 53 dBA



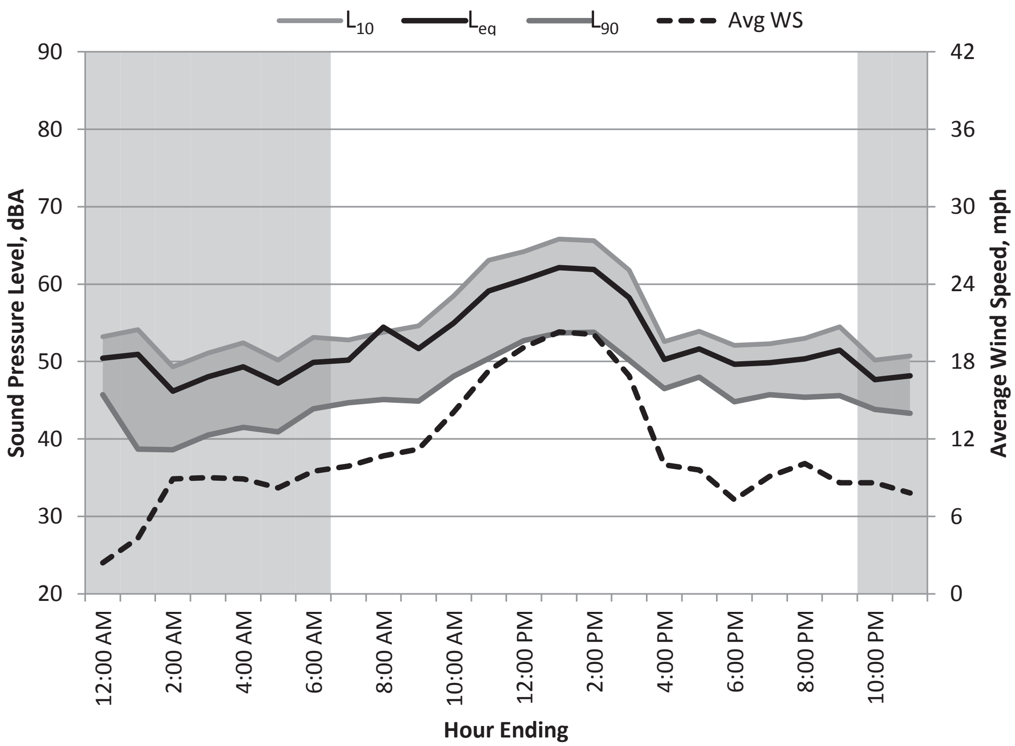
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	61	41	58	53	48	43	1
1:00	Night	52	65	42	62	56	48	45	2
2:00	Night	53	70	39	63	58	49	44	1
3:00	Night	49	66	35	60	51	45	40	3
4:00	Night	49	65	35	59	53	47	40	3
5:00	Night	51	61	38	58	55	50	43	3
6:00	Night	53	65	40	63	57	51	47	2
7:00	Day	48	58	37	54	50	46	43	8
8:00	Day	50	74	39	60	52	47	44	9
9:00	Day	46	54	37	51	48	45	42	9
10:00	Day	53	65	39	61	56	50	44	13
11:00	Day	55	65	44	62	59	53	49	16
12:00	Day	61	75	48	69	65	58	53	19
13:00	Day	59	75	45	66	62	56	51	18
14:00	Day	54	65	40	62	57	51	46	14
15:00	Day	52	63	41	60	56	50	46	13
16:00	Day	49	63	40	57	52	48	44	8
17:00	Day	47	56	38	54	50	46	42	7
18:00	Day	48	62	37	55	50	46	42	8
19:00	Day	48	63	38	58	51	46	41	7
20:00	Day	46	62	34	54	49	44	40	5
21:00	Day	47	64	32	58	50	43	37	5
22:00	Night	47	62	34	55	50	45	40	6
23:00	Night	48	60	35	55	51	45	40	7
Overall	Max	61	75	48	69	65	58	53	19
	Median	49	64	38	59	52	47	43	7
	Min	46	54	32	51	48	43	37	1
Daytime	Max	61	75	48	69	65	58	53	19
7am-10pm	Median	49	63	39	58	52	47	44	9
	Min	46	54	32	51	48	43	37	5
Nighttime	Max	53	70	42	63	58	51	47	7
10pm-7am	Median	50	65	38	59	53	48	43	3
	Min	47	60	34	55	50	45	40	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/8/2013

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 55 dBA



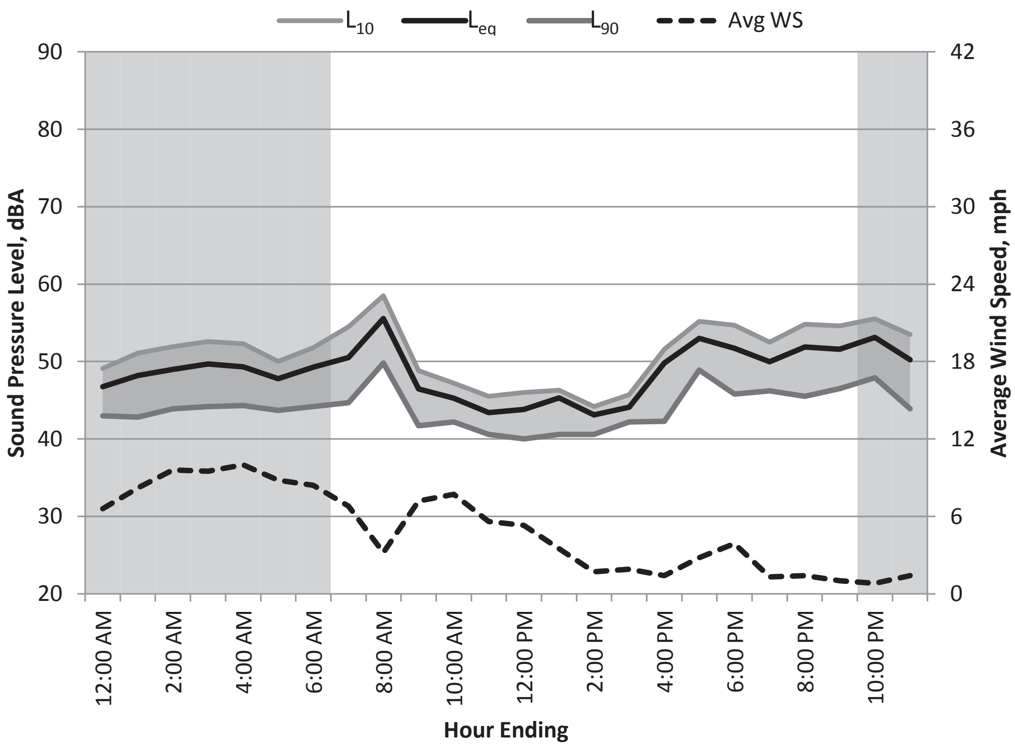
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	60	41	57	53	49	46	2
1:00	Night	51	69	33	61	54	46	39	4
2:00	Night	46	59	34	54	49	44	39	9
3:00	Night	48	63	35	57	51	46	41	9
4:00	Night	49	65	37	59	52	46	42	9
5:00	Night	47	61	35	55	50	45	41	8
6:00	Night	50	65	38	58	53	48	44	10
7:00	Day	50	66	38	59	53	48	45	10
8:00	Day	54	79	40	63	54	49	45	11
9:00	Day	52	65	40	61	55	50	45	11
10:00	Day	55	66	44	63	59	53	48	14
11:00	Day	59	72	43	68	63	56	50	17
12:00	Day	61	71	47	68	64	59	53	19
13:00	Day	62	74	45	70	66	60	54	20
14:00	Day	62	75	47	70	66	59	54	20
15:00	Day	58	72	45	67	62	55	50	17
16:00	Day	50	61	41	55	53	50	47	10
17:00	Day	52	63	45	58	54	51	48	10
18:00	Day	50	62	40	58	52	48	45	7
19:00	Day	50	62	42	56	52	49	46	9
20:00	Day	50	62	40	57	53	49	45	10
21:00	Day	51	65	41	60	55	49	46	9
22:00	Night	48	59	42	54	50	47	44	9
23:00	Night	48	63	40	56	51	47	43	8
Overall	Max	62	79	47	70	66	60	54	20
	Median	50	65	40	58	53	49	45	10
	Min	46	59	33	54	49	44	39	2
Daytime	Max	62	79	47	70	66	60	54	20
7am-10pm	Median	52	66	42	61	55	50	47	11
	Min	50	61	38	55	52	48	45	7
Nighttime	Max	51	69	42	61	54	49	46	10
10pm-7am	Median	48	63	37	57	51	46	42	9
	Min	46	59	33	54	49	44	39	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/9/2013

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 50 dBA



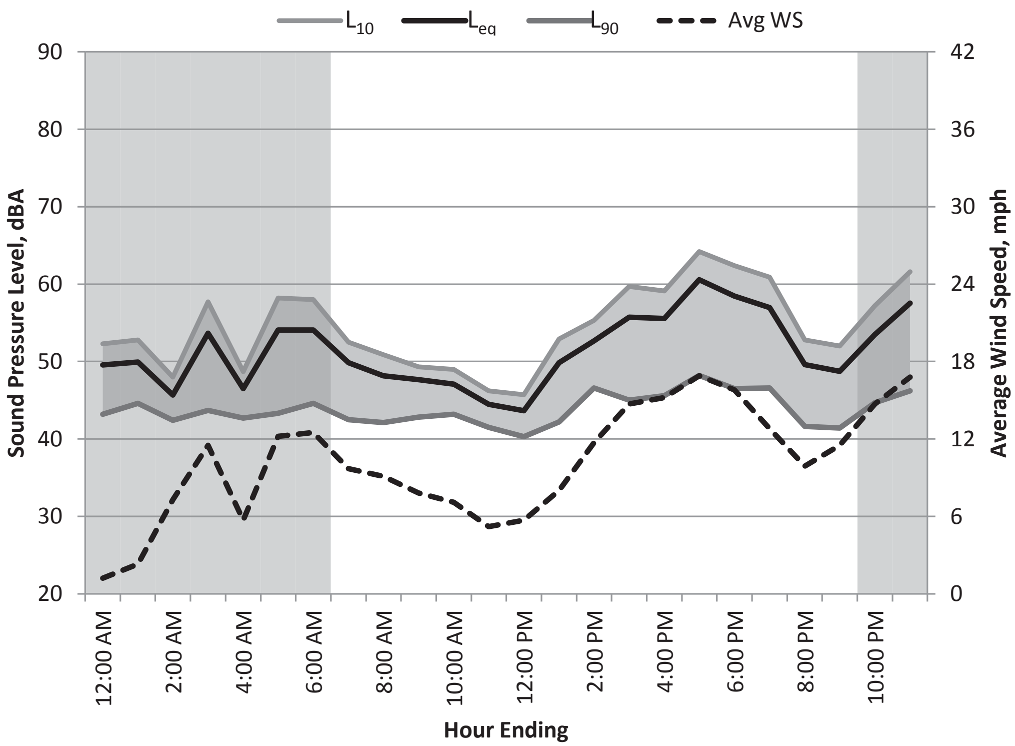
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	55	40	52	49	46	43	7
1:00	Night	48	61	39	56	51	47	43	8
2:00	Night	49	62	41	56	52	48	44	10
3:00	Night	50	63	41	57	53	48	44	10
4:00	Night	49	62	41	57	52	48	44	10
5:00	Night	48	62	40	55	50	47	44	9
6:00	Night	49	64	40	57	52	48	44	8
7:00	Day	51	64	41	58	55	48	45	7
8:00	Day	56	62	45	60	59	55	50	3
9:00	Day	46	60	37	55	49	45	42	7
10:00	Day	45	57	38	50	47	45	42	8
11:00	Day	43	56	37	48	46	43	41	6
12:00	Day	44	57	37	52	46	42	40	5
13:00	Day	45	68	37	54	46	43	41	4
14:00	Day	43	55	38	50	44	42	41	2
15:00	Day	44	53	40	48	46	44	42	2
16:00	Day	50	66	40	62	52	47	42	1
17:00	Day	53	66	45	62	55	51	49	3
18:00	Day	52	64	43	60	55	50	46	4
19:00	Day	50	58	44	55	53	49	46	1
20:00	Day	52	69	42	59	55	50	46	1
21:00	Day	52	63	44	59	55	50	47	1
22:00	Night	53	68	44	60	56	52	48	1
23:00	Night	50	57	39	56	54	49	44	1
Overall	Max	56	69	45	62	59	55	50	10
	Median	49	62	40	56	52	48	44	5
	Min	43	53	37	48	44	42	40	1
Daytime	Max	56	69	45	62	59	55	50	8
7am-10pm	Median	50	62	40	55	52	47	42	3
	Min	43	53	37	48	44	42	40	1
Nighttime	Max	53	68	44	60	56	52	48	10
10pm-7am	Median	49	62	40	56	52	48	44	8
	Min	47	55	39	52	49	46	43	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/10/2013

24hr Summary

L_{DN} = 60 dBA C_{NEL} = 60 dBA $L_{eq(24hr)}$ = 54 dBA



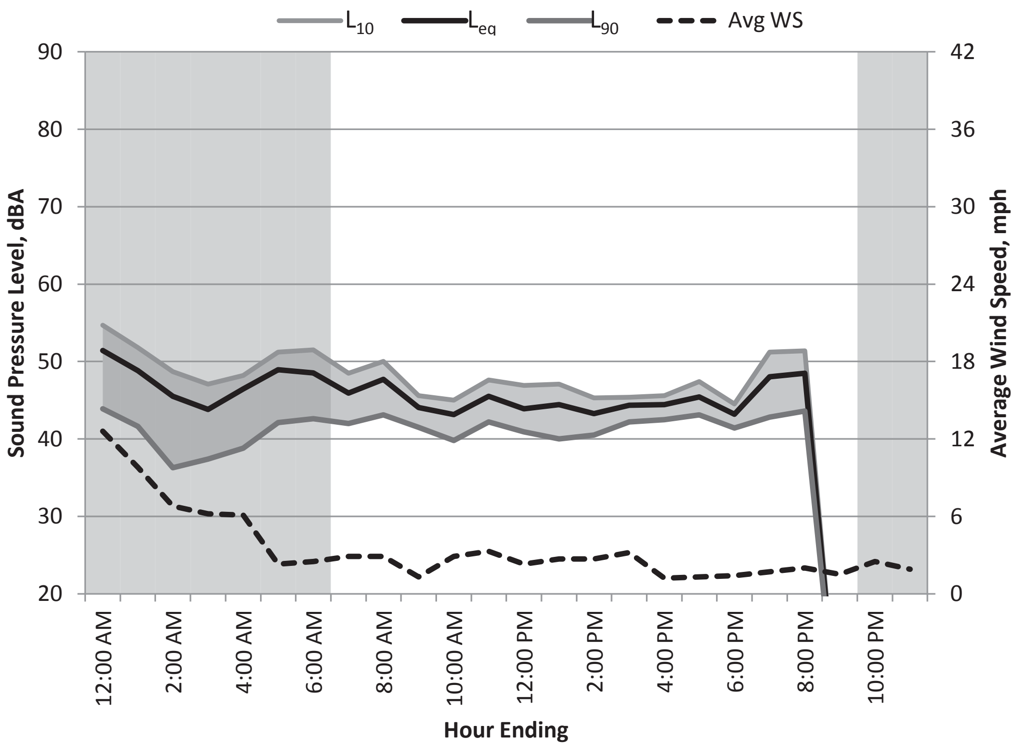
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	58	39	56	52	49	43	1
1:00	Night	50	61	39	57	53	48	45	2
2:00	Night	46	55	39	52	48	45	42	7
3:00	Night	54	67	39	64	58	49	44	12
4:00	Night	46	59	38	53	49	46	43	6
5:00	Night	54	68	39	63	58	50	43	12
6:00	Night	54	68	40	64	58	50	45	13
7:00	Day	50	67	39	61	53	46	43	10
8:00	Day	48	64	38	58	51	45	42	9
9:00	Day	48	68	39	57	49	45	43	8
10:00	Day	47	64	40	55	49	46	43	7
11:00	Day	44	58	39	50	46	44	42	5
12:00	Day	44	52	37	48	46	43	40	6
13:00	Day	50	63	39	59	53	47	42	8
14:00	Day	53	67	39	62	55	50	47	12
15:00	Day	56	71	37	66	60	51	45	15
16:00	Day	56	71	40	66	59	51	46	15
17:00	Day	61	75	42	71	64	56	48	17
18:00	Day	58	73	41	68	62	54	47	16
19:00	Day	57	71	41	66	61	54	47	13
20:00	Day	50	65	35	59	53	46	42	10
21:00	Day	49	65	37	57	52	46	41	12
22:00	Night	53	67	39	63	57	49	45	15
23:00	Night	58	70	39	67	62	53	46	17
Overall	Max	61	75	42	71	64	56	48	17
	Median	50	67	39	60	53	48	43	11
	Min	44	52	35	48	46	43	40	1
Daytime	Max	61	75	42	71	64	56	48	17
7am-10pm	Median	50	67	39	59	53	46	43	10
	Min	44	52	35	48	46	43	40	5
Nighttime	Max	58	70	40	67	62	53	46	17
10pm-7am	Median	53	67	39	63	57	49	44	12
	Min	46	55	38	52	48	45	42	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-1
DATE: 1/11/2013

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



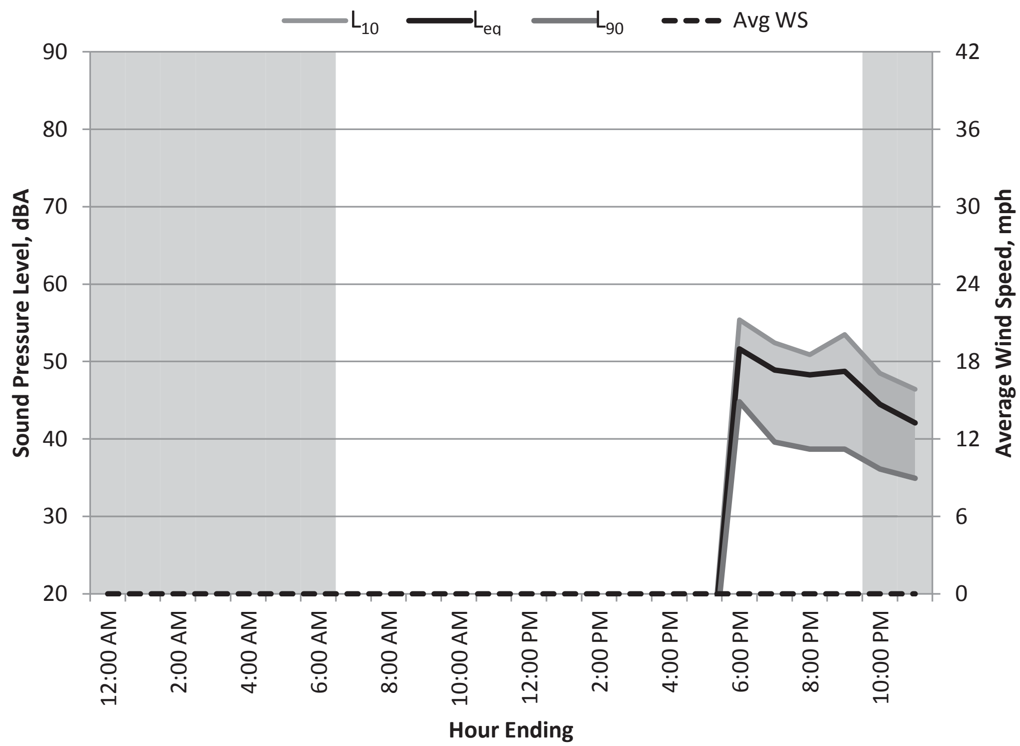
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	65	37	61	55	49	44	13
1:00	Night	49	62	34	58	52	46	42	10
2:00	Night	46	60	30	56	49	42	36	7
3:00	Night	44	55	34	51	47	42	37	6
4:00	Night	46	69	35	58	48	43	39	6
5:00	Night	49	62	35	59	51	47	42	2
6:00	Night	49	64	40	57	52	46	43	3
7:00	Day	46	54	38	51	49	45	42	3
8:00	Day	48	66	41	56	50	45	43	3
9:00	Day	44	57	40	51	46	43	42	1
10:00	Day	43	57	37	50	45	42	40	3
11:00	Day	46	62	39	52	48	44	42	3
12:00	Day	44	55	39	51	47	42	41	2
13:00	Day	44	57	37	52	47	43	40	3
14:00	Day	43	54	37	49	45	43	41	3
15:00	Day	44	58	40	52	45	44	42	3
16:00	Day	44	56	41	51	46	44	43	1
17:00	Day	45	55	41	52	47	44	43	1
18:00	Day	43	55	39	48	45	43	41	1
19:00	Day	48	60	39	55	51	46	43	2
20:00	Day	48	59	41	56	51	47	44	2
21:00	Day	--	--	--	--	--	--	--	2
22:00	Night	--	--	--	--	--	--	--	3
23:00	Night	--	--	--	--	--	--	--	2
Overall	Max	--	--	--	--	--	--	--	13
	Median	--	--	--	--	--	--	--	3
	Min	--	--	--	--	--	--	--	1
Daytime	Max	--	--	--	--	--	--	--	3
7am-10pm	Median	--	--	--	--	--	--	--	2
	Min	--	--	--	--	--	--	--	1
Nighttime	Max	--	--	--	--	--	--	--	13
10pm-7am	Median	--	--	--	--	--	--	--	6
	Min	--	--	--	--	--	--	--	2

Appendix E
ST-2 August Measurements

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	8/2/2012

24hr Summary

L_{DN} = -- dBA **C_{NEL} =** -- dBA **$L_{eq(24hr)}$ =** -- dBA



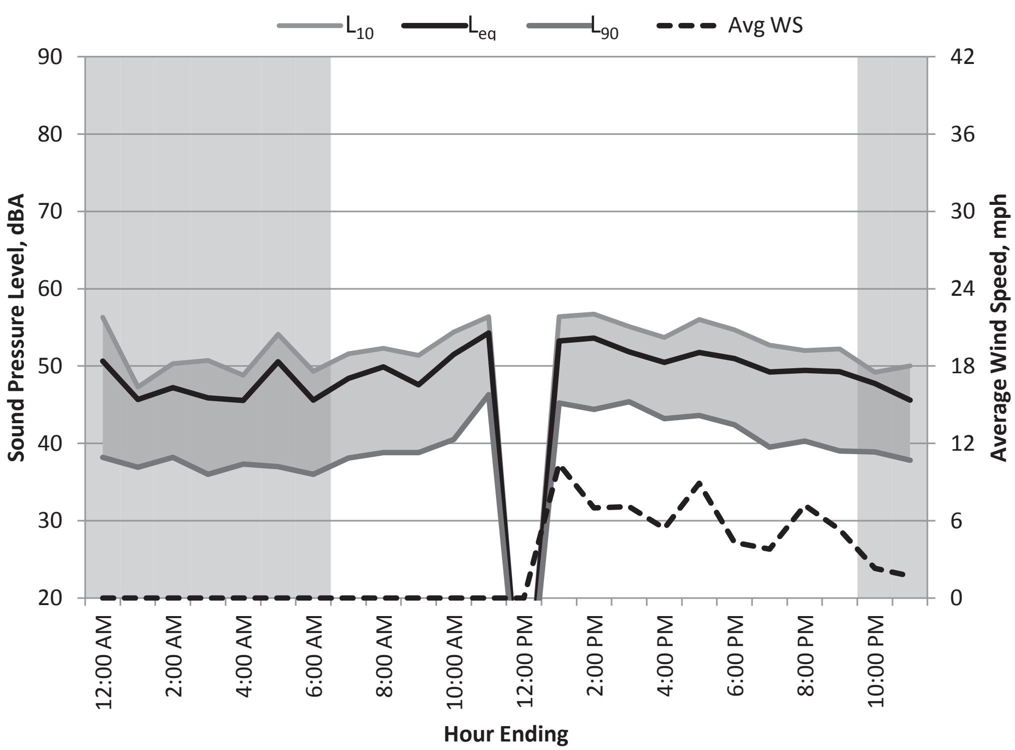
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	--	--	--	--	--	--	--	--
1:00	Night	--	--	--	--	--	--	--	--
2:00	Night	--	--	--	--	--	--	--	--
3:00	Night	--	--	--	--	--	--	--	--
4:00	Night	--	--	--	--	--	--	--	--
5:00	Night	--	--	--	--	--	--	--	--
6:00	Night	--	--	--	--	--	--	--	--
7:00	Day	--	--	--	--	--	--	--	--
8:00	Day	--	--	--	--	--	--	--	--
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	--	--	--	--	--	--	--	--
14:00	Day	--	--	--	--	--	--	--	--
15:00	Day	--	--	--	--	--	--	--	--
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	--	--	--	--	--	--	--	--
18:00	Day	52	69	39	61	55	48	45	--
19:00	Day	49	62	37	58	52	43	40	--
20:00	Day	48	61	34	55	51	48	39	--
21:00	Day	49	62	35	58	54	43	39	--
22:00	Night	44	58	33	54	49	40	36	--
23:00	Night	42	54	33	51	46	38	35	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime 7am-10pm	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime 10pm-7am	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/3/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA

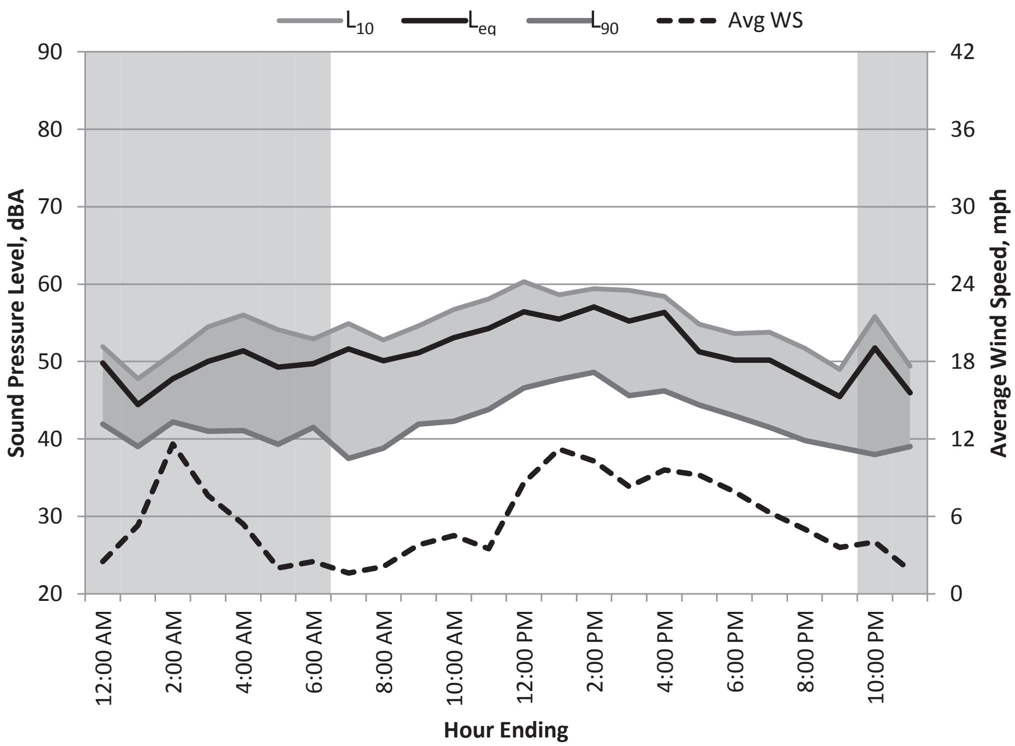


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	64	36	61	56	42	38	--
1:00	Night	46	61	34	57	47	41	37	--
2:00	Night	47	62	35	58	50	42	38	--
3:00	Night	46	60	34	57	51	39	36	--
4:00	Night	46	63	33	55	49	41	37	--
5:00	Night	51	69	35	62	54	41	37	--
6:00	Night	46	61	33	56	49	39	36	--
7:00	Day	48	66	36	60	52	41	38	--
8:00	Day	50	69	36	60	52	43	39	--
9:00	Day	48	63	36	57	51	43	39	--
10:00	Day	52	65	37	60	54	51	41	--
11:00	Day	54	73	41	65	56	50	46	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	53	69	42	63	56	50	45	10
14:00	Day	54	73	40	64	57	49	44	7
15:00	Day	52	65	42	61	55	48	45	7
16:00	Day	50	65	38	59	54	48	43	5
17:00	Day	52	65	38	60	56	48	44	9
18:00	Day	51	63	38	60	55	48	42	4
19:00	Day	49	66	35	59	53	45	40	4
20:00	Day	49	64	35	60	52	46	40	7
21:00	Day	49	73	35	59	52	44	39	5
22:00	Night	48	70	36	57	49	43	39	2
23:00	Night	46	60	35	55	50	41	38	2
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	51	70	36	62	56	43	39	--
10pm-7am	Median	46	62	35	57	50	41	37	--
	Min	46	60	33	55	47	39	36	--

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	8/4/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 52 dBA

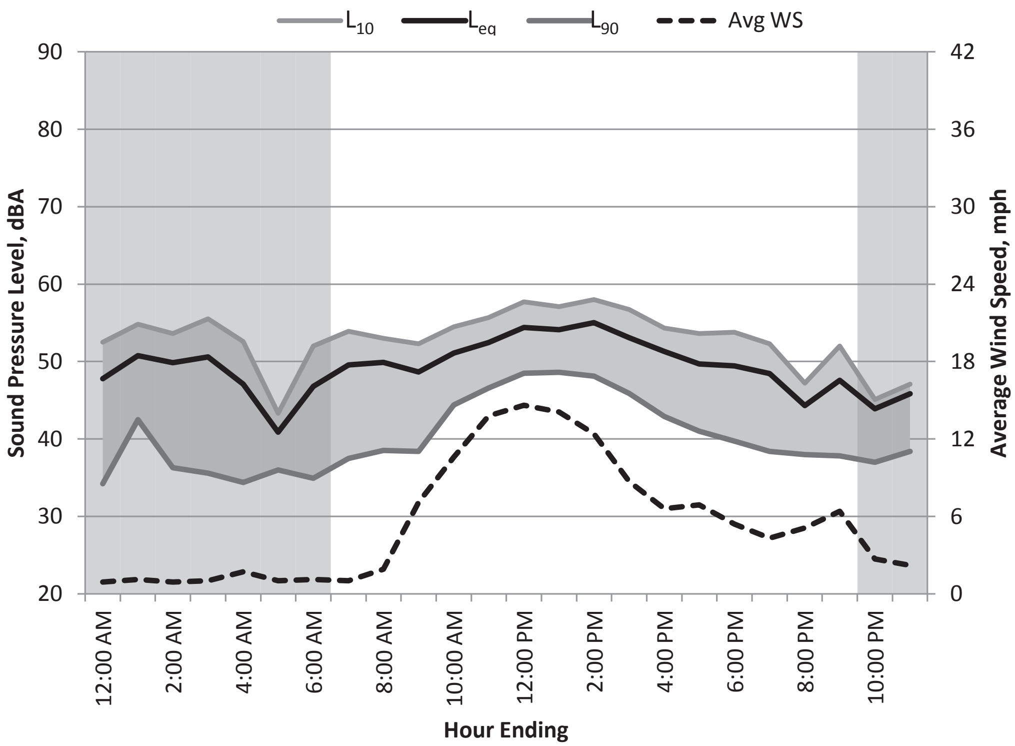


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	64	37	60	52	47	42	3
1:00	Night	44	59	36	53	48	42	39	5
2:00	Night	48	61	37	56	51	46	42	12
3:00	Night	50	65	37	60	55	45	41	8
4:00	Night	51	67	37	61	56	46	41	5
5:00	Night	49	63	33	59	54	44	39	2
6:00	Night	50	73	36	60	53	45	42	3
7:00	Day	52	68	34	64	55	45	38	2
8:00	Day	50	67	35	58	53	49	39	2
9:00	Day	51	64	38	62	55	47	42	4
10:00	Day	53	69	38	64	57	48	42	5
11:00	Day	54	69	39	63	58	50	44	4
12:00	Day	56	72	42	66	60	52	47	9
13:00	Day	55	77	42	64	59	52	48	11
14:00	Day	57	76	43	67	59	54	49	10
15:00	Day	55	69	41	64	59	52	46	8
16:00	Day	56	78	41	67	58	51	46	10
17:00	Day	51	65	41	60	55	49	44	9
18:00	Day	50	70	39	59	54	47	43	8
19:00	Day	50	65	36	59	54	47	42	6
20:00	Day	48	64	35	57	52	44	40	5
21:00	Day	45	58	35	53	49	43	39	4
22:00	Night	52	67	34	64	56	42	38	4
23:00	Night	46	56	36	54	49	44	39	2
Overall	Max	57	78	43	67	60	54	49	12
	Median	51	67	37	60	55	47	42	5
	Min	44	56	33	53	48	42	38	2
Daytime	Max	57	78	43	67	60	54	49	11
7am-10pm	Median	52	69	39	63	55	49	43	6
	Min	45	58	34	53	49	43	38	2
Nighttime	Max	52	73	37	64	56	47	42	12
10pm-7am	Median	50	64	36	60	53	45	41	4
	Min	44	56	33	53	48	42	38	2

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	8/5/2012

24hr Summary

L_{DN} = 55 dBA C_{NEL} = 55 dBA $L_{eq(24hr)}$ = 50 dBA

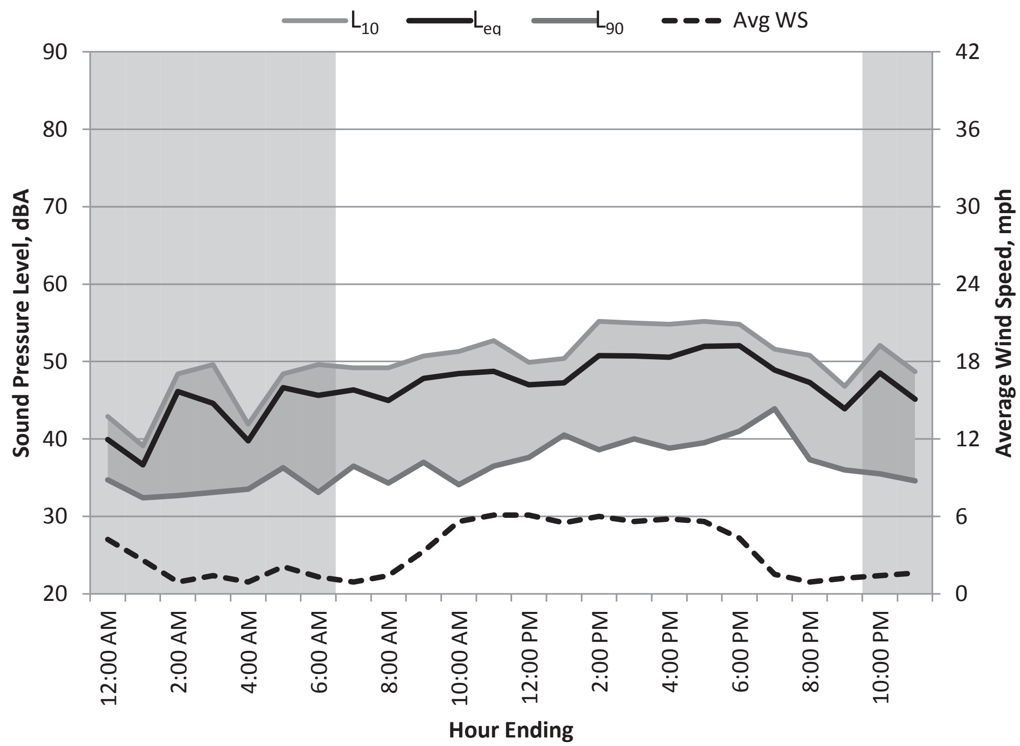


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	62	32	58	53	41	34	1
1:00	Night	51	64	38	60	55	47	43	1
2:00	Night	50	66	34	60	54	41	36	1
3:00	Night	51	63	31	61	56	41	36	1
4:00	Night	47	60	31	57	53	40	34	2
5:00	Night	41	57	32	49	43	39	36	1
6:00	Night	47	63	33	57	52	38	35	1
7:00	Day	50	64	35	59	54	43	38	1
8:00	Day	50	65	35	61	53	46	39	2
9:00	Day	49	65	36	60	52	44	38	7
10:00	Day	51	64	40	60	55	49	44	11
11:00	Day	52	62	39	59	56	51	47	14
12:00	Day	54	66	44	61	58	53	49	15
13:00	Day	54	69	44	61	57	52	49	14
14:00	Day	55	71	44	64	58	52	48	12
15:00	Day	53	66	40	62	57	50	46	9
16:00	Day	51	72	39	62	54	47	43	7
17:00	Day	50	64	37	59	54	46	41	7
18:00	Day	49	63	36	59	54	45	40	5
19:00	Day	48	63	35	59	52	45	38	4
20:00	Day	44	55	34	53	47	41	38	5
21:00	Day	48	64	35	58	52	41	38	6
22:00	Night	44	59	34	56	45	40	37	3
23:00	Night	46	65	34	56	47	42	38	2
Overall	Max	55	72	44	64	58	53	49	15
	Median	50	64	35	59	54	44	38	5
	Min	41	55	31	49	43	38	34	1
Daytime	Max	55	72	44	64	58	53	49	15
7am-10pm	Median	50	64	37	60	54	46	41	7
	Min	44	55	34	53	47	41	38	1
Nighttime	Max	51	66	38	61	56	47	43	3
10pm-7am	Median	47	63	33	57	53	41	36	1
	Min	41	57	31	49	43	38	34	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	8/6/2012

24hr Summary

L_{DN} = 52 dBA C_{NEL} = 53 dBA $L_{eq(24hr)}$ = 48 dBA



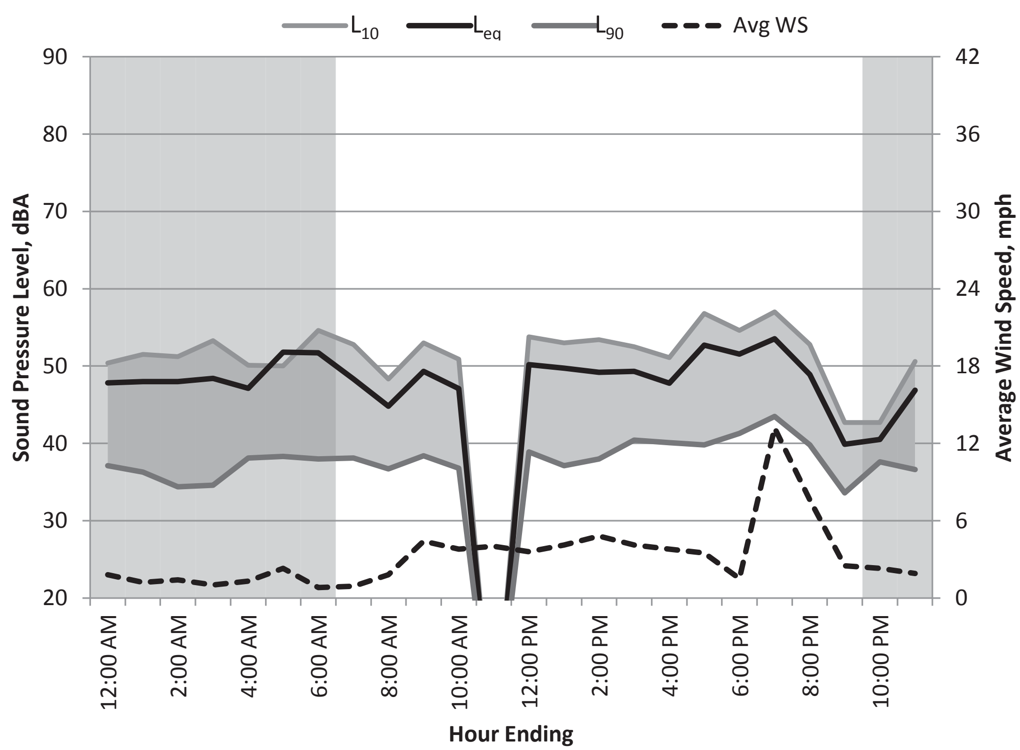
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	40	55	33	48	43	38	35	4
1:00	Night	37	47	30	43	39	36	32	3
2:00	Night	46	62	30	59	48	36	33	1
3:00	Night	45	58	31	56	50	38	33	1
4:00	Night	40	53	31	50	42	36	34	1
5:00	Night	47	63	31	59	48	41	36	2
6:00	Night	46	61	30	57	50	39	33	1
7:00	Day	46	66	33	57	49	40	37	1
8:00	Day	45	56	32	51	49	39	34	1
9:00	Day	48	65	32	56	51	46	37	3
10:00	Day	48	66	31	60	51	42	34	6
11:00	Day	49	63	29	59	53	45	37	6
12:00	Day	47	63	32	58	50	43	38	6
13:00	Day	47	61	37	57	50	44	41	6
14:00	Day	51	67	32	61	55	44	39	6
15:00	Day	51	63	36	61	55	46	40	6
16:00	Day	51	63	35	61	55	44	39	6
17:00	Day	52	66	31	63	55	46	40	6
18:00	Day	52	69	36	65	55	45	41	4
19:00	Day	49	64	41	57	52	47	44	2
20:00	Day	47	61	33	59	51	42	37	1
21:00	Day	44	62	33	54	47	40	36	1
22:00	Night	49	64	32	60	52	42	36	1
23:00	Night	45	63	30	56	49	39	35	2
Overall	Max	52	69	41	65	55	47	44	6
	Median	47	63	32	58	50	42	36	2
	Min	37	47	29	43	39	36	32	1
Daytime	Max	52	69	41	65	55	47	44	6
7am-10pm	Median	48	63	33	59	51	44	38	6
	Min	44	56	29	51	47	39	34	1
Nighttime	Max	49	64	33	60	52	42	36	4
10pm-7am	Median	45	61	31	56	48	38	34	1
	Min	37	47	30	43	39	36	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/7/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



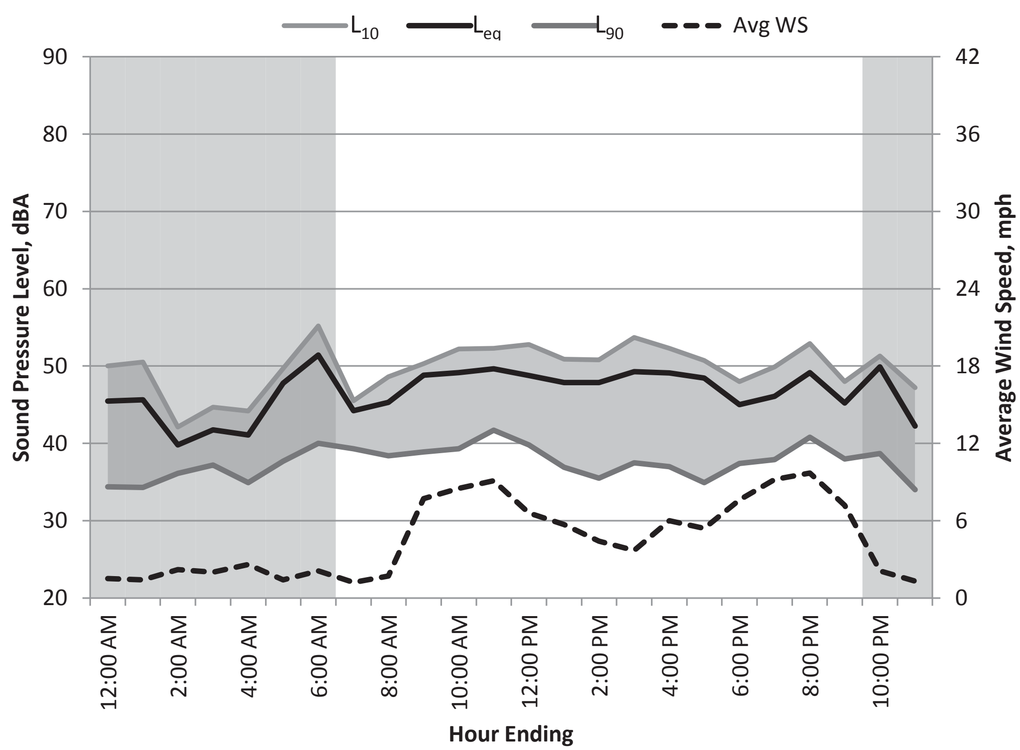
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	63	33	59	50	42	37	2
1:00	Night	48	62	33	60	52	41	36	1
2:00	Night	48	63	31	59	51	38	34	1
3:00	Night	48	63	33	59	53	40	35	1
4:00	Night	47	64	35	58	50	42	38	1
5:00	Night	52	79	34	61	50	43	38	2
6:00	Night	52	70	34	64	55	45	38	1
7:00	Day	48	63	36	60	53	40	38	1
8:00	Day	45	62	34	52	48	40	37	2
9:00	Day	49	64	33	58	53	47	38	4
10:00	Day	47	65	33	55	51	43	37	4
11:00	Day	--	--	--	--	--	--	--	4
12:00	Day	50	65	35	61	54	44	39	4
13:00	Day	50	73	32	60	53	45	37	4
14:00	Day	49	66	35	58	53	45	38	5
15:00	Day	49	63	35	60	53	45	40	4
16:00	Day	48	62	34	58	51	44	40	4
17:00	Day	53	66	34	63	57	46	40	4
18:00	Day	52	67	36	62	55	47	41	2
19:00	Day	54	67	36	63	57	50	44	13
20:00	Day	49	62	36	58	53	45	40	8
21:00	Day	40	55	31	49	43	37	34	3
22:00	Night	41	51	36	46	43	40	38	2
23:00	Night	47	61	34	57	51	41	37	2
Overall	Max	--	--	--	--	--	--	--	13
	Median	--	--	--	--	--	--	--	2
	Min	--	--	--	--	--	--	--	1
Daytime	Max	--	--	--	--	--	--	--	13
7am-10pm	Median	--	--	--	--	--	--	--	4
	Min	--	--	--	--	--	--	--	1
Nighttime	Max	52	79	36	64	55	45	38	2
10pm-7am	Median	48	63	34	59	51	41	37	1
	Min	41	51	31	46	43	38	34	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/8/2012

24hr Summary

L_{DN} = 53 dBA　　C_{NEL} = 54 dBA　　$L_{eq(24hr)}$ = 48 dBA

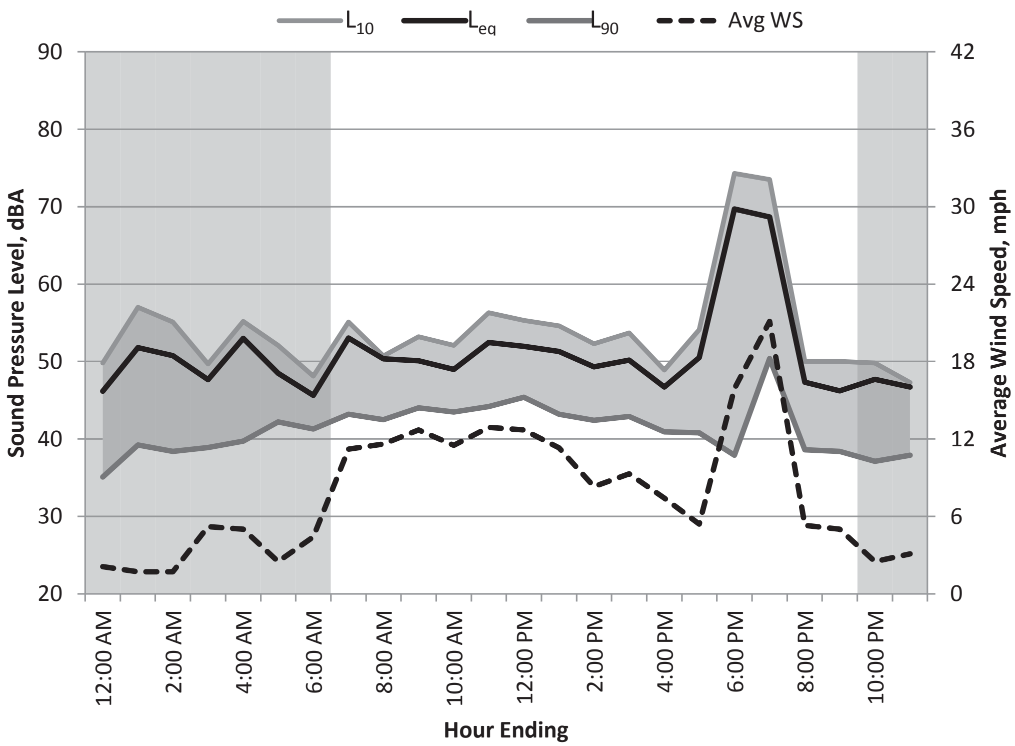


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	62	32	57	50	38	34	2
1:00	Night	46	61	31	56	51	39	34	1
2:00	Night	40	50	34	46	42	39	36	2
3:00	Night	42	57	34	48	45	40	37	2
4:00	Night	41	55	32	50	44	38	35	3
5:00	Night	48	66	33	59	50	44	38	1
6:00	Night	51	70	36	62	55	45	40	2
7:00	Day	44	61	36	54	46	42	39	1
8:00	Day	45	54	35	51	49	43	38	2
9:00	Day	49	69	35	60	50	43	39	8
10:00	Day	49	69	35	58	52	47	39	9
11:00	Day	50	76	36	57	52	46	42	9
12:00	Day	49	61	35	57	53	45	40	7
13:00	Day	48	68	33	59	51	42	37	6
14:00	Day	48	64	33	60	51	43	36	4
15:00	Day	49	64	33	60	54	44	38	4
16:00	Day	49	67	34	61	52	42	37	6
17:00	Day	48	66	32	60	51	41	35	5
18:00	Day	45	59	34	56	48	41	37	8
19:00	Day	46	59	32	56	50	43	38	9
20:00	Day	49	63	37	58	53	45	41	10
21:00	Day	45	61	33	55	48	42	38	7
22:00	Night	50	70	34	62	51	44	39	2
23:00	Night	42	53	31	51	47	38	34	1
Overall	Max	51	76	37	62	55	47	42	10
	Median	48	62	34	57	50	42	38	4
	Min	40	50	31	46	42	38	34	1
Daytime	Max	50	76	37	61	54	47	42	10
7am-10pm	Median	48	64	34	58	51	43	38	7
	Min	44	54	32	51	46	41	35	1
Nighttime	Max	51	70	36	62	55	45	40	3
10pm-7am	Median	45	61	33	56	50	39	36	2
	Min	40	50	31	46	42	38	34	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/9/2012

24hr Summary

L_{DN} = 60 dBA | C_{NEL} = 62 dBA | $L_{eq(24hr)}$ = 59 dBA



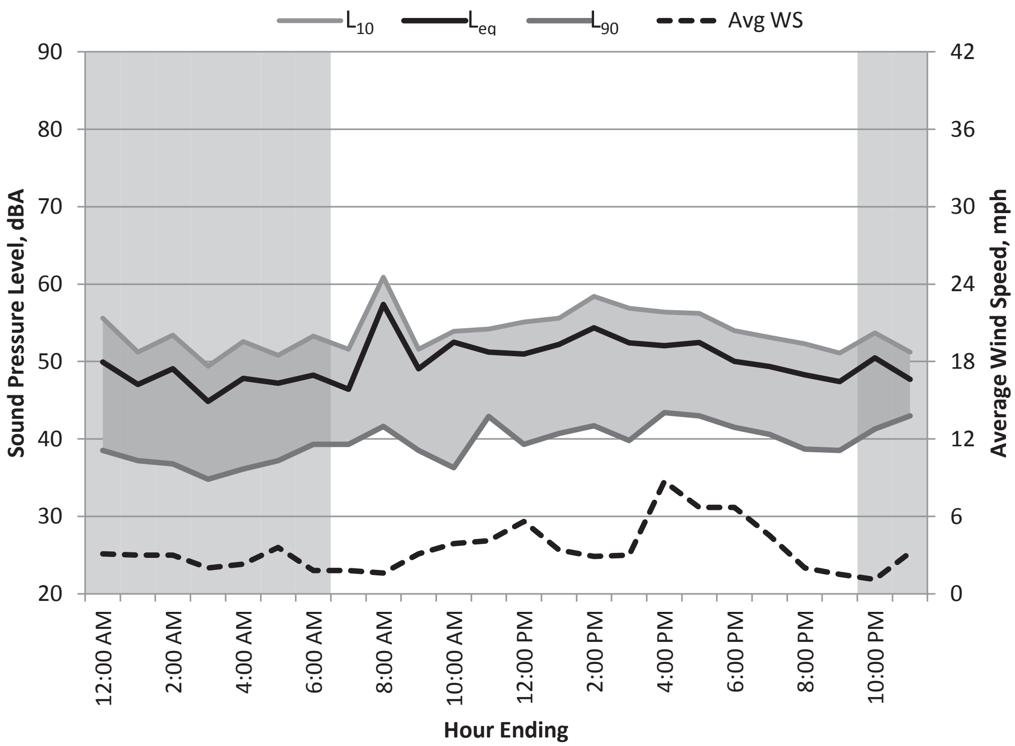
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	67	30	56	50	40	35	2
1:00	Night	52	64	35	62	57	45	39	2
2:00	Night	51	69	34	60	55	44	38	2
3:00	Night	48	66	34	58	50	43	39	5
4:00	Night	53	82	36	63	55	46	40	5
5:00	Night	48	67	38	55	52	46	42	3
6:00	Night	46	61	37	52	48	44	41	4
7:00	Day	53	72	38	64	55	48	43	11
8:00	Day	50	74	38	57	51	46	43	12
9:00	Day	50	63	38	58	53	48	44	13
10:00	Day	49	60	41	56	52	48	44	12
11:00	Day	52	66	40	62	56	49	44	13
12:00	Day	52	65	39	61	55	49	45	13
13:00	Day	51	67	39	61	55	48	43	11
14:00	Day	49	63	39	58	52	47	42	8
15:00	Day	50	63	39	60	54	47	43	9
16:00	Day	47	63	38	56	49	44	41	7
17:00	Day	50	68	37	61	54	46	41	5
18:00	Day	70	85	34	80	74	50	38	16
19:00	Day	69	82	41	78	74	62	50	21
20:00	Day	47	64	35	58	50	42	39	5
21:00	Day	46	62	36	56	50	41	38	5
22:00	Night	48	64	32	60	50	42	37	3
23:00	Night	47	64	35	59	47	41	38	3
Overall	Max	70	85	41	80	74	62	50	21
	Median	50	65	37	59	53	46	41	6
	Min	46	60	30	52	47	40	35	2
Daytime 7am-10pm	Max	70	85	41	80	74	62	50	21
	Median	50	65	38	60	54	48	43	11
	Min	46	60	34	56	49	41	38	5
Nighttime 10pm-7am	Max	53	82	38	63	57	46	42	5
	Median	48	66	35	59	50	44	39	3
	Min	46	61	30	52	47	40	35	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/10/2012

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 51 dBA

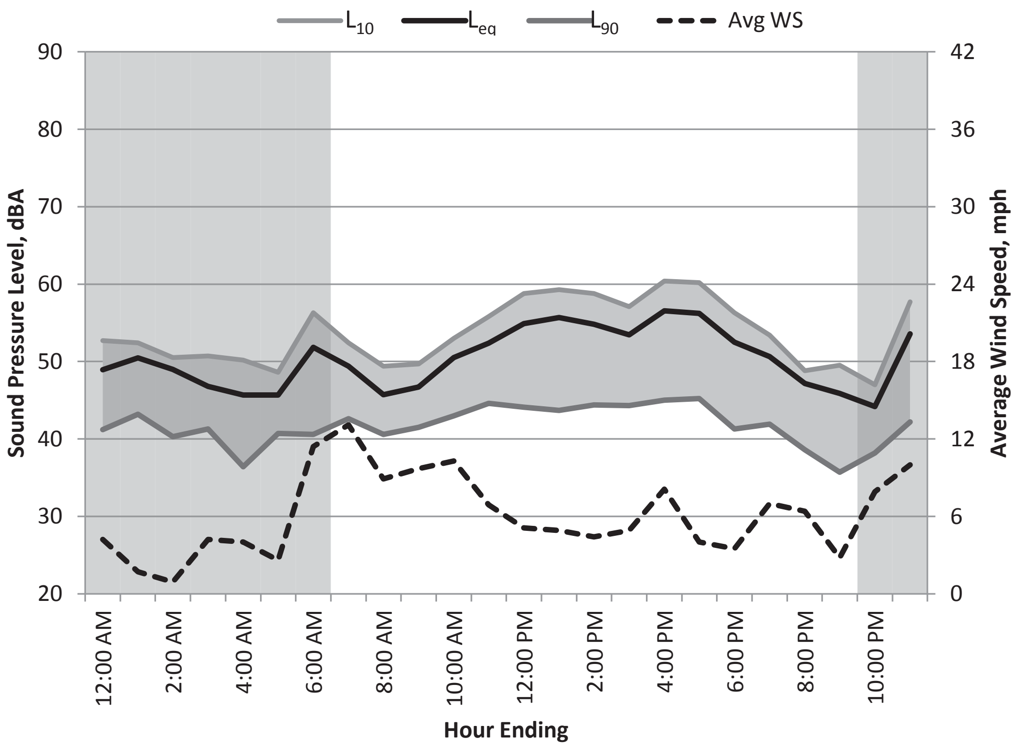


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	63	35	60	56	42	39	3
1:00	Night	47	62	33	58	51	41	37	3
2:00	Night	49	64	34	60	53	43	37	3
3:00	Night	45	57	31	54	49	39	35	2
4:00	Night	48	68	34	57	53	41	36	2
5:00	Night	47	67	35	59	51	40	37	4
6:00	Night	48	60	37	57	53	43	39	2
7:00	Day	46	61	37	55	52	42	39	2
8:00	Day	57	75	39	69	61	50	42	2
9:00	Day	49	63	35	60	52	46	39	3
10:00	Day	53	73	34	63	54	45	36	4
11:00	Day	51	65	39	63	54	46	43	4
12:00	Day	51	65	35	60	55	47	39	6
13:00	Day	52	71	37	62	56	47	41	3
14:00	Day	54	66	37	63	58	51	42	3
15:00	Day	52	65	37	62	57	48	40	3
16:00	Day	52	64	40	61	56	48	43	9
17:00	Day	52	68	40	63	56	47	43	7
18:00	Day	50	65	37	60	54	45	42	7
19:00	Day	49	67	37	59	53	45	41	5
20:00	Day	48	63	34	58	52	43	39	2
21:00	Day	47	62	35	59	51	41	39	2
22:00	Night	50	69	38	62	54	45	41	1
23:00	Night	48	63	39	54	51	46	43	3
Overall	Max	57	75	40	69	61	51	43	9
	Median	50	65	37	60	54	45	39	3
	Min	45	57	31	54	49	39	35	1
Daytime	Max	57	75	40	69	61	51	43	9
7am-10pm	Median	51	65	37	61	54	46	41	3
	Min	46	61	34	55	51	41	36	2
Nighttime	Max	50	69	39	62	56	46	43	4
10pm-7am	Median	48	63	35	58	53	42	37	3
	Min	45	57	31	54	49	39	35	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	8/11/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 52 dBA



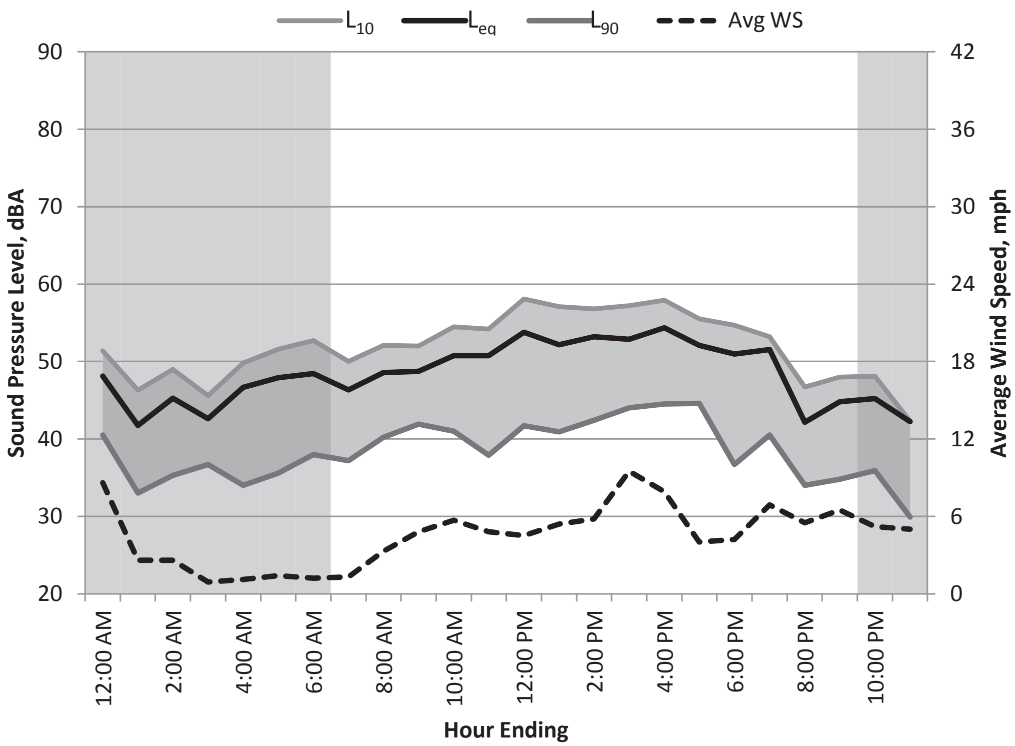
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	62	38	59	53	45	41	4
1:00	Night	50	68	39	61	52	47	43	2
2:00	Night	49	66	38	59	51	44	40	1
3:00	Night	47	56	39	53	51	45	41	4
4:00	Night	46	60	32	55	50	42	36	4
5:00	Night	46	56	37	52	49	44	41	3
6:00	Night	52	64	36	61	56	47	41	11
7:00	Day	49	64	38	58	52	47	43	13
8:00	Day	46	61	38	53	49	43	41	9
9:00	Day	47	60	38	53	50	45	42	10
10:00	Day	50	66	39	61	53	47	43	10
11:00	Day	52	66	41	62	56	49	45	7
12:00	Day	55	70	38	65	59	49	44	5
13:00	Day	56	72	39	65	59	52	44	5
14:00	Day	55	66	39	64	59	51	44	4
15:00	Day	53	66	40	63	57	50	44	5
16:00	Day	57	72	41	67	60	51	45	8
17:00	Day	56	73	38	66	60	51	45	4
18:00	Day	53	69	37	63	56	48	41	4
19:00	Day	51	67	36	62	53	46	42	7
20:00	Day	47	64	35	60	49	43	39	6
21:00	Day	46	62	32	57	50	40	36	3
22:00	Night	44	61	36	54	47	41	38	8
23:00	Night	54	66	36	63	58	49	42	10
Overall	Max	57	73	41	67	60	52	45	13
	Median	50	66	38	61	53	47	42	5
	Min	44	56	32	52	47	40	36	1
Daytime	Max	57	73	41	67	60	52	45	13
7am-10pm	Median	52	66	38	62	56	48	43	6
	Min	46	60	32	53	49	40	36	3
Nighttime	Max	54	68	39	63	58	49	43	11
10pm-7am	Median	49	62	37	59	51	45	41	4
	Min	44	56	32	52	47	41	36	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/12/2012

24hr Summary

L_{DN} = 54 dBA C_{NEL} = 54 dBA $L_{eq(24hr)}$ = 50 dBA



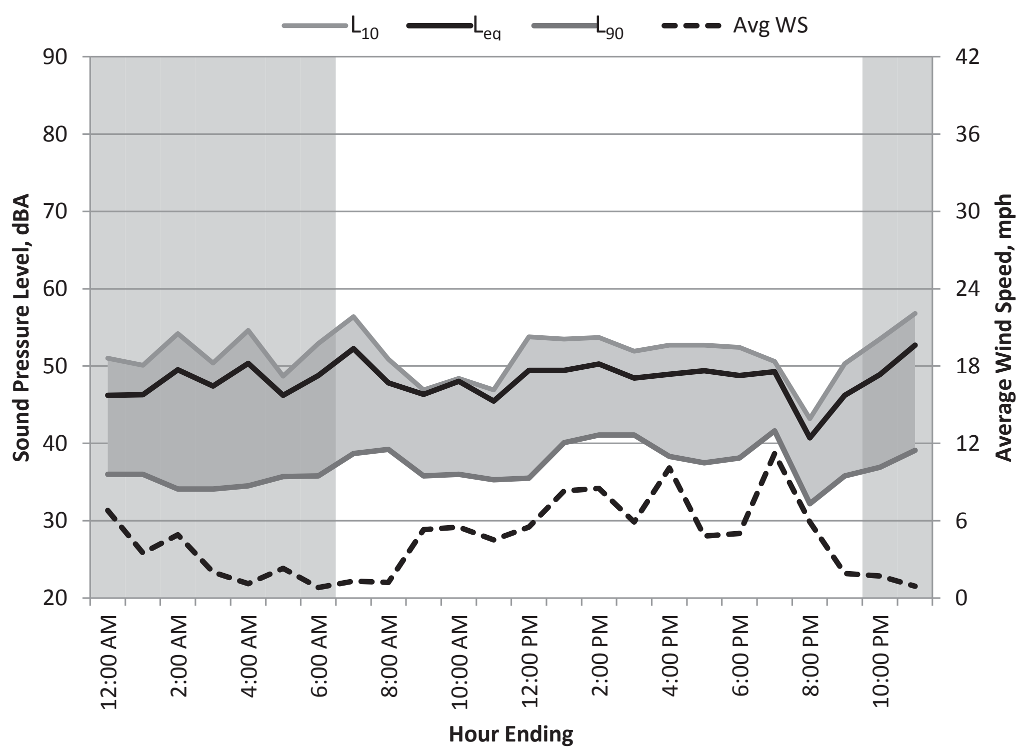
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	63	36	58	51	45	41	9
1:00	Night	42	55	31	51	46	36	33	3
2:00	Night	45	61	32	56	49	38	35	3
3:00	Night	43	57	32	52	46	40	37	1
4:00	Night	47	64	31	59	50	40	34	1
5:00	Night	48	62	31	58	52	43	36	1
6:00	Night	48	62	34	58	53	44	38	1
7:00	Day	46	58	34	57	50	42	37	1
8:00	Day	49	64	36	57	52	46	40	3
9:00	Day	49	62	37	59	52	45	42	5
10:00	Day	51	68	37	62	55	45	41	6
11:00	Day	51	65	33	62	54	46	38	5
12:00	Day	54	72	36	65	58	47	42	5
13:00	Day	52	65	37	61	57	46	41	5
14:00	Day	53	70	36	63	57	48	42	6
15:00	Day	53	64	41	61	57	49	44	10
16:00	Day	54	72	40	64	58	50	45	8
17:00	Day	52	70	40	61	56	49	45	4
18:00	Day	51	66	33	63	55	43	37	4
19:00	Day	52	68	35	63	53	47	41	7
20:00	Day	42	54	31	51	47	38	34	6
21:00	Day	45	64	32	54	48	40	35	7
22:00	Night	45	60	32	56	48	41	36	5
23:00	Night	42	64	27	54	42	34	30	5
Overall	Max	54	72	41	65	58	50	45	10
	Median	49	64	34	59	52	44	38	5
	Min	42	54	27	51	42	34	30	1
Daytime	Max	54	72	41	65	58	50	45	10
7am-10pm	Median	51	65	36	61	55	46	41	5
	Min	42	54	31	51	47	38	34	1
Nighttime	Max	48	64	36	59	53	45	41	9
10pm-7am	Median	45	62	32	56	49	40	36	3
	Min	42	55	27	51	42	34	30	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/13/2012

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 49 dBA

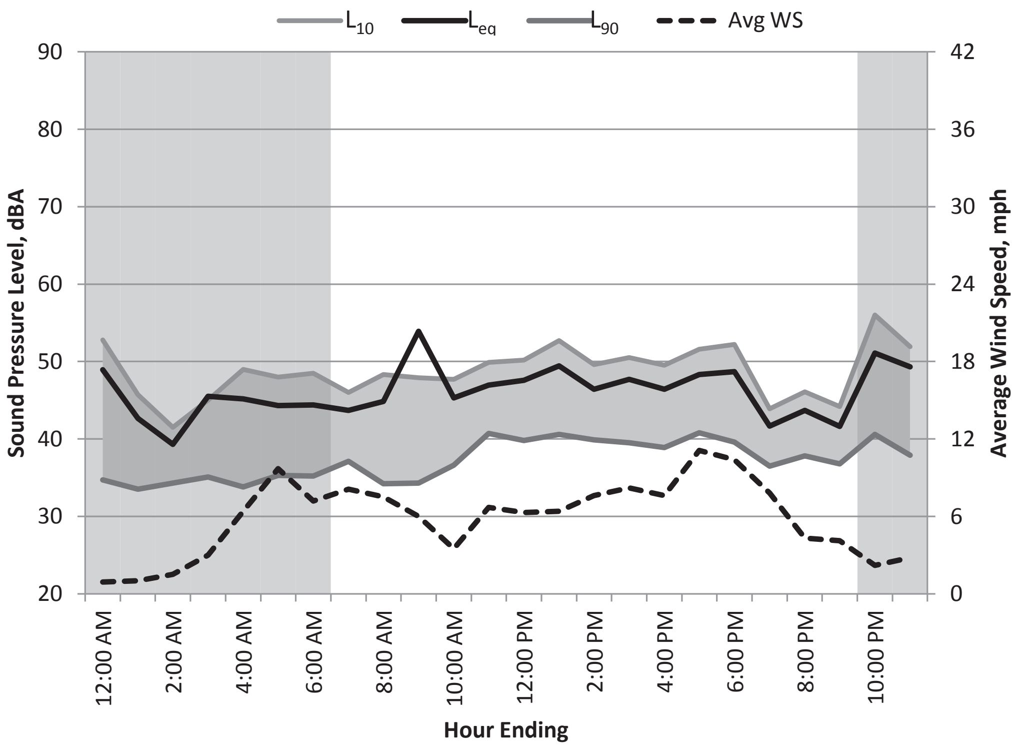


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	60	32	56	51	40	36	7
1:00	Night	46	63	33	57	50	40	36	4
2:00	Night	50	65	32	61	54	38	34	5
3:00	Night	47	65	31	60	50	38	34	2
4:00	Night	50	68	32	62	55	44	35	1
5:00	Night	46	61	32	59	49	38	36	2
6:00	Night	49	68	33	59	53	41	36	1
7:00	Day	52	67	35	63	56	43	39	1
8:00	Day	48	65	35	57	51	45	39	1
9:00	Day	46	63	32	59	47	40	36	5
10:00	Day	48	67	32	61	48	42	36	6
11:00	Day	45	61	31	57	47	42	35	5
12:00	Day	49	64	32	59	54	43	36	6
13:00	Day	49	63	36	59	54	45	40	8
14:00	Day	50	65	38	59	54	47	41	9
15:00	Day	48	66	36	58	52	45	41	6
16:00	Day	49	65	31	59	53	45	38	10
17:00	Day	49	64	33	60	53	45	38	5
18:00	Day	49	71	34	59	52	43	38	5
19:00	Day	49	69	37	61	51	45	42	11
20:00	Day	41	64	29	50	43	36	32	6
21:00	Day	46	59	32	56	50	41	36	2
22:00	Night	49	64	33	59	54	43	37	2
23:00	Night	53	69	35	63	57	44	39	1
Overall	Max	53	71	38	63	57	47	42	11
	Median	49	65	32	59	52	43	36	5
	Min	41	59	29	50	43	36	32	1
Daytime	Max	52	71	38	63	56	47	42	11
7am-10pm	Median	49	65	33	59	52	43	38	6
	Min	41	59	29	50	43	36	32	1
Nighttime	Max	53	69	35	63	57	44	39	7
10pm-7am	Median	49	65	32	59	53	40	36	2
	Min	46	60	31	56	49	38	34	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	8/14/2012

24hr Summary

L_{DN} = 53 dBA C_{NEL} = 54 dBA $L_{eq(24hr)}$ = 47 dBA



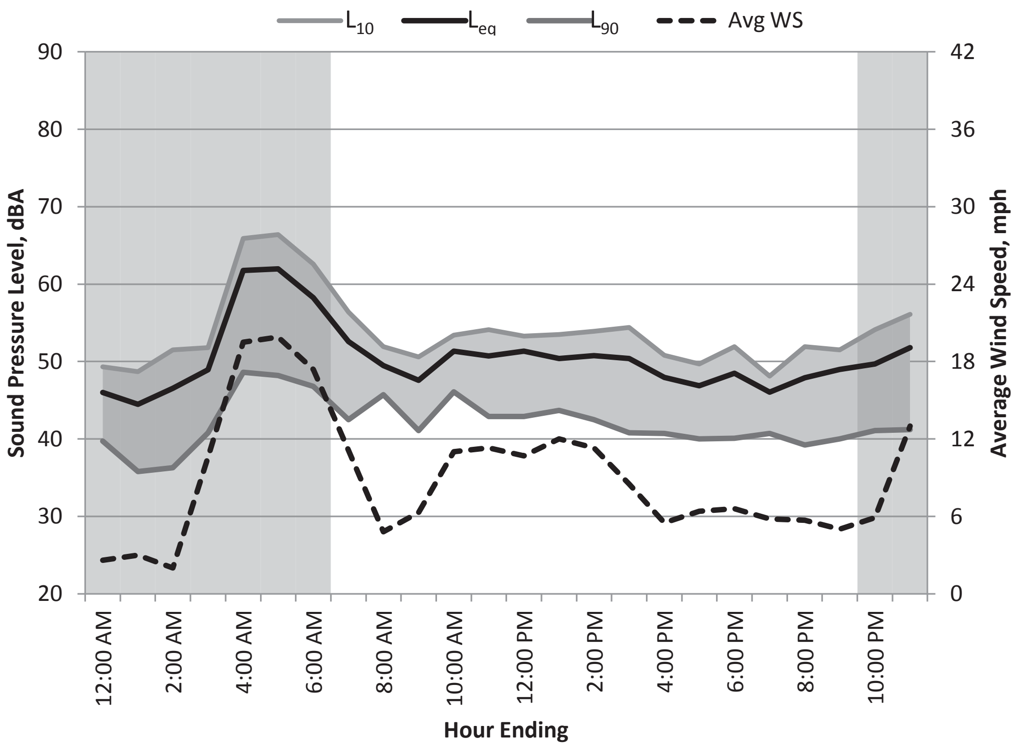
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	65	31	59	53	44	35	1
1:00	Night	43	60	30	52	46	39	34	1
2:00	Night	39	53	31	48	42	38	34	2
3:00	Night	46	65	31	58	45	39	35	3
4:00	Night	45	63	30	56	49	39	34	6
5:00	Night	44	61	30	55	48	40	35	10
6:00	Night	44	59	32	54	49	40	35	7
7:00	Day	44	51	33	47	46	44	37	8
8:00	Day	45	59	32	53	48	42	34	8
9:00	Day	54	76	32	70	48	40	34	6
10:00	Day	45	60	32	54	48	44	37	4
11:00	Day	47	64	36	55	50	45	41	7
12:00	Day	48	62	37	59	50	44	40	6
13:00	Day	49	66	37	60	53	45	41	6
14:00	Day	46	64	37	54	50	44	40	8
15:00	Day	48	64	36	59	51	44	40	8
16:00	Day	46	63	33	55	50	44	39	8
17:00	Day	48	61	37	58	52	45	41	11
18:00	Day	49	63	35	60	52	43	40	10
19:00	Day	42	57	33	50	44	40	37	8
20:00	Day	44	60	31	52	46	41	38	4
21:00	Day	42	55	30	48	44	41	37	4
22:00	Night	51	64	37	61	56	45	41	2
23:00	Night	49	66	32	61	52	43	38	3
Overall	Max	54	76	37	70	56	45	41	11
	Median	46	62	32	55	49	43	37	6
	Min	39	51	30	47	42	38	34	1
Daytime	Max	54	76	37	70	53	45	41	11
7am-10pm	Median	46	62	33	55	50	44	39	8
	Min	42	51	30	47	44	40	34	4
Nighttime	Max	51	66	37	61	56	45	41	10
10pm-7am	Median	45	63	31	56	49	40	35	3
	Min	39	53	30	48	42	38	34	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/15/2012

24hr Summary

L_{DN} = 63 dBA	C_{NEL} = 63 dBA	$L_{eq(24hr)}$ = 54 dBA



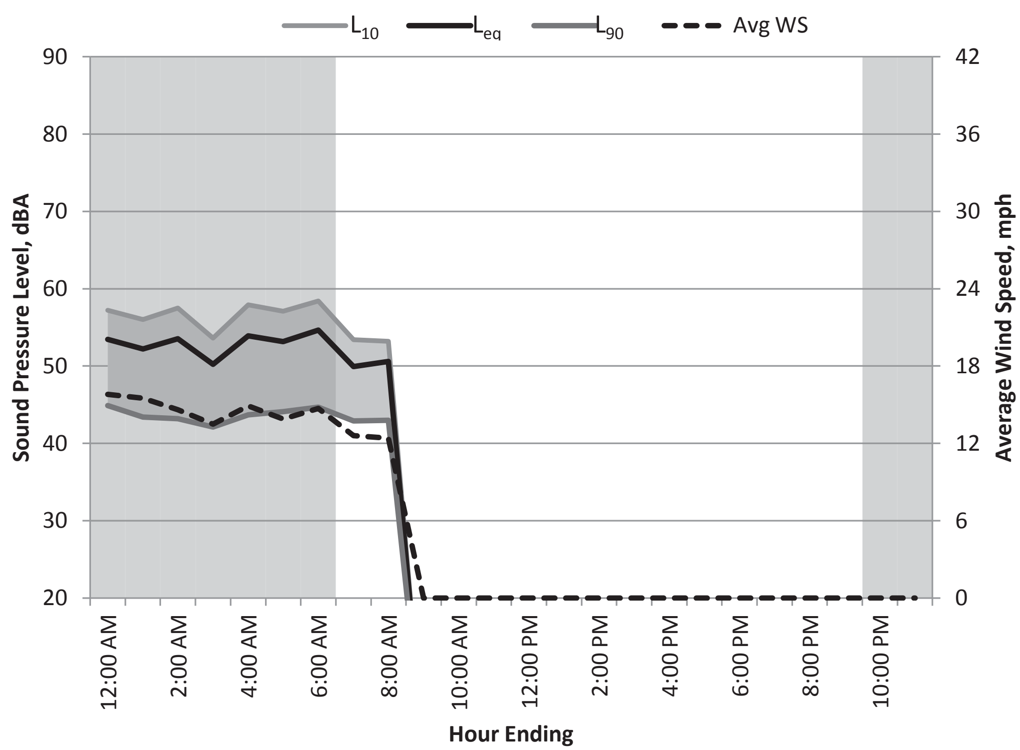
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	58	36	54	49	44	40	3
1:00	Night	44	56	32	52	49	42	36	3
2:00	Night	47	61	33	56	52	41	36	2
3:00	Night	49	63	36	59	52	45	41	11
4:00	Night	62	75	42	71	66	57	49	20
5:00	Night	62	74	41	71	66	58	48	20
6:00	Night	58	71	41	67	63	54	47	17
7:00	Day	53	68	37	63	56	47	43	11
8:00	Day	49	62	38	57	52	48	46	5
9:00	Day	48	64	36	55	51	46	41	6
10:00	Day	51	72	43	60	53	49	46	11
11:00	Day	51	67	39	61	54	48	43	11
12:00	Day	51	66	38	61	53	49	43	11
13:00	Day	50	64	38	60	54	48	44	12
14:00	Day	51	64	39	60	54	48	43	11
15:00	Day	50	63	37	59	54	48	41	9
16:00	Day	48	63	37	59	51	43	41	6
17:00	Day	47	63	37	56	50	43	40	6
18:00	Day	48	64	35	59	52	44	40	7
19:00	Day	46	57	37	55	48	44	41	6
20:00	Day	48	63	36	58	52	44	39	6
21:00	Day	49	67	35	60	52	44	40	5
22:00	Night	50	65	38	60	54	45	41	6
23:00	Night	52	66	36	62	56	46	41	13
Overall	Max	62	75	43	71	66	58	49	20
	Median	50	64	37	59	53	46	41	8
	Min	44	56	32	52	48	41	36	2
Daytime	Max	53	72	43	63	56	49	46	12
7am-10pm	Median	49	64	37	59	52	47	41	7
	Min	46	57	35	55	48	43	39	5
Nighttime	Max	62	75	42	71	66	58	49	20
10pm-7am	Median	50	65	36	60	54	45	41	11
	Min	44	56	32	52	49	41	36	2

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 8/16/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	66	40	62	57	50	45	16
1:00	Night	52	65	37	60	56	49	43	16
2:00	Night	54	67	36	62	58	51	43	15
3:00	Night	50	65	37	59	54	47	42	14
4:00	Night	54	69	39	64	58	49	44	15
5:00	Night	53	67	40	63	57	49	44	14
6:00	Night	55	69	40	64	58	51	45	15
7:00	Day	50	63	39	58	53	47	43	13
8:00	Day	51	67	38	60	53	48	43	12
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	--	--	--	--	--	--	--	--
14:00	Day	--	--	--	--	--	--	--	--
15:00	Day	--	--	--	--	--	--	--	--
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	--	--	--	--	--	--	--	--
18:00	Day	--	--	--	--	--	--	--	--
19:00	Day	--	--	--	--	--	--	--	--
20:00	Day	--	--	--	--	--	--	--	--
21:00	Day	--	--	--	--	--	--	--	--
22:00	Night	--	--	--	--	--	--	--	--
23:00	Night	--	--	--	--	--	--	--	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	--	--	--	--	--	--	--	--
10pm-7am	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

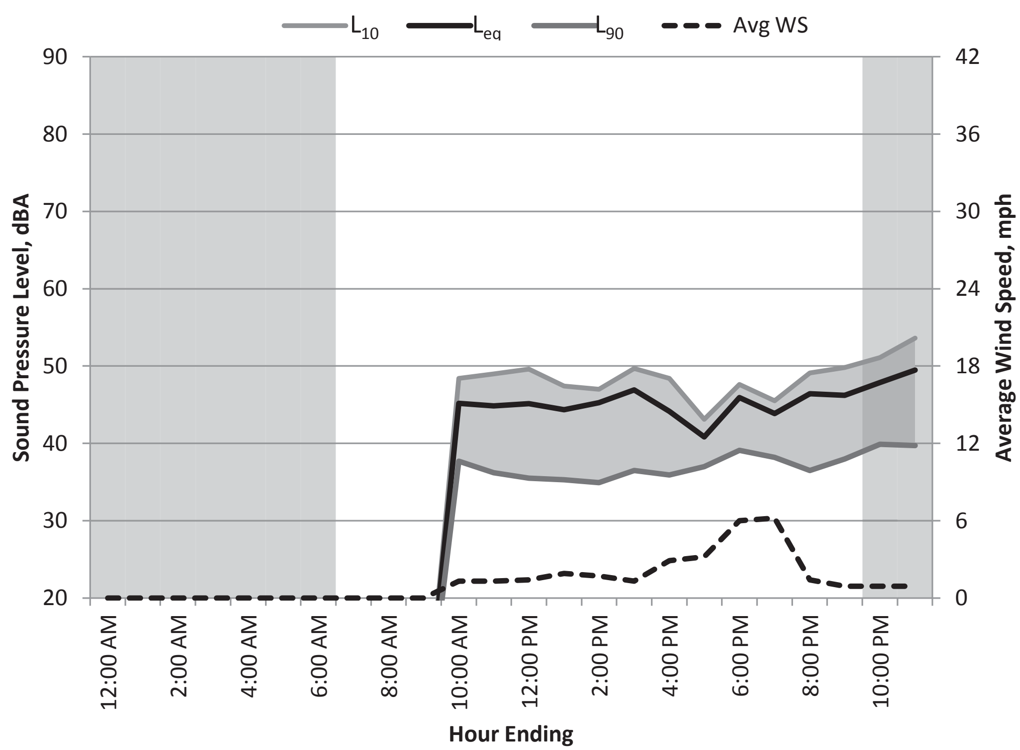
Appendix F
ST-2 December Measurements

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/5/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



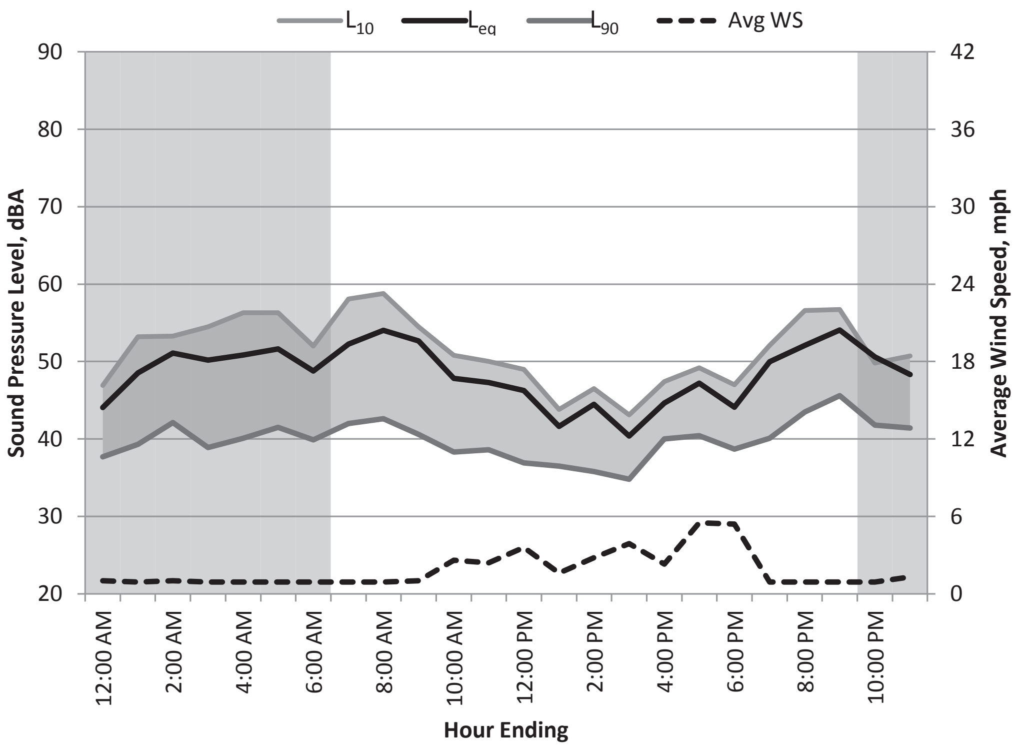
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	--	--	--	--	--	--	--	--
1:00	Night	--	--	--	--	--	--	--	--
2:00	Night	--	--	--	--	--	--	--	--
3:00	Night	--	--	--	--	--	--	--	--
4:00	Night	--	--	--	--	--	--	--	--
5:00	Night	--	--	--	--	--	--	--	--
6:00	Night	--	--	--	--	--	--	--	--
7:00	Day	--	--	--	--	--	--	--	--
8:00	Day	--	--	--	--	--	--	--	--
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	45	62	35	54	48	42	38	1
11:00	Day	45	63	34	55	49	39	36	1
12:00	Day	45	65	33	55	50	38	36	1
13:00	Day	44	63	33	55	47	38	35	2
14:00	Day	45	68	32	56	47	37	35	2
15:00	Day	47	64	34	58	50	40	37	1
16:00	Day	44	58	34	53	48	40	36	3
17:00	Day	41	52	34	47	43	40	37	3
18:00	Day	46	63	35	56	48	42	39	6
19:00	Day	44	60	34	54	46	42	38	6
20:00	Day	46	64	32	57	49	42	37	1
21:00	Day	46	57	32	55	50	44	38	1
22:00	Night	48	63	34	57	51	45	40	1
23:00	Night	49	63	33	58	54	46	40	1
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime 7am-10pm	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime 10pm-7am	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/6/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA



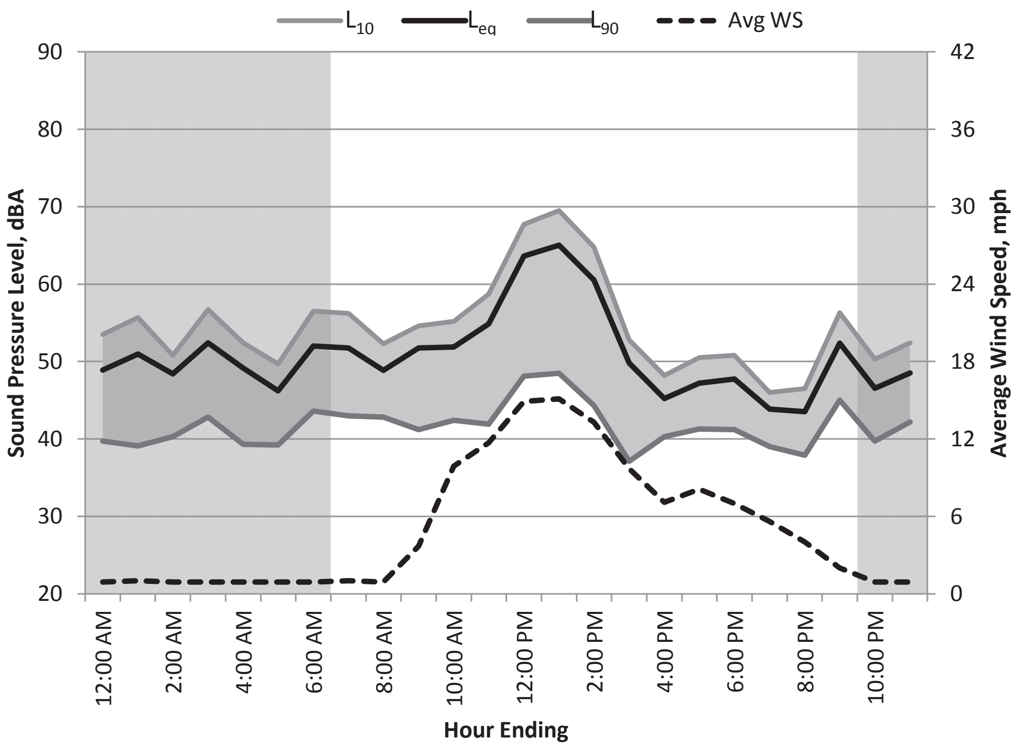
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	44	57	33	51	47	43	38	1
1:00	Night	49	62	36	59	53	42	39	1
2:00	Night	51	68	38	64	53	45	42	1
3:00	Night	50	62	35	60	55	44	39	1
4:00	Night	51	64	38	60	56	43	40	1
5:00	Night	52	62	38	59	56	48	42	1
6:00	Night	49	62	36	58	52	45	40	1
7:00	Day	52	65	39	60	58	46	42	1
8:00	Day	54	65	40	63	59	47	43	1
9:00	Day	53	76	38	62	55	46	41	1
10:00	Day	48	67	34	59	51	43	38	3
11:00	Day	47	65	35	58	50	43	39	2
12:00	Day	46	70	32	55	49	41	37	4
13:00	Day	42	57	34	52	44	39	37	2
14:00	Day	44	64	32	55	47	40	36	3
15:00	Day	40	58	32	49	43	38	35	4
16:00	Day	45	54	37	50	47	44	40	2
17:00	Day	47	66	36	56	49	44	40	6
18:00	Day	44	57	35	52	47	42	39	5
19:00	Day	50	66	34	61	52	46	40	1
20:00	Day	52	65	40	62	57	48	44	1
21:00	Day	54	70	40	65	57	50	46	1
22:00	Night	51	67	37	65	50	45	42	1
23:00	Night	48	60	39	59	51	45	41	1
Overall	Max	54	76	40	65	59	50	46	6
	Median	49	65	36	59	51	44	40	1
	Min	40	54	32	49	43	38	35	1
Daytime 7am-10pm	Max	54	76	40	65	59	50	46	6
	Median	47	65	35	58	50	44	40	2
	Min	40	54	32	49	43	38	35	1
Nighttime 10pm-7am	Max	52	68	39	65	56	48	42	1
	Median	50	62	37	59	53	45	40	1
	Min	44	57	33	51	47	42	38	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/7/2012

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 56 dBA



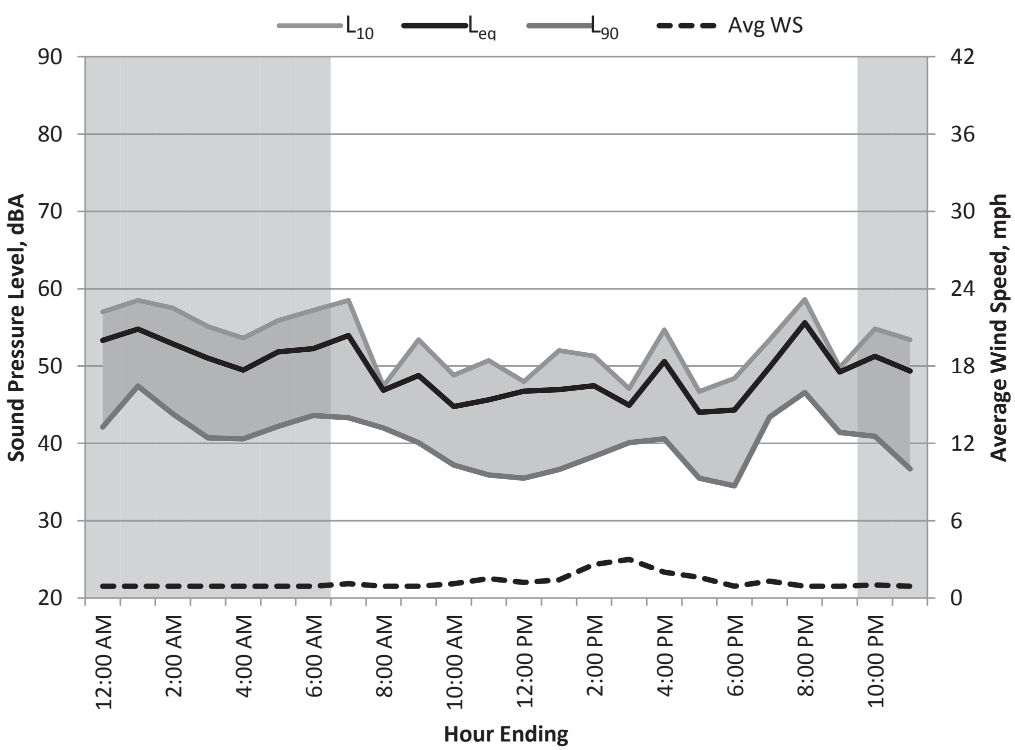
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	61	36	59	54	45	40	1
1:00	Night	51	65	36	61	56	43	39	1
2:00	Night	48	63	38	61	51	43	40	1
3:00	Night	52	64	39	62	57	48	43	1
4:00	Night	49	62	35	60	52	45	39	1
5:00	Night	46	58	36	56	50	43	39	1
6:00	Night	52	62	41	60	57	49	44	1
7:00	Day	52	65	39	62	56	47	43	1
8:00	Day	49	64	40	58	52	45	43	1
9:00	Day	52	73	36	61	55	48	41	4
10:00	Day	52	68	37	62	55	48	42	10
11:00	Day	55	71	34	65	59	50	42	12
12:00	Day	64	79	39	74	68	59	48	15
13:00	Day	65	79	41	75	70	59	49	15
14:00	Day	61	75	33	71	65	55	44	13
15:00	Day	50	69	33	61	53	43	37	10
16:00	Day	45	57	35	52	48	44	40	7
17:00	Day	47	60	38	55	51	45	41	8
18:00	Day	48	62	37	56	51	45	41	7
19:00	Day	44	58	33	51	46	43	39	6
20:00	Day	44	53	34	50	47	42	38	4
21:00	Day	52	66	34	61	56	49	45	2
22:00	Night	47	61	33	54	50	44	40	1
23:00	Night	49	59	39	57	52	46	42	1
Overall	Max	65	79	41	75	70	59	49	15
	Median	49	63	36	60	53	45	41	3
	Min	44	53	33	50	46	42	37	1
Daytime	Max	65	79	41	75	70	59	49	15
7am-10pm	Median	52	66	36	61	55	47	42	7
	Min	44	53	33	50	46	42	37	1
Nighttime	Max	52	65	41	62	57	49	44	1
10pm-7am	Median	49	62	36	60	52	45	40	1
	Min	46	58	33	54	50	43	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/8/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 59 dBA | $L_{eq(24hr)}$ = 51 dBA



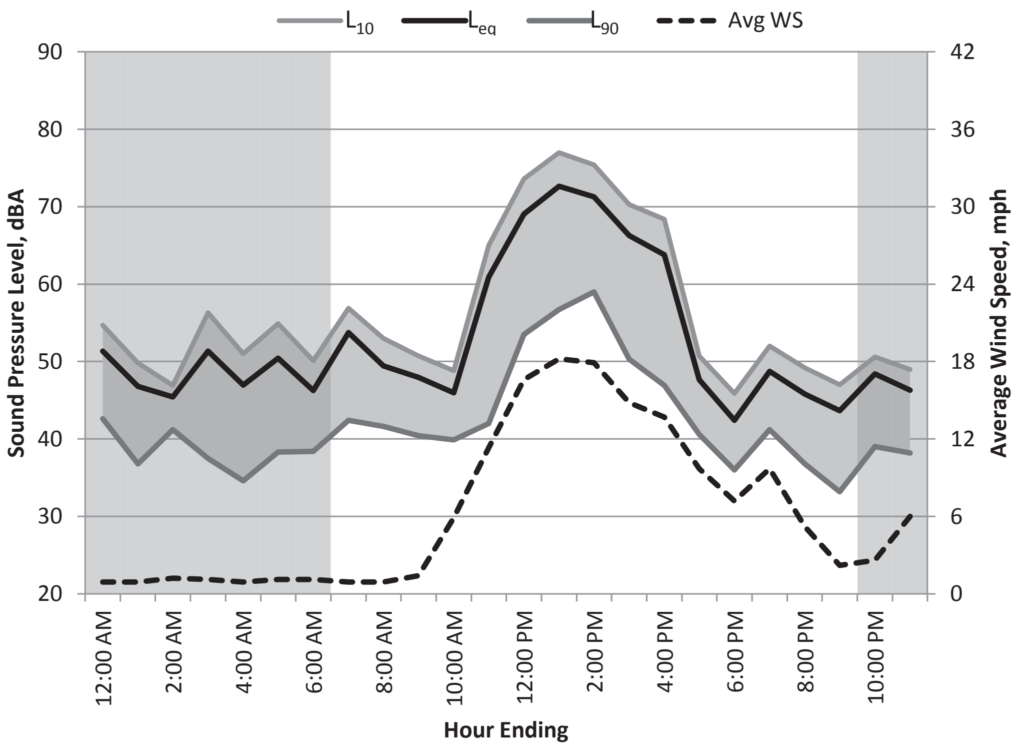
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	68	39	65	57	47	42	1
1:00	Night	55	69	43	64	59	52	47	1
2:00	Night	53	68	40	63	58	47	44	1
3:00	Night	51	62	36	60	55	47	41	1
4:00	Night	49	60	36	58	54	46	41	1
5:00	Night	52	67	40	62	56	47	42	1
6:00	Night	52	65	41	61	57	48	44	1
7:00	Day	54	66	40	64	59	47	43	1
8:00	Day	47	68	40	57	47	44	42	1
9:00	Day	49	63	37	58	53	44	40	1
10:00	Day	45	64	35	54	49	40	37	1
11:00	Day	46	62	34	55	51	38	36	2
12:00	Day	47	65	33	59	48	38	36	1
13:00	Day	47	63	35	57	52	40	37	1
14:00	Day	47	64	36	57	51	42	38	3
15:00	Day	45	59	37	54	47	43	40	3
16:00	Day	51	67	36	60	55	45	41	2
17:00	Day	44	62	32	53	47	41	36	2
18:00	Day	44	55	32	52	48	41	35	1
19:00	Day	50	61	38	56	53	48	43	1
20:00	Day	56	70	41	65	59	52	47	1
21:00	Day	49	65	40	60	50	45	41	1
22:00	Night	51	66	38	62	55	45	41	1
23:00	Night	49	63	32	59	53	45	37	1
Overall	Max	56	70	43	65	59	52	47	3
	Median	49	64	37	59	53	45	41	1
	Min	44	55	32	52	47	38	35	1
Daytime 7am-10pm	Max	56	70	41	65	59	52	47	3
	Median	47	64	36	57	51	43	40	1
	Min	44	55	32	52	47	38	35	1
Nighttime 10pm-7am	Max	55	69	43	65	59	52	47	1
	Median	52	66	39	62	56	47	42	1
	Min	49	60	32	58	53	45	37	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/9/2012

24hr Summary

L_{DN} = 64 dBA | C_{NEL} = 64 dBA | $L_{eq(24hr)}$ = 63 dBA



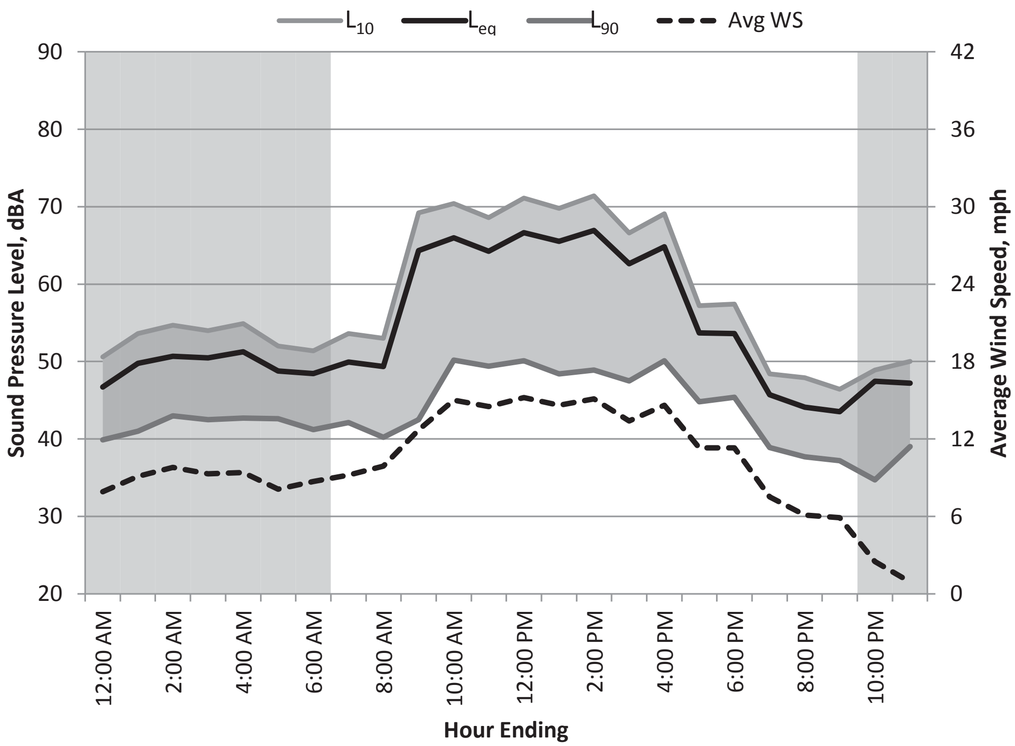
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	68	38	62	55	47	43	1
1:00	Night	47	63	34	58	50	41	37	1
2:00	Night	45	60	39	54	47	44	41	1
3:00	Night	51	65	35	62	56	44	38	1
4:00	Night	47	63	32	58	51	40	35	1
5:00	Night	50	63	36	61	55	43	38	1
6:00	Night	46	59	35	56	50	42	38	1
7:00	Day	54	75	38	64	57	49	42	1
8:00	Day	49	63	39	59	53	47	42	1
9:00	Day	48	64	38	57	51	45	40	1
10:00	Day	46	61	37	55	49	43	40	6
11:00	Day	61	77	34	73	65	50	42	11
12:00	Day	69	82	43	78	74	65	54	17
13:00	Day	73	84	43	81	77	69	57	18
14:00	Day	71	84	47	80	75	68	59	18
15:00	Day	66	81	41	77	70	60	50	15
16:00	Day	64	78	38	74	68	57	47	14
17:00	Day	48	64	37	57	51	45	41	10
18:00	Day	42	58	32	51	46	40	36	7
19:00	Day	49	63	36	58	52	46	41	10
20:00	Day	46	60	33	56	49	41	37	5
21:00	Day	44	60	31	56	47	36	33	2
22:00	Night	48	61	36	60	51	43	39	3
23:00	Night	46	66	34	58	49	42	38	6
Overall	Max	73	84	47	81	77	69	59	18
	Median	49	64	36	59	52	44	41	4
	Min	42	58	31	51	46	36	33	1
Daytime 7am-10pm	Max	73	84	47	81	77	69	59	18
	Median	49	64	38	59	53	47	42	10
	Min	42	58	31	51	46	36	33	1
Nighttime 10pm-7am	Max	51	68	39	62	56	47	43	6
	Median	47	63	35	58	51	43	38	1
	Min	45	59	32	54	47	40	35	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/10/2012

24hr Summary

L_{DN} = 62 dBA C_{NEL} = 62 dBA $L_{eq(24hr)}$ = 61 dBA



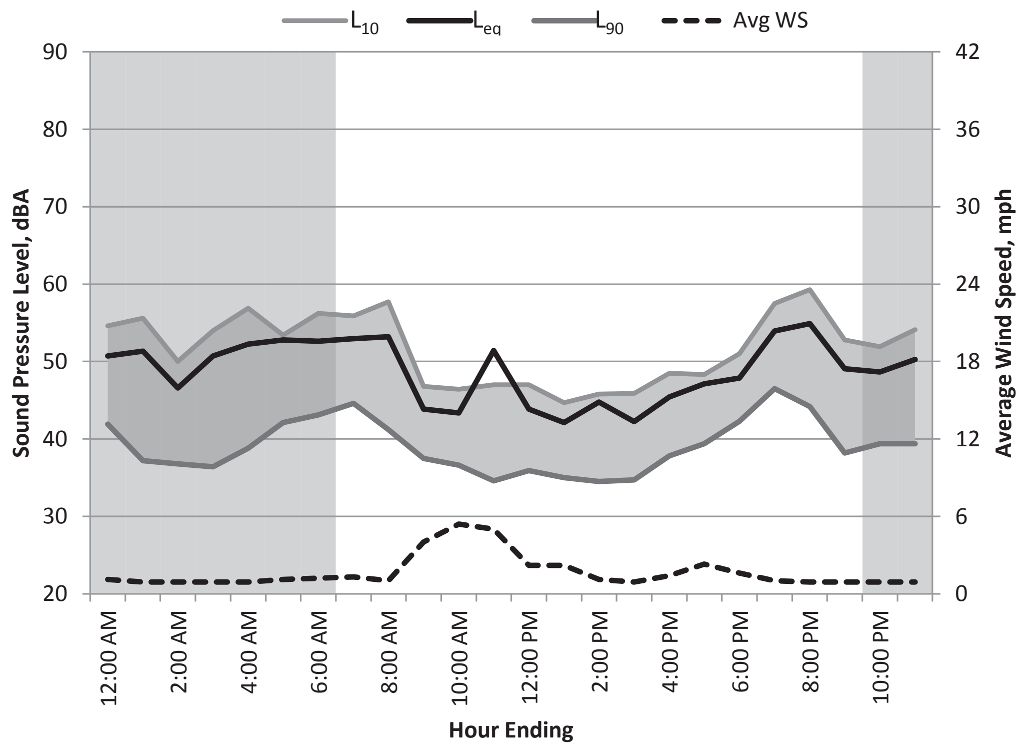
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	58	36	55	51	44	40	8
1:00	Night	50	64	36	59	54	46	41	9
2:00	Night	51	62	39	59	55	48	43	10
3:00	Night	50	63	37	59	54	48	43	9
4:00	Night	51	67	37	61	55	48	43	9
5:00	Night	49	63	38	56	52	47	43	8
6:00	Night	48	62	36	58	51	46	41	9
7:00	Day	50	64	36	59	54	46	42	9
8:00	Day	49	64	34	59	53	46	40	10
9:00	Day	64	79	34	75	69	55	43	13
10:00	Day	66	78	37	75	70	62	50	15
11:00	Day	64	76	39	73	69	60	49	15
12:00	Day	67	79	36	76	71	62	50	15
13:00	Day	66	81	38	75	70	60	48	15
14:00	Day	67	81	36	77	71	61	49	15
15:00	Day	63	77	39	74	67	56	48	13
16:00	Day	65	80	43	74	69	60	50	15
17:00	Day	54	70	39	63	57	51	45	11
18:00	Day	54	65	39	61	57	51	45	11
19:00	Day	46	62	34	55	48	43	39	8
20:00	Day	44	61	33	53	48	41	38	6
21:00	Day	44	60	33	52	46	41	37	6
22:00	Night	47	68	31	59	49	40	35	3
23:00	Night	47	63	31	56	50	45	39	1
Overall	Max	67	81	43	77	71	62	50	15
	Median	51	65	36	59	54	48	43	10
	Min	44	58	31	52	46	40	35	1
Daytime	Max	67	81	43	77	71	62	50	15
7am-10pm	Median	63	76	36	73	67	55	45	13
	Min	44	60	33	52	46	41	37	6
Nighttime	Max	51	68	39	61	55	48	43	10
10pm-7am	Median	49	63	36	59	52	46	41	9
	Min	47	58	31	55	49	40	35	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/11/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 50 dBA

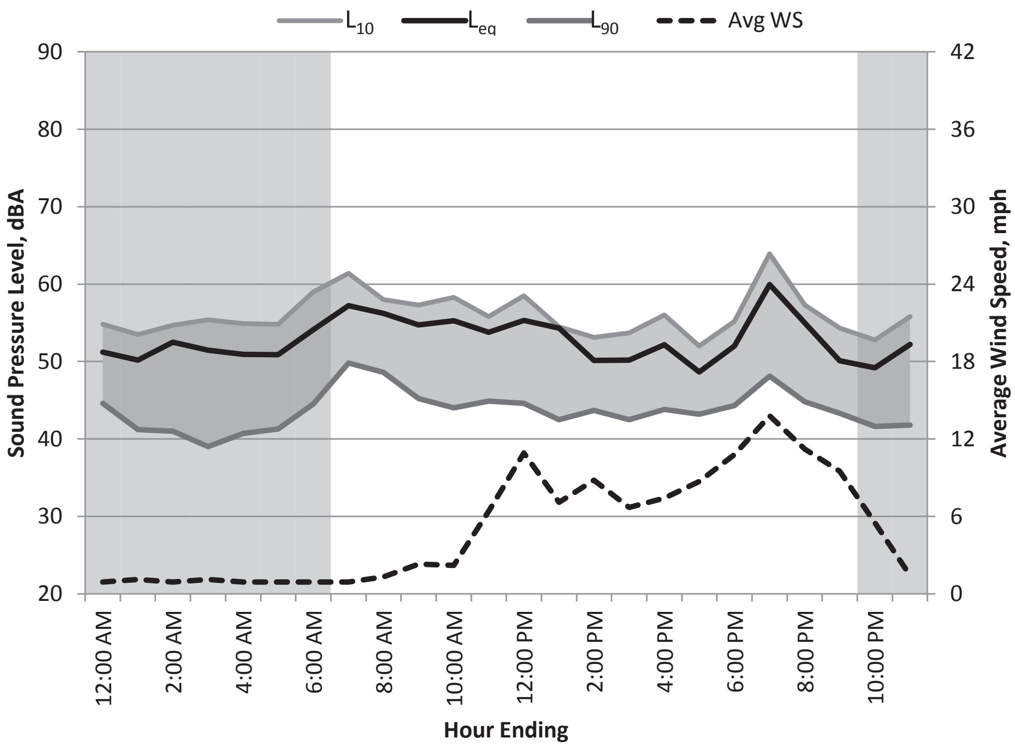


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	64	34	61	55	47	42	1
1:00	Night	51	65	31	63	56	45	37	1
2:00	Night	47	62	33	56	50	44	37	1
3:00	Night	51	64	32	61	54	45	36	1
4:00	Night	52	67	34	62	57	46	39	1
5:00	Night	53	75	36	65	53	48	42	1
6:00	Night	53	67	39	62	56	49	43	1
7:00	Day	53	71	39	63	56	49	45	1
8:00	Day	53	73	37	64	58	47	41	1
9:00	Day	44	61	35	53	47	41	38	4
10:00	Day	43	59	34	52	46	40	37	5
11:00	Day	51	77	32	64	47	39	35	5
12:00	Day	44	61	34	54	47	39	36	2
13:00	Day	42	63	33	51	45	37	35	2
14:00	Day	45	65	32	58	46	37	35	1
15:00	Day	42	58	33	53	46	37	35	1
16:00	Day	45	60	35	56	49	40	38	1
17:00	Day	47	63	36	58	48	43	39	2
18:00	Day	48	56	38	55	51	46	42	2
19:00	Day	54	66	43	64	58	51	47	1
20:00	Day	55	70	41	66	59	49	44	1
21:00	Day	49	65	34	58	53	45	38	1
22:00	Night	49	63	35	61	52	44	39	1
23:00	Night	50	63	36	61	54	46	39	1
Overall	Max	55	77	43	66	59	51	47	5
	Median	50	64	34	61	52	45	39	1
	Min	42	56	31	51	45	37	35	1
Daytime 7am-10pm	Max	55	77	43	66	59	51	47	5
	Median	47	63	35	58	48	41	38	1
	Min	42	56	32	51	45	37	35	1
Nighttime 10pm-7am	Max	53	75	39	65	57	49	43	1
	Median	51	64	34	61	54	46	39	1
	Min	47	62	31	56	50	44	36	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	12/12/2012

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 54 dBA



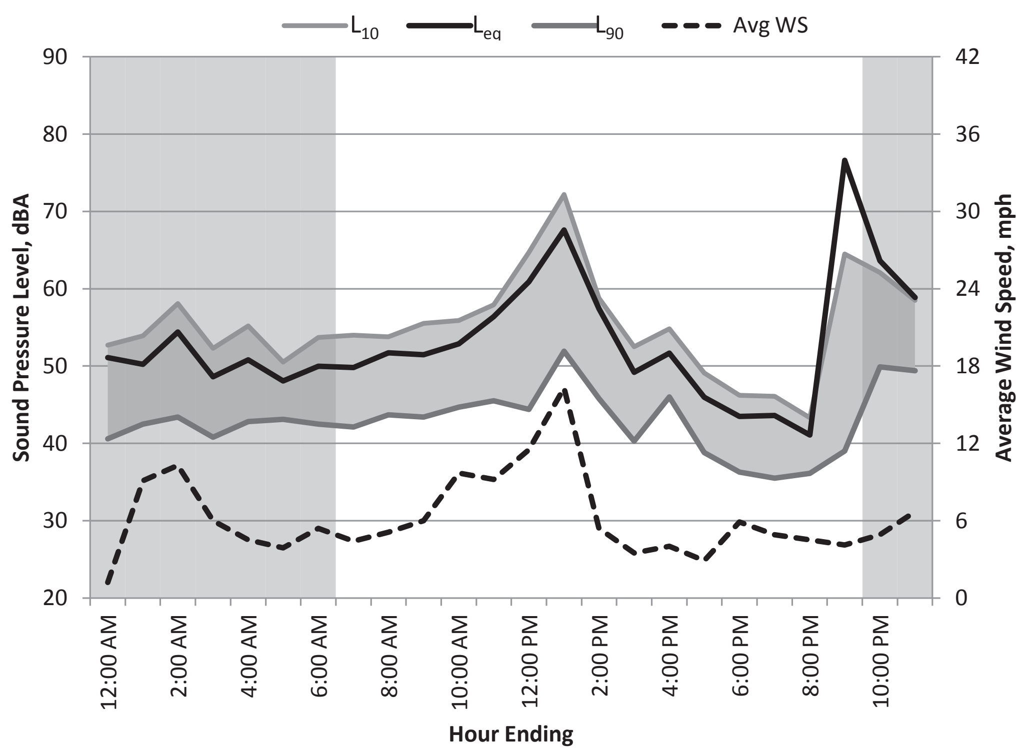
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	66	41	59	55	49	45	1
1:00	Night	50	60	34	58	54	48	41	1
2:00	Night	52	68	33	64	55	47	41	1
3:00	Night	51	68	34	61	55	45	39	1
4:00	Night	51	65	37	62	55	46	41	1
5:00	Night	51	63	37	61	55	46	41	1
6:00	Night	54	71	40	62	59	50	45	1
7:00	Day	57	67	44	65	61	54	50	1
8:00	Day	56	74	44	67	58	53	49	1
9:00	Day	55	73	41	66	57	50	45	2
10:00	Day	55	77	39	66	58	49	44	2
11:00	Day	54	75	41	64	56	49	45	6
12:00	Day	55	72	40	67	59	50	45	11
13:00	Day	54	81	39	63	55	47	43	7
14:00	Day	50	67	40	58	53	47	44	9
15:00	Day	50	66	39	60	54	46	43	7
16:00	Day	52	71	40	61	56	48	44	7
17:00	Day	49	62	38	56	52	46	43	9
18:00	Day	52	69	40	62	55	48	44	11
19:00	Day	60	75	43	71	64	55	48	14
20:00	Day	55	75	41	66	57	50	45	11
21:00	Day	50	64	39	60	54	46	43	10
22:00	Night	49	64	37	59	53	45	42	6
23:00	Night	52	67	35	64	56	46	42	1
Overall	Max	60	81	44	71	64	55	50	14
	Median	52	68	40	62	55	48	44	4
	Min	49	60	33	56	52	45	39	1
Daytime 7am-10pm	Max	60	81	44	71	64	55	50	14
	Median	54	72	40	64	56	49	44	7
	Min	49	62	38	56	52	46	43	1
Nighttime 10pm-7am	Max	54	71	41	64	59	50	45	6
	Median	51	66	37	61	55	46	41	1
	Min	49	60	33	58	53	45	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/13/2012

24hr Summary

L_{DN} = 66 dBA C_{NEL} = 69 dBA $L_{eq(24hr)}$ = 64 dBA



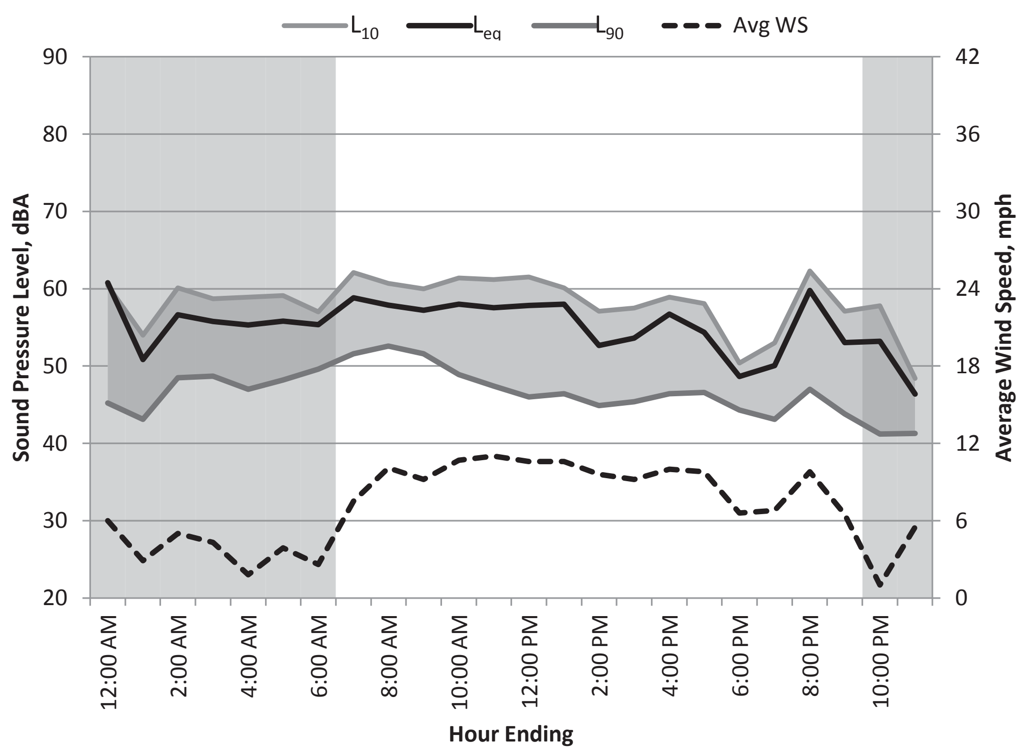
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	72	37	63	53	44	41	1
1:00	Night	50	65	38	59	54	47	43	9
2:00	Night	54	69	37	64	58	50	43	10
3:00	Night	49	65	37	59	52	44	41	6
4:00	Night	51	65	39	61	55	46	43	5
5:00	Night	48	59	39	57	51	46	43	4
6:00	Night	50	66	39	60	54	45	43	5
7:00	Day	50	65	39	60	54	45	42	4
8:00	Day	52	75	39	62	54	46	44	5
9:00	Day	51	66	41	61	56	47	43	6
10:00	Day	53	69	41	63	56	49	45	10
11:00	Day	56	75	41	69	58	50	46	9
12:00	Day	61	78	40	73	65	51	44	12
13:00	Day	68	81	44	78	72	61	52	16
14:00	Day	57	78	42	70	59	50	46	5
15:00	Day	49	66	37	60	53	45	40	4
16:00	Day	52	68	43	60	55	49	46	4
17:00	Day	46	56	35	53	49	45	39	3
18:00	Day	43	60	34	52	46	42	36	6
19:00	Day	44	61	32	53	46	39	36	5
20:00	Day	41	60	32	50	43	39	36	5
21:00	Day	77	101	37	91	65	55	39	4
22:00	Night	64	90	44	73	62	55	50	5
23:00	Night	59	89	44	65	59	54	49	7
Overall	Max	77	101	44	91	72	61	52	16
	Median	51	67	39	61	54	46	43	5
	Min	41	56	32	50	43	39	36	1
Daytime	Max	77	101	44	91	72	61	52	16
7am-10pm	Median	52	68	39	61	55	47	43	5
	Min	41	56	32	50	43	39	36	3
Nighttime	Max	64	90	44	73	62	55	50	10
10pm-7am	Median	51	66	39	61	54	46	43	5
	Min	48	59	37	57	51	44	41	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/14/2012

24hr Summary

L_{DN} = 62 dBA | C_{NEL} = 63 dBA | $L_{eq(24hr)}$ = 56 dBA

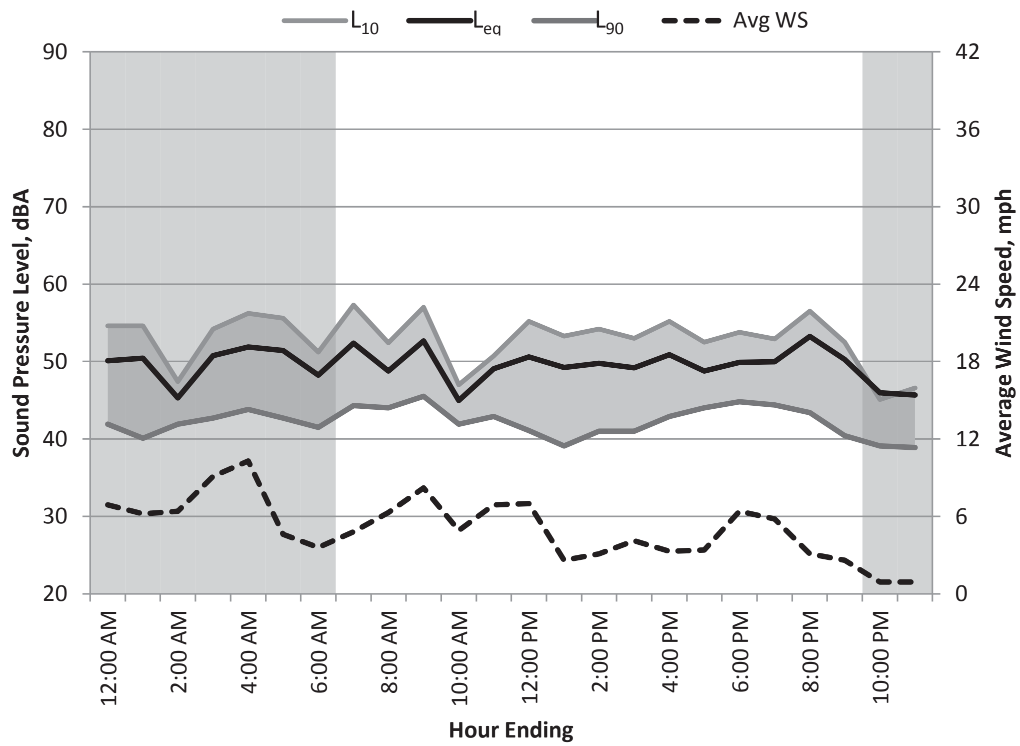


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	61	94	38	66	60	55	45	6
1:00	Night	51	67	38	60	54	48	43	3
2:00	Night	57	71	43	66	60	53	49	5
3:00	Night	56	72	43	64	59	54	49	4
4:00	Night	55	71	43	65	59	52	47	2
5:00	Night	56	71	44	64	59	54	48	4
6:00	Night	55	80	45	64	57	53	50	3
7:00	Day	59	72	47	67	62	56	52	8
8:00	Day	58	69	49	64	61	56	53	10
9:00	Day	57	73	48	64	60	56	52	9
10:00	Day	58	74	44	68	61	54	49	11
11:00	Day	58	74	42	68	61	53	47	11
12:00	Day	58	73	43	68	62	52	46	11
13:00	Day	58	81	43	69	60	51	46	11
14:00	Day	53	72	42	62	57	48	45	10
15:00	Day	54	74	42	64	58	48	45	9
16:00	Day	57	75	43	69	59	50	46	10
17:00	Day	54	69	44	63	58	51	47	10
18:00	Day	49	66	40	57	50	47	44	7
19:00	Day	50	67	38	60	53	46	43	7
20:00	Day	60	84	43	69	62	53	47	10
21:00	Day	53	66	41	62	57	49	44	7
22:00	Night	53	67	36	64	58	46	41	1
23:00	Night	46	62	38	55	48	44	41	6
Overall	Max	61	94	49	69	62	56	53	11
	Median	56	72	43	64	59	52	47	7
	Min	46	62	36	55	48	44	41	1
Daytime	Max	60	84	49	69	62	56	53	11
7am-10pm	Median	57	73	43	64	60	51	46	10
	Min	49	66	38	57	50	46	43	7
Nighttime	Max	61	94	45	66	60	55	50	6
10pm-7am	Median	55	71	43	64	59	53	47	4
	Min	46	62	36	55	48	44	41	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/15/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 50 dBA



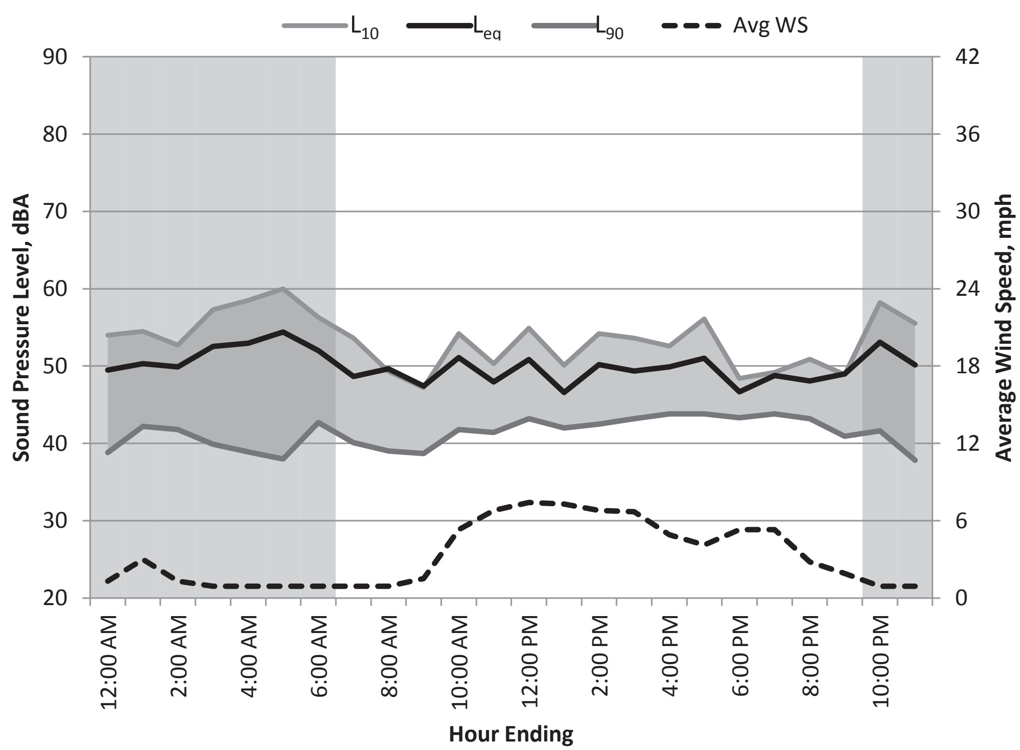
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	65	37	59	55	45	42	7
1:00	Night	50	65	37	60	55	45	40	6
2:00	Night	45	57	37	50	47	45	42	6
3:00	Night	51	71	39	61	54	46	43	9
4:00	Night	52	66	39	60	56	48	44	10
5:00	Night	51	66	39	61	56	47	43	5
6:00	Night	48	67	39	59	51	44	42	4
7:00	Day	52	63	41	60	57	48	44	5
8:00	Day	49	65	41	55	52	47	44	6
9:00	Day	53	66	42	62	57	49	46	8
10:00	Day	45	56	39	51	47	44	42	5
11:00	Day	49	67	40	60	51	45	43	7
12:00	Day	51	68	39	60	55	46	41	7
13:00	Day	49	65	36	57	53	44	39	3
14:00	Day	50	69	38	59	54	44	41	3
15:00	Day	49	66	38	59	53	44	41	4
16:00	Day	51	65	39	59	55	47	43	3
17:00	Day	49	63	40	55	53	47	44	3
18:00	Day	50	60	40	57	54	48	45	6
19:00	Day	50	61	41	60	53	47	44	6
20:00	Day	53	69	38	64	57	48	43	3
21:00	Day	50	66	37	63	53	43	40	3
22:00	Night	46	63	36	59	45	41	39	1
23:00	Night	46	60	37	58	47	41	39	1
Overall	Max	53	71	42	64	57	49	46	10
	Median	50	65	39	59	54	46	42	5
	Min	45	56	36	50	45	41	39	1
Daytime	Max	53	69	42	64	57	49	46	8
7am-10pm	Median	50	65	39	59	53	47	43	5
	Min	45	56	36	51	47	43	39	3
Nighttime	Max	52	71	39	61	56	48	44	10
10pm-7am	Median	50	65	37	59	54	45	42	6
	Min	45	57	36	50	45	41	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/16/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 50 dBA



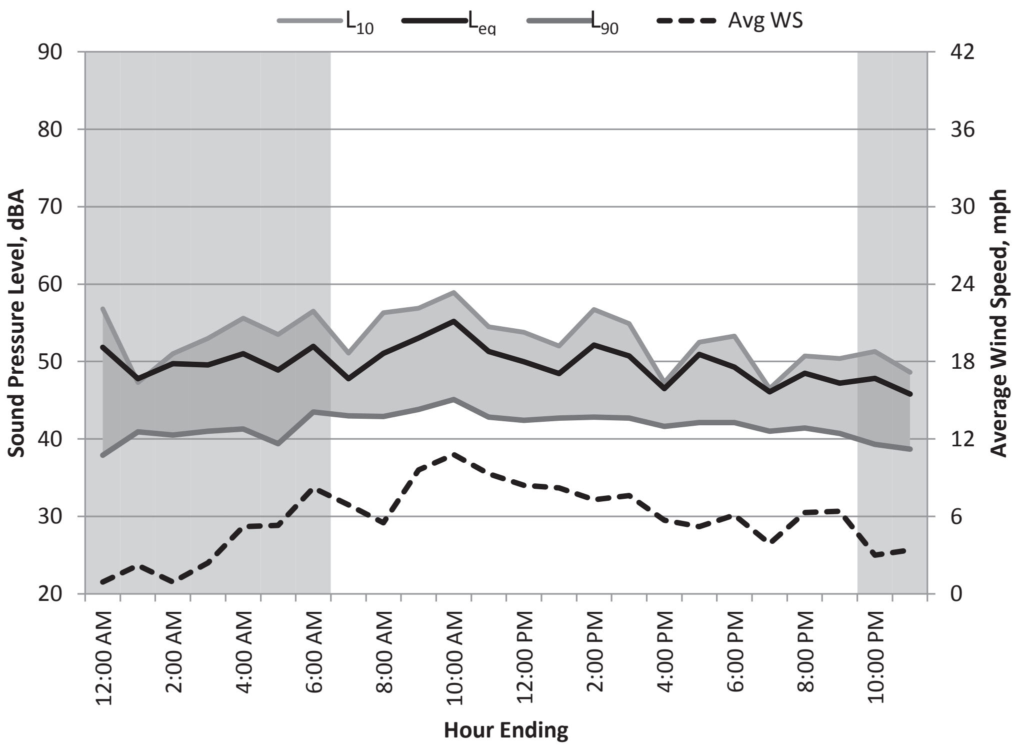
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	64	36	59	54	45	39	1
1:00	Night	50	63	38	61	55	45	42	3
2:00	Night	50	65	38	61	53	45	42	1
3:00	Night	53	68	36	63	57	44	40	1
4:00	Night	53	63	34	61	59	44	39	1
5:00	Night	54	66	36	64	60	44	38	1
6:00	Night	52	67	38	62	56	47	43	1
7:00	Day	49	63	36	58	54	44	40	1
8:00	Day	50	72	37	62	49	40	39	1
9:00	Day	47	67	37	60	47	40	39	2
10:00	Day	51	74	38	60	54	45	42	5
11:00	Day	48	64	38	58	50	44	41	7
12:00	Day	51	65	40	60	55	47	43	7
13:00	Day	47	59	39	54	50	44	42	7
14:00	Day	50	64	39	59	54	46	43	7
15:00	Day	49	63	40	58	54	46	43	7
16:00	Day	50	67	41	60	53	46	44	5
17:00	Day	51	65	41	60	56	46	44	4
18:00	Day	47	56	41	54	48	46	43	5
19:00	Day	49	65	41	59	49	46	44	5
20:00	Day	48	61	40	56	51	46	43	3
21:00	Day	49	64	37	61	49	44	41	2
22:00	Night	53	67	39	63	58	45	42	1
23:00	Night	50	61	34	59	56	46	38	1
Overall	Max	54	74	41	64	60	47	44	7
	Median	50	65	38	60	54	45	42	2
	Min	47	56	34	54	47	40	38	1
Daytime 7am-10pm	Max	51	74	41	62	56	47	44	7
	Median	49	64	39	59	51	46	43	5
	Min	47	56	36	54	47	40	39	1
Nighttime 10pm-7am	Max	54	68	39	64	60	47	43	3
	Median	52	65	36	61	56	45	40	1
	Min	49	61	34	59	53	44	38	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/17/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 50 dBA



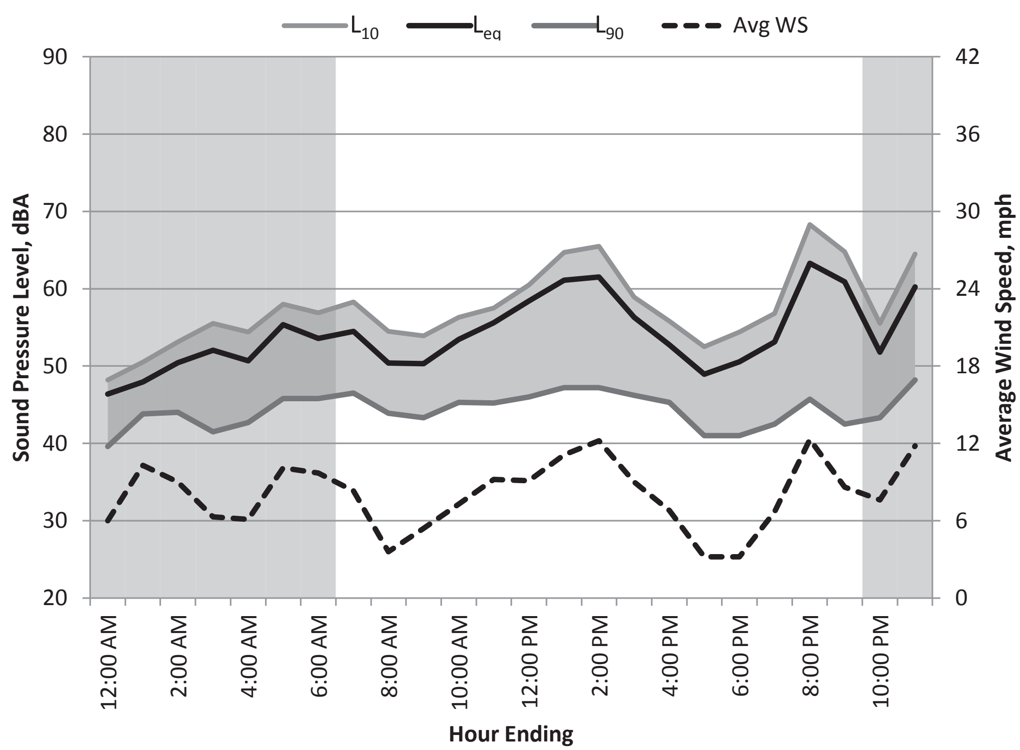
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	52	65	36	61	57	45	38	1
1:00	Night	48	69	38	60	47	43	41	2
2:00	Night	50	67	36	61	51	44	41	1
3:00	Night	50	68	38	60	53	44	41	2
4:00	Night	51	70	38	61	56	44	41	5
5:00	Night	49	64	37	59	54	43	39	5
6:00	Night	52	65	40	61	57	46	44	8
7:00	Day	48	65	41	55	51	46	43	7
8:00	Day	51	65	41	60	56	46	43	6
9:00	Day	53	70	40	63	57	48	44	10
10:00	Day	55	70	41	65	59	50	45	11
11:00	Day	51	70	39	63	55	46	43	9
12:00	Day	50	66	39	59	54	46	42	8
13:00	Day	48	62	40	58	52	45	43	8
14:00	Day	52	69	40	62	57	47	43	7
15:00	Day	51	65	38	61	55	46	43	8
16:00	Day	46	62	39	56	47	44	42	6
17:00	Day	51	74	39	62	53	45	42	5
18:00	Day	49	67	38	58	53	45	42	6
19:00	Day	46	65	39	58	47	43	41	4
20:00	Day	49	65	39	59	51	44	41	6
21:00	Day	47	66	37	57	50	43	41	6
22:00	Night	48	64	37	59	51	43	39	3
23:00	Night	46	62	36	57	49	41	39	3
Overall	Max	55	74	41	65	59	50	45	11
	Median	50	66	39	60	53	45	42	6
	Min	46	62	36	55	47	41	38	1
Daytime 7am-10pm	Max	55	74	41	65	59	50	45	11
	Median	50	66	39	59	53	46	43	7
	Min	46	62	37	55	47	43	41	4
Nighttime 10pm-7am	Max	52	70	40	61	57	46	44	8
	Median	50	65	37	60	53	44	41	3
	Min	46	62	36	57	47	41	38	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/18/2012

24hr Summary

L_{DN} = 61 dBA | C_{NEL} = 62 dBA | $L_{eq(24hr)}$ = 57 dBA



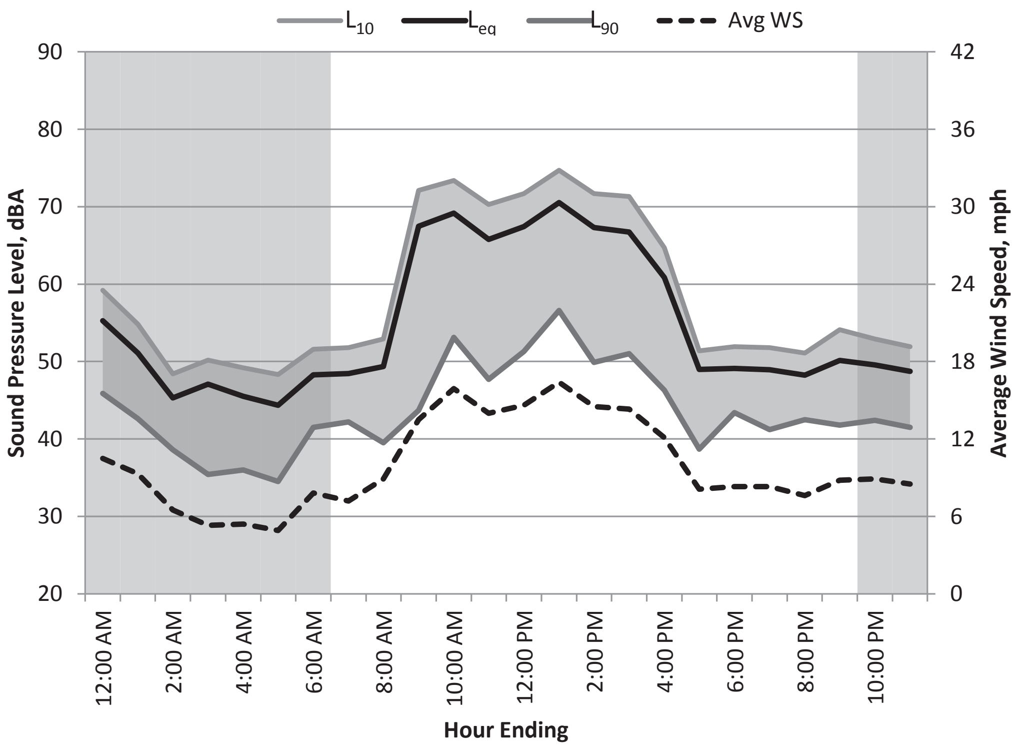
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	62	35	56	48	43	40	6
1:00	Night	48	60	40	55	51	47	44	10
2:00	Night	50	66	40	61	53	47	44	9
3:00	Night	52	69	36	63	56	47	42	6
4:00	Night	51	64	39	61	54	46	43	6
5:00	Night	55	75	42	66	58	50	46	10
6:00	Night	54	74	42	63	57	49	46	10
7:00	Day	54	70	43	63	58	51	47	8
8:00	Day	50	66	41	59	55	47	44	4
9:00	Day	50	64	40	61	54	47	43	5
10:00	Day	53	78	42	63	56	48	45	7
11:00	Day	56	77	42	67	58	49	45	9
12:00	Day	58	77	43	71	61	51	46	9
13:00	Day	61	79	42	72	65	55	47	11
14:00	Day	61	76	43	73	66	54	47	12
15:00	Day	56	74	43	68	59	50	46	9
16:00	Day	53	67	42	61	56	50	45	7
17:00	Day	49	67	38	58	53	44	41	3
18:00	Day	51	65	38	61	54	46	41	3
19:00	Day	53	69	35	65	57	48	43	7
20:00	Day	63	77	39	74	68	54	46	12
21:00	Day	61	77	37	73	65	52	43	9
22:00	Night	52	68	39	61	56	48	43	8
23:00	Night	60	75	41	69	65	56	48	12
Overall	Max	63	79	43	74	68	56	48	12
	Median	53	70	41	63	57	49	45	8
	Min	46	60	35	55	48	43	40	3
Daytime 7am-10pm	Max	63	79	43	74	68	55	47	12
	Median	54	74	42	65	58	50	45	8
	Min	49	64	35	58	53	44	41	3
Nighttime 10pm-7am	Max	60	75	42	69	65	56	48	12
	Median	52	68	40	61	56	47	44	9
	Min	46	60	35	55	48	43	40	6

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/19/2012

24hr Summary

L_{DN} = 64 dBA C_{NEL} = 64 dBA $L_{eq(24hr)}$ = 63 dBA



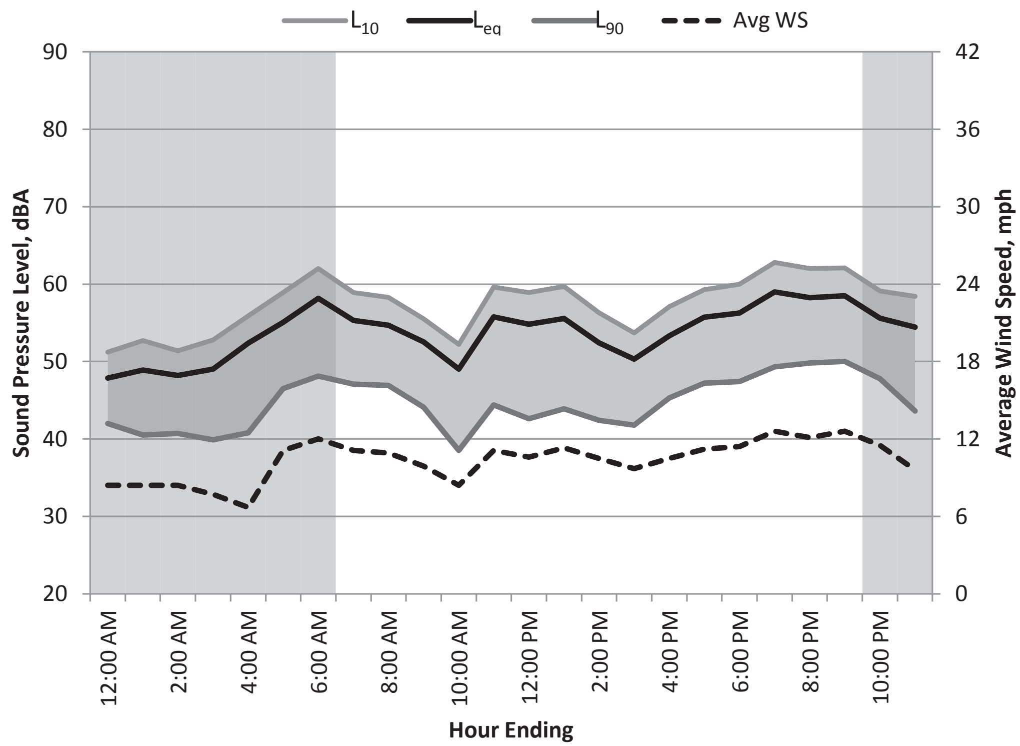
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	55	68	38	64	59	52	46	11
1:00	Night	51	68	36	59	55	48	43	9
2:00	Night	45	60	34	54	48	43	39	7
3:00	Night	47	66	32	58	50	41	35	5
4:00	Night	46	59	30	54	49	42	36	5
5:00	Night	44	55	31	53	48	41	35	5
6:00	Night	48	60	37	56	52	46	42	8
7:00	Day	48	62	39	57	52	46	42	7
8:00	Day	49	65	35	59	53	46	40	9
9:00	Day	67	84	36	78	72	57	44	14
10:00	Day	69	81	39	78	73	66	53	16
11:00	Day	66	79	36	75	70	61	48	14
12:00	Day	67	80	40	77	72	63	51	15
13:00	Day	71	83	40	79	75	68	57	16
14:00	Day	67	81	36	77	72	62	50	15
15:00	Day	67	80	36	76	71	62	51	14
16:00	Day	61	77	37	71	65	56	46	12
17:00	Day	49	67	35	60	51	44	39	8
18:00	Day	49	63	40	57	52	47	43	8
19:00	Day	49	66	36	59	52	45	41	8
20:00	Day	48	61	37	56	51	47	43	8
21:00	Day	50	65	36	59	54	47	42	9
22:00	Night	50	62	36	58	53	47	42	9
23:00	Night	49	62	37	58	52	46	42	9
Overall	Max	71	84	40	79	75	68	57	16
	Median	49	66	36	59	53	47	42	9
	Min	44	55	30	53	48	41	35	5
Daytime	Max	71	84	40	79	75	68	57	16
7am-10pm	Median	61	77	36	71	65	56	44	12
	Min	48	61	35	56	51	44	39	7
Nighttime	Max	55	68	38	64	59	52	46	11
10pm-7am	Median	48	62	36	58	52	46	42	8
	Min	44	55	30	53	48	41	35	5

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/20/2012

24hr Summary

L_{DN} = 60 dBA C_{NEL} = 61 dBA $L_{eq(24hr)}$ = 55 dBA



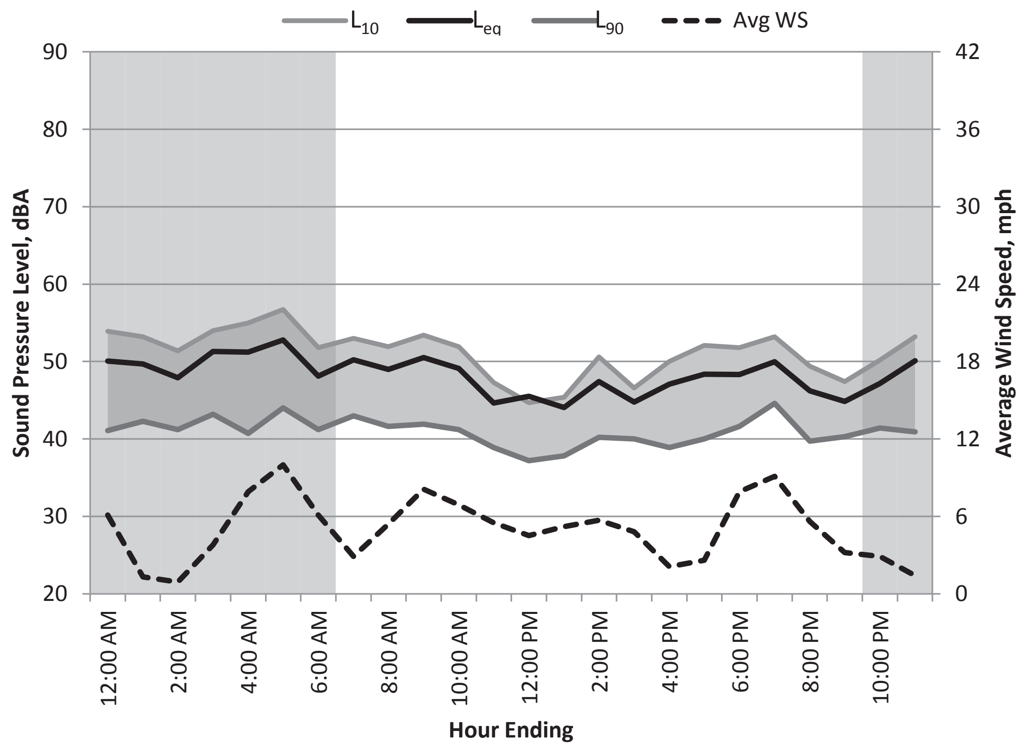
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	60	37	55	51	46	42	8
1:00	Night	49	64	36	58	53	45	41	8
2:00	Night	48	62	37	57	51	45	41	8
3:00	Night	49	62	32	57	53	46	40	8
4:00	Night	52	69	33	63	56	47	41	7
5:00	Night	55	67	40	63	59	53	47	11
6:00	Night	58	71	41	67	62	55	48	12
7:00	Day	55	68	40	63	59	53	47	11
8:00	Day	55	67	42	62	58	53	47	11
9:00	Day	53	68	39	61	56	50	44	10
10:00	Day	49	67	34	59	52	45	39	8
11:00	Day	56	71	36	66	60	51	44	11
12:00	Day	55	72	35	64	59	50	43	11
13:00	Day	56	71	36	64	60	52	44	11
14:00	Day	52	64	35	61	56	49	42	11
15:00	Day	50	65	38	60	54	47	42	10
16:00	Day	53	66	38	61	57	51	45	11
17:00	Day	56	68	42	65	59	53	47	11
18:00	Day	56	70	41	65	60	53	47	11
19:00	Day	59	73	42	68	63	56	49	13
20:00	Day	58	72	44	66	62	55	50	12
21:00	Day	58	72	44	66	62	56	50	13
22:00	Night	56	68	41	63	59	54	48	12
23:00	Night	54	69	39	64	58	50	44	10
Overall	Max	59	73	44	68	63	56	50	13
	Median	55	68	38	63	59	51	44	11
	Min	48	60	32	55	51	45	39	7
Daytime	Max	59	73	44	68	63	56	50	13
7am-10pm	Median	55	68	39	64	59	52	45	11
	Min	49	64	34	59	52	45	39	8
Nighttime	Max	58	71	41	67	62	55	48	12
10pm-7am	Median	52	67	37	63	56	47	42	8
	Min	48	60	32	55	51	45	40	7

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/21/2012

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 49 dBA

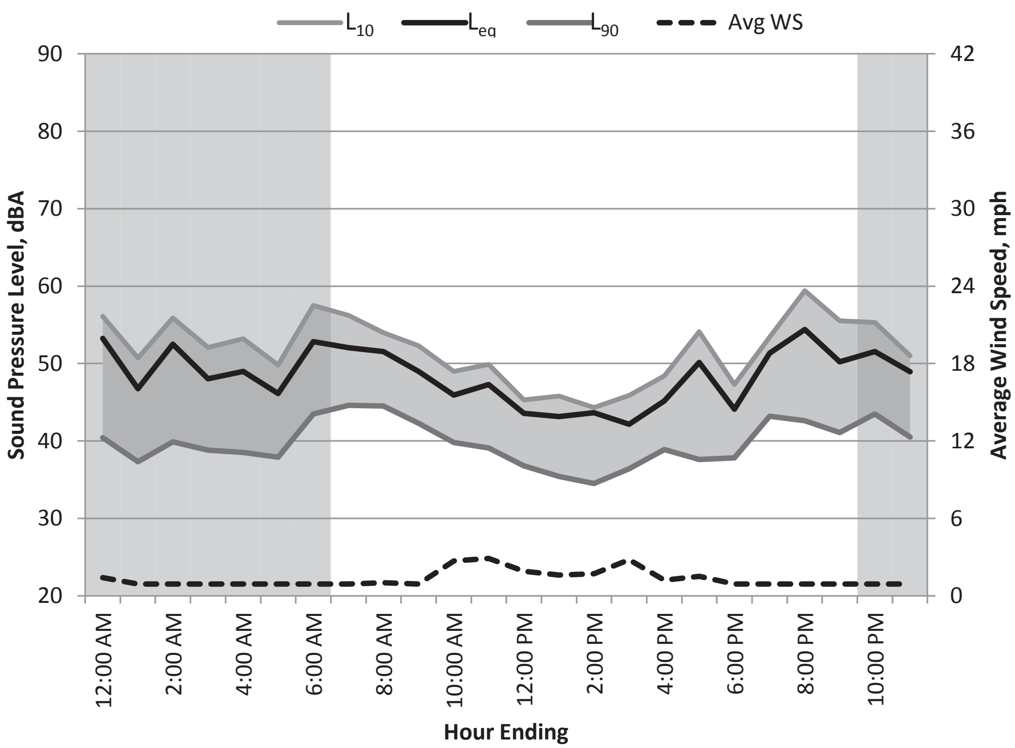


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	63	38	60	54	46	41	6
1:00	Night	50	61	38	58	53	47	42	1
2:00	Night	48	60	36	56	51	46	41	1
3:00	Night	51	67	38	61	54	48	43	4
4:00	Night	51	68	36	61	55	47	41	8
5:00	Night	53	65	38	60	57	50	44	10
6:00	Night	48	62	37	57	52	45	41	6
7:00	Day	50	65	39	60	53	47	43	3
8:00	Day	49	64	37	58	52	46	42	5
9:00	Day	50	70	38	62	53	46	42	8
10:00	Day	49	67	37	59	52	46	41	7
11:00	Day	45	62	36	54	47	42	39	6
12:00	Day	46	68	34	55	45	40	37	5
13:00	Day	44	68	34	52	45	41	38	5
14:00	Day	47	64	36	56	51	45	40	6
15:00	Day	45	60	37	53	47	43	40	5
16:00	Day	47	64	35	57	50	43	39	2
17:00	Day	48	65	36	58	52	44	40	3
18:00	Day	48	62	35	57	52	46	42	8
19:00	Day	50	61	40	57	53	48	45	9
20:00	Day	46	59	35	55	49	44	40	6
21:00	Day	45	54	35	51	47	44	40	3
22:00	Night	47	58	33	53	50	46	41	3
23:00	Night	50	63	34	59	53	48	41	1
Overall	Max	53	70	40	62	57	50	45	10
	Median	48	63	36	57	52	46	41	5
	Min	44	54	33	51	45	40	37	1
Daytime	Max	50	70	40	62	53	48	45	9
7am-10pm	Median	47	64	36	57	51	44	40	5
	Min	44	54	34	51	45	40	37	2
Nighttime	Max	53	68	38	61	57	50	44	10
10pm-7am	Median	50	63	37	59	53	47	41	4
	Min	47	58	33	53	50	45	41	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	12/22/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 50 dBA

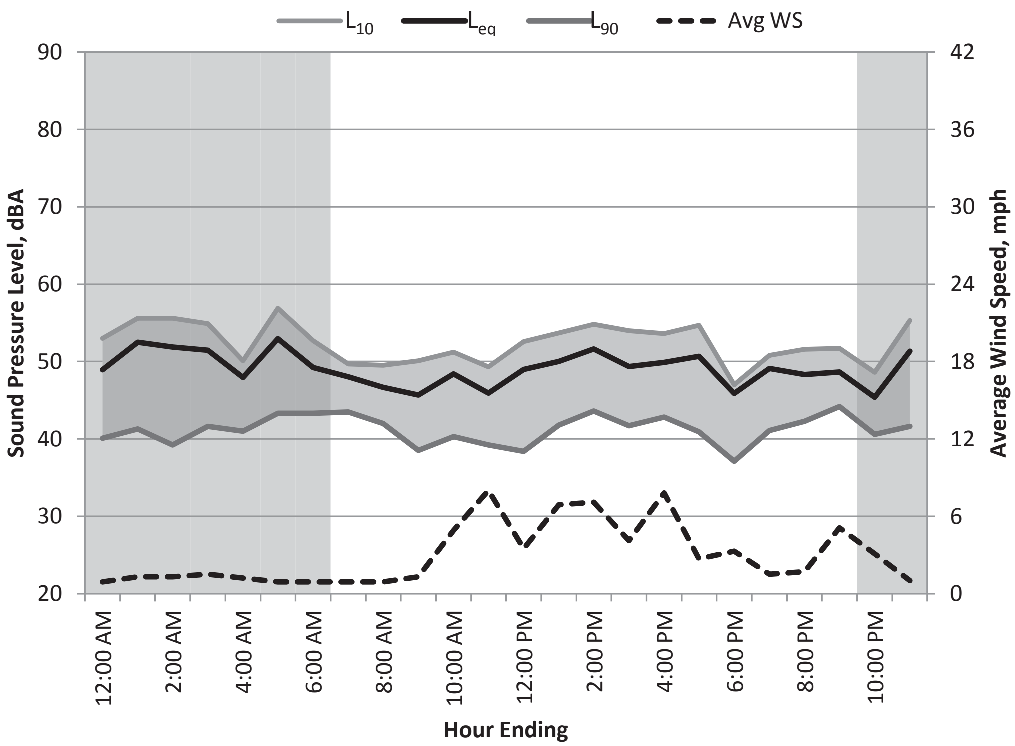


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	70	35	64	56	49	40	1
1:00	Night	47	57	34	55	51	44	37	1
2:00	Night	53	69	35	62	56	48	40	1
3:00	Night	48	61	34	58	52	44	39	1
4:00	Night	49	62	34	59	53	44	39	1
5:00	Night	46	56	34	53	50	44	38	1
6:00	Night	53	64	38	61	58	49	44	1
7:00	Day	52	65	41	60	56	49	45	1
8:00	Day	52	67	40	62	54	48	45	1
9:00	Day	49	63	39	58	52	46	42	1
10:00	Day	46	64	38	54	49	42	40	3
11:00	Day	47	68	37	59	50	42	39	3
12:00	Day	44	62	34	54	45	39	37	2
13:00	Day	43	63	33	54	46	38	35	2
14:00	Day	44	62	33	55	44	37	35	2
15:00	Day	42	56	35	52	46	38	36	3
16:00	Day	45	65	36	55	48	41	39	1
17:00	Day	50	67	34	61	54	44	38	2
18:00	Day	44	59	34	54	47	41	38	1
19:00	Day	51	64	39	63	53	48	43	1
20:00	Day	54	67	37	64	59	50	43	1
21:00	Day	50	64	36	60	56	44	41	1
22:00	Night	52	60	38	58	55	50	44	1
23:00	Night	49	65	36	61	51	44	41	1
Overall	Max	54	70	41	64	59	50	45	3
	Median	49	64	36	58	52	44	39	1
	Min	42	56	33	52	44	37	35	1
Daytime	Max	54	68	41	64	59	50	45	3
7am-10pm	Median	47	64	36	58	50	42	39	1
	Min	42	56	33	52	44	37	35	1
Nighttime	Max	53	70	38	64	58	50	44	1
10pm-7am	Median	49	62	35	59	53	44	40	1
	Min	46	56	34	53	50	44	37	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/23/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 50 dBA



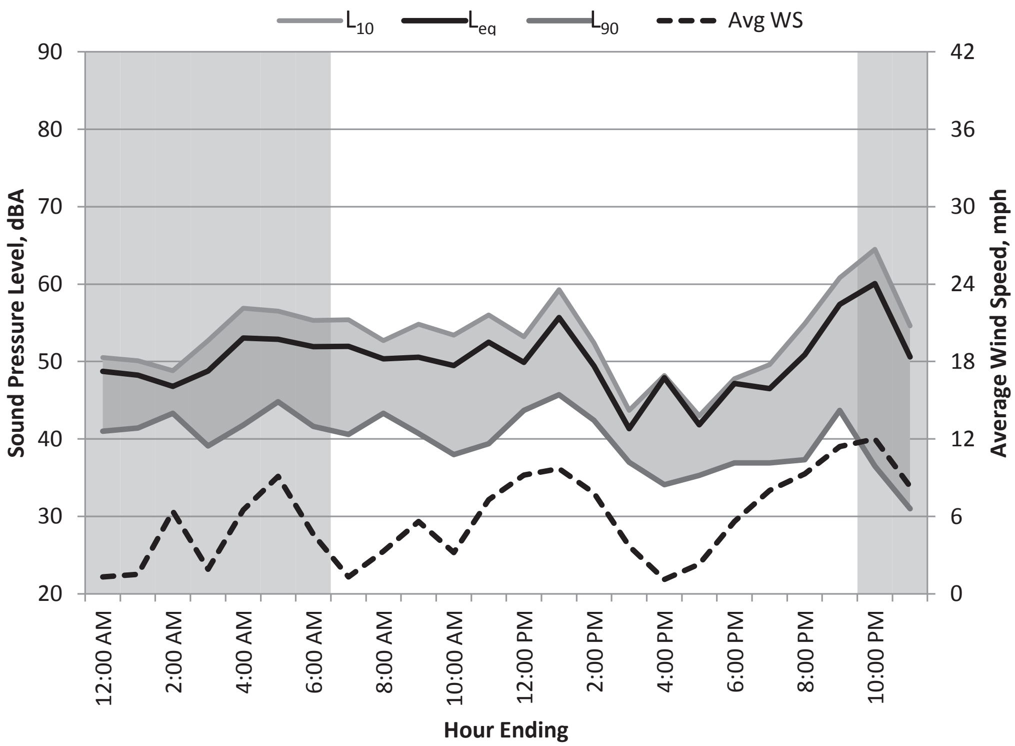
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	61	35	59	53	44	40	1
1:00	Night	53	67	37	64	56	46	41	1
2:00	Night	52	67	35	64	56	44	39	1
3:00	Night	51	64	36	62	55	47	42	2
4:00	Night	48	66	36	58	50	45	41	1
5:00	Night	53	64	39	63	57	49	43	1
6:00	Night	49	65	41	57	53	46	43	1
7:00	Day	48	64	40	57	50	46	44	1
8:00	Day	47	59	40	54	50	45	42	1
9:00	Day	46	61	36	56	50	41	39	1
10:00	Day	48	65	37	59	51	44	40	5
11:00	Day	46	58	35	52	49	44	39	8
12:00	Day	49	65	36	59	53	43	38	4
13:00	Day	50	65	38	60	54	45	42	7
14:00	Day	52	74	40	61	55	47	44	7
15:00	Day	49	63	39	59	54	44	42	4
16:00	Day	50	65	39	59	54	46	43	8
17:00	Day	51	66	37	61	55	45	41	3
18:00	Day	46	64	34	60	47	42	37	3
19:00	Day	49	66	37	59	51	46	41	2
20:00	Day	48	61	37	58	52	46	42	2
21:00	Day	49	59	41	55	52	47	44	5
22:00	Night	45	54	35	52	49	44	41	3
23:00	Night	51	66	37	61	55	47	42	1
Overall	Max	53	74	41	64	57	49	44	8
	Median	49	65	37	59	53	45	41	2
	Min	45	54	34	52	47	41	37	1
Daytime 7am-10pm	Max	52	74	41	61	55	47	44	8
	Median	49	64	37	59	52	45	42	4
	Min	46	58	34	52	47	41	37	1
Nighttime 10pm-7am	Max	53	67	41	64	57	49	43	3
	Median	51	65	36	61	55	46	41	1
	Min	45	54	35	52	49	44	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/24/2012

24hr Summary

L_{DN} = 60 dBA C_{NEL} = 60 dBA $L_{eq(24hr)}$ = 52 dBA



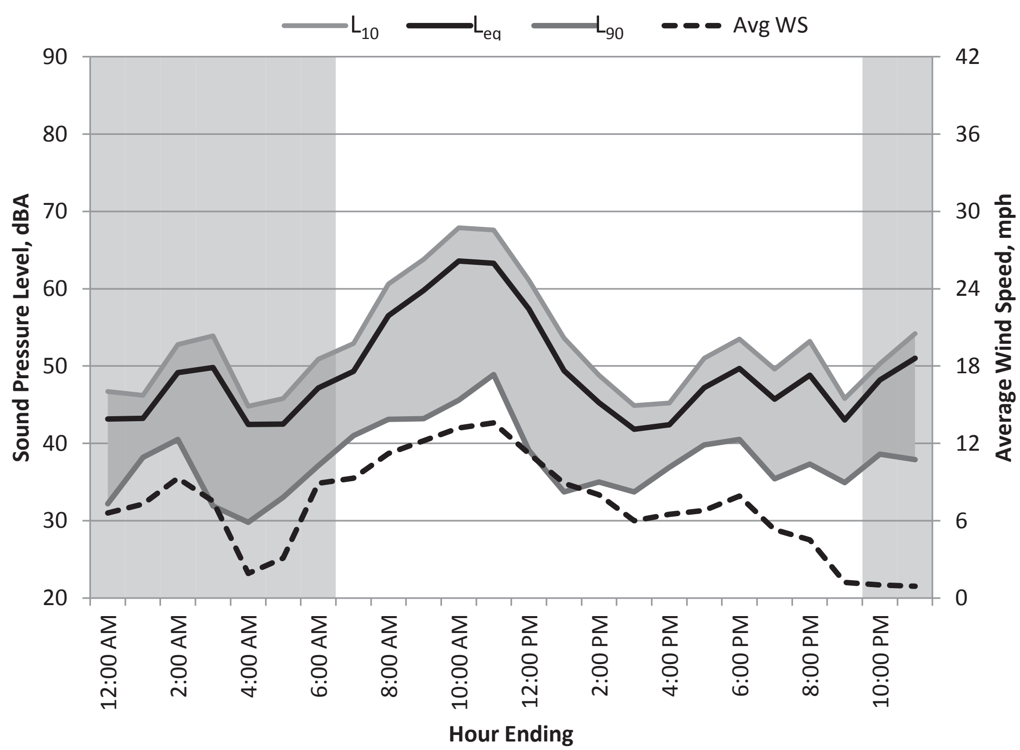
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	66	38	60	51	45	41	1
1:00	Night	48	65	37	58	50	45	41	2
2:00	Night	47	59	40	53	49	46	43	6
3:00	Night	49	65	37	60	53	42	39	2
4:00	Night	53	65	38	63	57	48	42	7
5:00	Night	53	65	41	61	57	50	45	9
6:00	Night	52	65	38	63	55	46	42	5
7:00	Day	52	66	38	63	55	45	41	1
8:00	Day	50	64	39	61	53	48	43	3
9:00	Day	51	65	37	61	55	44	41	6
10:00	Day	49	67	35	60	53	43	38	3
11:00	Day	52	70	36	63	56	46	39	7
12:00	Day	50	67	40	59	53	47	44	9
13:00	Day	56	72	41	65	59	52	46	10
14:00	Day	49	65	38	60	52	46	42	8
15:00	Day	41	50	35	48	44	41	37	4
16:00	Day	48	67	32	61	48	38	34	1
17:00	Day	42	62	32	52	43	38	35	2
18:00	Day	47	61	33	60	48	40	37	6
19:00	Day	47	65	33	56	50	43	37	8
20:00	Day	51	64	32	60	55	48	37	9
21:00	Day	57	76	34	68	61	51	44	11
22:00	Night	60	75	30	70	65	54	37	12
23:00	Night	51	68	28	62	55	40	31	8
Overall	Max	60	76	41	70	65	54	46	12
	Median	50	65	37	60	53	46	41	6
	Min	41	50	28	48	43	38	31	1
Daytime	Max	57	76	41	68	61	52	46	11
7am-10pm	Median	50	65	35	60	53	45	39	6
	Min	41	50	32	48	43	38	34	1
Nighttime	Max	60	75	41	70	65	54	45	12
10pm-7am	Median	51	65	38	61	55	46	41	6
	Min	47	59	28	53	49	40	31	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/25/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 55 dBA



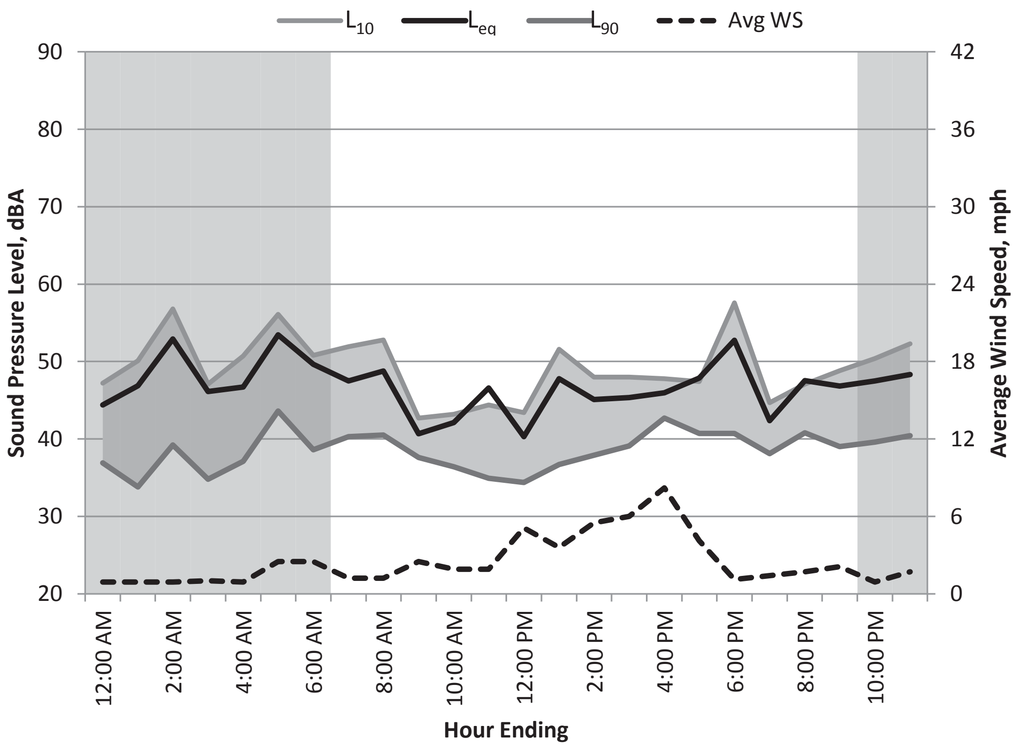
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	43	57	28	52	47	40	32	7
1:00	Night	43	54	35	50	46	42	38	7
2:00	Night	49	63	35	59	53	45	41	9
3:00	Night	50	66	29	60	54	44	32	8
4:00	Night	42	65	27	54	45	33	30	2
5:00	Night	42	61	29	53	46	36	33	3
6:00	Night	47	60	31	56	51	44	37	9
7:00	Day	49	61	33	58	53	47	41	9
8:00	Day	57	71	35	66	61	52	43	11
9:00	Day	60	75	32	70	64	55	43	12
10:00	Day	64	79	34	73	68	59	46	13
11:00	Day	63	76	37	72	68	59	49	14
12:00	Day	57	76	30	68	61	51	39	11
13:00	Day	49	66	29	60	54	42	34	9
14:00	Day	45	61	30	55	49	42	35	8
15:00	Day	42	59	30	51	45	39	34	6
16:00	Day	42	55	33	49	45	41	37	7
17:00	Day	47	62	35	57	51	44	40	7
18:00	Day	50	64	37	59	54	46	41	8
19:00	Day	46	61	32	57	50	39	35	5
20:00	Day	49	64	33	59	53	42	37	5
21:00	Day	43	61	31	53	46	39	35	1
22:00	Night	48	64	35	60	50	44	39	1
23:00	Night	51	65	33	62	54	44	38	1
Overall	Max	64	79	37	73	68	59	49	14
	Median	48	63	32	58	52	44	38	7
	Min	42	54	27	49	45	33	30	1
Daytime	Max	64	79	37	73	68	59	49	14
7am-10pm	Median	49	64	33	59	53	44	39	8
	Min	42	55	29	49	45	39	34	1
Nighttime	Max	51	66	35	62	54	45	41	9
10pm-7am	Median	47	63	31	56	50	44	37	7
	Min	42	54	27	50	45	33	30	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/26/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 48 dBA



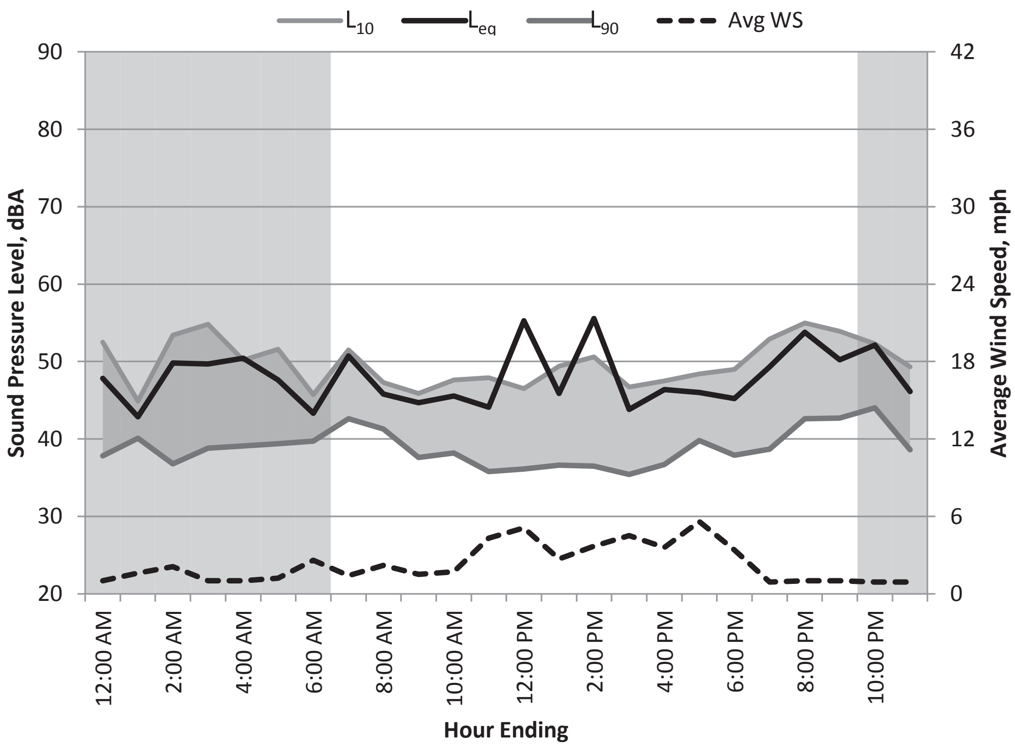
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	44	61	33	55	47	40	37	1
1:00	Night	47	62	31	57	50	42	34	1
2:00	Night	53	70	33	64	57	45	39	1
3:00	Night	46	64	31	58	47	39	35	1
4:00	Night	47	60	33	56	51	42	37	1
5:00	Night	53	70	37	65	56	47	44	3
6:00	Night	50	63	36	61	51	42	39	3
7:00	Day	48	59	36	55	52	45	40	1
8:00	Day	49	65	38	59	53	43	41	1
9:00	Day	41	51	35	47	43	40	38	3
10:00	Day	42	61	34	53	43	38	36	2
11:00	Day	47	72	31	53	44	37	35	2
12:00	Day	40	53	32	48	43	38	34	5
13:00	Day	48	64	33	58	52	41	37	4
14:00	Day	45	61	35	55	48	40	38	6
15:00	Day	45	70	37	54	48	42	39	6
16:00	Day	46	58	39	53	48	45	43	8
17:00	Day	48	64	38	60	47	43	41	4
18:00	Day	53	67	37	63	58	46	41	1
19:00	Day	42	54	34	50	45	41	38	1
20:00	Day	48	64	38	60	47	43	41	2
21:00	Day	47	64	35	58	49	42	39	2
22:00	Night	47	62	36	58	50	44	40	1
23:00	Night	48	61	38	57	52	45	40	2
Overall	Max	53	72	39	65	58	47	44	8
	Median	47	62	35	57	48	42	39	2
	Min	40	51	31	47	43	37	34	1
Daytime 7am-10pm	Max	53	72	39	63	58	46	43	8
	Median	47	64	35	55	48	42	39	2
	Min	40	51	31	47	43	37	34	1
Nighttime 10pm-7am	Max	53	70	38	65	57	47	44	3
	Median	47	62	33	58	51	42	39	1
	Min	44	60	31	55	47	39	34	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/27/2012

24hr Summary

L_{DN} = 55 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 50 dBA

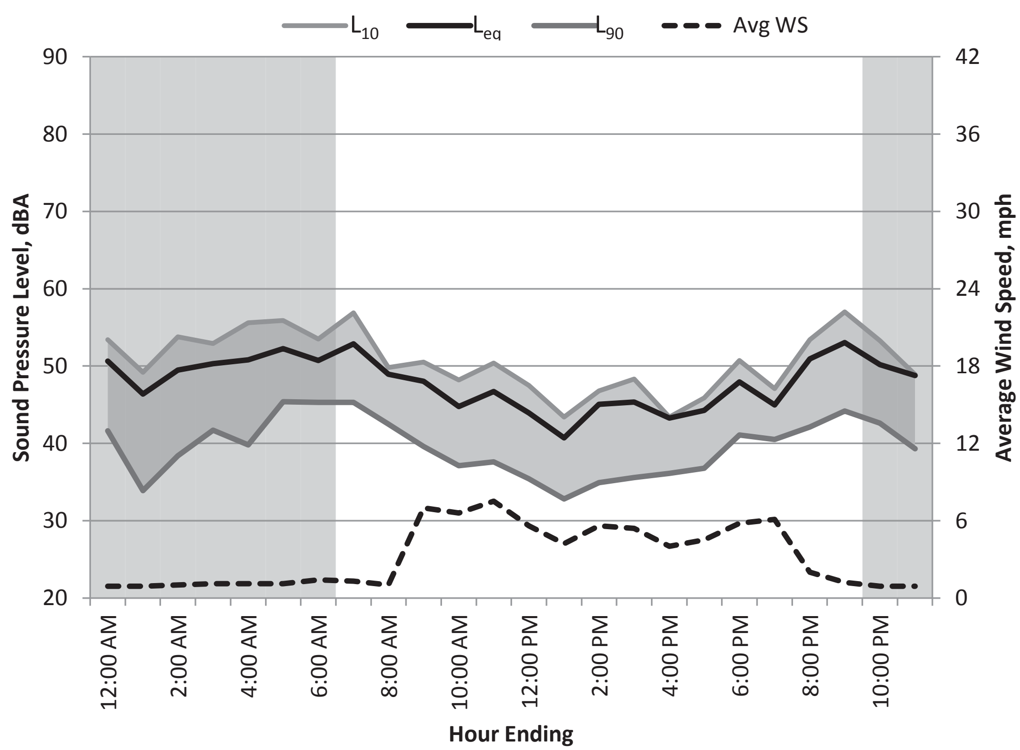


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	63	36	57	53	42	38	1
1:00	Night	43	51	38	48	45	42	40	2
2:00	Night	50	62	33	60	53	43	37	2
3:00	Night	50	63	35	60	55	43	39	1
4:00	Night	50	66	37	63	50	42	39	1
5:00	Night	48	62	36	56	52	44	39	1
6:00	Night	43	56	37	49	46	42	40	3
7:00	Day	51	77	40	58	52	45	43	1
8:00	Day	46	58	39	56	47	43	41	2
9:00	Day	45	64	35	55	46	41	38	2
10:00	Day	46	72	36	53	48	41	38	2
11:00	Day	44	60	33	54	48	39	36	4
12:00	Day	55	80	33	69	47	39	36	5
13:00	Day	46	63	35	58	49	39	37	3
14:00	Day	56	80	34	69	51	40	37	4
15:00	Day	44	61	33	55	47	39	35	5
16:00	Day	46	64	33	57	48	41	37	4
17:00	Day	46	63	37	55	48	43	40	6
18:00	Day	45	60	32	55	49	41	38	3
19:00	Day	49	69	35	59	53	44	39	1
20:00	Day	54	80	39	64	55	46	43	1
21:00	Day	50	63	39	59	54	47	43	1
22:00	Night	52	68	41	65	52	48	44	1
23:00	Night	46	57	35	55	49	44	39	1
Overall	Max	56	80	41	69	55	48	44	6
	Median	47	63	35	57	49	42	39	2
	Min	43	51	32	48	45	39	35	1
Daytime	Max	56	80	40	69	55	47	43	6
7am-10pm	Median	46	64	35	57	48	41	38	3
	Min	44	58	32	53	46	39	35	1
Nighttime	Max	52	68	41	65	55	48	44	3
10pm-7am	Median	48	62	36	57	52	43	39	1
	Min	43	51	33	48	45	42	37	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	12/28/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 49 dBA

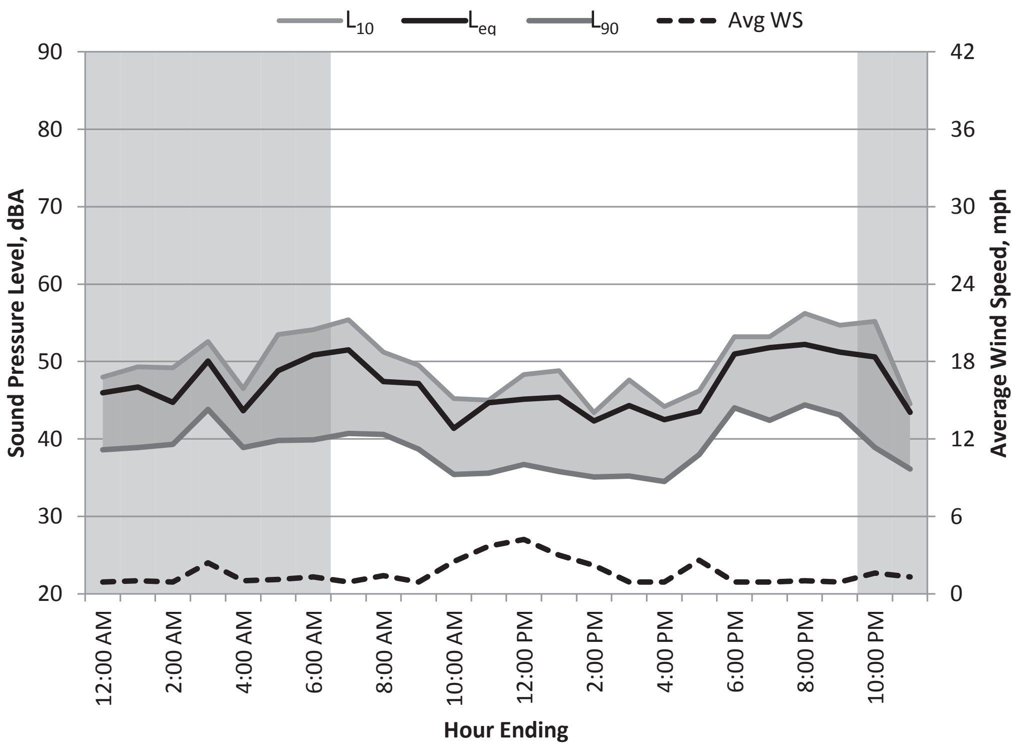


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	63	38	61	53	47	42	1
1:00	Night	46	63	30	58	49	41	34	1
2:00	Night	49	67	33	59	54	45	38	1
3:00	Night	50	65	37	61	53	47	42	1
4:00	Night	51	63	35	60	56	46	40	1
5:00	Night	52	63	39	61	56	50	45	1
6:00	Night	51	66	41	59	54	48	45	1
7:00	Day	53	65	39	62	57	50	45	1
8:00	Day	49	71	37	58	50	46	43	1
9:00	Day	48	67	34	58	51	44	40	7
10:00	Day	45	58	34	54	48	42	37	7
11:00	Day	47	63	33	56	50	43	38	8
12:00	Day	44	59	32	54	48	39	35	6
13:00	Day	41	62	30	50	43	37	33	4
14:00	Day	45	67	31	57	47	39	35	6
15:00	Day	45	59	33	56	48	40	36	5
16:00	Day	43	70	33	52	43	39	36	4
17:00	Day	44	66	34	52	46	40	37	5
18:00	Day	48	63	38	56	51	46	41	6
19:00	Day	45	57	37	53	47	43	41	6
20:00	Day	51	68	37	61	53	47	42	2
21:00	Day	53	67	39	63	57	49	44	1
22:00	Night	50	63	38	59	53	47	43	1
23:00	Night	49	65	36	61	49	43	39	1
Overall	Max	53	71	41	63	57	50	45	8
	Median	48	64	35	58	50	45	40	2
	Min	41	57	30	50	43	37	33	1
Daytime 7am-10pm	Max	53	71	39	63	57	50	45	8
	Median	45	65	34	56	48	43	38	5
	Min	41	57	30	50	43	37	33	1
Nighttime 10pm-7am	Max	52	67	41	61	56	50	45	1
	Median	50	63	37	60	53	47	42	1
	Min	46	63	30	58	49	41	34	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	12/29/2012

24hr Summary

L_{DN} = 54 dBA | C_{NEL} = 55 dBA | $L_{eq(24hr)}$ = 48 dBA

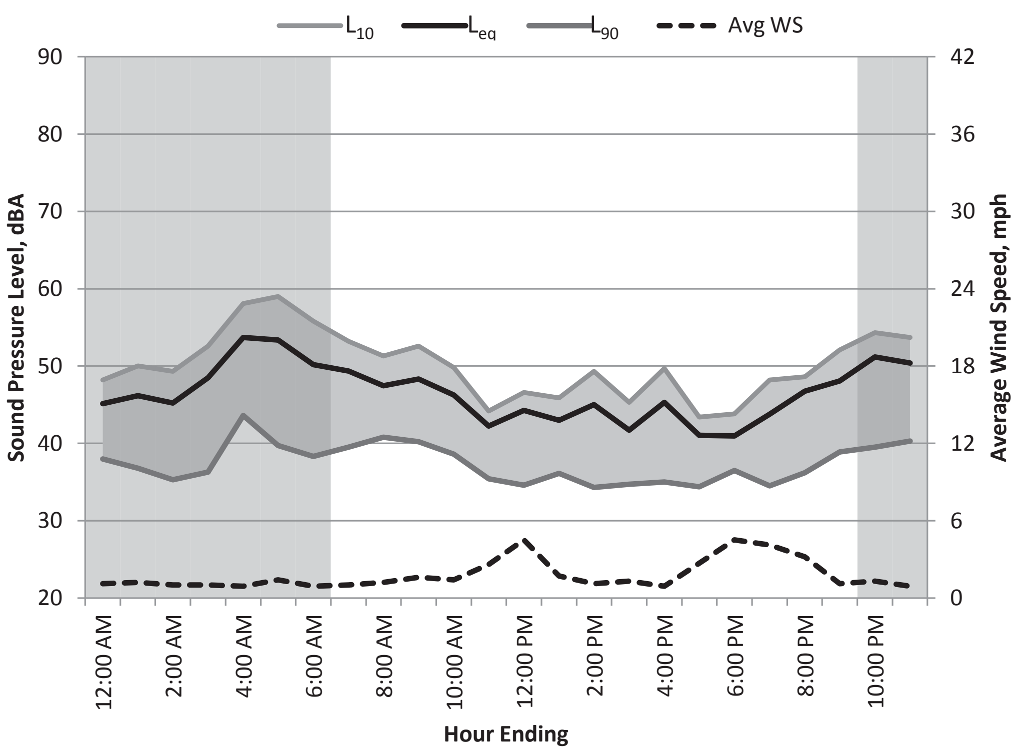


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	62	35	56	48	42	39	1
1:00	Night	47	60	36	57	49	42	39	1
2:00	Night	45	58	37	52	49	42	39	1
3:00	Night	50	62	39	57	53	49	44	2
4:00	Night	44	55	37	52	47	41	39	1
5:00	Night	49	62	37	57	54	44	40	1
6:00	Night	51	66	36	62	54	45	40	1
7:00	Day	52	64	38	62	55	46	41	1
8:00	Day	47	60	37	57	51	44	41	1
9:00	Day	47	66	37	59	50	41	39	1
10:00	Day	41	57	34	50	45	38	35	3
11:00	Day	45	65	34	57	45	38	36	4
12:00	Day	45	63	35	56	48	41	37	4
13:00	Day	45	63	33	55	49	39	36	3
14:00	Day	42	63	33	53	43	37	35	2
15:00	Day	44	64	33	54	48	37	35	1
16:00	Day	42	58	32	54	44	37	35	1
17:00	Day	44	53	35	51	46	42	38	3
18:00	Day	51	64	36	61	53	49	44	1
19:00	Day	52	67	38	64	53	47	42	1
20:00	Day	52	64	41	61	56	49	44	1
21:00	Day	51	65	39	62	55	48	43	1
22:00	Night	51	64	35	60	55	44	39	2
23:00	Night	43	57	34	56	45	39	36	1
Overall	Max	52	67	41	64	56	49	44	4
	Median	46	63	36	57	49	42	39	1
	Min	41	53	32	50	43	37	35	1
Daytime 7am-10pm	Max	52	67	41	64	56	49	44	4
	Median	45	64	35	57	49	41	38	1
	Min	41	53	32	50	43	37	35	1
Nighttime 10pm-7am	Max	51	66	39	62	55	49	44	2
	Median	47	62	36	57	49	42	39	1
	Min	43	55	34	52	45	39	36	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	12/30/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 48 dBA



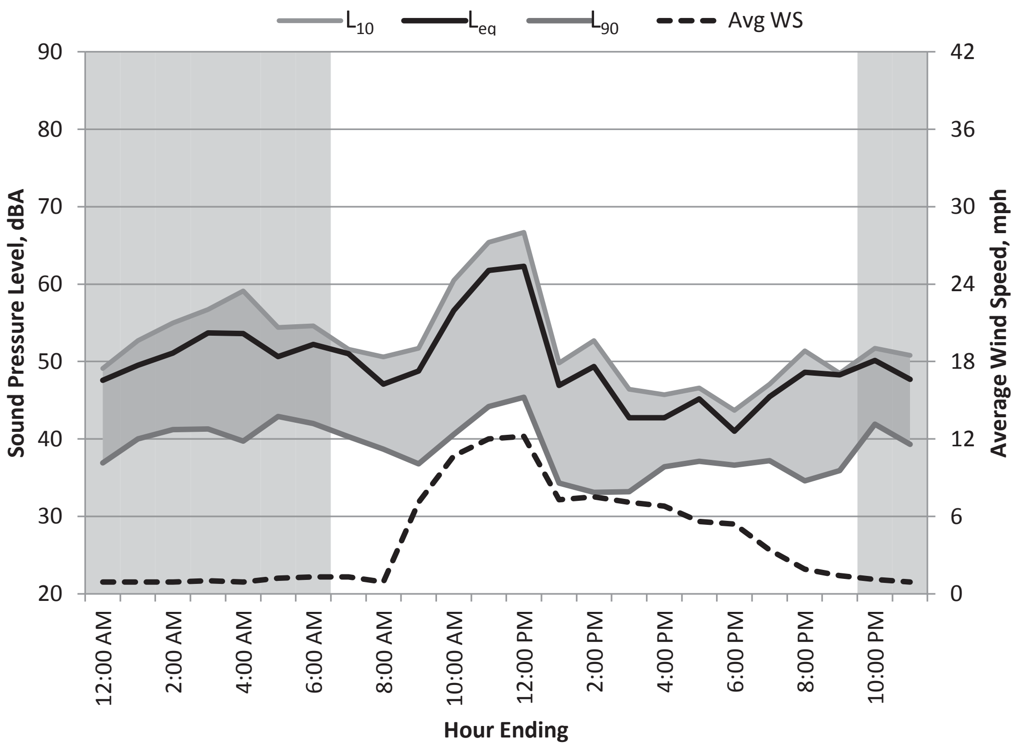
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	60	35	54	48	42	38	1
1:00	Night	46	63	34	55	50	42	37	1
2:00	Night	45	60	32	56	49	39	35	1
3:00	Night	48	67	34	59	53	41	36	1
4:00	Night	54	65	39	63	58	49	44	1
5:00	Night	53	66	36	62	59	44	40	1
6:00	Night	50	61	35	59	56	44	38	1
7:00	Day	49	66	36	60	53	42	40	1
8:00	Day	47	64	38	56	51	44	41	1
9:00	Day	48	64	38	58	53	43	40	2
10:00	Day	46	63	36	57	50	41	39	1
11:00	Day	42	64	33	51	44	38	35	3
12:00	Day	44	64	32	55	47	38	35	5
13:00	Day	43	59	33	53	46	39	36	2
14:00	Day	45	63	33	55	49	37	34	1
15:00	Day	42	60	33	53	45	37	35	1
16:00	Day	45	63	32	56	50	39	35	1
17:00	Day	41	62	31	51	43	37	34	3
18:00	Day	41	51	33	49	44	39	37	5
19:00	Day	44	64	32	53	48	38	35	4
20:00	Day	47	64	32	58	49	41	36	3
21:00	Day	48	57	34	55	52	45	39	1
22:00	Night	51	66	35	63	54	44	40	1
23:00	Night	50	64	34	62	54	45	40	1
Overall	Max	54	67	39	63	59	49	44	5
	Median	46	63	34	56	50	41	37	1
	Min	41	51	31	49	43	37	34	1
Daytime 7am-10pm	Max	49	66	38	60	53	45	41	5
	Median	45	63	33	55	49	39	36	2
	Min	41	51	31	49	43	37	34	1
Nighttime 10pm-7am	Max	54	67	39	63	59	49	44	1
	Median	50	64	35	59	54	44	38	1
	Min	45	60	32	54	48	39	35	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 12/31/2012

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 54 dBA



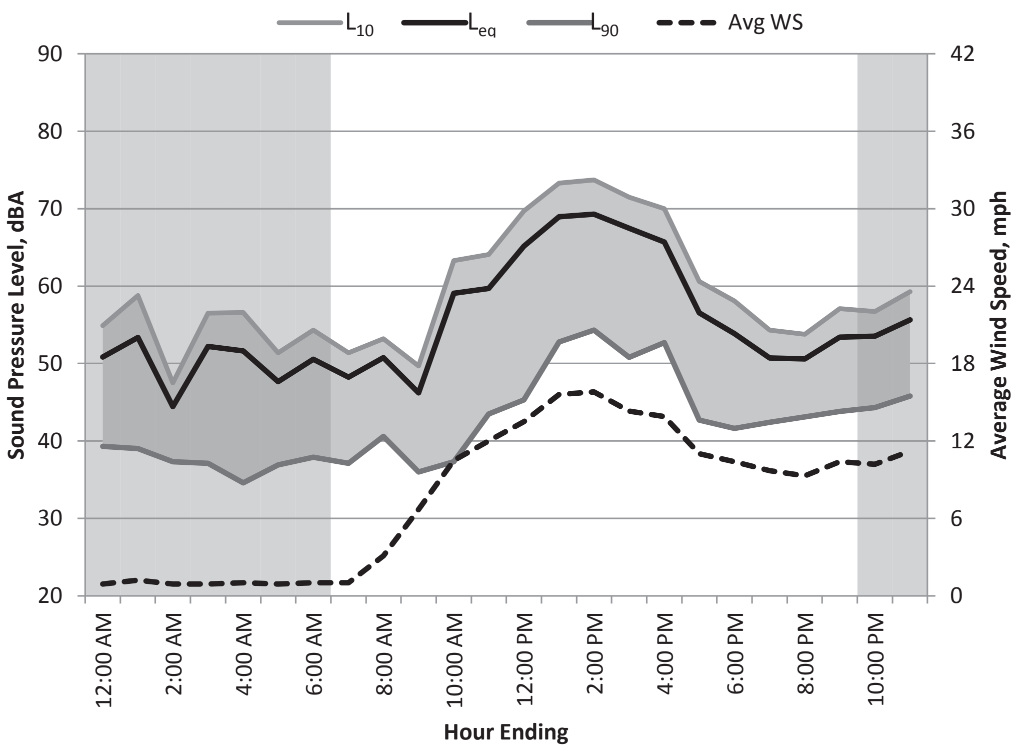
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	64	33	59	49	42	37	1
1:00	Night	50	65	36	60	53	44	40	1
2:00	Night	51	64	38	62	55	46	41	1
3:00	Night	54	68	37	65	57	47	41	1
4:00	Night	54	71	36	63	59	44	40	1
5:00	Night	51	61	39	60	54	47	43	1
6:00	Night	52	68	37	64	55	45	42	1
7:00	Day	51	70	34	63	52	45	40	1
8:00	Day	47	57	35	54	51	45	39	1
9:00	Day	49	65	31	60	52	42	37	7
10:00	Day	57	72	33	67	61	51	41	11
11:00	Day	62	80	33	72	65	55	44	12
12:00	Day	62	75	32	72	67	57	45	12
13:00	Day	47	68	28	57	50	41	34	7
14:00	Day	49	68	28	61	53	41	33	8
15:00	Day	43	58	29	53	46	38	33	7
16:00	Day	43	56	30	51	46	40	36	7
17:00	Day	45	63	33	56	47	41	37	6
18:00	Day	41	55	33	48	44	40	37	5
19:00	Day	45	60	32	57	47	41	37	3
20:00	Day	49	63	31	61	51	40	35	2
21:00	Day	48	68	33	61	49	40	36	1
22:00	Night	50	65	37	61	52	46	42	1
23:00	Night	48	63	36	58	51	44	39	1
Overall	Max	62	80	39	72	67	57	45	12
	Median	49	65	33	61	52	44	39	2
	Min	41	55	28	48	44	38	33	1
Daytime	Max	62	80	35	72	67	57	45	12
7am-10pm	Median	48	65	32	60	51	41	37	7
	Min	41	55	28	48	44	38	33	1
Nighttime	Max	54	71	39	65	59	47	43	1
10pm-7am	Median	51	65	37	61	54	45	41	1
	Min	48	61	33	58	49	42	37	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/1/2013

24hr Summary

L_{DN} = 63 dBA C_{NEL} = 63 dBA $L_{eq(24hr)}$ = 61 dBA



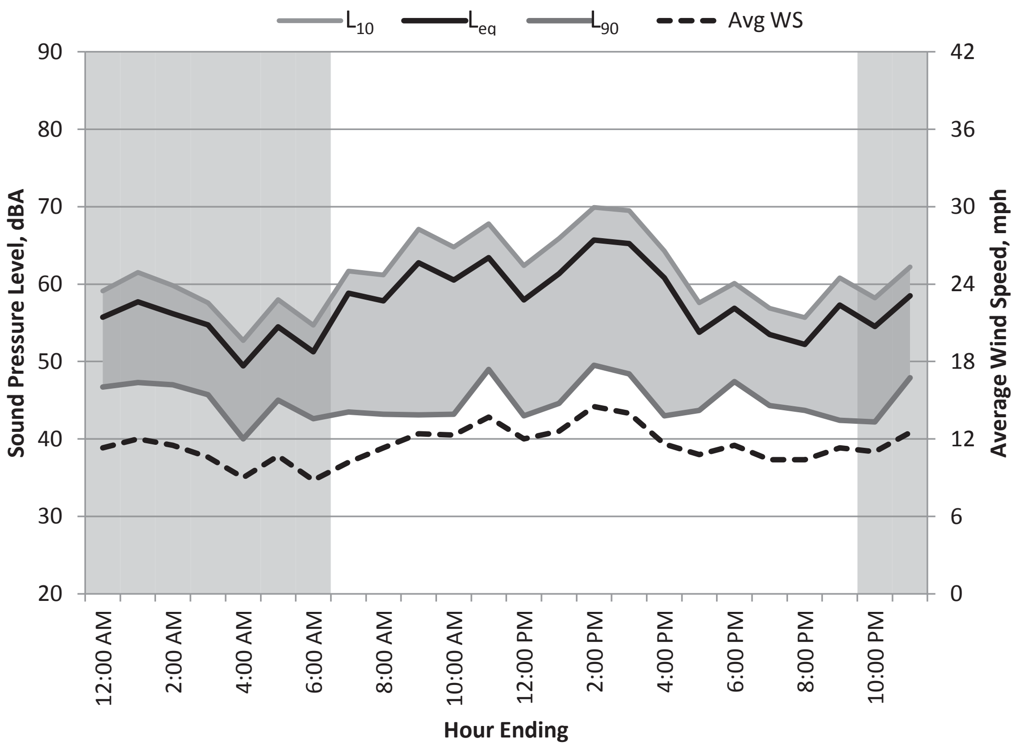
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	67	36	61	55	45	39	1
1:00	Night	53	66	35	65	59	44	39	1
2:00	Night	44	59	35	54	48	41	37	1
3:00	Night	52	65	33	62	57	45	37	1
4:00	Night	52	64	32	60	57	46	35	1
5:00	Night	48	62	33	59	51	40	37	1
6:00	Night	51	63	33	59	54	47	38	1
7:00	Day	48	67	33	58	51	44	37	1
8:00	Day	51	72	35	60	53	46	41	3
9:00	Day	46	62	32	57	50	41	36	7
10:00	Day	59	75	31	70	63	48	37	11
11:00	Day	60	75	35	70	64	54	44	12
12:00	Day	65	79	36	75	70	60	45	14
13:00	Day	69	81	39	77	73	65	53	16
14:00	Day	69	82	40	78	74	66	54	16
15:00	Day	67	82	39	78	72	62	51	14
16:00	Day	66	80	40	75	70	62	53	14
17:00	Day	57	73	36	67	61	50	43	11
18:00	Day	54	70	35	64	58	48	42	10
19:00	Day	51	63	37	60	54	48	42	10
20:00	Day	51	65	38	60	54	48	43	9
21:00	Day	53	68	36	63	57	50	44	10
22:00	Night	54	69	37	63	57	50	44	10
23:00	Night	56	68	38	65	59	53	46	11
Overall	Max	69	82	40	78	74	66	54	16
	Median	53	68	35	63	57	48	42	10
	Min	44	59	31	54	48	40	35	1
Daytime	Max	69	82	40	78	74	66	54	16
7am-10pm	Median	57	73	36	67	61	50	43	11
	Min	46	62	31	57	50	41	36	1
Nighttime	Max	56	69	38	65	59	53	46	11
10pm-7am	Median	52	65	35	61	57	45	38	1
	Min	44	59	32	54	48	40	35	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/2/2013

24hr Summary

L_{DN} = 63 dBA | C_{NEL} = 63 dBA | $L_{eq(24hr)}$ = 60 dBA

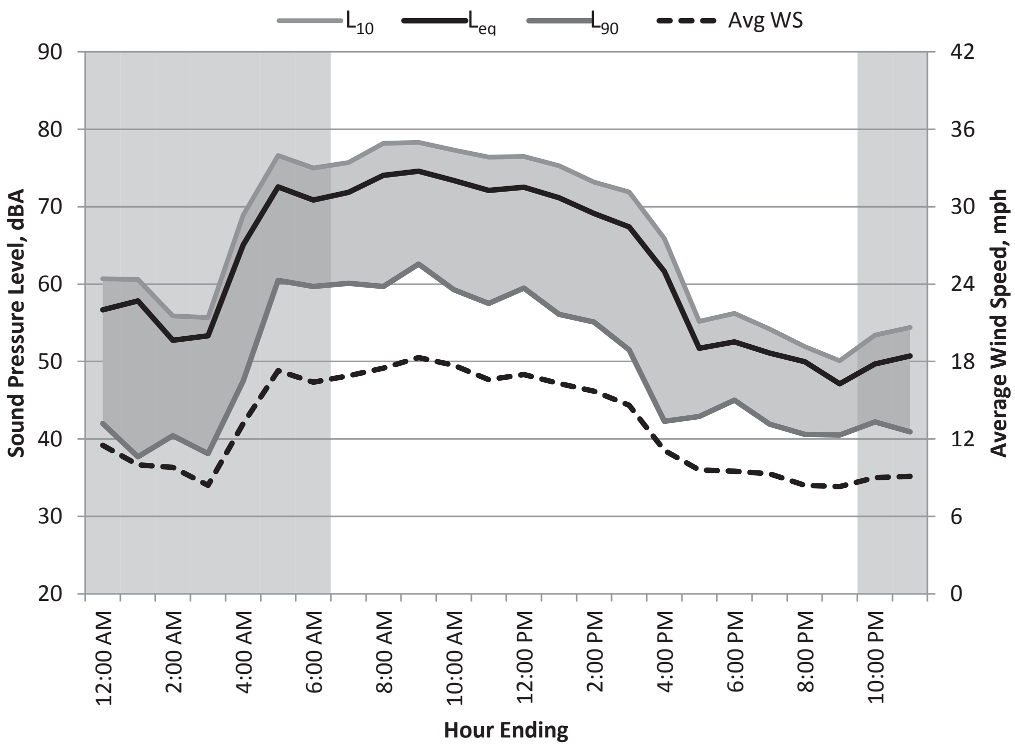


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	56	71	39	65	59	53	47	11
1:00	Night	58	70	38	67	62	55	47	12
2:00	Night	56	70	38	65	60	53	47	12
3:00	Night	55	71	38	64	58	52	46	11
4:00	Night	49	66	35	59	53	46	40	9
5:00	Night	54	69	37	64	58	52	45	11
6:00	Night	51	65	38	60	55	48	43	9
7:00	Day	59	75	38	71	62	51	44	10
8:00	Day	58	74	35	69	61	52	43	11
9:00	Day	63	78	34	73	67	57	43	12
10:00	Day	61	74	32	71	65	55	43	12
11:00	Day	63	77	35	72	68	59	49	14
12:00	Day	58	71	34	68	62	53	43	12
13:00	Day	61	76	34	71	66	55	45	13
14:00	Day	66	80	37	75	70	62	50	15
15:00	Day	65	80	38	76	70	59	48	14
16:00	Day	61	78	35	72	64	54	43	12
17:00	Day	54	69	38	63	58	50	44	11
18:00	Day	57	73	40	67	60	53	47	12
19:00	Day	53	68	39	63	57	50	44	10
20:00	Day	52	66	35	61	56	49	44	10
21:00	Day	57	74	35	69	61	51	42	11
22:00	Night	55	72	34	64	58	50	42	11
23:00	Night	58	74	37	68	62	55	48	13
Overall	Max	66	80	40	76	70	62	50	15
	Median	57	73	37	67	61	53	44	11
	Min	49	65	32	59	53	46	40	9
Daytime	Max	66	80	40	76	70	62	50	15
7am-10pm	Median	59	74	35	71	62	53	44	12
	Min	52	66	32	61	56	49	42	10
Nighttime	Max	58	74	39	68	62	55	48	13
10pm-7am	Median	55	70	38	64	58	52	46	11
	Min	49	65	34	59	53	46	40	9

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	1/3/2013

24hr Summary

L_{DN} = 73 dBA C_{NEL} = 73 dBA $L_{eq(24hr)}$ = 69 dBA



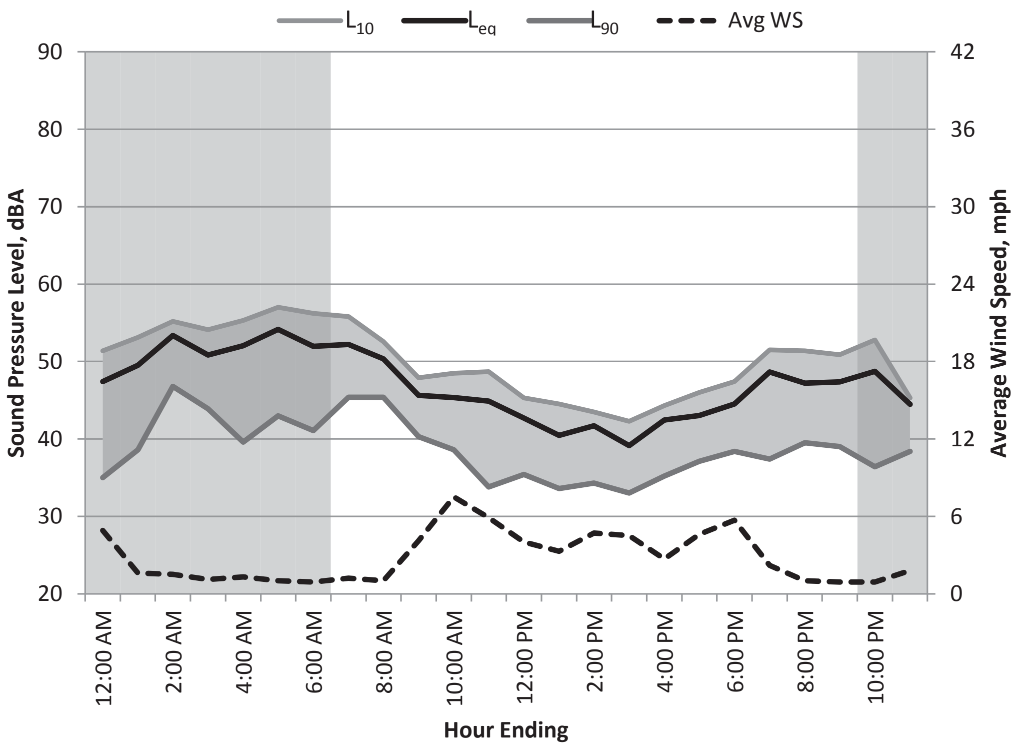
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	57	72	35	67	61	51	42	12
1:00	Night	58	76	31	71	61	46	38	10
2:00	Night	53	69	31	63	56	48	40	10
3:00	Night	53	72	32	65	56	46	38	8
4:00	Night	65	81	37	76	69	58	48	13
5:00	Night	73	85	48	81	77	70	61	17
6:00	Night	71	83	46	79	75	68	60	16
7:00	Day	72	85	45	80	76	69	60	17
8:00	Day	74	88	44	83	78	71	60	18
9:00	Day	75	87	42	83	78	72	63	18
10:00	Day	73	86	42	82	77	70	59	18
11:00	Day	72	86	37	81	76	68	58	17
12:00	Day	73	83	41	80	77	70	60	17
13:00	Day	71	83	41	80	75	68	56	16
14:00	Day	69	83	43	78	73	66	55	16
15:00	Day	67	82	39	77	72	62	52	15
16:00	Day	62	77	35	73	66	53	42	11
17:00	Day	52	65	35	61	55	49	43	10
18:00	Day	53	65	39	61	56	50	45	10
19:00	Day	51	69	36	61	54	47	42	9
20:00	Day	50	68	36	60	52	45	41	8
21:00	Day	47	63	35	56	50	45	41	8
22:00	Night	50	64	37	58	53	47	42	9
23:00	Night	51	66	36	60	54	47	41	9
Overall	Max	75	88	48	83	78	72	63	18
	Median	63	79	37	75	67	55	46	12
	Min	47	63	31	56	50	45	38	8
Daytime	Max	75	88	45	83	78	72	63	18
7am-10pm	Median	69	83	39	78	73	66	55	16
	Min	47	63	35	56	50	45	41	8
Nighttime	Max	73	85	48	81	77	70	61	17
10pm-7am	Median	57	72	36	67	61	48	42	10
	Min	50	64	31	58	53	46	38	8

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/4/2013

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 49 dBA

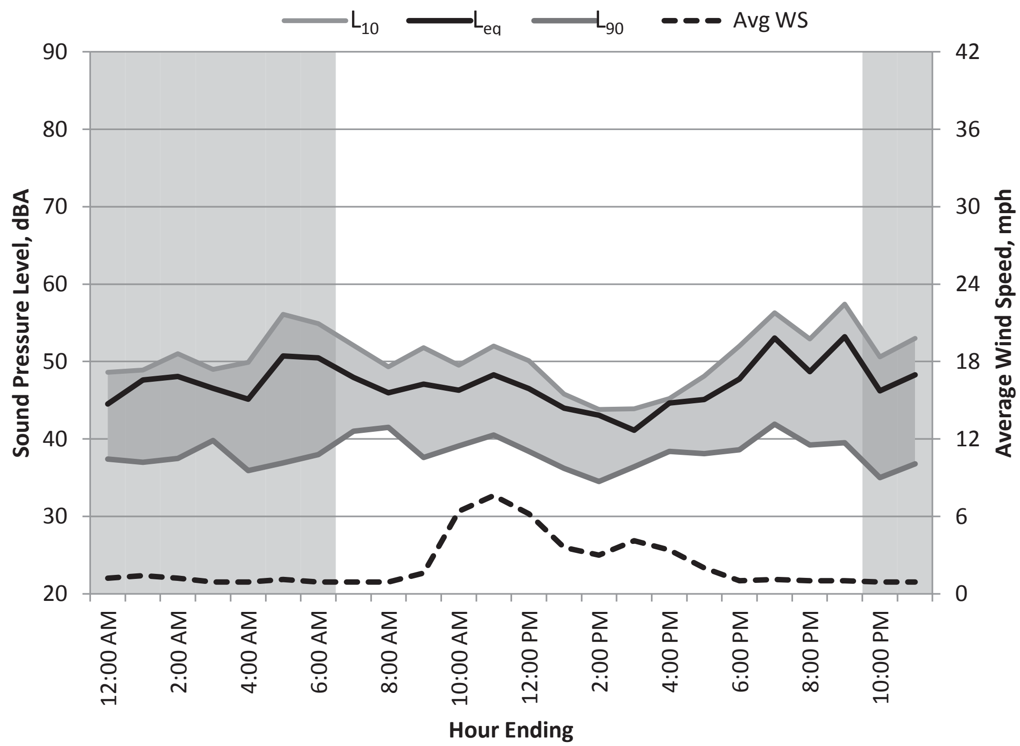


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	64	31	58	51	41	35	5
1:00	Night	50	60	32	57	53	48	39	2
2:00	Night	53	69	42	63	55	51	47	2
3:00	Night	51	58	38	56	54	50	44	1
4:00	Night	52	71	36	63	55	46	40	1
5:00	Night	54	71	39	66	57	49	43	1
6:00	Night	52	68	35	61	56	48	41	1
7:00	Day	52	67	39	60	56	50	45	1
8:00	Day	50	65	40	58	53	49	45	1
9:00	Day	46	63	37	53	48	44	40	4
10:00	Day	45	60	35	54	49	43	39	8
11:00	Day	45	62	31	55	49	40	34	6
12:00	Day	43	59	31	52	45	40	35	4
13:00	Day	40	54	31	50	45	37	34	3
14:00	Day	42	59	32	53	44	38	34	5
15:00	Day	39	50	30	48	42	37	33	5
16:00	Day	42	60	30	54	44	38	35	3
17:00	Day	43	55	34	51	46	41	37	5
18:00	Day	45	58	35	54	47	42	38	6
19:00	Day	49	66	34	60	52	43	37	2
20:00	Day	47	61	35	55	51	44	40	1
21:00	Day	47	60	34	57	51	44	39	1
22:00	Night	49	62	34	57	53	45	36	1
23:00	Night	44	61	37	56	45	40	38	2
Overall	Max	54	71	42	66	57	51	47	8
	Median	47	61	35	56	51	43	39	2
	Min	39	50	30	48	42	37	33	1
Daytime 7am-10pm	Max	52	67	40	60	56	50	45	8
	Median	45	60	34	54	48	42	37	4
	Min	39	50	30	48	42	37	33	1
Nighttime 10pm-7am	Max	54	71	42	66	57	51	47	5
	Median	51	64	36	58	54	48	40	1
	Min	44	58	31	56	45	40	35	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	1/5/2013

24hr Summary

L_{DN} = 54 dBA C_{NEL} = 55 dBA $L_{eq(24hr)}$ = 48 dBA



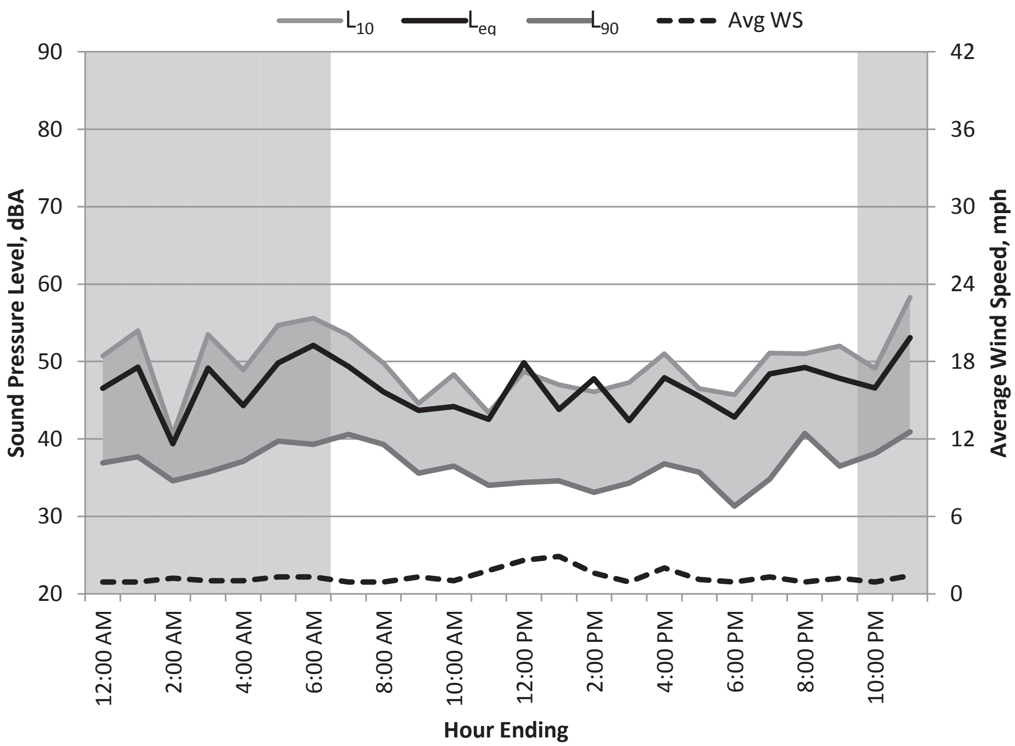
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	55	35	53	49	41	37	1
1:00	Night	48	62	33	60	49	40	37	1
2:00	Night	48	62	35	60	51	41	38	1
3:00	Night	47	58	37	56	49	43	40	1
4:00	Night	45	59	33	54	50	40	36	1
5:00	Night	51	64	34	60	56	43	37	1
6:00	Night	50	63	35	61	55	44	38	1
7:00	Day	48	63	38	54	52	44	41	1
8:00	Day	46	56	39	54	49	44	42	1
9:00	Day	47	65	35	57	52	41	38	2
10:00	Day	46	62	35	55	50	44	39	6
11:00	Day	48	63	37	57	52	45	41	8
12:00	Day	47	61	35	56	50	43	38	6
13:00	Day	44	60	33	55	46	40	36	4
14:00	Day	43	63	31	54	44	38	35	3
15:00	Day	41	54	32	48	44	40	36	4
16:00	Day	45	67	35	55	45	41	38	3
17:00	Day	45	61	35	56	48	41	38	2
18:00	Day	48	66	34	59	52	42	39	1
19:00	Day	53	69	36	63	56	49	42	1
20:00	Day	49	58	34	56	53	46	39	1
21:00	Day	53	67	30	63	57	49	40	1
22:00	Night	46	60	30	56	51	41	35	1
23:00	Night	48	59	34	58	53	42	37	1
Overall	Max	53	69	39	63	57	49	42	8
	Median	47	62	35	56	50	42	38	1
	Min	41	54	30	48	44	38	35	1
Daytime 7am-10pm	Max	53	69	39	63	57	49	42	8
	Median	47	63	35	56	50	43	39	2
	Min	41	54	30	48	44	38	35	1
Nighttime 10pm-7am	Max	51	64	37	61	56	44	40	1
	Median	48	60	34	58	51	41	37	1
	Min	45	55	30	53	49	40	35	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/6/2013

24hr Summary

L_{DN} = 55 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 48 dBA



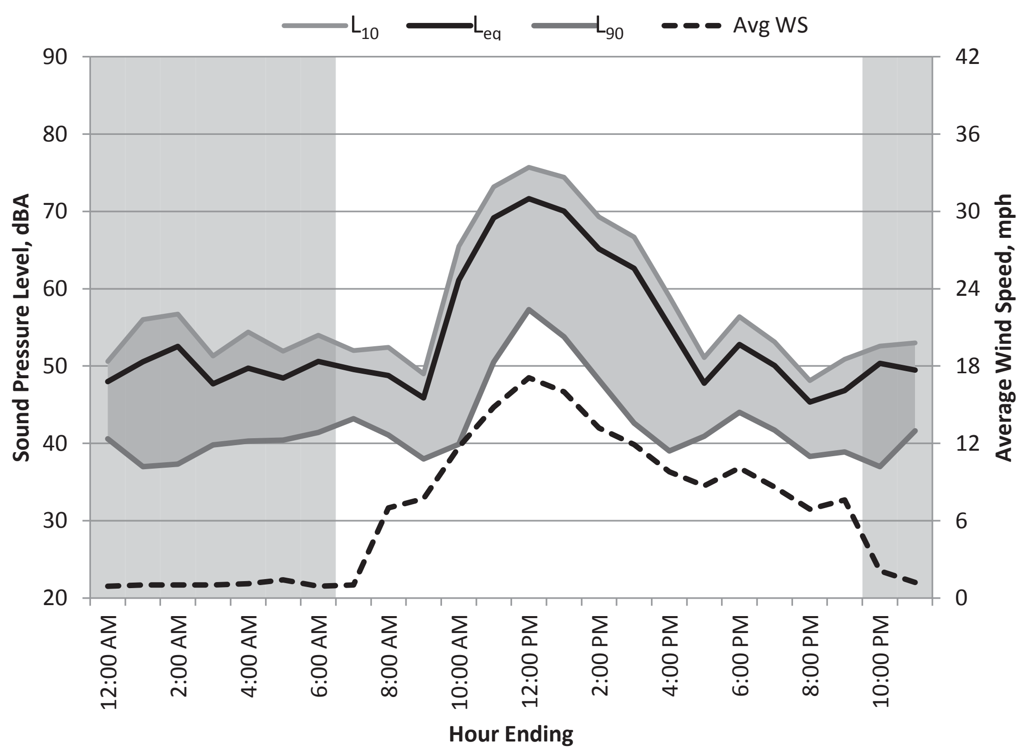
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	62	34	57	51	42	37	1
1:00	Night	49	62	33	59	54	44	38	1
2:00	Night	39	53	30	50	41	38	35	1
3:00	Night	49	65	33	59	54	40	36	1
4:00	Night	44	56	35	53	49	40	37	1
5:00	Night	50	62	36	57	55	44	40	1
6:00	Night	52	65	35	64	56	45	39	1
7:00	Day	49	64	38	60	53	44	41	1
8:00	Day	46	62	37	55	50	42	39	1
9:00	Day	44	62	34	54	45	38	36	1
10:00	Day	44	61	34	55	48	38	37	1
11:00	Day	43	63	32	54	43	36	34	2
12:00	Day	50	76	33	58	49	38	34	3
13:00	Day	44	63	32	54	47	38	35	3
14:00	Day	48	72	30	60	46	36	33	2
15:00	Day	42	54	32	52	47	38	34	1
16:00	Day	48	68	33	57	51	41	37	2
17:00	Day	46	64	31	57	47	41	36	1
18:00	Day	43	63	29	54	46	37	31	1
19:00	Day	48	68	32	60	51	39	35	1
20:00	Day	49	67	36	59	51	45	41	1
21:00	Day	48	63	33	59	52	42	37	1
22:00	Night	47	60	34	57	49	43	38	1
23:00	Night	53	67	32	63	58	47	41	1
Overall	Max	53	76	38	64	58	47	41	3
	Median	47	63	33	57	49	40	37	1
	Min	39	53	29	50	41	36	31	1
Daytime	Max	50	76	38	60	53	45	41	3
7am-10pm	Median	46	63	33	57	48	38	36	1
	Min	42	54	29	52	43	36	31	1
Nighttime	Max	53	67	36	64	58	47	41	1
10pm-7am	Median	49	62	34	57	54	43	38	1
	Min	39	53	30	50	41	38	35	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/7/2013

24hr Summary

L_{DN} = 63 dBA C_{NEL} = 63 dBA $L_{eq(24hr)}$ = 62 dBA



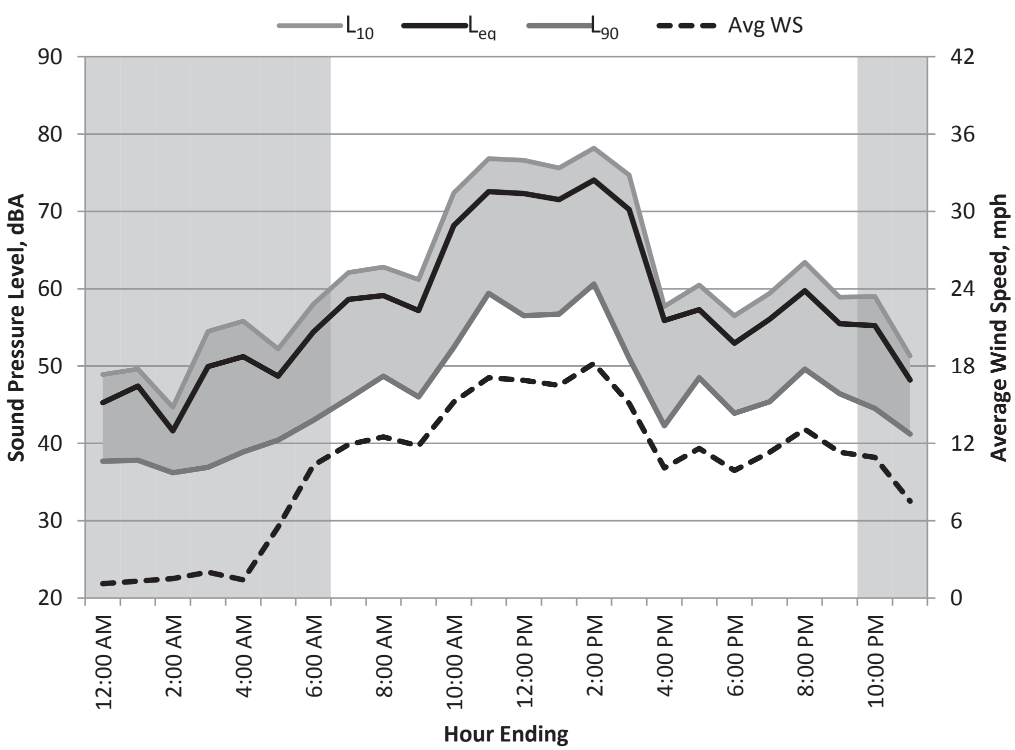
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	63	38	58	51	44	41	1
1:00	Night	51	62	32	60	56	43	37	1
2:00	Night	53	67	34	64	57	44	37	1
3:00	Night	48	60	36	57	51	44	40	1
4:00	Night	50	63	35	59	54	45	40	1
5:00	Night	48	60	35	57	52	46	40	1
6:00	Night	51	64	36	61	54	47	41	1
7:00	Day	50	68	38	58	52	47	43	1
8:00	Day	49	62	35	58	52	46	41	7
9:00	Day	46	64	34	55	49	42	38	8
10:00	Day	61	76	32	72	66	54	40	12
11:00	Day	69	83	36	80	73	63	51	15
12:00	Day	72	84	41	80	76	69	57	17
13:00	Day	70	82	39	79	74	66	54	16
14:00	Day	65	78	32	75	69	60	48	13
15:00	Day	63	79	31	73	67	56	43	12
16:00	Day	55	74	33	66	59	48	39	10
17:00	Day	48	64	33	56	51	45	41	9
18:00	Day	53	70	36	61	56	50	44	10
19:00	Day	50	64	36	59	53	47	42	9
20:00	Day	45	64	35	54	48	42	38	7
21:00	Day	47	60	34	55	51	44	39	8
22:00	Night	50	68	32	63	53	44	37	2
23:00	Night	49	63	36	60	53	46	42	1
Overall	Max	72	84	41	80	76	69	57	17
	Median	50	64	35	60	54	46	41	7
	Min	45	60	31	54	48	42	37	1
Daytime	Max	72	84	41	80	76	69	57	17
7am-10pm	Median	53	70	35	61	56	48	42	10
	Min	45	60	31	54	48	42	38	1
Nighttime	Max	53	68	38	64	57	47	42	2
10pm-7am	Median	50	63	35	60	53	44	40	1
	Min	48	60	32	57	51	43	37	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/8/2013

24hr Summary

L_{DN} = 67 dBA C_{NEL} = 67 dBA $L_{eq(24hr)}$ = 66 dBA

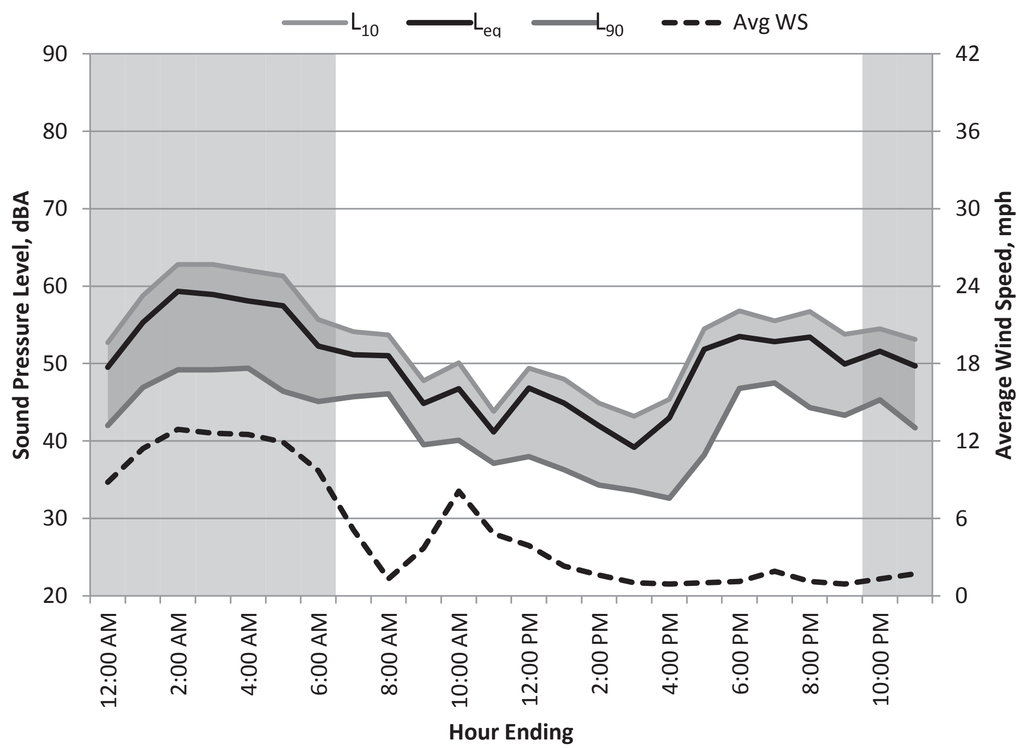


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	57	33	53	49	43	38	1
1:00	Night	47	63	32	59	50	43	38	1
2:00	Night	42	53	32	48	45	40	36	2
3:00	Night	50	65	32	60	55	43	37	2
4:00	Night	51	65	34	62	56	44	39	1
5:00	Night	49	62	36	58	52	46	40	6
6:00	Night	54	71	38	64	58	50	43	10
7:00	Day	59	77	36	69	62	54	46	12
8:00	Day	59	76	39	68	63	56	49	13
9:00	Day	57	73	40	66	61	54	46	12
10:00	Day	68	83	44	78	72	63	52	15
11:00	Day	73	84	43	81	77	70	59	17
12:00	Day	72	83	39	80	77	69	57	17
13:00	Day	72	84	40	80	76	68	57	17
14:00	Day	74	86	42	82	78	72	61	18
15:00	Day	70	85	37	80	75	65	51	15
16:00	Day	56	77	37	68	58	48	42	10
17:00	Day	57	72	43	67	61	54	49	12
18:00	Day	53	68	39	62	57	50	44	10
19:00	Day	56	75	39	66	59	52	45	11
20:00	Day	60	74	40	69	63	56	50	13
21:00	Day	55	70	40	65	59	53	46	11
22:00	Night	55	71	38	65	59	51	45	11
23:00	Night	48	64	36	57	51	45	41	8
Overall	Max	74	86	44	82	78	72	61	18
	Median	56	72	38	66	59	52	46	11
	Min	42	53	32	48	45	40	36	1
Daytime	Max	74	86	44	82	78	72	61	18
7am-10pm	Median	59	77	40	69	63	56	49	13
	Min	53	68	36	62	57	48	42	10
Nighttime	Max	55	71	38	65	59	51	45	11
10pm-7am	Median	49	64	34	59	52	44	39	2
	Min	42	53	32	48	45	40	36	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-2
DATE:	1/9/2013

24hr Summary

L_{DN} = 62 dBA C_{NEL} = 62 dBA $L_{eq(24hr)}$ = 53 dBA



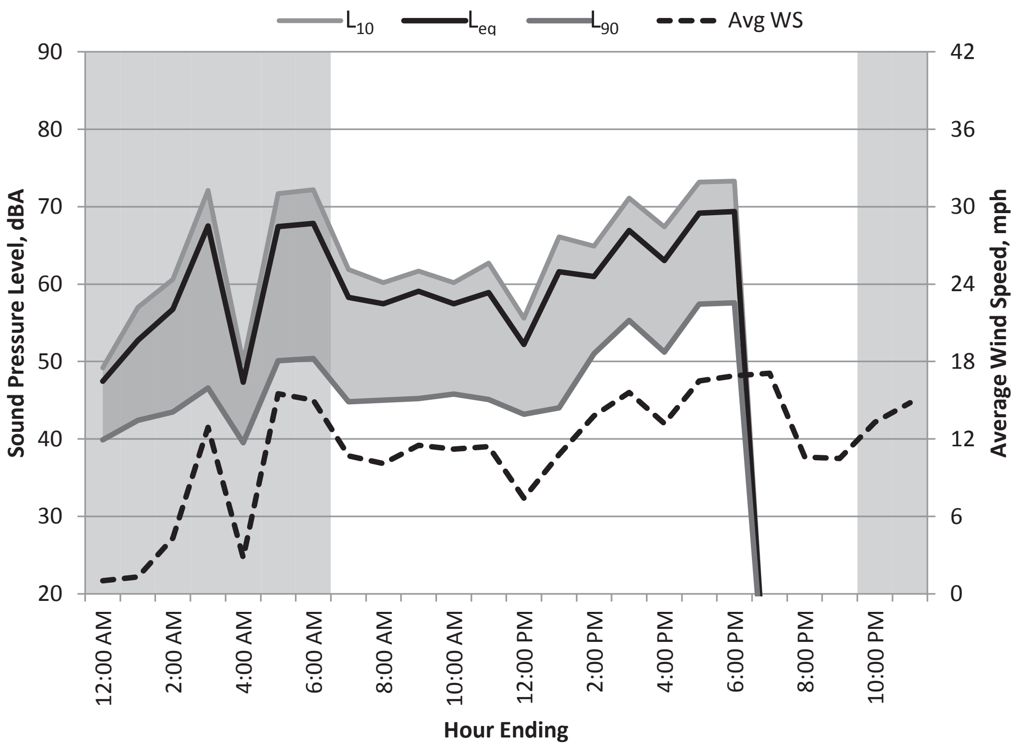
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	68	39	59	53	46	42	9
1:00	Night	55	67	40	63	59	53	47	11
2:00	Night	59	74	42	69	63	56	49	13
3:00	Night	59	72	41	68	63	56	49	13
4:00	Night	58	70	42	66	62	55	49	13
5:00	Night	57	73	39	67	61	54	46	12
6:00	Night	52	66	39	60	56	50	45	10
7:00	Day	51	63	41	58	54	50	46	5
8:00	Day	51	58	39	56	54	50	46	1
9:00	Day	45	58	36	52	48	43	40	4
10:00	Day	47	66	36	56	50	44	40	8
11:00	Day	41	52	34	49	44	40	37	5
12:00	Day	47	64	35	58	49	41	38	4
13:00	Day	45	59	34	56	48	40	36	2
14:00	Day	42	60	32	51	45	38	34	2
15:00	Day	39	53	32	49	43	35	34	1
16:00	Day	43	62	31	54	45	35	33	1
17:00	Day	52	71	35	62	55	46	38	1
18:00	Day	53	65	44	62	57	51	47	1
19:00	Day	53	63	43	60	56	52	48	2
20:00	Day	53	66	39	63	57	50	44	1
21:00	Day	50	60	38	58	54	47	43	1
22:00	Night	52	69	43	62	55	48	45	1
23:00	Night	50	62	37	58	53	47	42	2
Overall	Max	59	74	44	69	63	56	49	13
	Median	51	65	39	59	54	47	44	3
	Min	39	52	31	49	43	35	33	1
Daytime	Max	53	71	44	63	57	52	48	8
7am-10pm	Median	47	62	36	56	50	44	40	2
	Min	39	52	31	49	43	35	33	1
Nighttime	Max	59	74	43	69	63	56	49	13
10pm-7am	Median	55	69	40	63	59	53	46	11
	Min	50	62	37	58	53	46	42	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-2
DATE: 1/10/2013

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	63	37	58	49	43	40	1
1:00	Night	53	65	36	62	57	49	42	1
2:00	Night	57	75	39	68	61	48	44	4
3:00	Night	68	83	40	78	72	57	47	13
4:00	Night	47	66	36	56	50	45	40	3
5:00	Night	67	80	38	77	72	63	50	16
6:00	Night	68	85	44	78	72	61	50	15
7:00	Day	58	74	41	70	62	50	45	11
8:00	Day	57	81	41	67	60	50	45	10
9:00	Day	59	79	41	71	62	51	45	12
10:00	Day	57	75	42	70	60	52	46	11
11:00	Day	59	76	40	70	63	52	45	11
12:00	Day	52	69	37	63	56	48	43	7
13:00	Day	62	76	40	71	66	55	44	11
14:00	Day	61	73	43	70	65	58	51	14
15:00	Day	67	80	44	75	71	64	55	16
16:00	Day	63	76	43	72	67	59	51	13
17:00	Day	69	82	46	77	73	66	57	17
18:00	Day	69	81	46	78	73	67	58	17
19:00	Day	--	--	--	--	--	--	--	17
20:00	Day	--	--	--	--	--	--	--	11
21:00	Day	--	--	--	--	--	--	--	11
22:00	Night	--	--	--	--	--	--	--	13
23:00	Night	--	--	--	--	--	--	--	15
Overall	Max	--	--	--	--	--	--	--	17
	Median	--	--	--	--	--	--	--	11
	Min	--	--	--	--	--	--	--	1
Daytime	Max	--	--	--	--	--	--	--	17
7am-10pm	Median	--	--	--	--	--	--	--	11
	Min	--	--	--	--	--	--	--	7
Nighttime	Max	--	--	--	--	--	--	--	16
10pm-7am	Median	--	--	--	--	--	--	--	13
	Min	--	--	--	--	--	--	--	1

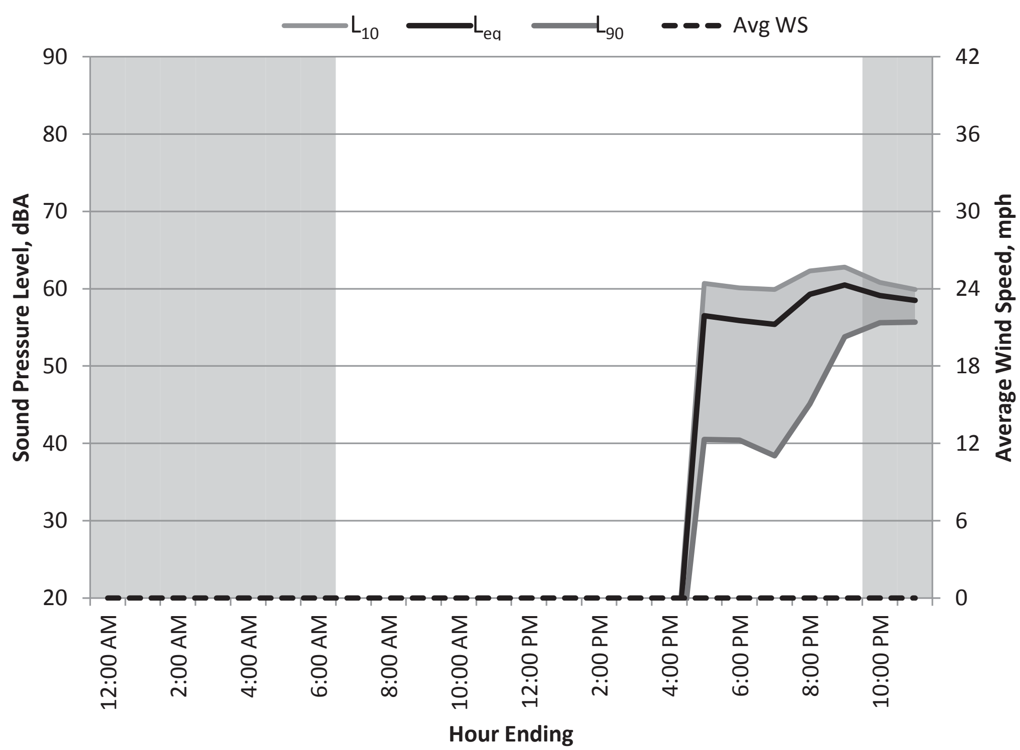
Appendix G
ST-3 August Measurements

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/2/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA

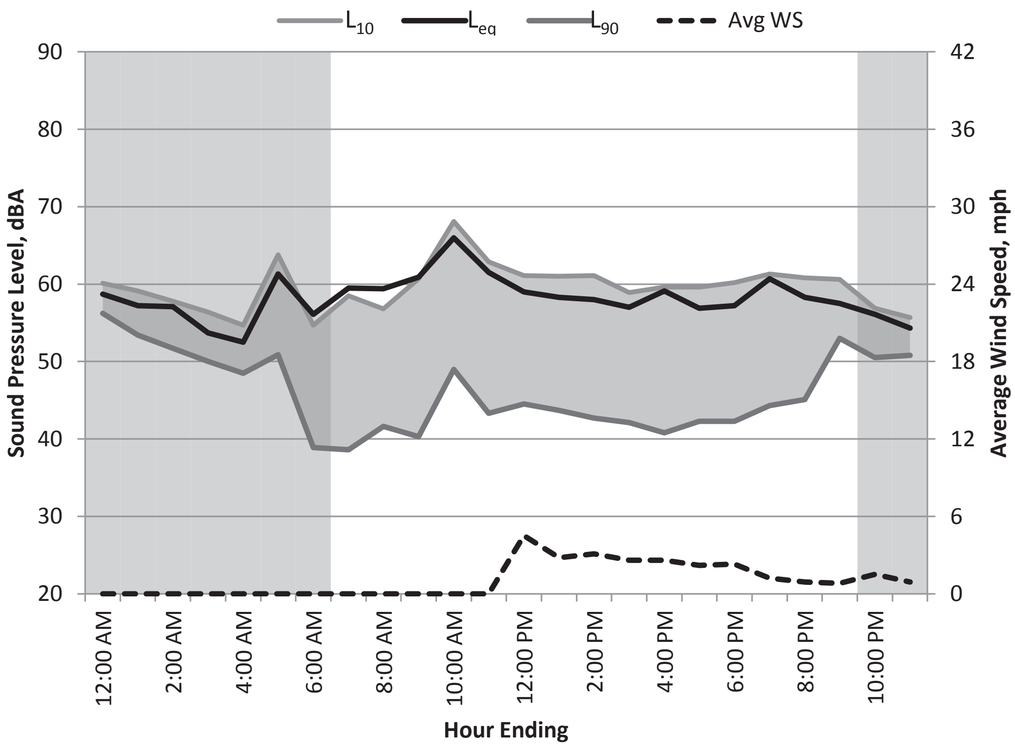


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	--	--	--	--	--	--	--	--
1:00	Night	--	--	--	--	--	--	--	--
2:00	Night	--	--	--	--	--	--	--	--
3:00	Night	--	--	--	--	--	--	--	--
4:00	Night	--	--	--	--	--	--	--	--
5:00	Night	--	--	--	--	--	--	--	--
6:00	Night	--	--	--	--	--	--	--	--
7:00	Day	--	--	--	--	--	--	--	--
8:00	Day	--	--	--	--	--	--	--	--
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	--	--	--	--	--	--	--	--
14:00	Day	--	--	--	--	--	--	--	--
15:00	Day	--	--	--	--	--	--	--	--
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	57	75	36	67	61	48	41	--
18:00	Day	56	75	38	67	60	46	40	--
19:00	Day	55	72	36	66	60	46	38	--
20:00	Day	59	79	42	69	62	55	45	--
21:00	Day	61	76	51	68	63	60	54	--
22:00	Night	59	72	53	63	61	59	56	--
23:00	Night	59	70	49	62	60	58	56	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	--	--	--	--	--	--	--	--
10pm-7am	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/3/2012

24hr Summary

L_{DN} = 64 dBA | C_{NEL} = 64 dBA | $L_{eq(24hr)}$ = 59 dBA



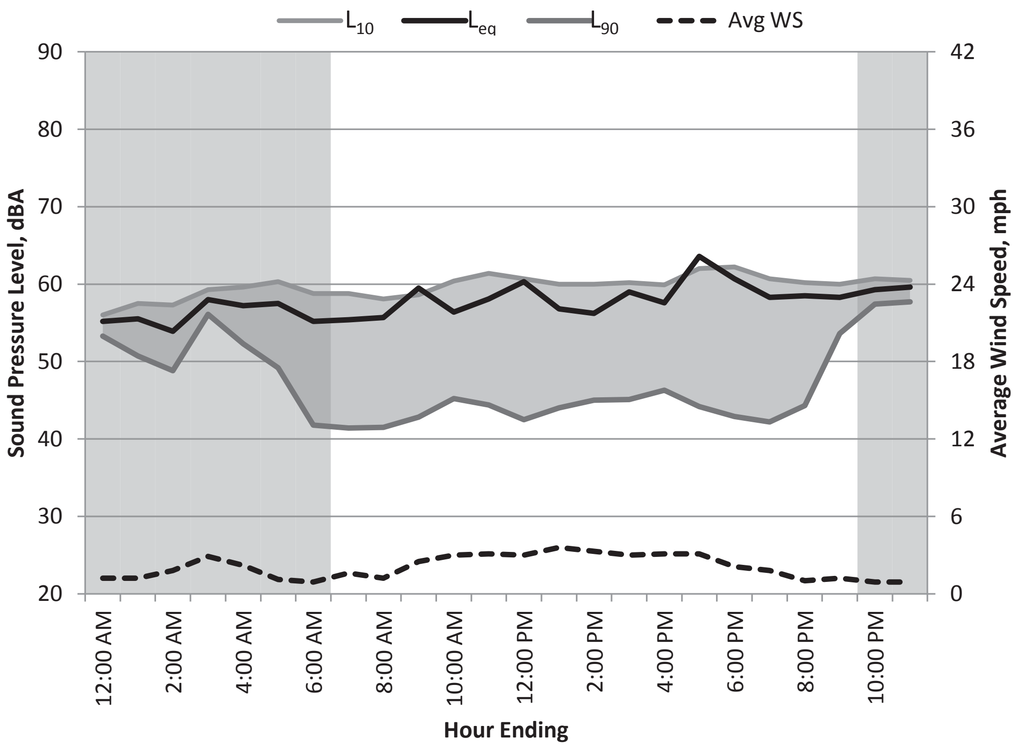
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	59	70	54	65	60	58	56	--
1:00	Night	57	64	50	61	59	57	53	--
2:00	Night	57	78	50	64	58	55	52	--
3:00	Night	54	68	47	60	56	52	50	--
4:00	Night	53	68	46	60	55	51	49	--
5:00	Night	61	84	43	69	64	56	51	--
6:00	Night	56	81	35	70	55	42	39	--
7:00	Day	60	84	35	73	59	42	39	--
8:00	Day	59	85	38	68	57	46	42	--
9:00	Day	61	88	37	72	61	47	40	--
10:00	Day	66	86	41	79	68	56	49	--
11:00	Day	62	82	41	74	63	50	43	--
12:00	Day	59	79	42	72	61	49	45	5
13:00	Day	58	78	41	70	61	49	44	3
14:00	Day	58	76	39	70	61	50	43	3
15:00	Day	57	78	39	70	59	46	42	3
16:00	Day	59	84	38	72	60	46	41	3
17:00	Day	57	79	38	69	60	48	42	2
18:00	Day	57	78	38	69	60	49	42	2
19:00	Day	61	88	41	71	61	50	44	1
20:00	Day	58	79	42	70	61	51	45	1
21:00	Day	58	69	48	66	61	55	53	1
22:00	Night	56	80	47	63	57	54	51	2
23:00	Night	54	73	45	63	56	52	51	1
Overall	Max	66	88	54	79	68	58	56	--
	Median	58	79	41	69	60	50	44	--
	Min	53	64	35	60	55	42	39	--
Daytime	Max	66	88	48	79	68	56	53	--
7am-10pm	Median	59	79	39	70	61	49	43	--
	Min	57	69	35	66	57	42	39	--
Nighttime	Max	61	84	54	70	64	58	56	--
10pm-7am	Median	56	73	47	63	57	54	51	--
	Min	53	64	35	60	55	42	39	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/4/2012

24hr Summary

L_{DN} = 64 dBA C_{NEL} = 64 dBA $L_{eq(24hr)}$ = 58 dBA



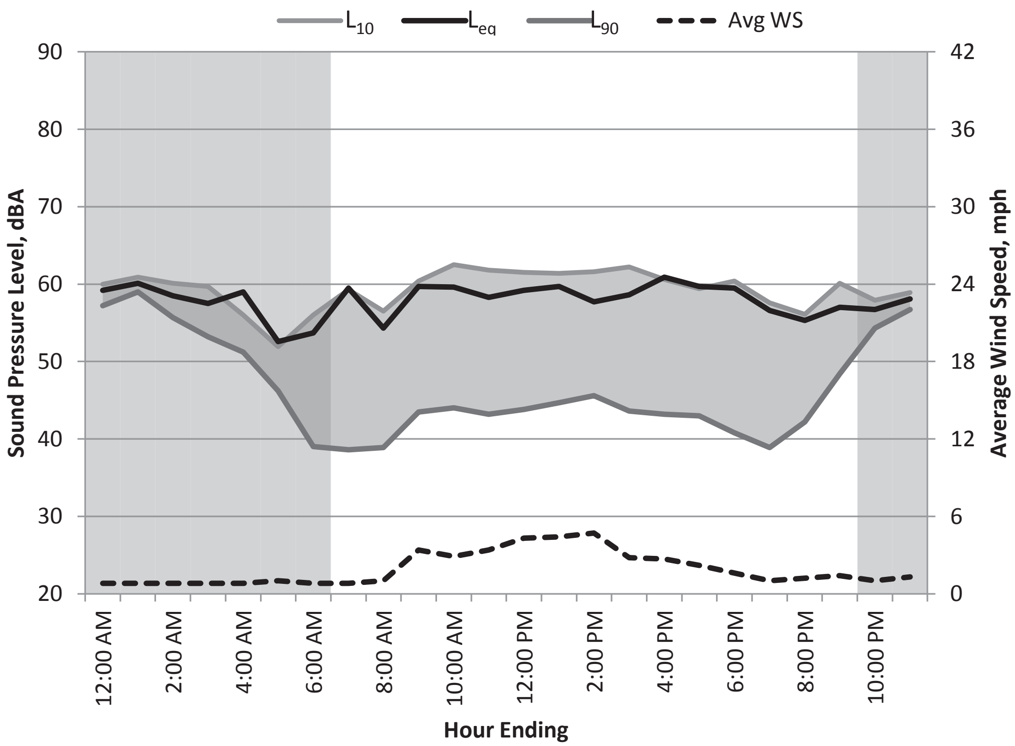
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	55	67	50	61	56	55	53	1
1:00	Night	56	75	49	62	58	54	51	1
2:00	Night	54	61	47	59	57	52	49	2
3:00	Night	58	66	52	64	59	58	56	3
4:00	Night	57	68	50	62	60	57	52	2
5:00	Night	58	70	46	68	60	55	49	1
6:00	Night	55	75	38	67	59	45	42	1
7:00	Day	55	75	39	67	59	46	41	2
8:00	Day	56	77	39	68	58	47	42	1
9:00	Day	60	84	39	72	59	48	43	3
10:00	Day	56	75	42	67	60	50	45	3
11:00	Day	58	76	41	70	61	50	44	3
12:00	Day	60	88	39	71	61	49	43	3
13:00	Day	57	76	41	68	60	50	44	4
14:00	Day	56	74	42	67	60	49	45	3
15:00	Day	59	88	42	68	60	50	45	3
16:00	Day	58	80	44	69	60	50	46	3
17:00	Day	64	91	40	76	62	50	44	3
18:00	Day	61	81	38	74	62	50	43	2
19:00	Day	58	81	38	70	61	48	42	2
20:00	Day	59	81	41	71	60	53	44	1
21:00	Day	58	78	46	65	60	57	54	1
22:00	Night	59	70	56	65	61	59	57	1
23:00	Night	60	73	55	66	61	59	58	1
Overall	Max	64	91	56	76	62	59	58	4
	Median	58	76	42	67	60	50	45	2
	Min	54	61	38	59	56	45	41	1
Daytime	Max	64	91	46	76	62	57	54	4
7am-10pm	Median	58	80	41	69	60	50	44	3
	Min	55	74	38	65	58	46	41	1
Nighttime	Max	60	75	56	68	61	59	58	3
10pm-7am	Median	57	70	50	64	59	55	52	1
	Min	54	61	38	59	56	45	42	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/5/2012

CH2MHILL

24hr Summary

L_{DN} = 64 dBA C_{NEL} = 65 dBA $L_{eq(24hr)}$ = 58 dBA



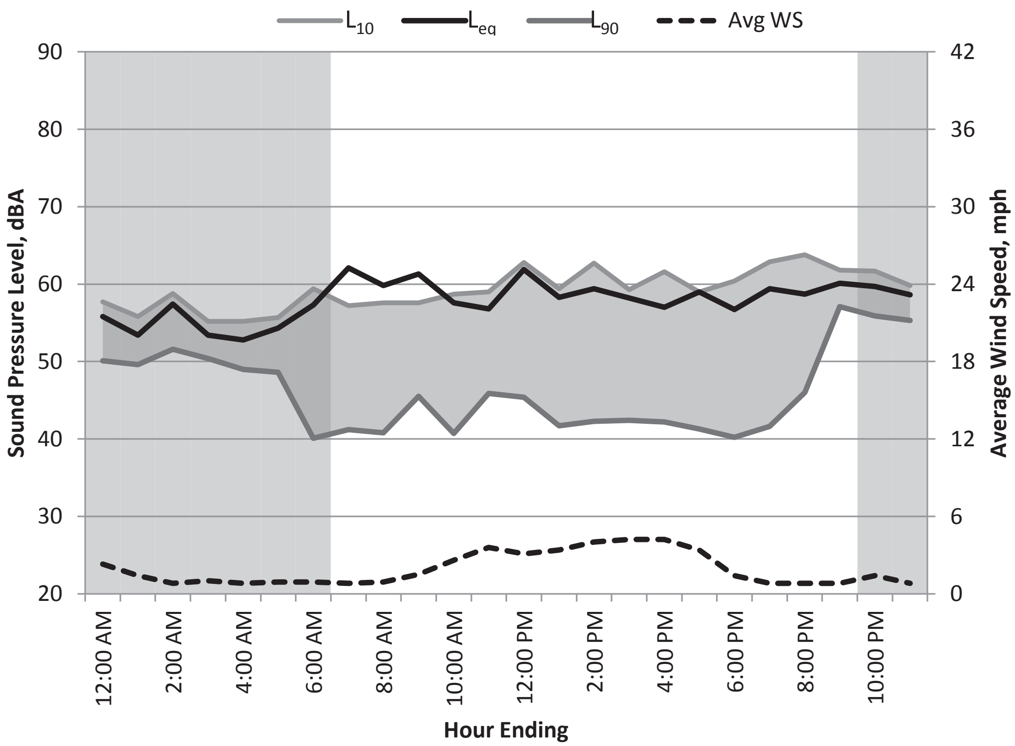
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	59	79	52	63	60	59	57	1
1:00	Night	60	64	56	63	61	60	59	1
2:00	Night	59	72	54	63	60	58	56	1
3:00	Night	58	66	47	64	60	57	53	1
4:00	Night	59	84	49	72	56	53	51	1
5:00	Night	53	75	44	63	52	49	46	1
6:00	Night	54	76	36	66	56	42	39	1
7:00	Day	60	86	36	68	59	43	39	1
8:00	Day	54	73	37	68	57	43	39	1
9:00	Day	60	85	40	71	60	50	44	3
10:00	Day	60	83	40	69	63	51	44	3
11:00	Day	58	77	40	70	62	50	43	3
12:00	Day	59	81	40	71	62	50	44	4
13:00	Day	60	84	42	72	61	51	45	4
14:00	Day	58	74	41	68	62	52	46	5
15:00	Day	59	77	40	70	62	52	44	3
16:00	Day	61	85	38	73	61	48	43	3
17:00	Day	60	88	39	68	59	47	43	2
18:00	Day	60	84	38	71	60	46	41	2
19:00	Day	57	79	36	70	58	47	39	1
20:00	Day	55	77	39	68	56	47	42	1
21:00	Day	57	81	44	66	60	51	48	1
22:00	Night	57	67	50	61	58	57	54	1
23:00	Night	58	71	55	64	59	58	57	1
Overall	Max	61	88	56	73	63	60	59	5
	Median	59	78	40	68	60	50	44	1
	Min	53	64	36	61	52	42	39	1
Daytime 7am-10pm	Max	61	88	44	73	63	52	48	5
	Median	59	81	40	70	60	50	43	3
	Min	54	73	36	66	56	43	39	1
Nighttime 10pm-7am	Max	60	84	56	72	61	60	59	1
	Median	58	72	50	63	59	57	54	1
	Min	53	64	36	61	52	42	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/6/2012

24hr Summary

L_{DN} = 63 dBA C_{NEL} = 64 dBA $L_{eq(24hr)}$ = 59 dBA



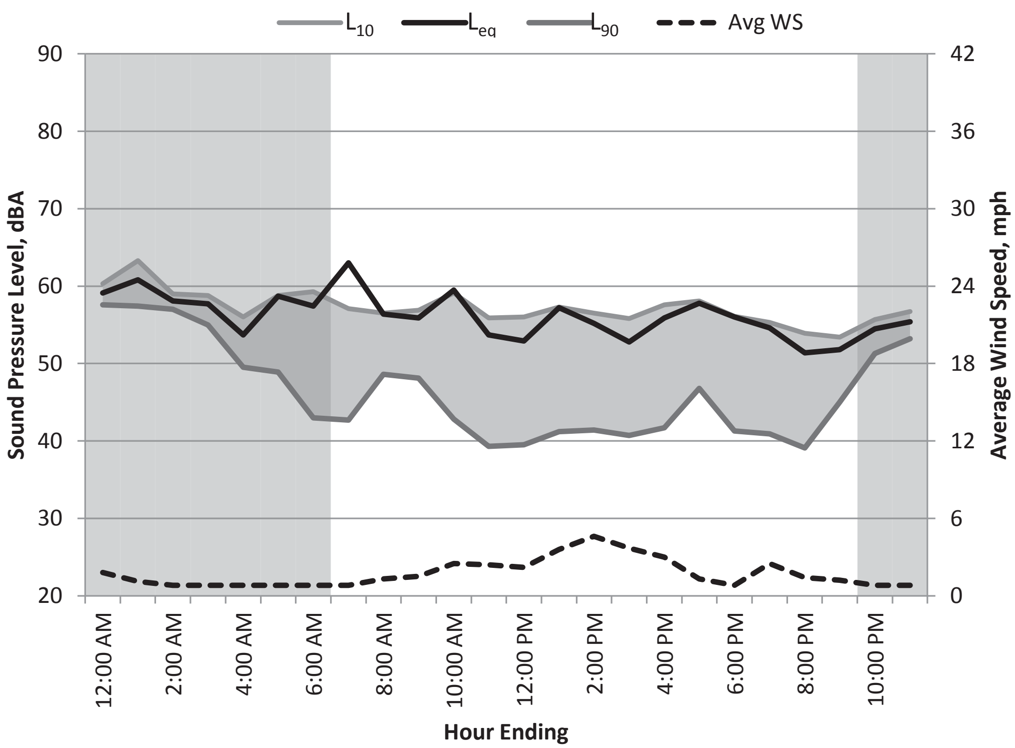
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	56	64	47	58	58	56	50	2
1:00	Night	53	63	45	57	56	53	50	1
2:00	Night	57	72	49	66	59	57	52	1
3:00	Night	53	65	48	61	55	52	50	1
4:00	Night	53	65	46	59	55	52	49	1
5:00	Night	54	70	47	64	56	52	49	1
6:00	Night	57	82	37	70	59	44	40	1
7:00	Day	62	89	38	72	57	48	41	1
8:00	Day	60	84	38	72	58	46	41	1
9:00	Day	61	86	43	72	58	49	46	2
10:00	Day	58	78	37	71	59	47	41	3
11:00	Day	57	74	41	68	59	53	46	4
12:00	Day	62	86	41	72	63	52	45	3
13:00	Day	58	81	39	71	59	47	42	3
14:00	Day	59	85	39	68	63	48	42	4
15:00	Day	58	82	40	71	59	47	42	4
16:00	Day	57	73	38	66	62	48	42	4
17:00	Day	59	87	39	68	59	46	41	3
18:00	Day	57	77	38	67	60	47	40	1
19:00	Day	59	76	38	66	63	58	42	1
20:00	Day	59	78	42	66	64	52	46	1
21:00	Day	60	73	55	65	62	60	57	1
22:00	Night	60	72	49	65	62	59	56	1
23:00	Night	59	68	52	61	60	59	55	1
Overall	Max	62	89	55	72	64	60	57	4
	Median	58	77	41	67	59	52	45	1
	Min	53	63	37	57	55	44	40	1
Daytime 7am-10pm	Max	62	89	55	72	64	60	57	4
	Median	59	81	39	68	59	48	42	3
	Min	57	73	37	65	57	46	40	1
Nighttime 10pm-7am	Max	60	82	52	70	62	59	56	2
	Median	56	68	47	61	58	53	50	1
	Min	53	63	37	57	55	44	40	1

CH2MHILL

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	8/7/2012

24hr Summary

L_{DN} = 64 dBA C_{NEL} = 64 dBA $L_{eq(24hr)}$ = 57 dBA



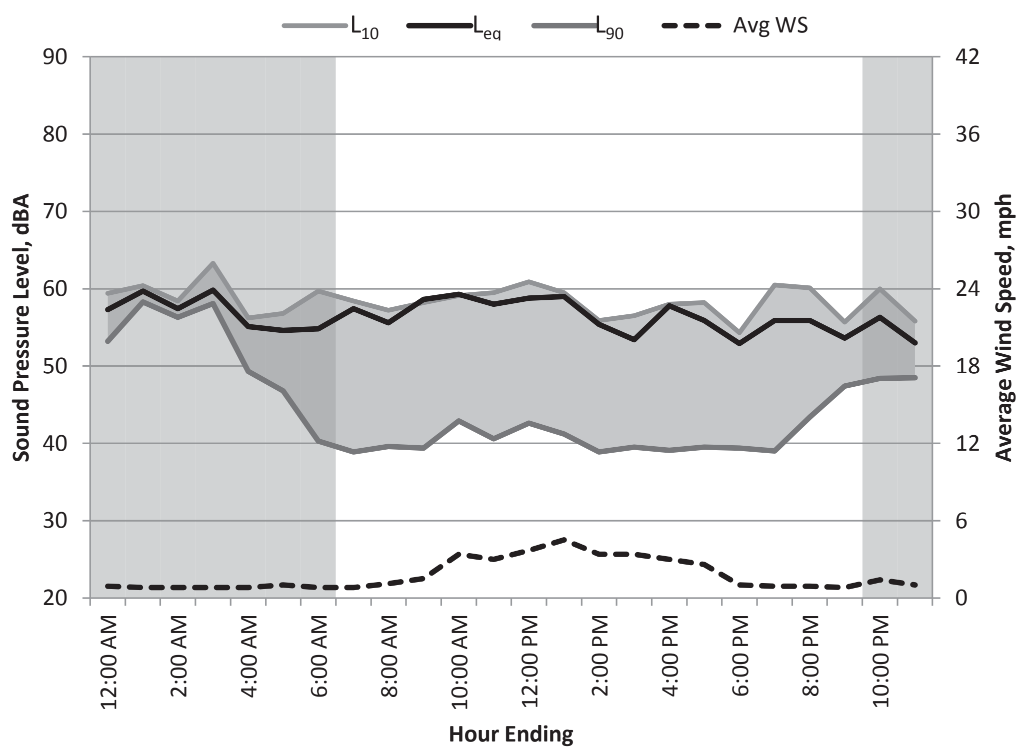
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	59	66	48	62	60	59	58	2
1:00	Night	61	66	51	65	63	59	57	1
2:00	Night	58	64	52	62	59	58	57	1
3:00	Night	58	72	49	61	59	58	55	1
4:00	Night	54	72	47	61	56	52	50	1
5:00	Night	59	82	45	68	59	54	49	1
6:00	Night	57	79	38	68	59	48	43	1
7:00	Day	63	93	39	68	57	49	43	1
8:00	Day	56	77	48	69	57	51	49	1
9:00	Day	56	76	45	68	57	52	48	2
10:00	Day	60	85	41	72	59	49	43	3
11:00	Day	54	74	37	65	56	45	39	2
12:00	Day	53	72	37	64	56	46	40	2
13:00	Day	57	80	38	70	57	48	41	4
14:00	Day	55	76	38	68	57	47	41	5
15:00	Day	53	71	39	65	56	45	41	4
16:00	Day	56	78	39	68	58	49	42	3
17:00	Day	58	84	42	68	58	51	47	1
18:00	Day	56	78	36	69	56	47	41	1
19:00	Day	55	76	39	66	55	50	41	3
20:00	Day	51	68	37	63	54	46	39	1
21:00	Day	52	71	40	61	53	50	45	1
22:00	Night	55	71	45	60	56	54	51	1
23:00	Night	55	64	48	62	57	55	53	1
Overall	Max	63	93	52	72	63	59	58	5
	Median	56	75	40	65	57	50	44	1
	Min	51	64	36	60	53	45	39	1
Daytime	Max	63	93	48	72	59	52	49	5
7am-10pm	Median	56	76	39	68	57	49	41	2
	Min	51	68	36	61	53	45	39	1
Nighttime	Max	61	82	52	68	63	59	58	2
10pm-7am	Median	58	71	48	62	59	55	53	1
	Min	54	64	38	60	56	48	43	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/8/2012

24hr Summary

L_{DN} = 63 dBA | C_{NEL} = 64 dBA | $L_{eq(24hr)}$ = 57 dBA



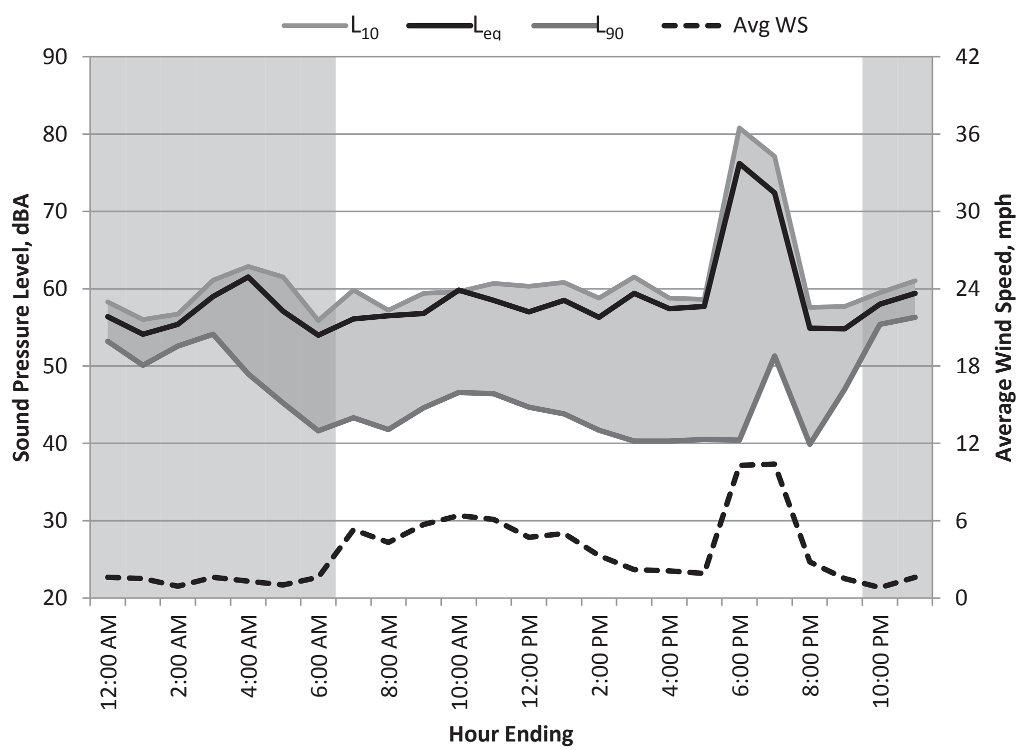
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	57	64	51	61	59	58	53	1
1:00	Night	60	71	55	63	60	59	58	1
2:00	Night	57	66	46	59	58	57	56	1
3:00	Night	60	71	53	64	63	59	58	1
4:00	Night	55	74	47	64	56	52	49	1
5:00	Night	55	70	43	65	57	51	47	1
6:00	Night	55	73	37	65	60	44	40	1
7:00	Day	57	82	37	69	58	43	39	1
8:00	Day	56	75	37	69	57	47	40	1
9:00	Day	59	86	36	69	58	46	39	2
10:00	Day	59	83	39	71	59	49	43	3
11:00	Day	58	82	37	69	60	49	41	3
12:00	Day	59	78	38	71	61	51	43	4
13:00	Day	59	83	37	71	60	49	41	5
14:00	Day	55	75	37	68	56	46	39	3
15:00	Day	53	73	36	65	57	45	40	3
16:00	Day	58	83	36	68	58	48	39	3
17:00	Day	56	76	37	66	58	48	40	3
18:00	Day	53	79	36	64	54	43	39	1
19:00	Day	56	73	37	64	61	49	39	1
20:00	Day	56	73	40	65	60	52	43	1
21:00	Day	54	70	44	64	56	51	47	1
22:00	Night	56	70	43	66	60	53	48	1
23:00	Night	53	71	44	59	56	52	49	1
Overall	Max	60	86	55	71	63	59	58	5
	Median	56	74	37	65	58	49	42	1
	Min	53	64	36	59	54	43	39	1
Daytime	Max	59	86	44	71	61	52	47	5
7am-10pm	Median	56	78	37	68	58	48	40	3
	Min	53	70	36	64	54	43	39	1
Nighttime	Max	60	74	55	66	63	59	58	1
10pm-7am	Median	56	71	46	64	59	53	49	1
	Min	53	64	37	59	56	44	40	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/9/2012

24hr Summary

L_{DN} = 67 dBA C_{NEL} = 68 dBA $L_{eq(24hr)}$ = 65 dBA



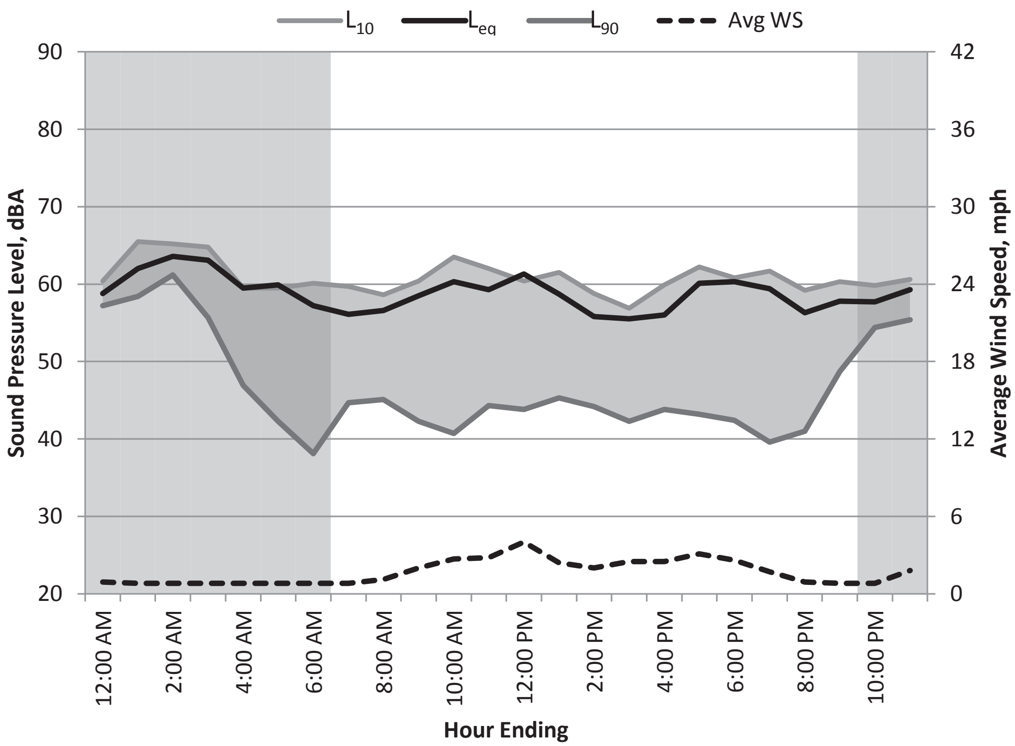
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	56	66	48	62	58	56	53	2
1:00	Night	54	65	46	62	56	53	50	2
2:00	Night	55	65	50	62	57	55	53	1
3:00	Night	59	71	48	64	61	59	54	2
4:00	Night	62	75	47	67	63	62	49	1
5:00	Night	57	81	42	66	62	51	45	1
6:00	Night	54	76	37	66	56	45	42	2
7:00	Day	56	73	37	68	60	49	43	5
8:00	Day	57	78	38	70	57	46	42	4
9:00	Day	57	76	39	68	59	49	45	6
10:00	Day	60	87	42	70	60	52	47	6
11:00	Day	59	84	41	68	61	51	46	6
12:00	Day	57	75	41	68	60	50	45	5
13:00	Day	59	79	40	71	61	50	44	5
14:00	Day	56	77	37	68	59	48	42	3
15:00	Day	59	80	37	72	62	50	40	2
16:00	Day	57	79	37	70	59	47	40	2
17:00	Day	58	83	37	68	59	48	41	2
18:00	Day	76	92	37	88	81	58	40	10
19:00	Day	72	88	46	83	77	64	51	10
20:00	Day	55	73	37	67	58	50	40	3
21:00	Day	55	72	42	64	58	51	47	2
22:00	Night	58	72	49	64	60	57	55	1
23:00	Night	59	66	53	63	61	59	56	2
Overall	Max	76	92	53	88	81	64	56	10
	Median	57	76	41	68	60	51	45	2
	Min	54	65	37	62	56	45	40	1
Daytime	Max	76	92	46	88	81	64	51	10
7am-10pm	Median	57	79	38	68	60	50	43	5
	Min	55	72	37	64	57	46	40	2
Nighttime	Max	62	81	53	67	63	62	56	2
10pm-7am	Median	57	71	48	64	60	56	53	2
	Min	54	65	37	62	56	45	42	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/10/2012

24hr Summary

L_{DN} = 67 dBA C_{NEL} = 67 dBA $L_{eq(24hr)}$ = 59 dBA

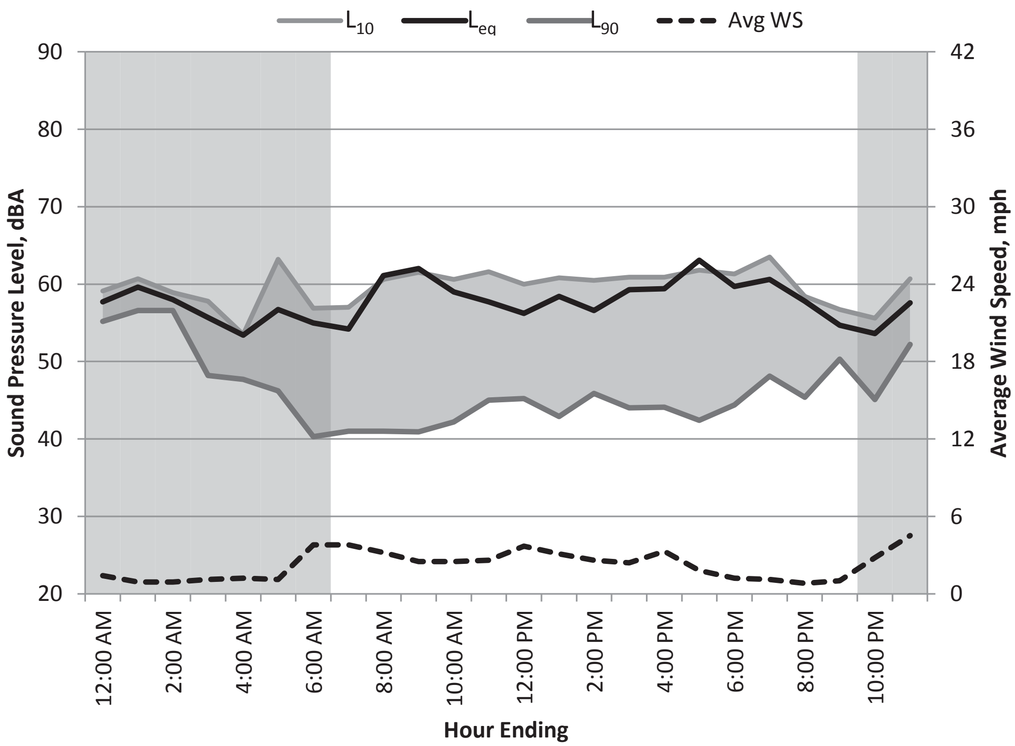


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	59	67	55	63	60	59	57	1
1:00	Night	62	67	55	66	66	61	58	1
2:00	Night	64	68	60	68	65	63	61	1
3:00	Night	63	75	49	66	65	64	56	1
4:00	Night	60	87	45	68	60	50	47	1
5:00	Night	60	83	39	71	60	50	42	1
6:00	Night	57	78	35	69	60	43	38	1
7:00	Day	56	74	40	67	60	49	45	1
8:00	Day	57	76	39	69	59	51	45	1
9:00	Day	59	80	39	70	60	50	42	2
10:00	Day	60	75	38	71	64	50	41	3
11:00	Day	59	82	40	71	62	50	44	3
12:00	Day	61	90	39	70	60	50	44	4
13:00	Day	59	79	40	71	62	51	45	2
14:00	Day	56	77	41	68	59	48	44	2
15:00	Day	56	76	39	68	57	47	42	3
16:00	Day	56	75	40	68	60	48	44	3
17:00	Day	60	85	39	71	62	50	43	3
18:00	Day	60	85	37	72	61	49	42	3
19:00	Day	59	82	37	70	62	49	40	2
20:00	Day	56	75	37	68	59	49	41	1
21:00	Day	58	75	43	67	60	55	49	1
22:00	Night	58	72	52	65	60	56	54	1
23:00	Night	59	78	51	67	61	59	55	2
Overall	Max	64	90	60	72	66	64	61	4
	Median	59	76	40	68	60	50	44	1
	Min	56	67	35	63	57	43	38	1
Daytime 7am-10pm	Max	61	90	43	72	64	55	49	4
	Median	59	77	39	70	60	50	44	2
	Min	56	74	37	67	57	47	40	1
Nighttime 10pm-7am	Max	64	87	60	71	66	64	61	2
	Median	60	75	51	67	60	59	55	1
	Min	57	67	35	63	60	43	38	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/11/2012

24hr Summary

L_{DN} = 64 dBA C_{NEL} = 64 dBA $L_{eq(24hr)}$ = 59 dBA



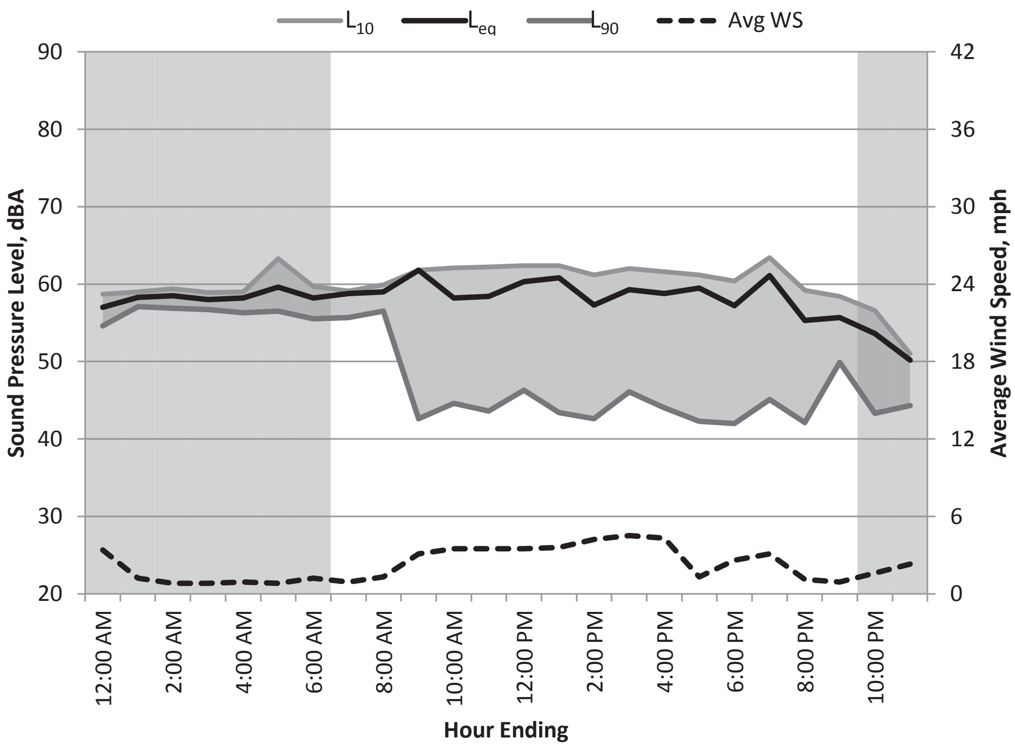
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	58	68	51	62	59	57	55	1
1:00	Night	60	64	49	62	61	60	57	1
2:00	Night	58	72	50	60	59	58	57	1
3:00	Night	56	74	46	64	58	56	48	1
4:00	Night	53	77	46	62	54	51	48	1
5:00	Night	57	74	42	65	63	50	46	1
6:00	Night	55	76	35	67	57	45	40	4
7:00	Day	54	72	35	66	57	46	41	4
8:00	Day	61	85	37	73	61	48	41	3
9:00	Day	62	88	37	74	62	47	41	3
10:00	Day	59	84	38	70	61	48	42	3
11:00	Day	58	78	41	69	62	50	45	3
12:00	Day	56	76	41	67	60	50	45	4
13:00	Day	58	79	40	70	61	49	43	3
14:00	Day	57	75	42	67	61	50	46	3
15:00	Day	59	85	41	71	61	49	44	2
16:00	Day	59	83	41	71	61	49	44	3
17:00	Day	63	92	38	72	62	50	42	2
18:00	Day	60	80	39	72	61	52	44	1
19:00	Day	61	76	38	70	64	58	48	1
20:00	Day	58	84	40	67	58	52	45	1
21:00	Day	55	71	47	62	57	54	50	1
22:00	Night	54	70	39	63	56	51	45	3
23:00	Night	58	74	48	66	61	55	52	5
Overall	Max	63	92	51	74	64	60	57	5
	Median	58	76	41	67	61	50	45	2
	Min	53	64	35	60	54	45	40	1
Daytime	Max	63	92	47	74	64	58	50	4
7am-10pm	Median	59	80	40	70	61	50	44	3
	Min	54	71	35	62	57	46	41	1
Nighttime	Max	60	77	51	67	63	60	57	5
10pm-7am	Median	57	74	46	63	59	55	48	1
	Min	53	64	35	60	54	45	40	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/12/2012

24hr Summary

L_{DN} = 64 dBA | C_{NEL} = 64 dBA | $L_{eq(24hr)}$ = 59 dBA



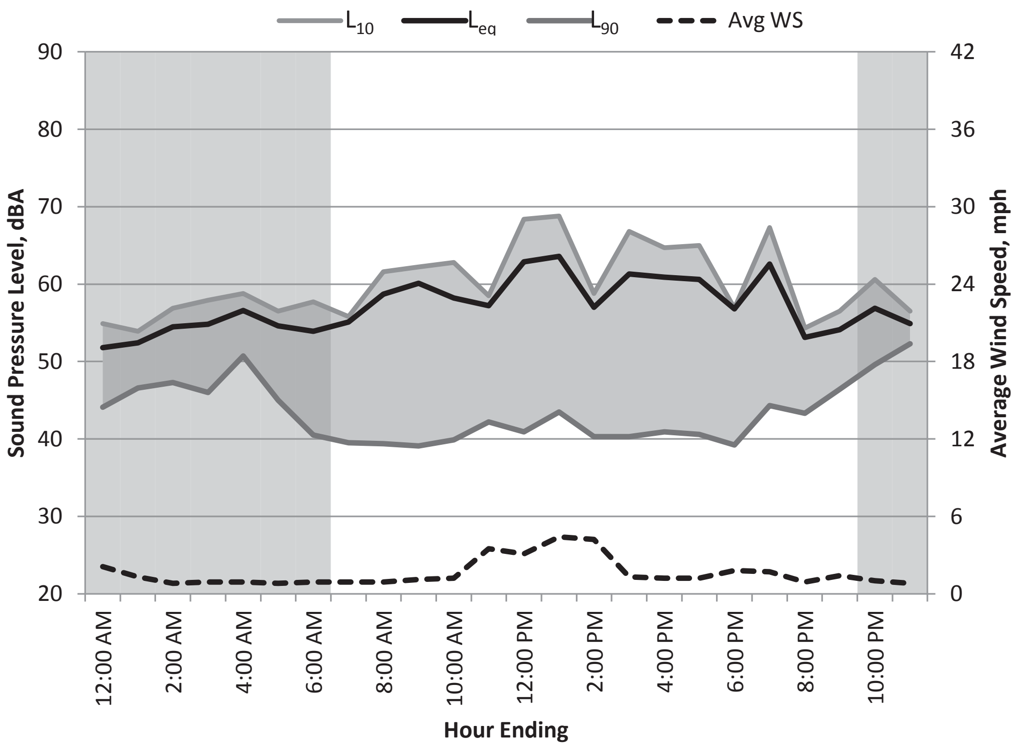
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	57	65	52	61	59	57	55	3
1:00	Night	58	71	55	60	59	58	57	1
2:00	Night	59	74	56	62	59	58	57	1
3:00	Night	58	61	56	60	59	58	57	1
4:00	Night	58	68	56	64	59	58	56	1
5:00	Night	60	67	55	65	63	58	57	1
6:00	Night	58	71	54	66	60	57	56	1
7:00	Day	59	78	55	66	59	57	56	1
8:00	Day	59	75	49	67	60	58	57	1
9:00	Day	62	86	39	75	62	51	43	3
10:00	Day	58	76	41	70	62	51	45	4
11:00	Day	58	78	40	70	62	50	44	4
12:00	Day	60	83	40	73	62	52	46	4
13:00	Day	61	83	40	73	62	50	43	4
14:00	Day	57	77	38	69	61	49	43	4
15:00	Day	59	80	41	70	62	53	46	5
16:00	Day	59	79	40	71	62	50	44	4
17:00	Day	60	80	39	73	61	50	42	1
18:00	Day	57	76	40	70	60	47	42	3
19:00	Day	61	82	40	69	63	60	45	3
20:00	Day	55	77	37	66	59	49	42	1
21:00	Day	56	70	45	64	58	54	50	1
22:00	Night	54	73	39	63	57	48	43	2
23:00	Night	50	65	42	60	51	49	44	2
Overall	Max	62	86	56	75	63	60	57	5
	Median	58	76	41	67	60	52	46	2
	Min	50	61	37	60	51	47	42	1
Daytime 7am-10pm	Max	62	86	55	75	63	60	57	5
	Median	59	78	40	70	62	51	44	3
	Min	55	70	37	64	58	47	42	1
Nighttime 10pm-7am	Max	60	74	56	66	63	58	57	3
	Median	58	68	55	62	59	58	56	1
	Min	50	61	39	60	51	48	43	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/13/2012

24hr Summary

L_{DN} = 62 dBA | C_{NEL} = 63 dBA | $L_{eq(24hr)}$ = 59 dBA



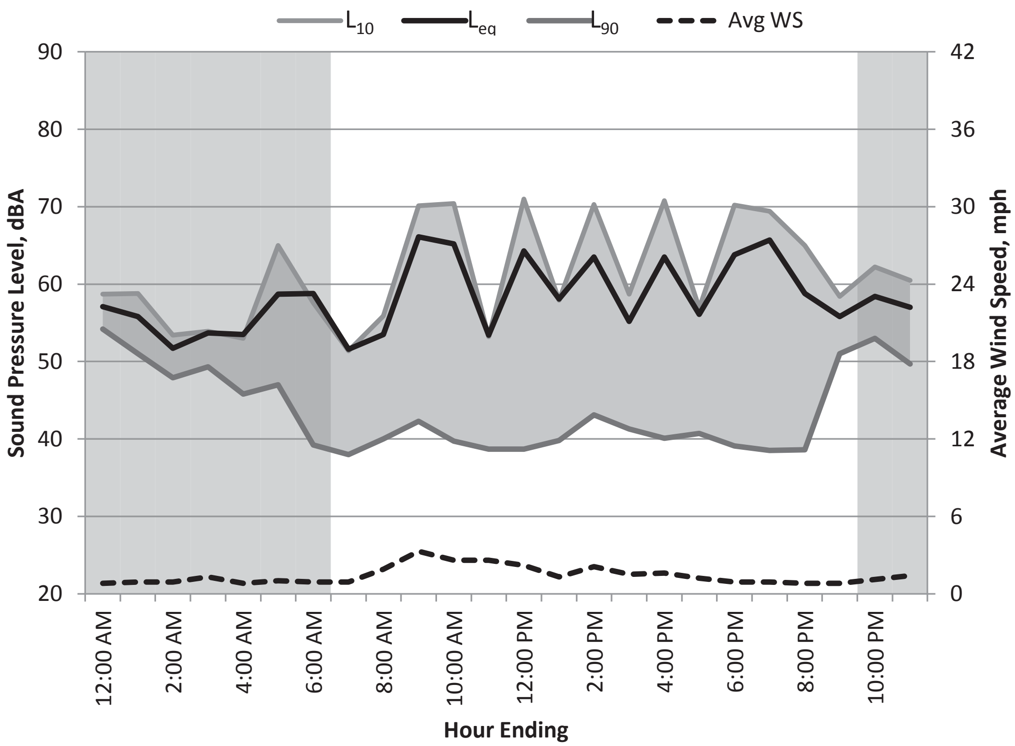
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	52	68	41	62	55	48	44	2
1:00	Night	52	66	44	63	54	50	47	1
2:00	Night	55	72	46	60	57	53	47	1
3:00	Night	55	75	43	64	58	50	46	1
4:00	Night	57	75	46	64	59	56	51	1
5:00	Night	55	75	43	65	57	50	45	1
6:00	Night	54	72	37	66	58	44	41	1
7:00	Day	55	79	37	67	56	42	40	1
8:00	Day	59	80	37	69	62	47	39	1
9:00	Day	60	82	37	70	62	48	39	1
10:00	Day	58	77	37	68	63	48	40	1
11:00	Day	57	84	39	68	59	47	42	4
12:00	Day	63	77	38	71	68	49	41	3
13:00	Day	64	81	39	71	69	58	44	4
14:00	Day	57	80	37	68	59	48	40	4
15:00	Day	61	76	37	69	67	49	40	1
16:00	Day	61	88	37	68	65	49	41	1
17:00	Day	61	81	38	71	65	46	41	1
18:00	Day	57	83	36	69	57	45	39	2
19:00	Day	63	77	41	70	67	53	44	2
20:00	Day	53	76	38	64	54	47	43	1
21:00	Day	54	72	42	64	57	52	46	1
22:00	Night	57	71	47	64	61	53	50	1
23:00	Night	55	66	49	62	57	54	52	1
Overall	Max	64	88	49	71	69	58	52	4
	Median	57	76	38	67	59	49	43	1
	Min	52	66	36	60	54	42	39	1
Daytime 7am-10pm	Max	64	88	42	71	69	58	46	4
	Median	59	80	37	69	62	48	41	1
	Min	53	72	36	64	54	42	39	1
Nighttime 10pm-7am	Max	57	75	49	66	61	56	52	2
	Median	55	72	44	64	57	50	47	1
	Min	52	66	37	60	54	44	41	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/14/2012

24hr Summary

L_{DN} = 64 dBA | C_{NEL} = 65 dBA | $L_{eq(24hr)}$ = 61 dBA



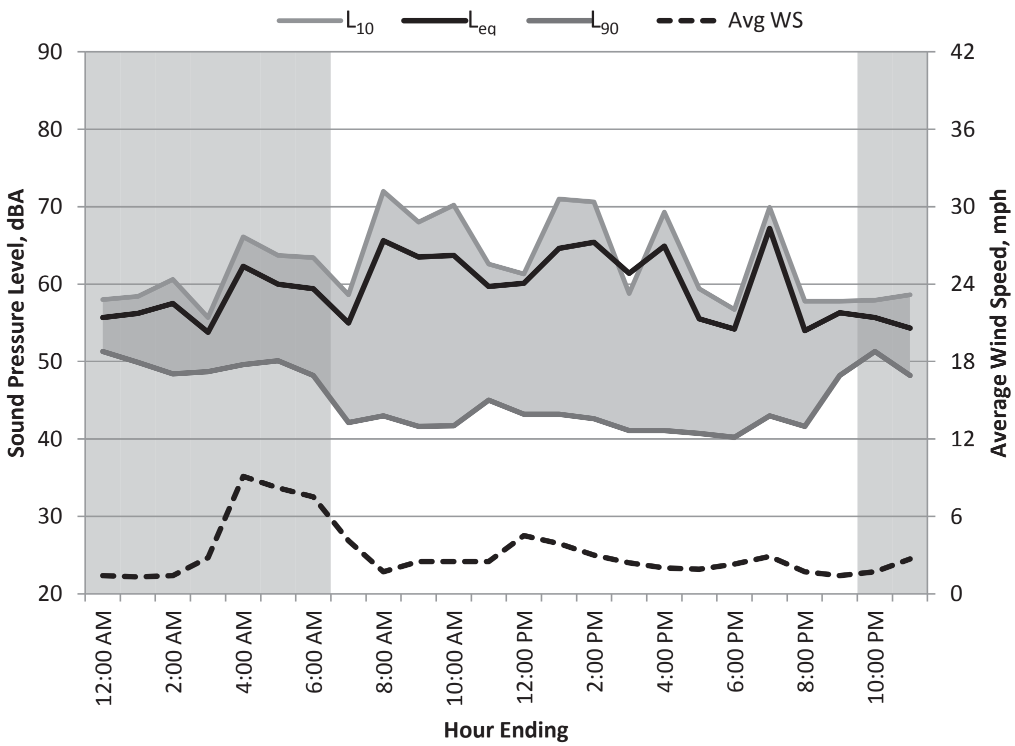
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	57	73	49	61	59	56	54	1
1:00	Night	56	68	50	60	59	53	51	1
2:00	Night	52	74	46	56	53	50	48	1
3:00	Night	54	75	48	61	54	52	49	1
4:00	Night	54	74	43	64	53	49	46	1
5:00	Night	59	72	42	67	65	50	47	1
6:00	Night	59	86	36	70	58	43	39	1
7:00	Day	52	73	36	65	51	43	38	1
8:00	Day	54	72	37	66	56	45	40	2
9:00	Day	66	82	38	73	70	60	42	3
10:00	Day	65	80	37	72	70	52	40	3
11:00	Day	53	79	36	65	53	43	39	3
12:00	Day	64	76	36	73	71	45	39	2
13:00	Day	58	84	37	70	58	46	40	1
14:00	Day	64	81	40	72	70	48	43	2
15:00	Day	55	74	38	67	59	47	41	2
16:00	Day	64	77	37	73	71	48	40	2
17:00	Day	56	80	37	68	57	47	41	1
18:00	Day	64	81	37	72	70	47	39	1
19:00	Day	66	71	36	70	69	66	39	1
20:00	Day	59	73	35	69	65	48	39	1
21:00	Day	56	69	44	63	58	54	51	1
22:00	Night	58	72	50	66	62	56	53	1
23:00	Night	57	68	46	64	61	56	50	1
Overall	Max	66	86	50	73	71	66	54	3
	Median	58	74	37	67	59	49	41	1
	Min	52	68	35	56	51	43	38	1
Daytime 7am-10pm	Max	66	84	44	73	71	66	51	3
	Median	59	77	37	70	65	47	40	2
	Min	52	69	35	63	51	43	38	1
Nighttime 10pm-7am	Max	59	86	50	70	65	56	54	1
	Median	57	73	46	64	59	52	49	1
	Min	52	68	36	56	53	43	39	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/15/2012

24hr Summary

L_{DN} = 66 dBA C_{NEL} = 66 dBA $L_{eq(24hr)}$ = 61 dBA



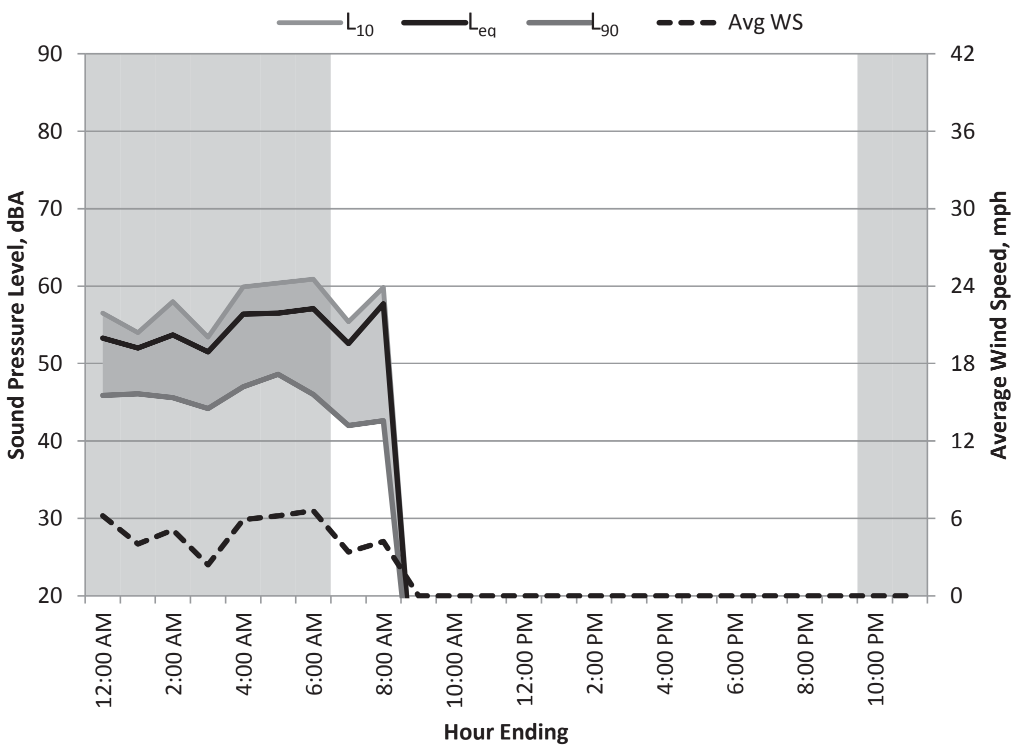
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	56	71	48	61	58	55	51	1
1:00	Night	56	64	47	60	58	56	50	1
2:00	Night	58	65	45	64	61	56	48	1
3:00	Night	54	66	46	61	56	52	49	3
4:00	Night	62	79	46	72	66	58	50	9
5:00	Night	60	77	46	70	64	56	50	8
6:00	Night	59	74	43	69	63	55	48	8
7:00	Day	55	72	39	67	59	48	42	4
8:00	Day	66	75	40	73	72	51	43	2
9:00	Day	64	89	39	72	68	50	42	3
10:00	Day	64	79	37	73	70	49	42	3
11:00	Day	60	79	40	72	63	51	45	3
12:00	Day	60	83	39	72	61	51	43	5
13:00	Day	65	75	40	73	71	52	43	4
14:00	Day	65	80	39	73	71	54	43	3
15:00	Day	61	91	38	70	59	46	41	2
16:00	Day	65	75	39	71	69	56	41	2
17:00	Day	56	70	38	67	59	45	41	2
18:00	Day	54	77	38	66	57	44	40	2
19:00	Day	67	84	38	71	70	68	43	3
20:00	Day	54	77	39	65	58	47	42	2
21:00	Day	56	80	44	64	58	54	48	1
22:00	Night	56	72	42	64	58	54	51	2
23:00	Night	54	69	42	61	59	51	48	3
Overall	Max	67	91	48	73	72	68	51	9
	Median	60	76	40	70	61	52	43	3
	Min	54	64	37	60	56	44	40	1
Daytime	Max	67	91	44	73	72	68	48	5
7am-10pm	Median	61	79	39	71	63	51	42	3
	Min	54	70	37	64	57	44	40	1
Nighttime	Max	62	79	48	72	66	58	51	9
10pm-7am	Median	56	71	46	64	59	55	50	3
	Min	54	64	42	60	56	51	48	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 8/16/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



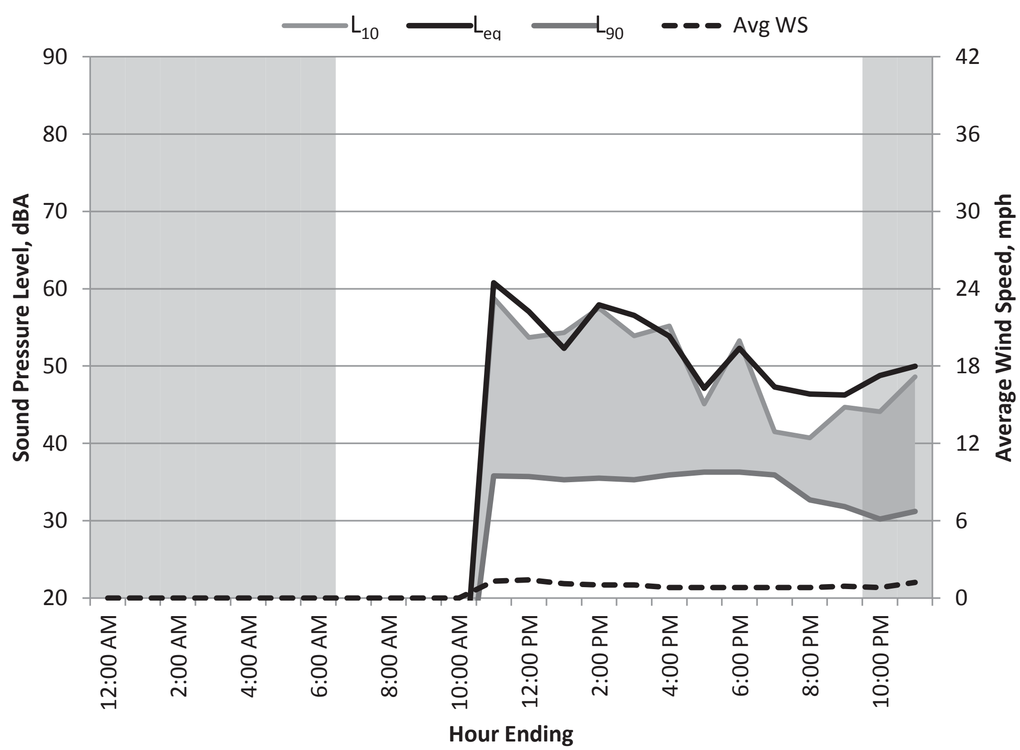
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	69	42	63	57	51	46	6
1:00	Night	52	72	42	60	54	50	46	4
2:00	Night	54	69	43	64	58	49	46	5
3:00	Night	52	71	43	64	53	46	44	2
4:00	Night	56	76	45	66	60	50	47	6
5:00	Night	57	70	45	66	60	53	49	6
6:00	Night	57	73	41	67	61	53	46	7
7:00	Day	53	71	38	65	55	46	42	3
8:00	Day	58	82	39	69	60	48	43	4
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	--	--	--	--	--	--	--	--
12:00	Day	--	--	--	--	--	--	--	--
13:00	Day	--	--	--	--	--	--	--	--
14:00	Day	--	--	--	--	--	--	--	--
15:00	Day	--	--	--	--	--	--	--	--
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	--	--	--	--	--	--	--	--
18:00	Day	--	--	--	--	--	--	--	--
19:00	Day	--	--	--	--	--	--	--	--
20:00	Day	--	--	--	--	--	--	--	--
21:00	Day	--	--	--	--	--	--	--	--
22:00	Night	--	--	--	--	--	--	--	--
23:00	Night	--	--	--	--	--	--	--	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime	Max	--	--	--	--	--	--	--	--
7am-10pm	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime	Max	--	--	--	--	--	--	--	--
10pm-7am	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

Appendix H
ST-3 December Measurements

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	12/5/2012

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



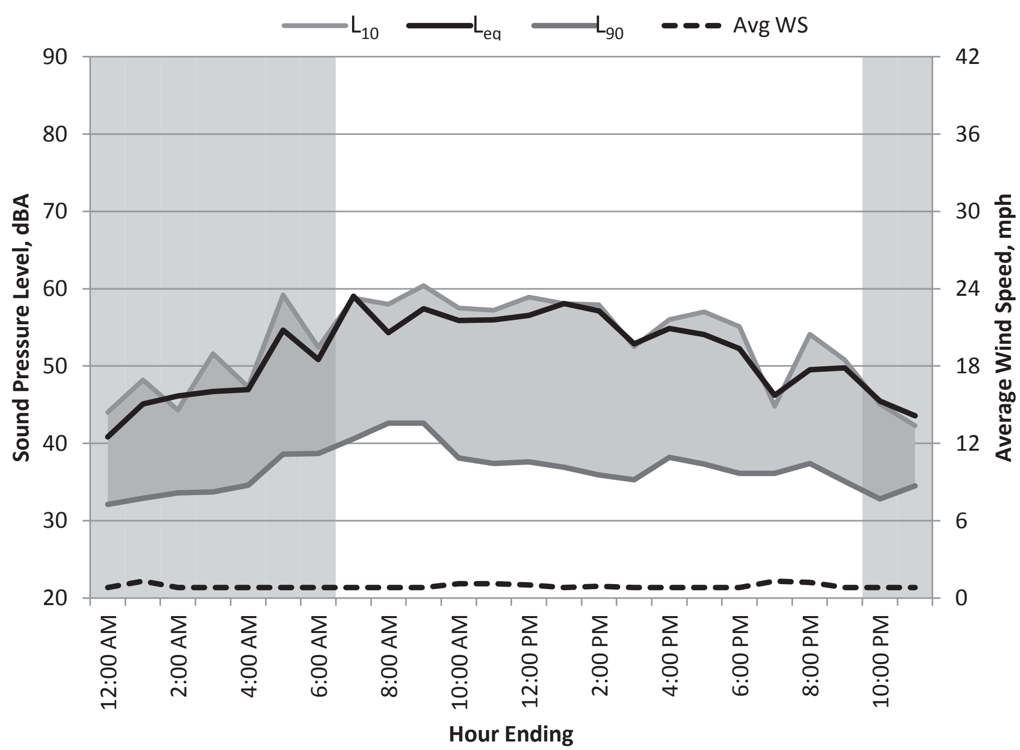
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	--	--	--	--	--	--	--	--
1:00	Night	--	--	--	--	--	--	--	--
2:00	Night	--	--	--	--	--	--	--	--
3:00	Night	--	--	--	--	--	--	--	--
4:00	Night	--	--	--	--	--	--	--	--
5:00	Night	--	--	--	--	--	--	--	--
6:00	Night	--	--	--	--	--	--	--	--
7:00	Day	--	--	--	--	--	--	--	--
8:00	Day	--	--	--	--	--	--	--	--
9:00	Day	--	--	--	--	--	--	--	--
10:00	Day	--	--	--	--	--	--	--	--
11:00	Day	61	89	34	70	59	45	36	1
12:00	Day	57	84	34	66	54	40	36	1
13:00	Day	52	73	34	65	54	39	35	1
14:00	Day	58	85	34	69	58	41	36	1
15:00	Day	57	85	34	68	54	39	35	1
16:00	Day	54	76	35	66	55	43	36	1
17:00	Day	47	70	35	60	45	38	36	1
18:00	Day	52	78	35	63	53	39	36	1
19:00	Day	47	68	34	62	42	38	36	1
20:00	Day	46	70	28	60	41	37	33	1
21:00	Day	46	63	24	60	45	37	32	1
22:00	Night	49	67	25	63	44	34	30	1
23:00	Night	50	67	26	63	49	37	31	1
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime 7am-10pm	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime 10pm-7am	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/6/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 54 dBA

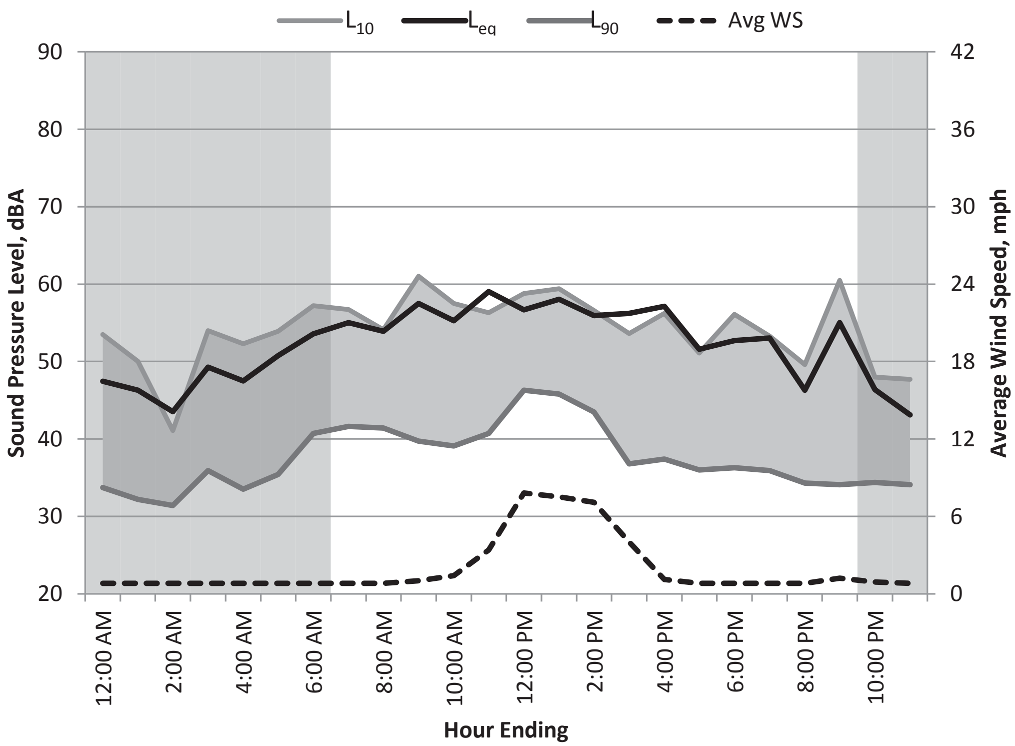


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	41	55	26	50	44	38	32	1
1:00	Night	45	62	30	58	48	37	33	1
2:00	Night	46	66	30	59	44	38	34	1
3:00	Night	47	59	30	57	52	39	34	1
4:00	Night	47	65	31	59	47	39	35	1
5:00	Night	55	73	35	66	59	46	39	1
6:00	Night	51	69	34	64	52	43	39	1
7:00	Day	59	82	35	71	59	45	41	1
8:00	Day	54	75	39	65	58	47	43	1
9:00	Day	57	78	39	69	60	48	43	1
10:00	Day	56	79	35	67	58	46	38	1
11:00	Day	56	79	36	68	57	44	37	1
12:00	Day	57	81	36	69	59	46	38	1
13:00	Day	58	80	34	70	58	43	37	1
14:00	Day	57	84	35	68	58	42	36	1
15:00	Day	53	76	34	65	53	39	35	1
16:00	Day	55	76	35	67	56	43	38	1
17:00	Day	54	77	35	65	57	42	37	1
18:00	Day	52	71	34	65	55	40	36	1
19:00	Day	46	69	35	58	45	38	36	1
20:00	Day	50	67	34	61	54	41	37	1
21:00	Day	50	74	30	62	51	40	35	1
22:00	Night	45	63	28	60	45	38	33	1
23:00	Night	44	60	31	56	42	38	35	1
Overall	Max	59	84	39	71	60	48	43	1
	Median	53	73	34	65	55	42	37	1
	Min	41	55	26	50	42	37	32	1
Daytime	Max	59	84	39	71	60	48	43	1
7am-10pm	Median	55	77	35	67	57	43	37	1
	Min	46	67	30	58	45	38	35	1
Nighttime	Max	55	73	35	66	59	46	39	1
10pm-7am	Median	46	63	30	59	47	38	34	1
	Min	41	55	26	50	42	37	32	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/7/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 54 dBA

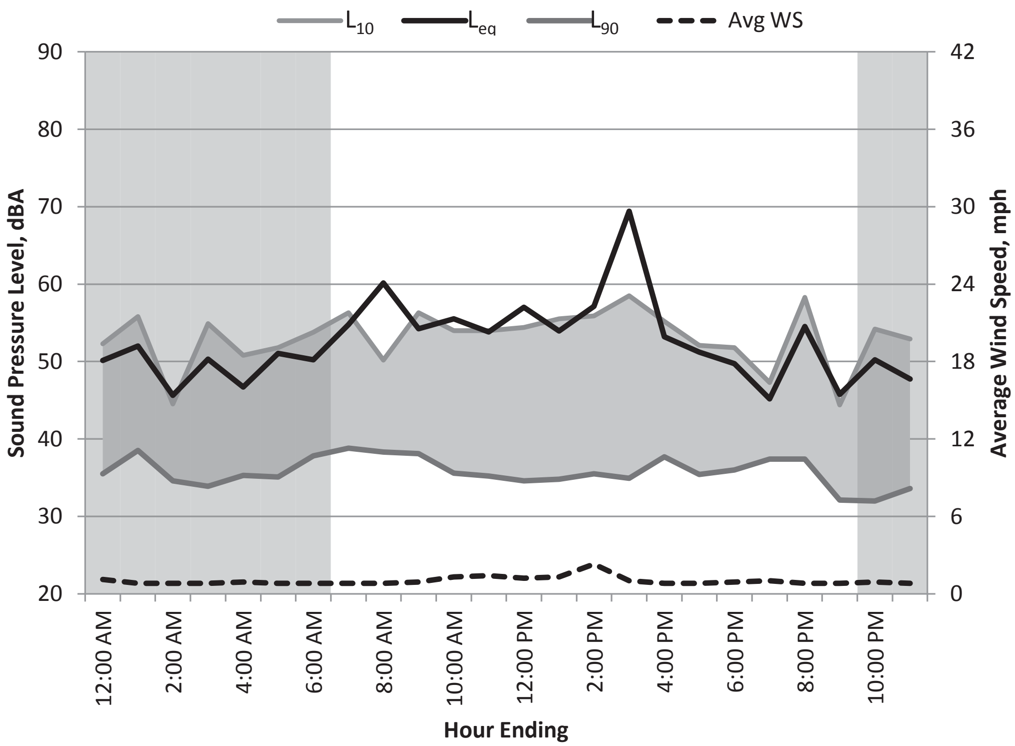


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	60	29	58	54	39	34	1
1:00	Night	46	64	27	58	50	37	32	1
2:00	Night	44	66	29	57	41	35	31	1
3:00	Night	49	65	31	61	54	41	36	1
4:00	Night	47	66	29	59	52	38	34	1
5:00	Night	51	72	32	64	54	38	35	1
6:00	Night	54	71	37	65	57	45	41	1
7:00	Day	55	76	38	68	57	45	42	1
8:00	Day	54	75	39	67	54	45	41	1
9:00	Day	57	81	36	68	61	48	40	1
10:00	Day	55	76	37	68	58	46	39	1
11:00	Day	59	84	36	70	56	47	41	3
12:00	Day	57	78	42	68	59	52	46	8
13:00	Day	58	80	41	69	59	52	46	8
14:00	Day	56	79	39	68	57	49	44	7
15:00	Day	56	82	35	67	54	41	37	4
16:00	Day	57	79	35	70	56	43	37	1
17:00	Day	52	80	35	61	51	38	36	1
18:00	Day	53	70	34	64	56	40	36	1
19:00	Day	53	81	35	61	53	38	36	1
20:00	Day	46	68	29	57	50	38	34	1
21:00	Day	55	68	29	66	61	40	34	1
22:00	Night	46	70	27	59	48	40	34	1
23:00	Night	43	57	30	53	48	39	34	1
Overall	Max	59	84	42	70	61	52	46	8
	Median	53	74	35	65	54	41	36	1
	Min	43	57	27	53	41	35	31	1
Daytime	Max	59	84	42	70	61	52	46	8
7am-10pm	Median	55	79	36	68	56	45	39	1
	Min	46	68	29	57	50	38	34	1
Nighttime	Max	54	72	37	65	57	45	41	1
10pm-7am	Median	47	66	29	59	52	39	34	1
	Min	43	57	27	53	41	35	31	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	12/8/2012

24hr Summary

L_{DN} = 60 dBA C_{NEL} = 60 dBA $L_{eq(24hr)}$ = 58 dBA



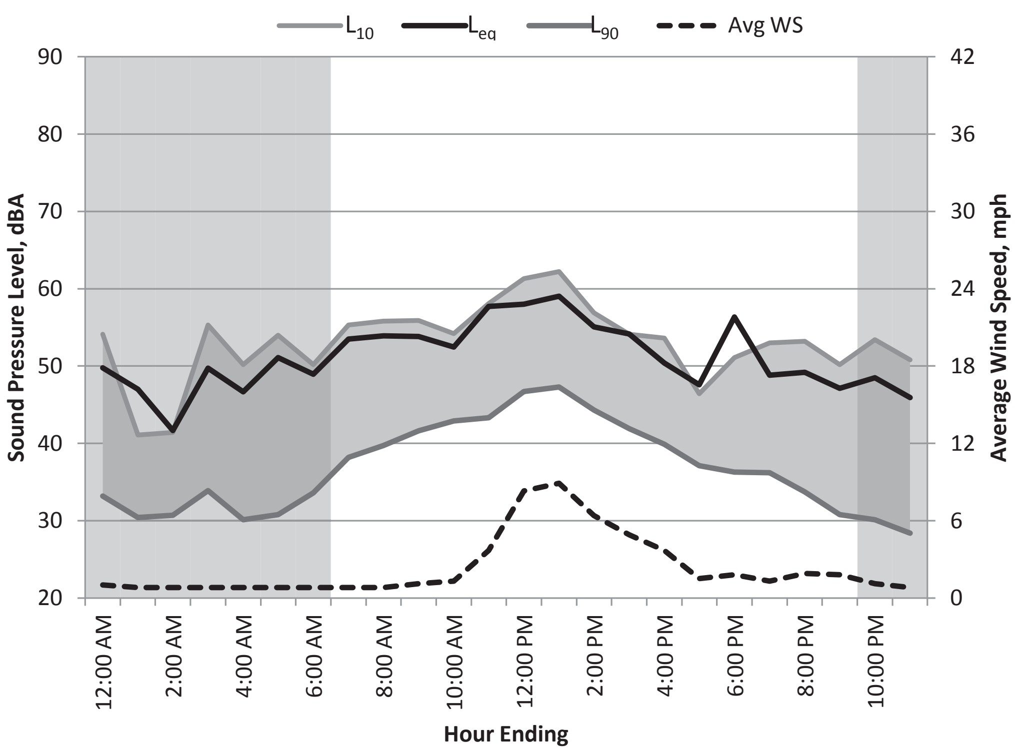
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	70	30	61	52	40	36	1
1:00	Night	52	66	34	63	56	45	39	1
2:00	Night	46	61	31	59	45	38	35	1
3:00	Night	50	66	29	62	55	40	34	1
4:00	Night	47	64	32	58	51	40	35	1
5:00	Night	51	70	32	65	52	40	35	1
6:00	Night	50	72	35	62	54	41	38	1
7:00	Day	55	79	35	68	56	43	39	1
8:00	Day	60	88	36	71	50	41	38	1
9:00	Day	54	79	36	66	56	44	38	1
10:00	Day	56	78	34	68	54	40	36	1
11:00	Day	54	77	34	66	54	40	35	1
12:00	Day	57	83	33	69	54	38	35	1
13:00	Day	54	81	33	65	56	39	35	1
14:00	Day	57	81	34	69	56	42	36	2
15:00	Day	69	98	34	76	59	38	35	1
16:00	Day	53	74	35	65	55	42	38	1
17:00	Day	51	72	34	65	52	38	35	1
18:00	Day	50	71	34	63	52	39	36	1
19:00	Day	45	66	35	56	47	40	37	1
20:00	Day	55	69	31	67	58	43	37	1
21:00	Day	46	72	29	58	44	36	32	1
22:00	Night	50	66	27	62	54	37	32	1
23:00	Night	48	61	27	59	53	38	34	1
Overall	Max	69	98	36	76	59	45	39	2
	Median	52	72	34	65	54	40	35	1
	Min	45	61	27	56	44	36	32	1
Daytime	Max	69	98	36	76	59	44	39	2
7am-10pm	Median	54	78	34	66	54	40	36	1
	Min	45	66	29	56	44	36	32	1
Nighttime	Max	52	72	35	65	56	45	39	1
10pm-7am	Median	50	66	31	62	53	40	35	1
	Min	46	61	27	58	45	37	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/9/2012

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 53 dBA

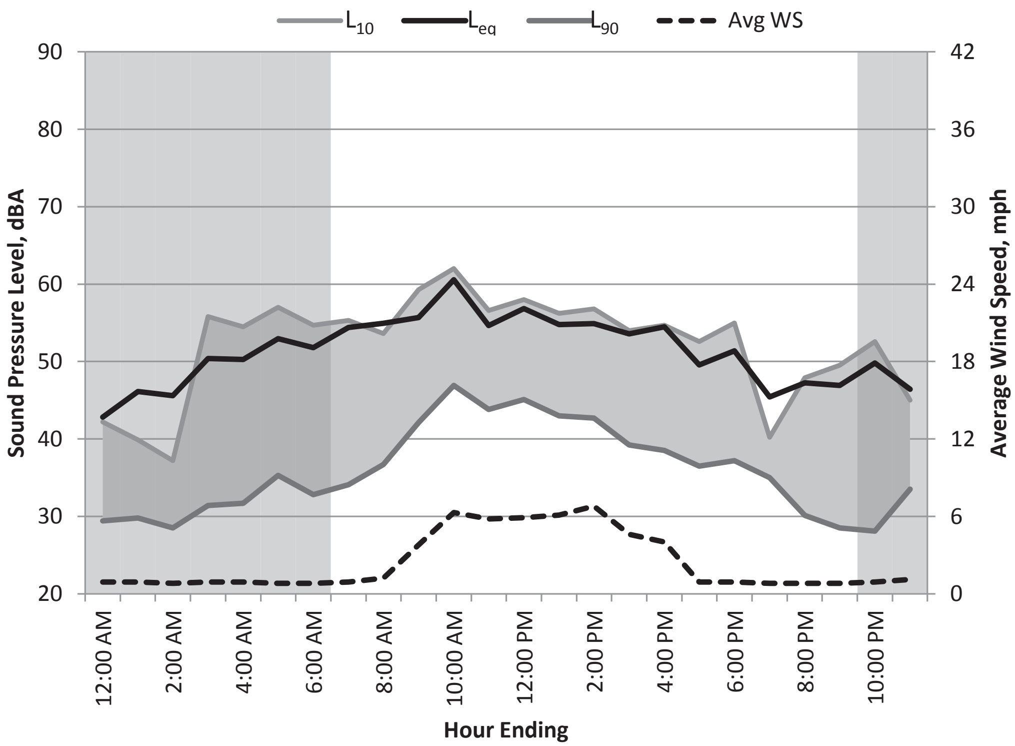


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	64	29	61	54	40	33	1
1:00	Night	47	67	28	62	41	36	30	1
2:00	Night	42	60	28	55	41	33	31	1
3:00	Night	50	63	30	61	55	38	34	1
4:00	Night	47	70	27	57	50	35	30	1
5:00	Night	51	70	29	64	54	35	31	1
6:00	Night	49	71	28	62	50	40	34	1
7:00	Day	53	73	35	67	55	44	38	1
8:00	Day	54	79	37	65	56	44	40	1
9:00	Day	54	78	38	64	56	47	42	1
10:00	Day	52	72	36	64	54	48	43	1
11:00	Day	58	81	37	70	58	50	43	4
12:00	Day	58	80	43	68	61	53	47	8
13:00	Day	59	76	41	70	62	53	47	9
14:00	Day	55	80	41	66	57	49	44	6
15:00	Day	54	76	38	66	54	46	42	5
16:00	Day	50	71	37	61	54	45	40	4
17:00	Day	48	72	36	59	46	39	37	2
18:00	Day	56	85	35	65	51	41	36	2
19:00	Day	49	75	35	58	53	39	36	1
20:00	Day	49	72	30	60	53	37	34	2
21:00	Day	47	68	27	59	50	35	31	2
22:00	Night	48	61	27	60	53	36	30	1
23:00	Night	46	60	25	57	51	32	28	1
Overall	Max	59	85	43	70	62	53	47	9
	Median	50	72	35	62	54	40	36	1
	Min	42	60	25	55	41	32	28	1
Daytime	Max	59	85	43	70	62	53	47	9
7am-10pm	Median	54	76	37	65	54	45	40	2
	Min	47	68	27	58	46	35	31	1
Nighttime	Max	51	71	30	64	55	40	34	1
10pm-7am	Median	48	64	28	61	51	36	31	1
	Min	42	60	25	55	41	32	28	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/10/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 53 dBA



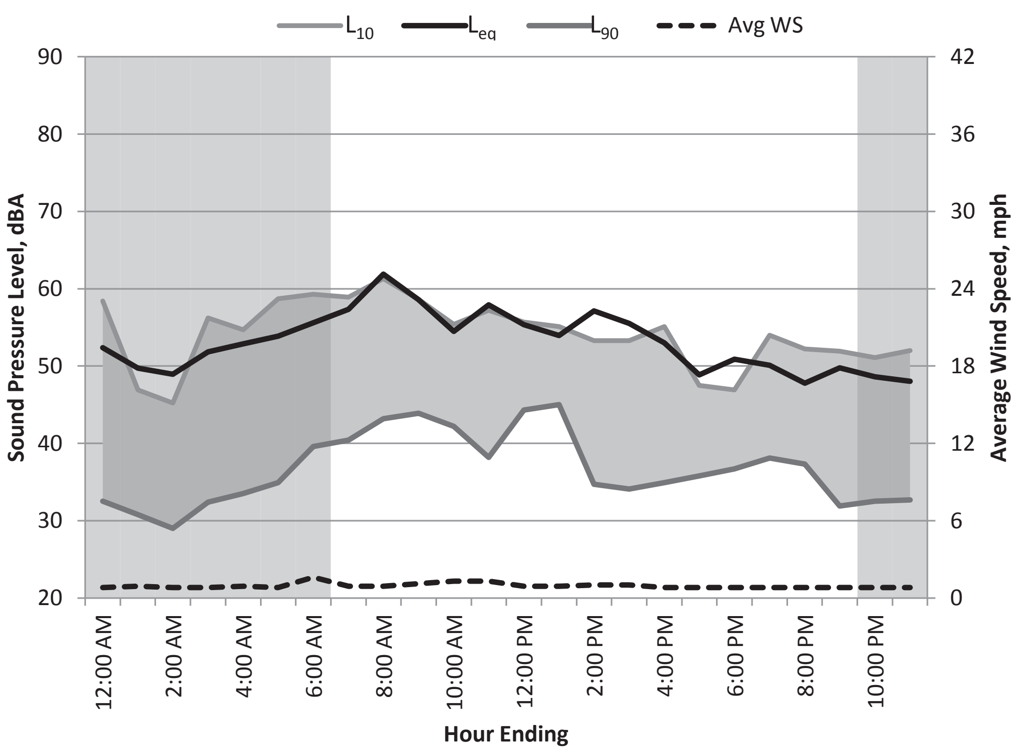
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	43	60	26	57	42	32	29	1
1:00	Night	46	65	28	60	40	32	30	1
2:00	Night	46	64	25	60	37	32	29	1
3:00	Night	50	68	28	62	56	36	31	1
4:00	Night	50	67	28	63	55	37	32	1
5:00	Night	53	70	30	65	57	41	35	1
6:00	Night	52	73	30	65	55	37	33	1
7:00	Day	54	78	30	67	55	38	34	1
8:00	Day	55	77	35	69	54	39	37	1
9:00	Day	56	75	37	67	59	49	42	4
10:00	Day	61	80	43	71	62	57	47	6
11:00	Day	55	75	39	66	57	49	44	6
12:00	Day	57	80	41	68	58	49	45	6
13:00	Day	55	80	37	65	56	49	43	6
14:00	Day	55	74	36	67	57	48	43	7
15:00	Day	54	77	37	66	54	44	39	5
16:00	Day	54	79	35	66	55	43	39	4
17:00	Day	50	70	35	61	53	38	37	1
18:00	Day	51	70	35	63	55	40	37	1
19:00	Day	45	63	34	59	40	37	35	1
20:00	Day	47	68	25	59	48	36	30	1
21:00	Day	47	72	25	59	50	32	29	1
22:00	Night	50	74	25	63	53	33	28	1
23:00	Night	46	64	27	61	45	39	34	1
Overall	Max	61	80	43	71	62	57	47	7
	Median	52	72	32	64	55	39	35	1
	Min	43	60	25	57	37	32	28	1
Daytime	Max	61	80	43	71	62	57	47	7
7am-10pm	Median	54	75	35	66	55	43	39	4
	Min	45	63	25	59	40	32	29	1
Nighttime	Max	53	74	30	65	57	41	35	1
10pm-7am	Median	50	67	28	62	53	36	31	1
	Min	43	60	25	57	37	32	28	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/11/2012

24hr Summary

L_{DN} = 59 dBA | C_{NEL} = 59 dBA | $L_{eq(24hr)}$ = 55 dBA



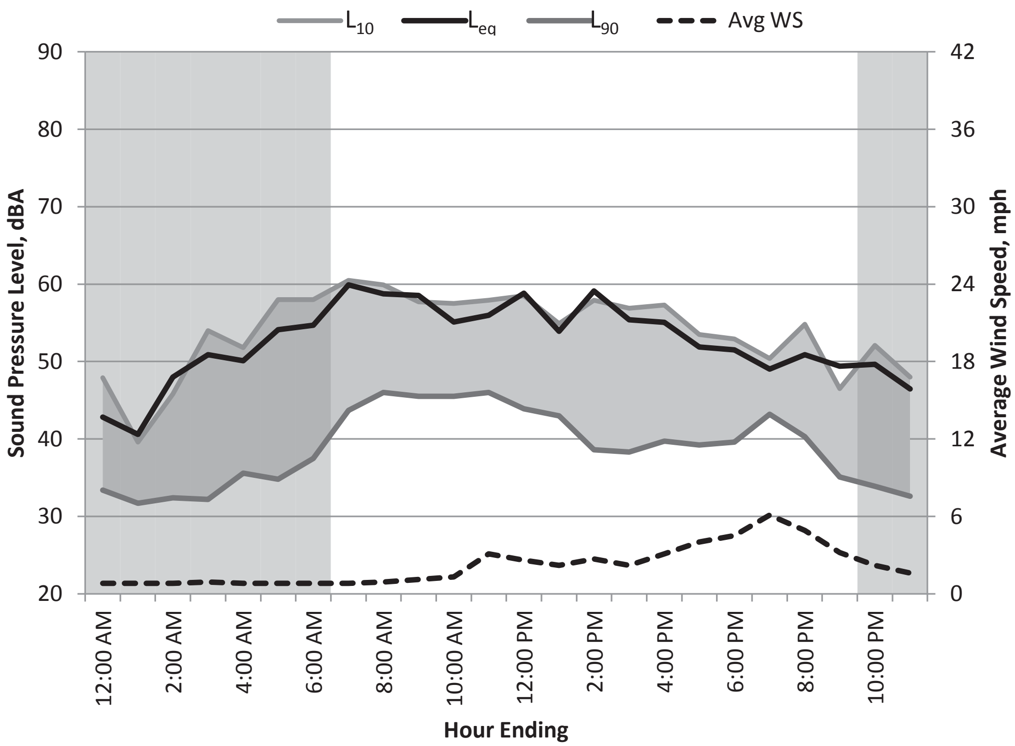
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	52	67	28	63	58	41	33	1
1:00	Night	50	65	25	63	47	37	31	1
2:00	Night	49	67	25	64	45	35	29	1
3:00	Night	52	67	27	65	56	40	32	1
4:00	Night	53	68	28	66	55	38	34	1
5:00	Night	54	69	31	66	59	41	35	1
6:00	Night	56	75	33	67	59	46	40	2
7:00	Day	57	83	35	68	59	47	40	1
8:00	Day	62	86	39	75	61	49	43	1
9:00	Day	59	83	40	70	59	47	44	1
10:00	Day	54	75	36	67	55	45	42	1
11:00	Day	58	83	34	70	57	45	38	1
12:00	Day	55	79	42	67	56	47	44	1
13:00	Day	54	75	43	66	55	47	45	1
14:00	Day	57	87	33	68	53	40	35	1
15:00	Day	56	83	33	67	53	38	34	1
16:00	Day	53	71	34	66	55	38	35	1
17:00	Day	49	71	34	62	48	37	36	1
18:00	Day	51	74	34	64	47	39	37	1
19:00	Day	50	67	36	62	54	41	38	1
20:00	Day	48	67	35	59	52	41	37	1
21:00	Day	50	73	28	62	52	39	32	1
22:00	Night	49	67	30	60	51	36	33	1
23:00	Night	48	64	29	60	52	37	33	1
Overall	Max	62	87	43	75	61	49	45	2
	Median	53	72	33	66	55	40	35	1
	Min	48	64	25	59	45	35	29	1
Daytime	Max	62	87	43	75	61	49	45	1
7am-10pm	Median	54	75	35	67	55	41	38	1
	Min	48	67	28	59	47	37	32	1
Nighttime	Max	56	75	33	67	59	46	40	2
10pm-7am	Median	52	67	28	64	55	38	33	1
	Min	48	64	25	60	45	35	29	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/12/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 55 dBA

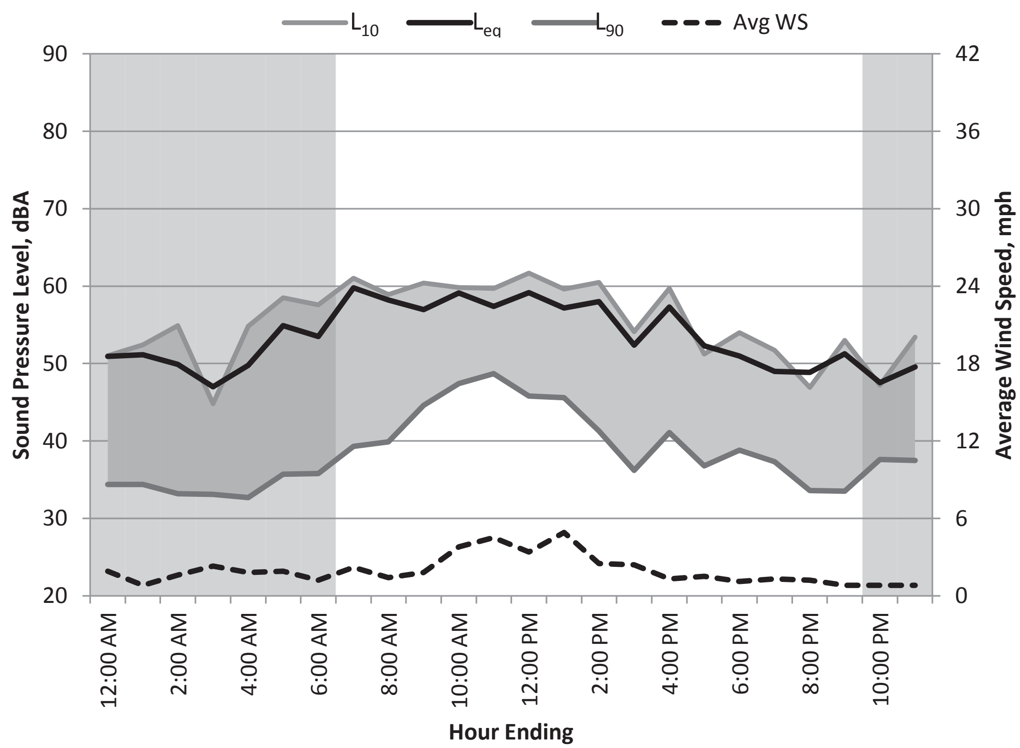


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	43	55	30	53	48	37	33	1
1:00	Night	41	59	29	54	40	34	32	1
2:00	Night	48	63	28	61	46	36	32	1
3:00	Night	51	68	29	64	54	40	32	1
4:00	Night	50	72	32	62	52	40	36	1
5:00	Night	54	71	31	66	58	40	35	1
6:00	Night	55	75	34	66	58	44	38	1
7:00	Day	60	86	38	69	61	50	44	1
8:00	Day	59	81	44	72	60	48	46	1
9:00	Day	59	83	41	70	58	48	46	1
10:00	Day	55	76	43	67	58	49	46	1
11:00	Day	56	78	42	67	58	49	46	3
12:00	Day	59	83	42	71	59	47	44	3
13:00	Day	54	80	36	66	55	47	43	2
14:00	Day	59	83	36	72	58	45	39	3
15:00	Day	55	79	36	68	57	44	38	2
16:00	Day	55	76	36	68	57	44	40	3
17:00	Day	52	78	36	64	54	42	39	4
18:00	Day	52	79	37	62	53	43	40	5
19:00	Day	49	68	39	59	50	46	43	6
20:00	Day	51	72	37	61	55	44	40	5
21:00	Day	49	75	30	60	47	41	35	3
22:00	Night	50	67	30	63	52	38	34	2
23:00	Night	46	65	28	59	48	38	33	2
Overall	Max	60	86	44	72	61	50	46	6
	Median	53	76	36	65	55	44	39	2
	Min	41	55	28	53	40	34	32	1
Daytime	Max	60	86	44	72	61	50	46	6
7am-10pm	Median	55	79	37	67	57	46	43	3
	Min	49	68	30	59	47	41	35	1
Nighttime	Max	55	75	34	66	58	44	38	2
10pm-7am	Median	50	67	30	62	52	38	33	1
	Min	41	55	28	53	40	34	32	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/13/2012

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 55 dBA

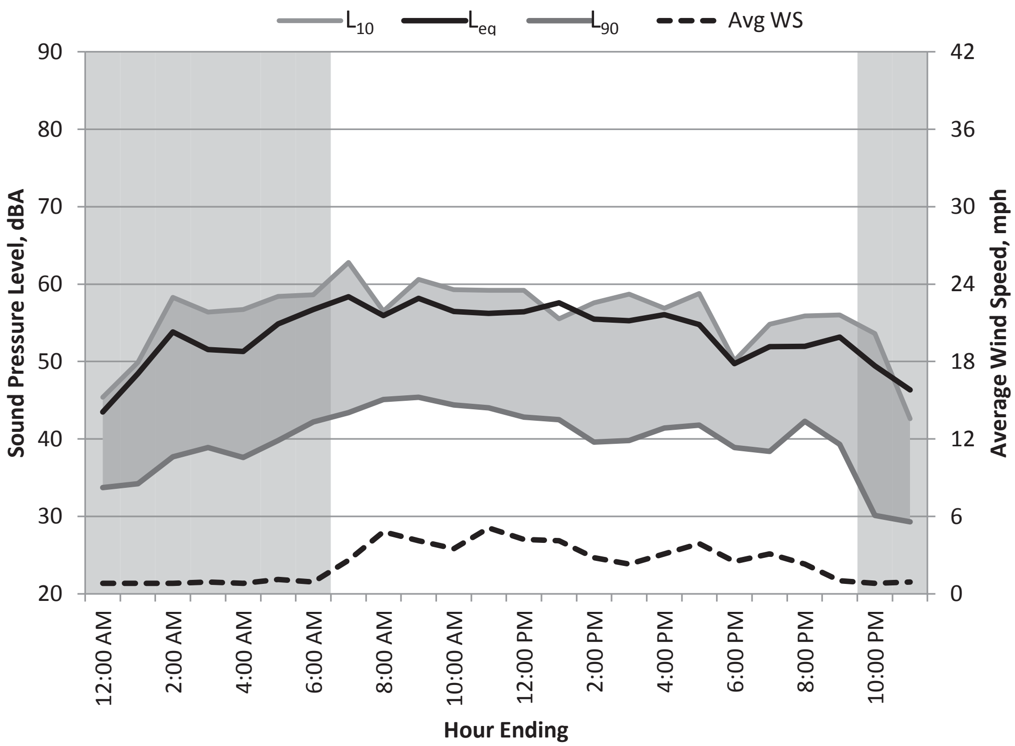


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	69	30	64	51	39	34	2
1:00	Night	51	68	28	66	52	40	34	1
2:00	Night	50	64	29	61	55	38	33	2
3:00	Night	47	67	29	60	45	37	33	2
4:00	Night	50	67	26	62	55	38	33	2
5:00	Night	55	75	30	67	59	41	36	2
6:00	Night	53	73	31	65	58	40	36	1
7:00	Day	60	83	35	73	61	46	39	2
8:00	Day	58	83	38	69	59	44	40	1
9:00	Day	57	76	36	68	60	49	45	2
10:00	Day	59	81	44	71	60	51	47	4
11:00	Day	57	78	45	68	60	52	49	5
12:00	Day	59	81	38	71	62	51	46	3
13:00	Day	57	79	42	67	60	52	46	5
14:00	Day	58	78	37	70	61	48	41	3
15:00	Day	52	77	35	65	54	41	36	2
16:00	Day	57	78	38	70	60	46	41	1
17:00	Day	52	76	35	65	51	42	37	2
18:00	Day	51	70	36	63	54	42	39	1
19:00	Day	49	73	36	59	52	40	37	1
20:00	Day	49	74	30	62	47	39	34	1
21:00	Day	51	75	29	63	53	41	34	1
22:00	Night	48	76	32	55	47	42	38	1
23:00	Night	50	65	34	61	53	43	38	1
Overall	Max	60	83	45	73	62	52	49	5
	Median	52	75	35	65	55	42	37	2
	Min	47	64	26	55	45	37	33	1
Daytime	Max	60	83	45	73	62	52	49	5
7am-10pm	Median	57	78	36	68	60	46	40	2
	Min	49	70	29	59	47	39	34	1
Nighttime	Max	55	76	34	67	59	43	38	2
10pm-7am	Median	50	68	30	62	53	40	34	2
	Min	47	64	26	55	45	37	33	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/14/2012

24hr Summary

L_{DN} = 59 dBA | C_{NEL} = 60 dBA | $L_{eq(24hr)}$ = 55 dBA

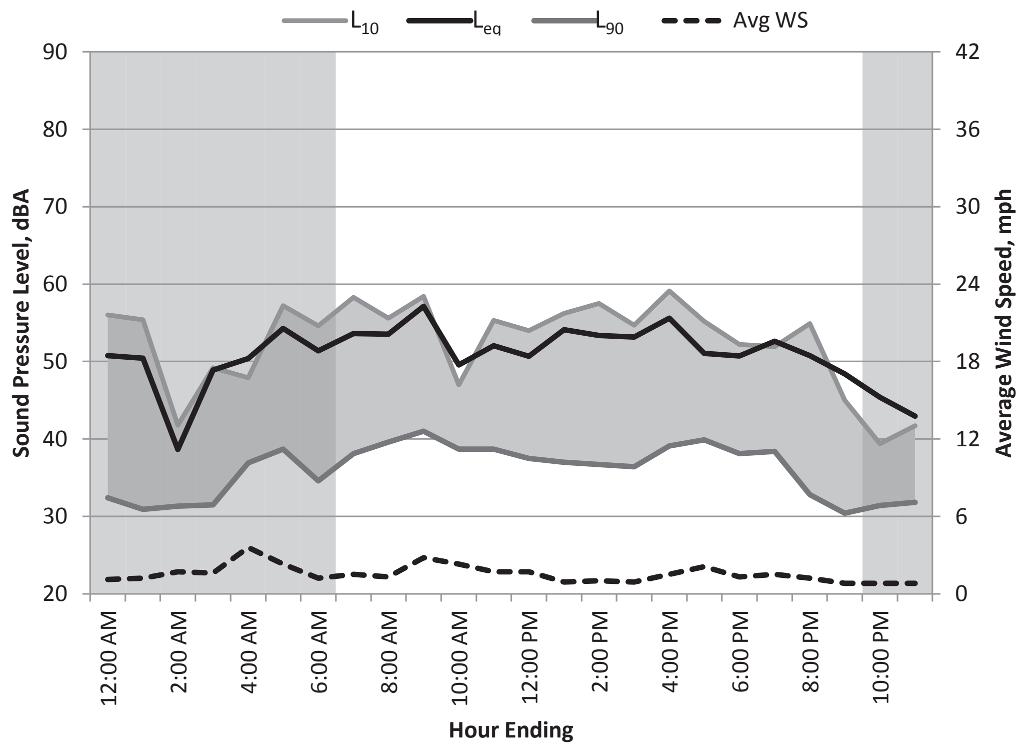


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	43	56	29	54	45	41	34	1
1:00	Night	48	70	30	60	50	39	34	1
2:00	Night	54	69	33	66	58	41	38	1
3:00	Night	52	65	35	63	56	43	39	1
4:00	Night	51	68	30	62	57	42	38	1
5:00	Night	55	74	30	67	58	46	40	1
6:00	Night	57	75	39	70	59	45	42	1
7:00	Day	58	75	38	70	63	47	43	3
8:00	Day	56	78	41	69	57	48	45	5
9:00	Day	58	82	41	69	61	49	45	4
10:00	Day	56	78	40	67	59	48	44	4
11:00	Day	56	78	41	67	59	47	44	5
12:00	Day	56	78	40	67	59	46	43	4
13:00	Day	58	85	39	68	56	46	43	4
14:00	Day	55	80	37	67	58	44	40	3
15:00	Day	55	81	37	66	59	45	40	2
16:00	Day	56	78	37	69	57	45	41	3
17:00	Day	55	72	37	66	59	45	42	4
18:00	Day	50	66	36	63	50	42	39	3
19:00	Day	52	77	36	63	55	41	38	3
20:00	Day	52	71	38	61	56	48	42	2
21:00	Day	53	75	35	65	56	44	39	1
22:00	Night	49	65	26	62	54	38	30	1
23:00	Night	46	69	26	58	43	34	29	1
Overall	Max	58	85	41	70	63	49	45	5
	Median	55	75	37	66	57	45	40	2
	Min	43	56	26	54	43	34	29	1
Daytime	Max	58	85	41	70	63	49	45	5
7am-10pm	Median	56	78	38	67	58	46	42	3
	Min	50	66	35	61	50	41	38	1
Nighttime	Max	57	75	39	70	59	46	42	1
10pm-7am	Median	51	69	30	62	56	41	38	1
	Min	43	56	26	54	43	34	29	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	12/15/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 52 dBA



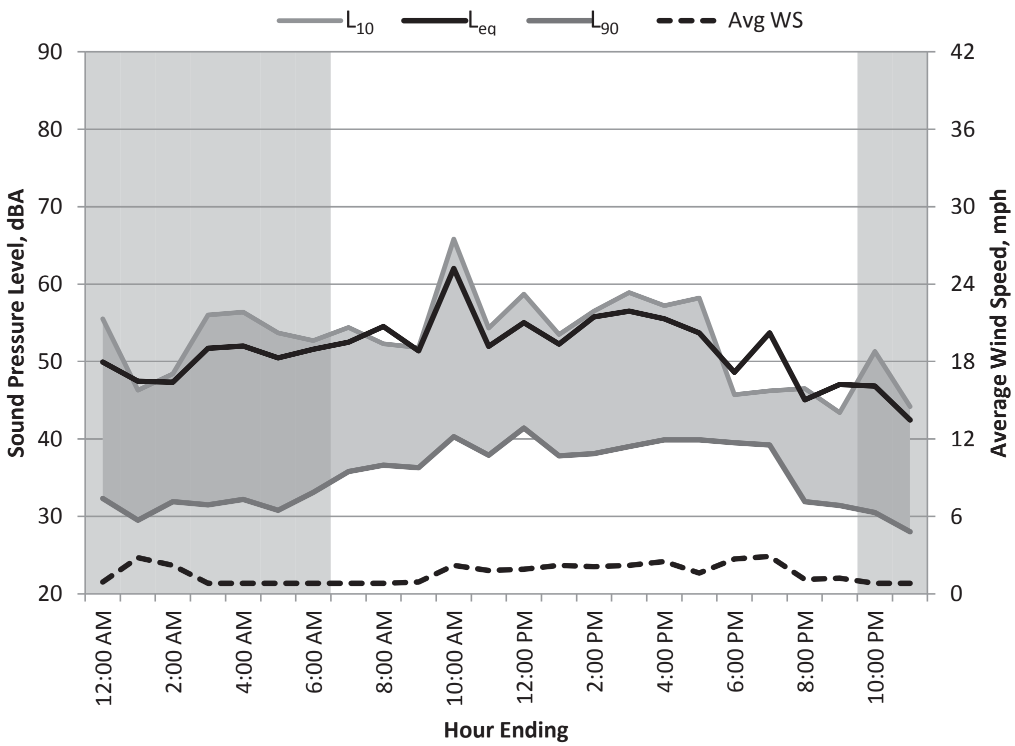
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	66	27	62	56	39	32	1
1:00	Night	50	66	27	63	55	37	31	1
2:00	Night	39	53	25	46	42	37	31	2
3:00	Night	49	64	27	61	49	38	32	2
4:00	Night	50	72	31	63	48	41	37	4
5:00	Night	54	74	35	67	57	44	39	2
6:00	Night	51	71	31	64	55	40	35	1
7:00	Day	54	73	33	64	58	43	38	2
8:00	Day	54	74	37	66	56	43	40	1
9:00	Day	57	82	39	68	58	44	41	3
10:00	Day	50	75	36	61	47	42	39	2
11:00	Day	52	71	36	64	55	42	39	2
12:00	Day	51	73	35	62	54	42	38	2
13:00	Day	54	77	34	65	56	41	37	1
14:00	Day	53	74	34	64	58	41	37	1
15:00	Day	53	74	34	66	55	44	36	1
16:00	Day	56	79	36	67	59	44	39	2
17:00	Day	51	74	37	61	55	43	40	2
18:00	Day	51	70	35	63	52	43	38	1
19:00	Day	53	82	35	62	52	42	38	2
20:00	Day	51	69	28	62	55	40	33	1
21:00	Day	48	75	26	61	45	34	30	1
22:00	Night	45	68	29	60	39	34	31	1
23:00	Night	43	60	28	56	42	36	32	1
Overall	Max	57	82	39	68	59	44	41	4
	Median	51	73	34	63	55	41	37	1
	Min	39	53	25	46	39	34	30	1
Daytime	Max	57	82	39	68	59	44	41	3
7am-10pm	Median	53	74	35	64	55	42	38	2
	Min	48	69	26	61	45	34	30	1
Nighttime	Max	54	74	35	67	57	44	39	4
10pm-7am	Median	50	66	28	62	49	38	32	1
	Min	39	53	25	46	39	34	31	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/16/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 54 dBA



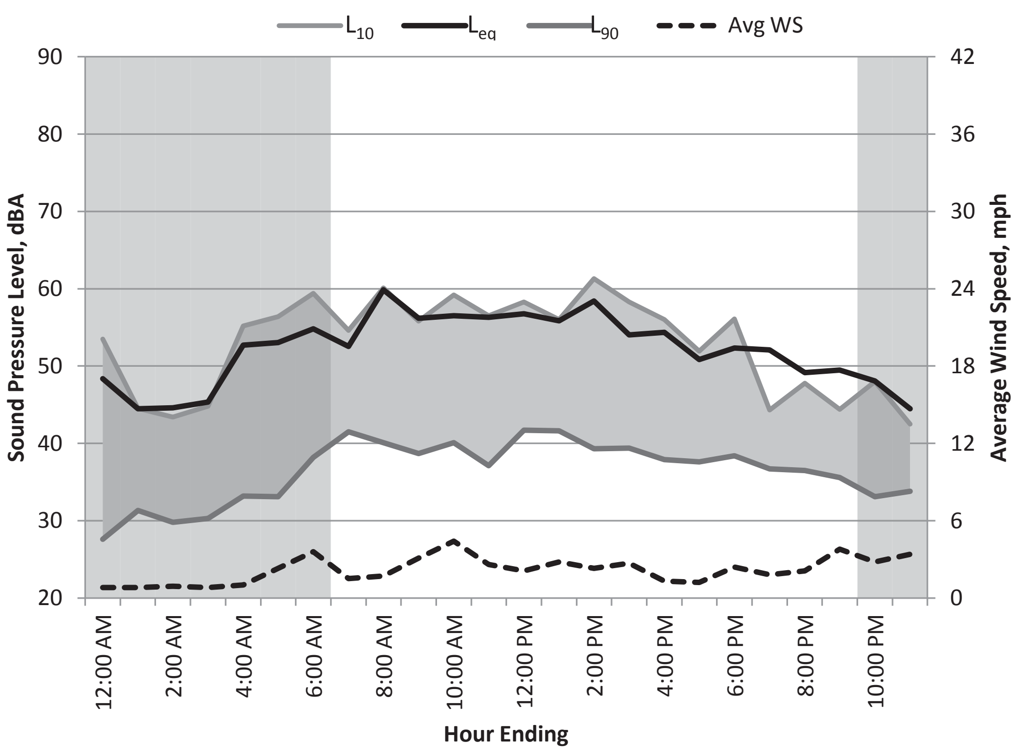
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	65	24	61	56	37	32	1
1:00	Night	47	66	25	61	46	36	30	3
2:00	Night	47	65	27	61	48	38	32	2
3:00	Night	52	66	27	64	56	36	32	1
4:00	Night	52	69	29	63	56	38	32	1
5:00	Night	50	68	27	63	54	37	31	1
6:00	Night	52	73	30	65	53	37	33	1
7:00	Day	52	72	31	66	54	43	36	1
8:00	Day	55	81	35	66	52	43	37	1
9:00	Day	51	78	35	63	52	39	36	1
10:00	Day	62	77	37	71	66	57	40	2
11:00	Day	52	73	35	64	54	42	38	2
12:00	Day	55	72	37	67	59	48	41	2
13:00	Day	52	75	36	65	54	42	38	2
14:00	Day	56	82	35	67	57	42	38	2
15:00	Day	57	78	35	69	59	43	39	2
16:00	Day	56	82	37	66	57	43	40	3
17:00	Day	54	74	35	64	58	43	40	2
18:00	Day	49	70	37	62	46	42	40	3
19:00	Day	54	82	36	59	46	42	39	3
20:00	Day	45	68	28	57	47	39	32	1
21:00	Day	47	75	27	60	43	36	31	1
22:00	Night	47	66	27	59	51	35	31	1
23:00	Night	42	61	26	56	44	31	28	1
Overall	Max	62	82	37	71	66	57	41	3
	Median	52	73	33	64	54	40	36	1
	Min	42	61	24	56	43	31	28	1
Daytime	Max	62	82	37	71	66	57	41	3
7am-10pm	Median	54	75	35	65	54	42	38	2
	Min	45	68	27	57	43	36	31	1
Nighttime	Max	52	73	30	65	56	38	33	3
10pm-7am	Median	50	66	27	61	53	37	32	1
	Min	42	61	24	56	44	31	28	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/17/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 54 dBA



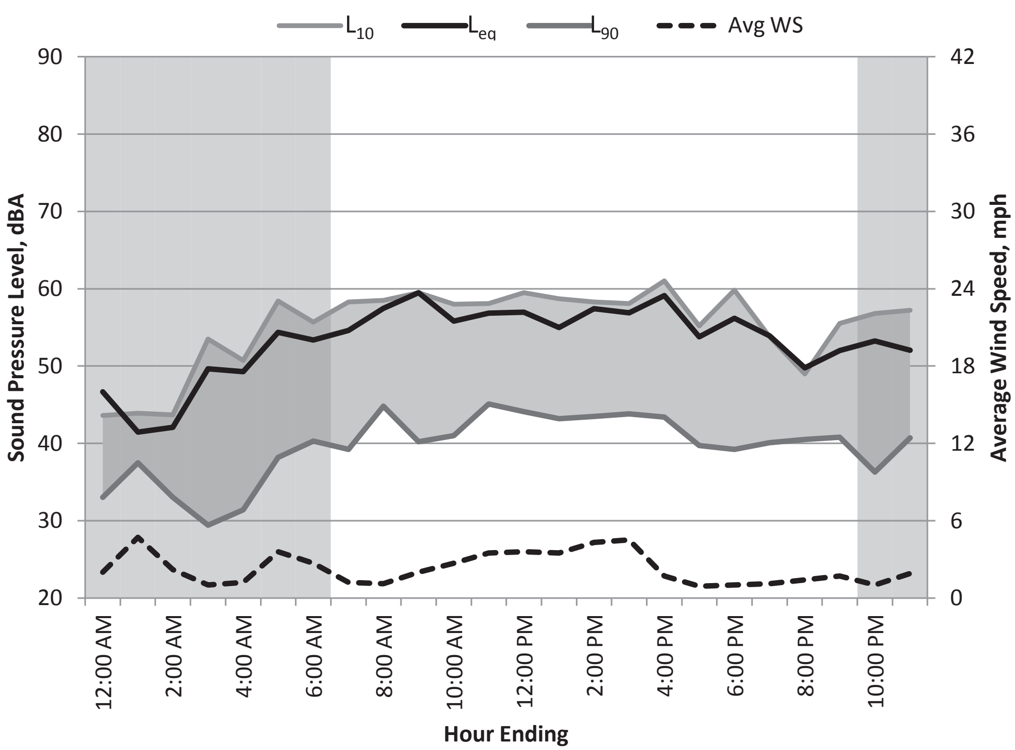
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	63	25	61	54	33	28	1
1:00	Night	44	62	27	59	45	38	31	1
2:00	Night	45	63	24	58	43	37	30	1
3:00	Night	45	64	27	59	45	36	30	1
4:00	Night	53	68	25	65	55	38	33	1
5:00	Night	53	70	26	66	56	39	33	2
6:00	Night	55	74	34	66	59	43	38	4
7:00	Day	53	73	39	65	55	45	42	2
8:00	Day	60	87	36	72	60	45	40	2
9:00	Day	56	81	35	68	56	42	39	3
10:00	Day	57	79	36	68	59	45	40	4
11:00	Day	56	80	33	68	57	42	37	3
12:00	Day	57	79	40	69	58	46	42	2
13:00	Day	56	79	39	69	56	45	42	3
14:00	Day	58	81	37	70	61	45	39	2
15:00	Day	54	75	37	65	58	43	39	3
16:00	Day	54	78	36	67	56	41	38	1
17:00	Day	51	72	35	65	52	41	38	1
18:00	Day	52	70	36	64	56	42	38	2
19:00	Day	52	81	35	61	44	39	37	2
20:00	Day	49	66	30	61	48	40	37	2
21:00	Day	49	67	29	63	44	39	36	4
22:00	Night	48	68	28	61	48	37	33	3
23:00	Night	44	61	30	58	43	37	34	3
Overall	Max	60	87	40	72	61	46	42	4
	Median	53	73	35	65	56	41	37	2
	Min	44	61	24	58	43	33	28	1
Daytime	Max	60	87	40	72	61	46	42	4
7am-10pm	Median	54	79	36	67	56	42	39	2
	Min	49	66	29	61	44	39	36	1
Nighttime	Max	55	74	34	66	59	43	38	4
10pm-7am	Median	48	64	27	61	48	37	33	1
	Min	44	61	24	58	43	33	28	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/18/2012

CH2MHILL

24hr Summary

L_{DN} = 59 dBA | C_{NEL} = 59 dBA | $L_{eq(24hr)}$ = 55 dBA



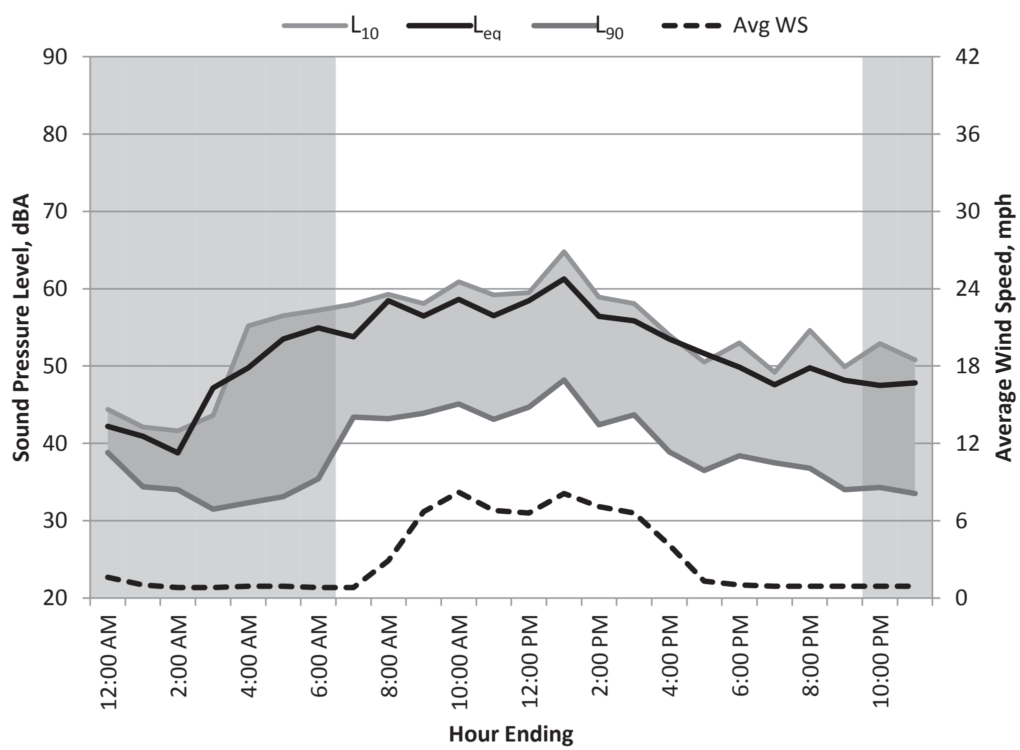
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	65	28	60	44	39	33	2
1:00	Night	41	50	33	46	44	41	38	5
2:00	Night	42	64	26	50	44	39	33	2
3:00	Night	50	69	24	62	54	35	29	1
4:00	Night	49	71	25	63	51	38	31	1
5:00	Night	54	71	33	66	58	45	38	4
6:00	Night	53	74	37	66	56	44	40	3
7:00	Day	55	75	34	67	58	45	39	1
8:00	Day	57	80	41	68	59	50	45	1
9:00	Day	59	85	36	71	60	46	40	2
10:00	Day	56	76	38	68	58	45	41	3
11:00	Day	57	79	40	69	58	48	45	4
12:00	Day	57	79	41	69	60	48	44	4
13:00	Day	55	72	38	66	59	48	43	4
14:00	Day	57	79	39	70	58	48	44	4
15:00	Day	57	79	40	69	58	47	44	5
16:00	Day	59	81	40	71	61	49	43	2
17:00	Day	54	78	38	64	55	43	40	1
18:00	Day	56	85	38	66	60	43	39	1
19:00	Day	54	84	37	61	54	44	40	1
20:00	Day	50	69	38	63	49	45	41	1
21:00	Day	52	75	34	60	56	48	41	2
22:00	Night	53	67	32	65	57	42	36	1
23:00	Night	52	65	35	62	57	45	41	2
Overall	Max	59	85	41	71	61	50	45	5
	Median	54	75	37	66	58	45	40	2
	Min	41	50	24	46	44	35	29	1
Daytime	Max	59	85	41	71	61	50	45	5
7am-10pm	Median	56	79	38	68	58	47	41	2
	Min	50	69	34	60	49	43	39	1
Nighttime	Max	54	74	37	66	58	45	41	5
10pm-7am	Median	50	67	32	62	54	41	36	2
	Min	41	50	24	46	44	35	29	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/19/2012

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 55 dBA



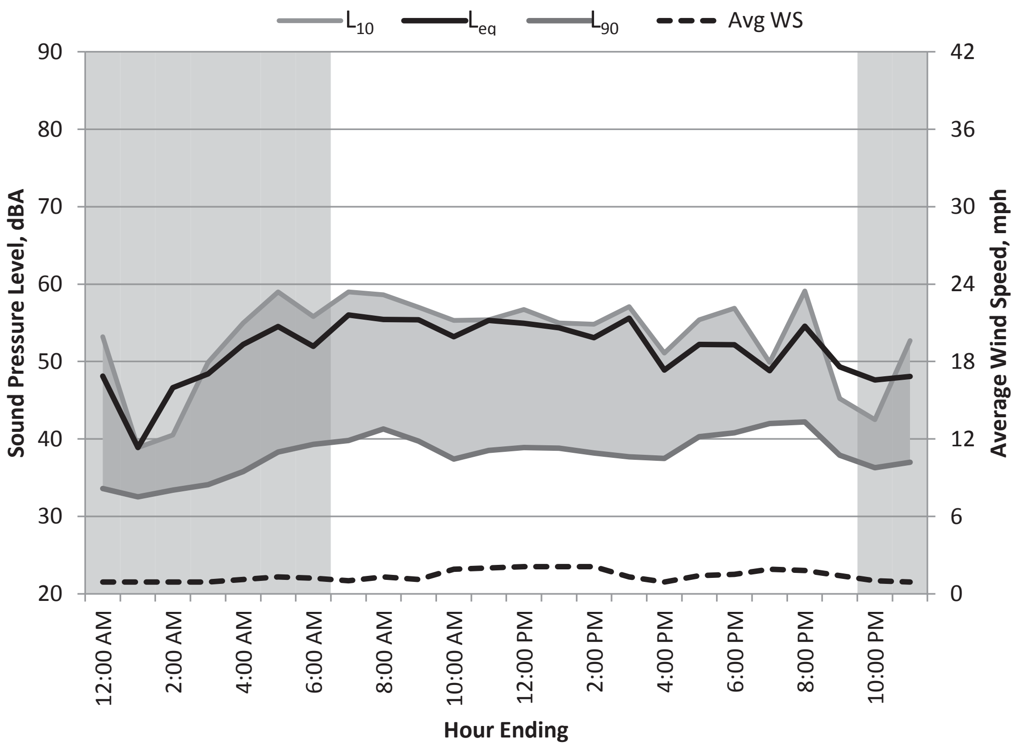
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	42	49	34	47	44	42	39	2
1:00	Night	41	59	31	53	42	38	34	1
2:00	Night	39	51	26	45	42	38	34	1
3:00	Night	47	63	28	61	44	37	32	1
4:00	Night	50	66	29	59	55	37	32	1
5:00	Night	53	69	28	66	57	38	33	1
6:00	Night	55	79	32	66	57	43	35	1
7:00	Day	54	75	40	64	58	46	43	1
8:00	Day	58	81	42	70	59	51	43	3
9:00	Day	56	78	40	68	58	50	44	7
10:00	Day	59	80	41	69	61	52	45	8
11:00	Day	57	78	38	68	59	49	43	7
12:00	Day	58	85	40	69	60	51	45	7
13:00	Day	61	79	43	72	65	55	48	8
14:00	Day	56	76	38	68	59	50	42	7
15:00	Day	56	78	39	67	58	49	44	7
16:00	Day	53	75	37	66	54	44	39	4
17:00	Day	52	78	35	63	51	38	37	1
18:00	Day	50	70	37	61	53	41	38	1
19:00	Day	48	67	36	61	49	40	38	1
20:00	Day	50	69	33	60	55	40	37	1
21:00	Day	48	74	31	59	50	37	34	1
22:00	Night	48	65	31	59	53	37	34	1
23:00	Night	48	63	30	60	51	36	34	1
Overall	Max	61	85	43	72	65	55	48	8
	Median	53	75	36	63	55	41	38	1
	Min	39	49	26	45	42	36	32	1
Daytime	Max	61	85	43	72	65	55	48	8
7am-10pm	Median	56	78	38	67	58	49	43	4
	Min	48	67	31	59	49	37	34	1
Nighttime	Max	55	79	34	66	57	43	39	2
10pm-7am	Median	48	63	30	59	51	38	34	1
	Min	39	49	26	45	42	36	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/20/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 53 dBA



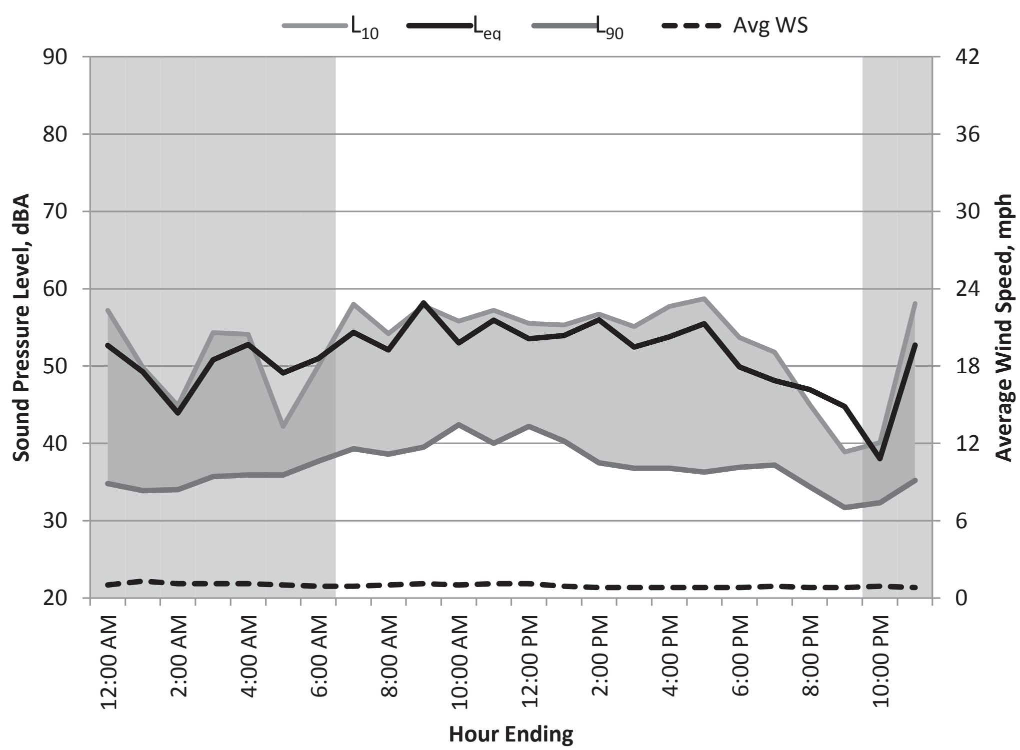
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	62	31	60	53	37	34	1
1:00	Night	39	59	29	50	39	35	33	1
2:00	Night	47	65	29	60	41	37	33	1
3:00	Night	48	66	31	62	50	37	34	1
4:00	Night	52	75	32	62	55	39	36	1
5:00	Night	55	73	35	67	59	42	38	1
6:00	Night	52	70	37	64	56	42	39	1
7:00	Day	56	77	36	68	59	44	40	1
8:00	Day	55	74	38	68	59	44	41	1
9:00	Day	55	77	37	68	57	44	40	1
10:00	Day	53	74	36	66	55	42	37	2
11:00	Day	55	78	36	69	55	43	39	2
12:00	Day	55	76	36	67	57	44	39	2
13:00	Day	54	77	36	67	55	43	39	2
14:00	Day	53	76	36	65	55	42	38	2
15:00	Day	56	76	35	68	57	44	38	1
16:00	Day	49	68	36	61	51	40	38	1
17:00	Day	52	73	37	64	55	43	40	1
18:00	Day	52	71	38	63	57	44	41	2
19:00	Day	49	71	40	60	50	44	42	2
20:00	Day	55	73	40	65	59	46	42	2
21:00	Day	49	73	35	61	45	41	38	1
22:00	Night	48	64	33	62	43	39	36	1
23:00	Night	48	62	34	59	53	40	37	1
Overall	Max	56	78	40	69	59	46	42	2
	Median	52	73	36	64	55	42	38	1
	Min	39	59	29	50	39	35	33	1
Daytime 7am-10pm	Max	56	78	40	69	59	46	42	2
	Median	54	74	36	66	55	44	39	2
	Min	49	68	35	60	45	40	37	1
Nighttime 10pm-7am	Max	55	75	37	67	59	42	39	1
	Median	48	65	32	62	53	39	36	1
	Min	39	59	29	50	39	35	33	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/21/2012

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 53 dBA



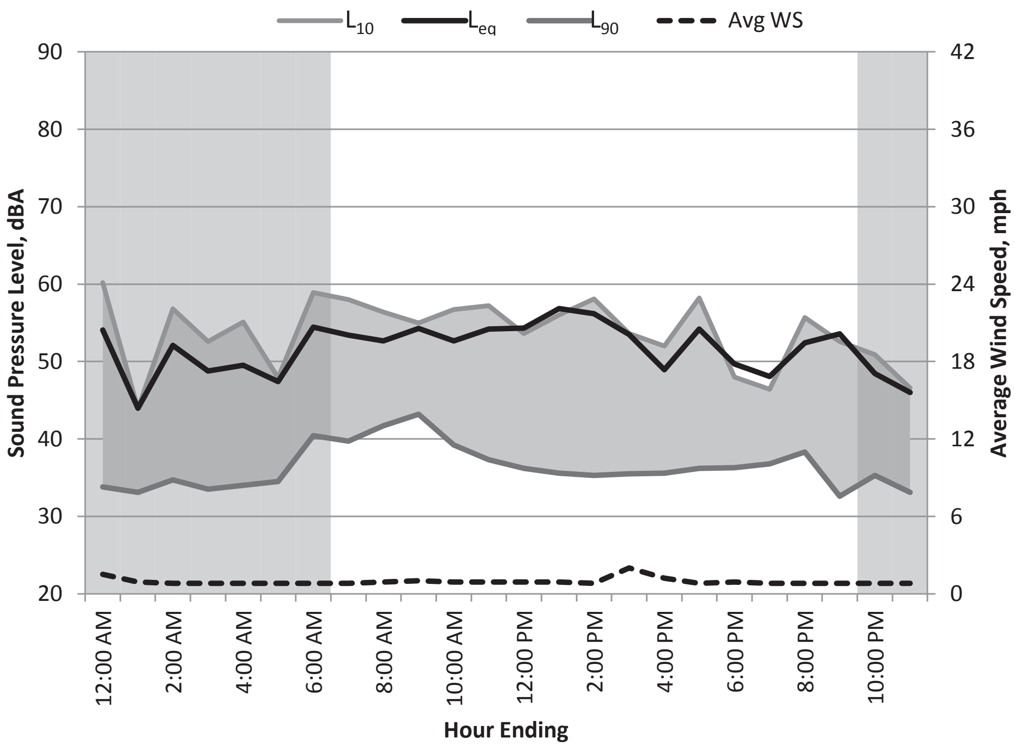
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	53	69	30	65	57	40	35	1
1:00	Night	49	67	30	63	50	38	34	1
2:00	Night	44	62	29	58	45	39	34	1
3:00	Night	51	67	31	64	54	39	36	1
4:00	Night	53	78	33	65	54	39	36	1
5:00	Night	49	73	33	64	42	38	36	1
6:00	Night	51	70	35	65	50	40	38	1
7:00	Day	54	72	37	66	58	44	39	1
8:00	Day	52	72	37	65	54	41	39	1
9:00	Day	58	83	38	71	58	43	40	1
10:00	Day	53	72	39	64	56	47	42	1
11:00	Day	56	78	38	68	57	43	40	1
12:00	Day	54	78	39	65	56	46	42	1
13:00	Day	54	76	38	66	55	46	40	1
14:00	Day	56	78	35	68	57	48	38	1
15:00	Day	52	74	35	64	55	40	37	1
16:00	Day	54	76	35	65	58	40	37	1
17:00	Day	55	81	35	66	59	39	36	1
18:00	Day	50	69	35	62	54	39	37	1
19:00	Day	48	62	35	60	52	39	37	1
20:00	Day	47	70	30	59	45	38	34	1
21:00	Day	45	75	28	46	39	35	32	1
22:00	Night	38	56	27	46	40	36	32	1
23:00	Night	53	64	31	62	58	40	35	1
Overall	Max	58	83	39	71	59	48	42	1
	Median	53	72	35	64	55	40	37	1
	Min	38	56	27	46	39	35	32	1
Daytime 7am-10pm	Max	58	83	39	71	59	48	42	1
	Median	54	75	35	65	56	41	38	1
	Min	45	62	28	46	39	35	32	1
Nighttime 10pm-7am	Max	53	78	35	65	58	40	38	1
	Median	51	67	31	64	50	39	35	1
	Min	38	56	27	46	40	36	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/22/2012

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 53 dBA

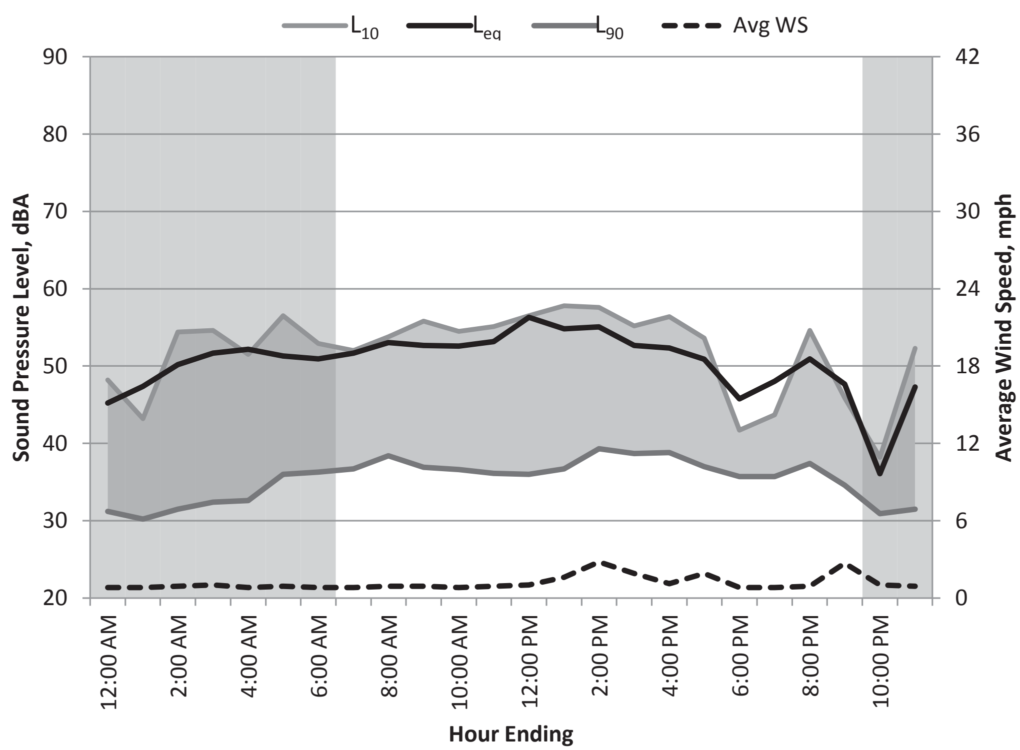


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	54	69	29	65	60	39	34	2
1:00	Night	44	63	29	57	44	37	33	1
2:00	Night	52	67	30	64	57	39	35	1
3:00	Night	49	64	29	60	53	39	34	1
4:00	Night	50	66	30	60	55	41	34	1
5:00	Night	47	75	29	55	48	41	35	1
6:00	Night	54	71	31	65	59	47	40	1
7:00	Day	53	72	35	65	58	45	40	1
8:00	Day	53	72	38	63	56	46	42	1
9:00	Day	54	79	40	65	55	46	43	1
10:00	Day	53	70	38	64	57	43	39	1
11:00	Day	54	76	35	66	57	43	37	1
12:00	Day	54	78	34	68	54	39	36	1
13:00	Day	57	82	35	69	56	40	36	1
14:00	Day	56	78	34	69	58	40	35	1
15:00	Day	53	78	34	66	54	38	36	2
16:00	Day	49	68	35	61	52	37	36	1
17:00	Day	54	74	34	66	58	41	36	1
18:00	Day	50	76	35	60	48	39	36	1
19:00	Day	48	68	35	61	46	39	37	1
20:00	Day	52	69	35	64	56	42	38	1
21:00	Day	54	78	28	65	53	38	33	1
22:00	Night	48	65	29	61	51	39	35	1
23:00	Night	46	65	28	60	47	38	33	1
Overall	Max	57	82	40	69	60	47	43	2
	Median	53	71	34	64	55	40	36	1
	Min	44	63	28	55	44	37	33	1
Daytime 7am-10pm	Max	57	82	40	69	58	46	43	2
	Median	53	76	35	65	56	40	36	1
	Min	48	68	28	60	46	37	33	1
Nighttime 10pm-7am	Max	54	75	31	65	60	47	40	2
	Median	49	66	29	60	53	39	34	1
	Min	44	63	28	55	44	37	33	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/23/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 52 dBA



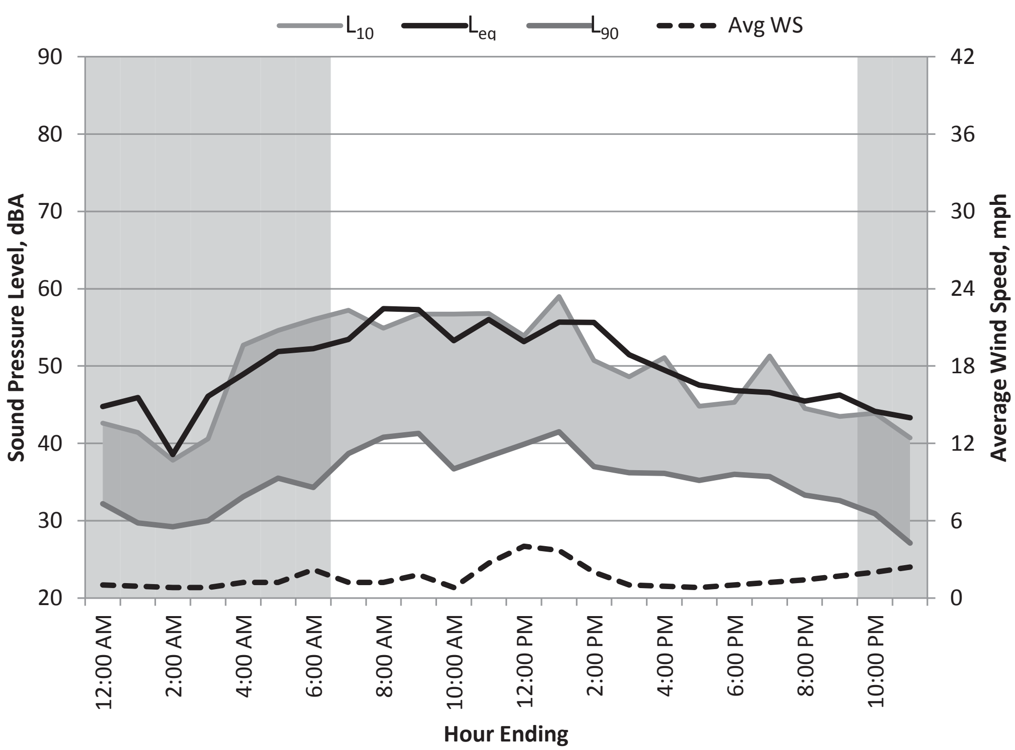
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	62	27	57	48	36	31	1
1:00	Night	47	62	25	61	43	34	30	1
2:00	Night	50	67	28	62	54	36	32	1
3:00	Night	52	79	30	60	55	39	32	1
4:00	Night	52	78	28	63	52	39	33	1
5:00	Night	51	64	30	62	57	41	36	1
6:00	Night	51	74	32	63	53	42	36	1
7:00	Day	52	74	34	66	52	40	37	1
8:00	Day	53	72	37	66	54	42	38	1
9:00	Day	53	77	36	64	56	39	37	1
10:00	Day	53	76	34	64	55	43	37	1
11:00	Day	53	73	35	66	55	41	36	1
12:00	Day	56	85	35	66	57	40	36	1
13:00	Day	55	75	35	67	58	41	37	2
14:00	Day	55	77	37	65	58	43	39	3
15:00	Day	53	72	37	65	55	43	39	2
16:00	Day	52	71	36	64	56	42	39	1
17:00	Day	51	74	35	63	54	41	37	2
18:00	Day	46	69	34	60	42	37	36	1
19:00	Day	48	65	35	62	44	38	36	1
20:00	Day	51	69	31	62	55	40	37	1
21:00	Day	48	75	30	59	46	39	35	3
22:00	Night	36	54	26	46	38	34	31	1
23:00	Night	47	66	27	59	52	35	32	1
Overall	Max	56	85	37	67	58	43	39	3
	Median	51	73	34	63	54	40	36	1
	Min	36	54	25	46	38	34	30	1
Daytime 7am-10pm	Max	56	85	37	67	58	43	39	3
	Median	53	74	35	64	55	41	37	1
	Min	46	65	30	59	42	37	35	1
Nighttime 10pm-7am	Max	52	79	32	63	57	42	36	1
	Median	50	66	28	61	52	36	32	1
	Min	36	54	25	46	38	34	30	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/24/2012

24hr Summary

L_{DN} = 56 dBA C_{NEL} = 56 dBA $L_{eq(24hr)}$ = 52 dBA



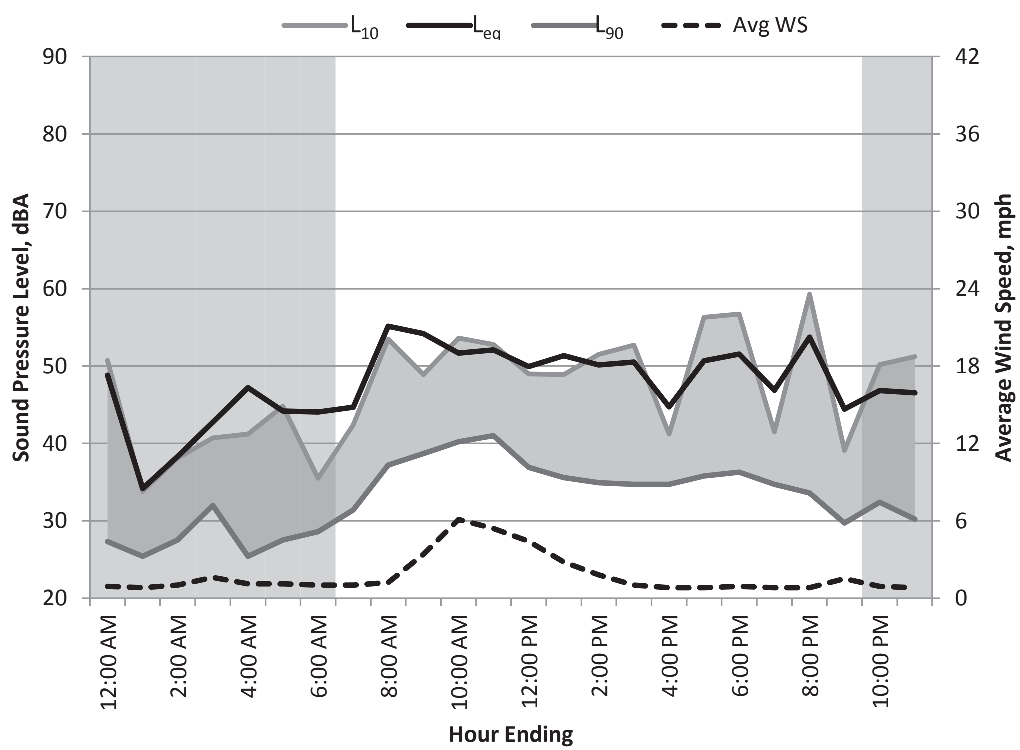
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	62	29	59	43	36	32	1
1:00	Night	46	65	25	60	41	33	30	1
2:00	Night	39	58	27	52	38	33	29	1
3:00	Night	46	63	27	59	41	33	30	1
4:00	Night	49	74	30	59	53	38	33	1
5:00	Night	52	70	32	65	55	41	36	1
6:00	Night	52	69	31	64	56	39	34	2
7:00	Day	53	73	35	65	57	46	39	1
8:00	Day	57	86	39	69	55	47	41	1
9:00	Day	57	84	40	65	57	44	41	2
10:00	Day	53	75	35	65	57	42	37	1
11:00	Day	56	79	36	69	57	44	38	3
12:00	Day	53	77	38	65	54	43	40	4
13:00	Day	56	77	38	67	59	46	42	4
14:00	Day	56	85	35	65	51	40	37	2
15:00	Day	51	80	35	63	49	38	36	1
16:00	Day	49	71	35	62	51	38	36	1
17:00	Day	48	67	34	61	45	36	35	1
18:00	Day	47	66	35	60	45	37	36	1
19:00	Day	47	65	35	58	51	37	36	1
20:00	Day	45	66	29	58	45	37	33	1
21:00	Day	46	71	28	58	44	36	33	2
22:00	Night	44	66	27	56	44	38	31	2
23:00	Night	43	68	22	56	41	33	27	2
Overall	Max	57	86	40	69	59	47	42	4
	Median	49	70	34	61	51	38	36	1
	Min	39	58	22	52	38	33	27	1
Daytime	Max	57	86	40	69	59	47	42	4
7am-10pm	Median	53	75	35	65	51	40	37	1
	Min	45	65	28	58	44	36	33	1
Nighttime	Max	52	74	32	65	56	41	36	2
10pm-7am	Median	46	66	27	59	43	36	31	1
	Min	39	58	22	52	38	33	27	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/25/2012

24hr Summary

L_{DN} = 53 dBA | C_{NEL} = 54 dBA | $L_{eq(24hr)}$ = 50 dBA



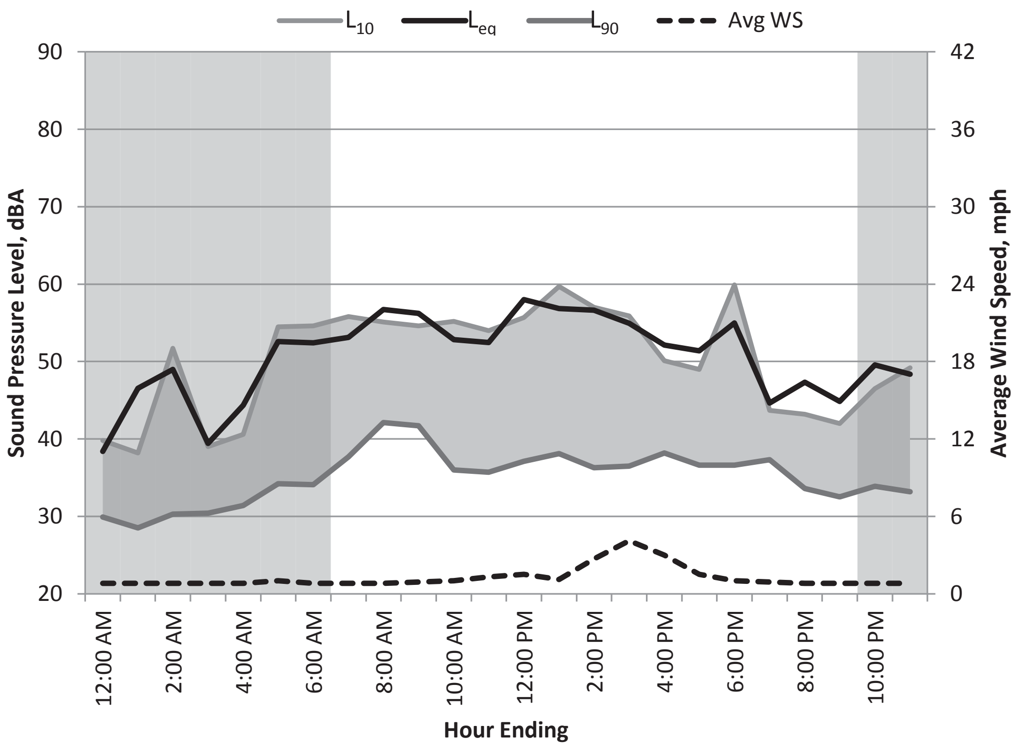
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	73	23	59	51	33	27	1
1:00	Night	34	54	23	47	34	31	25	1
2:00	Night	38	53	26	51	38	32	28	1
3:00	Night	43	60	27	56	41	36	32	2
4:00	Night	47	72	22	60	41	32	25	1
5:00	Night	44	70	24	55	45	33	28	1
6:00	Night	44	71	25	56	36	32	29	1
7:00	Day	45	65	27	57	42	35	31	1
8:00	Day	55	79	35	67	54	40	37	1
9:00	Day	54	79	36	67	49	42	39	3
10:00	Day	52	76	36	64	54	45	40	6
11:00	Day	52	75	38	62	53	46	41	5
12:00	Day	50	74	34	62	49	41	37	4
13:00	Day	51	77	34	64	49	38	36	3
14:00	Day	50	71	34	63	52	37	35	2
15:00	Day	51	72	34	63	53	37	35	1
16:00	Day	45	71	33	57	41	37	35	1
17:00	Day	51	68	34	61	56	38	36	1
18:00	Day	52	67	34	62	57	39	36	1
19:00	Day	47	64	34	60	42	36	35	1
20:00	Day	54	71	28	64	59	38	34	1
21:00	Day	44	69	27	57	39	33	30	2
22:00	Night	47	61	28	59	50	37	32	1
23:00	Night	47	63	27	57	51	35	30	1
Overall	Max	55	79	38	67	59	46	41	6
	Median	48	71	31	60	49	37	34	1
	Min	34	53	22	47	34	31	25	1
Daytime	Max	55	79	38	67	59	46	41	6
7am-10pm	Median	51	71	34	62	52	38	36	1
	Min	44	64	27	57	39	33	30	1
Nighttime	Max	49	73	28	60	51	37	32	2
10pm-7am	Median	44	63	25	56	41	33	28	1
	Min	34	53	22	47	34	31	25	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/26/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 53 dBA



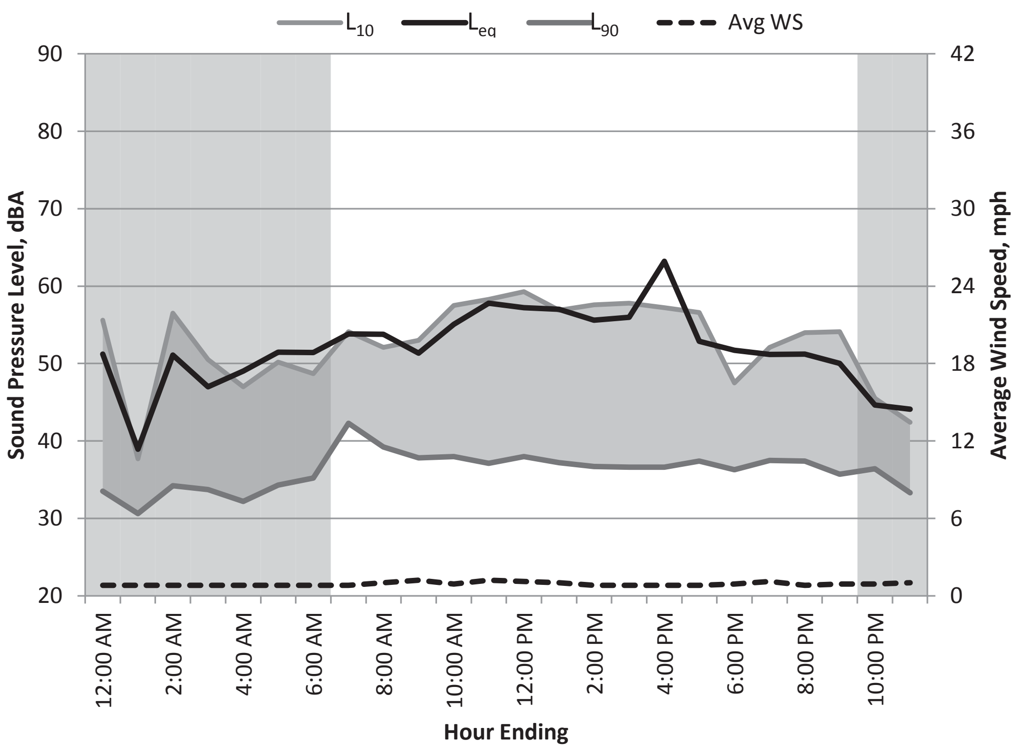
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	38	55	27	51	40	34	30	1
1:00	Night	47	66	25	59	38	33	29	1
2:00	Night	49	67	27	61	52	35	30	1
3:00	Night	39	59	27	52	39	34	30	1
4:00	Night	44	71	29	54	41	35	31	1
5:00	Night	53	71	30	66	55	39	34	1
6:00	Night	52	76	30	64	55	41	34	1
7:00	Day	53	76	34	64	56	47	38	1
8:00	Day	57	80	40	69	55	45	42	1
9:00	Day	56	78	40	70	55	45	42	1
10:00	Day	53	73	35	65	55	43	36	1
11:00	Day	52	73	34	65	54	39	36	1
12:00	Day	58	83	35	71	56	41	37	2
13:00	Day	57	79	36	69	60	44	38	1
14:00	Day	57	82	35	67	57	41	36	3
15:00	Day	55	78	35	67	56	41	37	4
16:00	Day	52	77	36	65	50	40	38	3
17:00	Day	51	73	35	64	49	40	37	2
18:00	Day	55	77	34	65	60	42	37	1
19:00	Day	45	67	35	56	44	39	37	1
20:00	Day	47	68	28	61	43	38	34	1
21:00	Day	45	71	29	57	42	36	33	1
22:00	Night	50	70	30	62	47	38	34	1
23:00	Night	48	67	28	61	49	38	33	1
Overall	Max	58	83	40	71	60	47	42	4
	Median	52	73	34	64	53	39	36	1
	Min	38	55	25	51	38	33	29	1
Daytime	Max	58	83	40	71	60	47	42	4
7am-10pm	Median	53	77	35	65	55	41	37	1
	Min	45	67	28	56	42	36	33	1
Nighttime	Max	53	76	30	66	55	41	34	1
10pm-7am	Median	48	67	28	61	47	35	31	1
	Min	38	55	25	51	38	33	29	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/27/2012

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 55 dBA

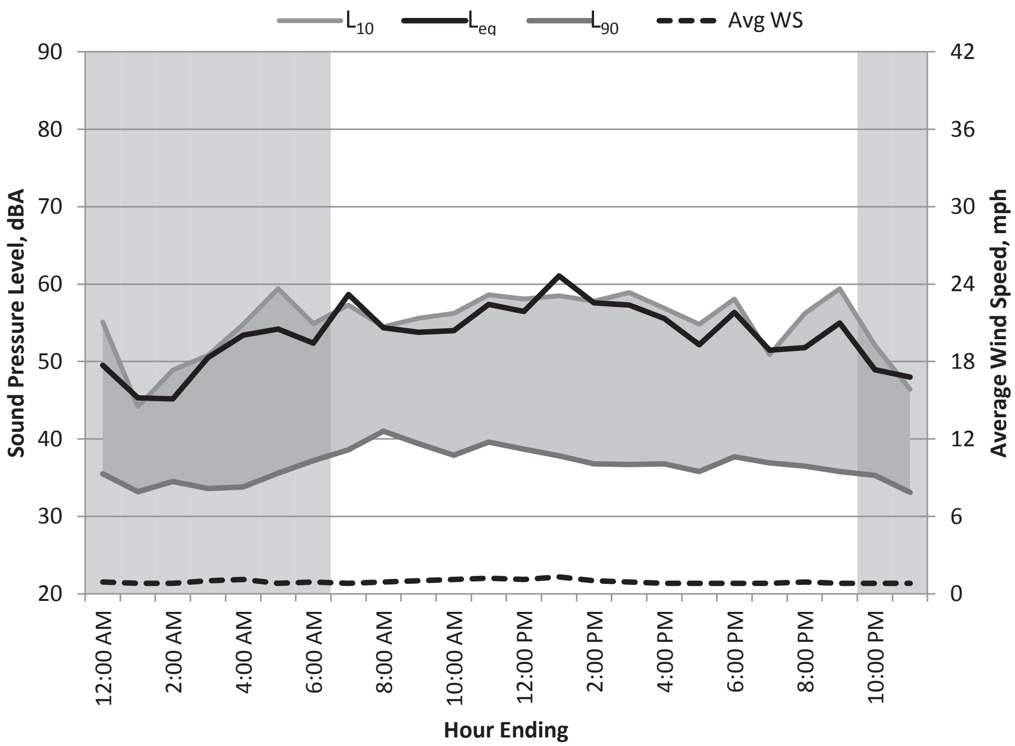


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	51	68	29	64	56	37	34	1
1:00	Night	39	60	26	47	38	34	31	1
2:00	Night	51	67	30	62	57	38	34	1
3:00	Night	47	67	30	59	51	37	34	1
4:00	Night	49	73	28	61	47	36	32	1
5:00	Night	51	70	32	65	50	38	34	1
6:00	Night	51	76	33	65	49	38	35	1
7:00	Day	54	79	35	66	54	45	42	1
8:00	Day	54	79	37	66	52	43	39	1
9:00	Day	51	72	36	65	53	40	38	1
10:00	Day	55	73	36	67	58	45	38	1
11:00	Day	58	83	35	70	58	44	37	1
12:00	Day	57	77	35	70	59	44	38	1
13:00	Day	57	81	36	70	57	44	37	1
14:00	Day	56	76	35	68	58	45	37	1
15:00	Day	56	78	34	68	58	43	37	1
16:00	Day	63	93	35	67	57	42	37	1
17:00	Day	53	74	35	63	57	41	37	1
18:00	Day	52	77	34	64	48	38	36	1
19:00	Day	51	68	35	65	52	40	38	1
20:00	Day	51	73	32	63	54	40	37	1
21:00	Day	50	71	31	61	54	40	36	1
22:00	Night	45	61	33	57	46	40	36	1
23:00	Night	44	63	31	58	42	37	33	1
Overall	Max	63	93	37	70	59	45	42	1
	Median	51	73	34	65	54	40	37	1
	Min	39	60	26	47	38	34	31	1
Daytime	Max	63	93	37	70	59	45	42	1
7am-10pm	Median	54	77	35	66	57	43	37	1
	Min	50	68	31	61	48	38	36	1
Nighttime	Max	51	76	33	65	57	40	36	1
10pm-7am	Median	49	67	30	61	49	37	34	1
	Min	39	60	26	47	38	34	31	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/28/2012

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 55 dBA



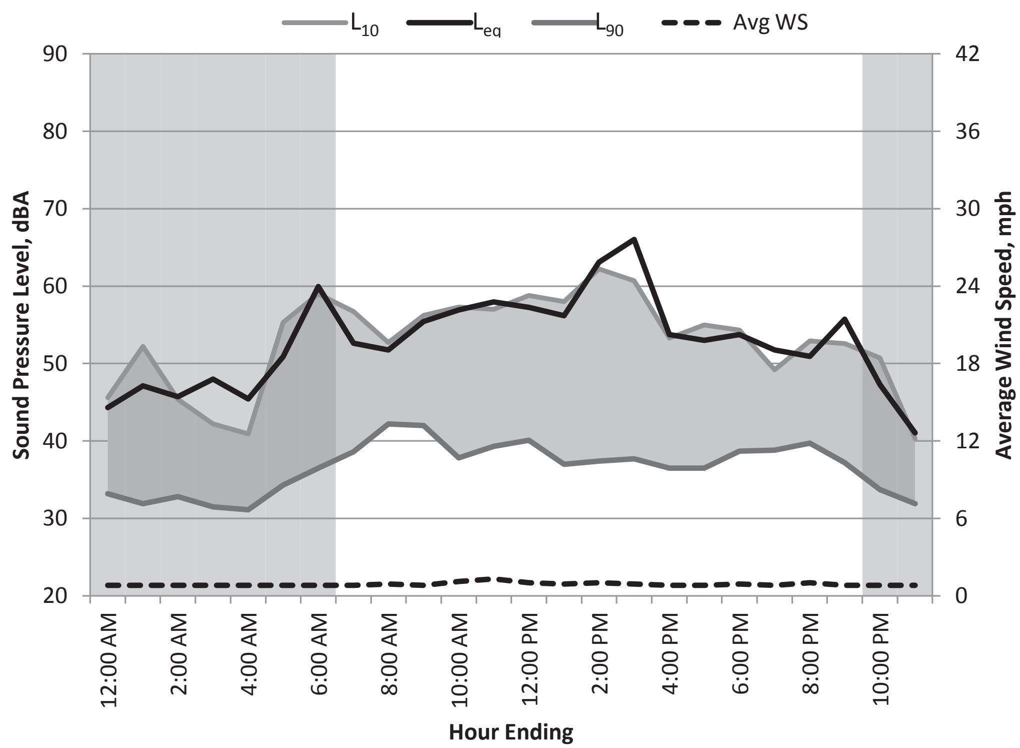
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	63	32	61	55	39	36	1
1:00	Night	45	64	31	58	44	37	33	1
2:00	Night	45	60	30	57	49	39	35	1
3:00	Night	51	66	26	64	51	38	34	1
4:00	Night	53	70	30	68	55	40	34	1
5:00	Night	54	73	32	66	59	42	36	1
6:00	Night	52	75	33	65	55	43	37	1
7:00	Day	59	89	34	67	57	44	39	1
8:00	Day	54	78	38	66	55	45	41	1
9:00	Day	54	73	36	67	56	43	39	1
10:00	Day	54	79	36	64	56	44	38	1
11:00	Day	57	81	36	69	59	45	40	1
12:00	Day	56	79	35	70	58	44	39	1
13:00	Day	61	88	35	71	59	46	38	1
14:00	Day	58	79	35	71	58	42	37	1
15:00	Day	57	80	34	70	59	44	37	1
16:00	Day	56	79	35	68	57	42	37	1
17:00	Day	52	74	34	65	55	39	36	1
18:00	Day	56	80	36	65	58	47	38	1
19:00	Day	51	75	35	63	51	39	37	1
20:00	Day	52	69	33	64	56	40	37	1
21:00	Day	55	75	32	66	59	42	36	1
22:00	Night	49	66	30	61	52	40	35	1
23:00	Night	48	64	30	62	46	38	33	1
Overall	Max	61	89	38	71	59	47	41	1
	Median	54	75	34	66	56	42	37	1
	Min	45	60	26	57	44	37	33	1
Daytime	Max	61	89	38	71	59	47	41	1
7am-10pm	Median	56	79	35	67	57	44	38	1
	Min	51	69	32	63	51	39	36	1
Nighttime	Max	54	75	33	68	59	43	37	1
10pm-7am	Median	50	66	30	62	52	39	35	1
	Min	45	60	26	57	44	37	33	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/29/2012

24hr Summary

L_{DN} = 60 dBA C_{NEL} = 60 dBA $L_{eq(24hr)}$ = 57 dBA

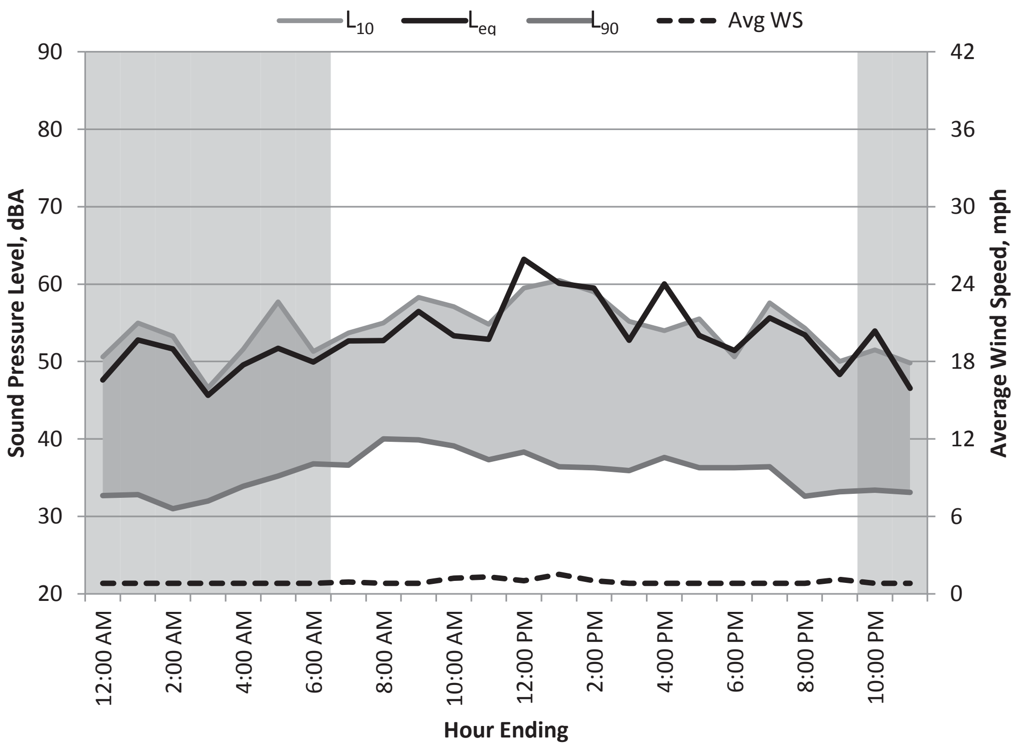


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	44	59	30	57	46	38	33	1
1:00	Night	47	63	28	59	52	38	32	1
2:00	Night	46	65	29	58	45	37	33	1
3:00	Night	48	67	28	62	42	36	32	1
4:00	Night	45	62	28	60	41	35	31	1
5:00	Night	51	67	30	62	55	38	34	1
6:00	Night	60	90	33	68	59	40	37	1
7:00	Day	53	71	35	65	57	42	39	1
8:00	Day	52	73	39	64	53	45	42	1
9:00	Day	55	80	38	67	56	46	42	1
10:00	Day	57	82	35	69	57	44	38	1
11:00	Day	58	81	35	70	57	45	39	1
12:00	Day	57	78	35	70	59	48	40	1
13:00	Day	56	82	35	67	58	46	37	1
14:00	Day	63	90	35	75	62	46	37	1
15:00	Day	66	91	35	80	61	46	38	1
16:00	Day	54	76	35	67	53	42	37	1
17:00	Day	53	73	35	66	55	41	37	1
18:00	Day	54	76	36	67	54	43	39	1
19:00	Day	52	75	37	64	49	41	39	1
20:00	Day	51	76	34	63	53	43	40	1
21:00	Day	56	83	34	64	53	41	37	1
22:00	Night	47	64	31	60	51	39	34	1
23:00	Night	41	64	29	52	40	36	32	1
Overall	Max	66	91	39	80	62	48	42	1
	Median	53	76	35	65	54	41	37	1
	Min	41	59	28	52	40	35	31	1
Daytime	Max	66	91	39	80	62	48	42	1
7am-10pm	Median	55	78	35	67	56	44	39	1
	Min	51	71	34	63	49	41	37	1
Nighttime	Max	60	90	33	68	59	40	37	1
10pm-7am	Median	47	64	29	60	46	38	33	1
	Min	41	59	28	52	40	35	31	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	12/30/2012

24hr Summary

L_{DN} = 59 dBA | C_{NEL} = 59 dBA | $L_{eq(24hr)}$ = 55 dBA



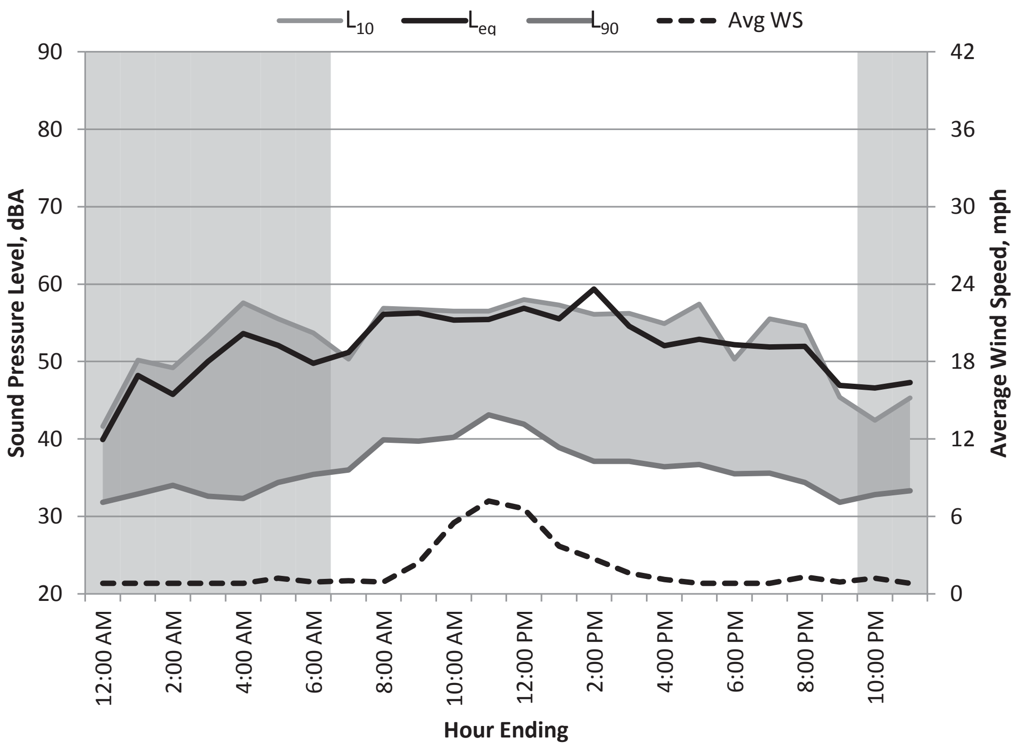
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	65	27	60	51	37	33	1
1:00	Night	53	78	24	64	55	37	33	1
2:00	Night	52	71	27	64	53	36	31	1
3:00	Night	46	65	26	57	47	36	32	1
4:00	Night	50	75	31	61	52	39	34	1
5:00	Night	52	66	32	62	58	40	35	1
6:00	Night	50	70	34	63	51	40	37	1
7:00	Day	53	80	32	64	54	41	37	1
8:00	Day	53	78	38	64	55	42	40	1
9:00	Day	56	80	37	68	58	46	40	1
10:00	Day	53	74	36	65	57	43	39	1
11:00	Day	53	72	36	65	55	42	37	1
12:00	Day	63	90	36	75	60	47	38	1
13:00	Day	60	83	34	73	61	43	36	2
14:00	Day	60	82	34	73	59	44	36	1
15:00	Day	53	74	35	65	55	41	36	1
16:00	Day	60	89	36	66	54	42	38	1
17:00	Day	53	76	35	64	56	39	36	1
18:00	Day	51	74	35	65	51	39	36	1
19:00	Day	56	80	35	64	58	38	36	1
20:00	Day	53	82	29	62	54	37	33	1
21:00	Day	48	64	29	60	50	38	33	1
22:00	Night	54	80	30	65	52	38	33	1
23:00	Night	47	61	26	58	50	37	33	1
Overall	Max	63	90	38	75	61	47	40	2
	Median	53	76	34	64	55	40	36	1
	Min	46	61	24	57	47	36	31	1
Daytime	Max	63	90	38	75	61	47	40	2
7am-10pm	Median	53	80	35	65	55	42	36	1
	Min	48	64	29	60	50	37	33	1
Nighttime	Max	54	80	34	65	58	40	37	1
10pm-7am	Median	50	70	27	62	52	37	33	1
	Min	46	61	24	57	47	36	31	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 12/31/2012

24hr Summary

L_{DN} = 57 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 53 dBA



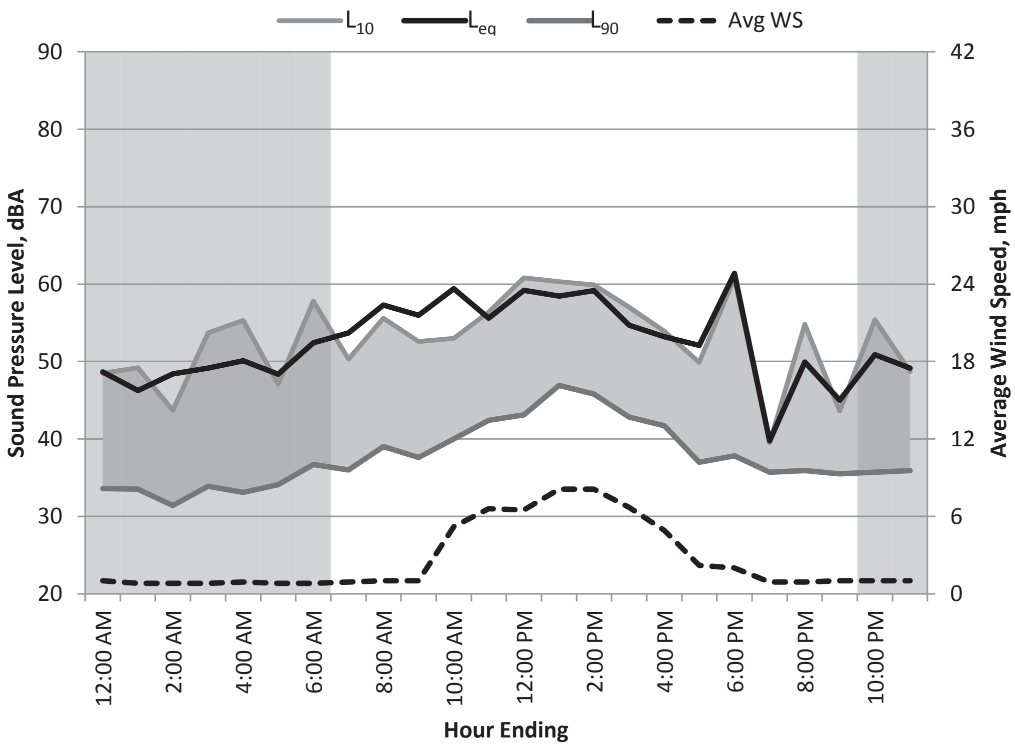
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	40	59	27	49	42	36	32	1
1:00	Night	48	68	29	60	50	37	33	1
2:00	Night	46	61	29	57	49	38	34	1
3:00	Night	50	67	29	62	53	36	33	1
4:00	Night	54	73	27	66	58	37	32	1
5:00	Night	52	76	31	64	56	39	34	1
6:00	Night	50	66	31	62	54	41	35	1
7:00	Day	51	70	32	65	50	39	36	1
8:00	Day	56	81	37	68	57	44	40	1
9:00	Day	56	80	38	69	57	45	40	2
10:00	Day	55	76	37	67	57	48	40	6
11:00	Day	55	76	38	68	57	48	43	7
12:00	Day	57	80	39	68	58	49	42	7
13:00	Day	56	75	36	69	57	44	39	4
14:00	Day	59	85	35	69	56	41	37	3
15:00	Day	55	74	34	68	56	42	37	2
16:00	Day	52	75	34	64	55	42	36	1
17:00	Day	53	73	35	64	57	40	37	1
18:00	Day	52	79	33	66	50	38	36	1
19:00	Day	52	74	34	64	56	38	36	1
20:00	Day	52	74	29	65	55	38	34	1
21:00	Day	47	73	28	59	45	36	32	1
22:00	Night	47	72	30	60	42	36	33	1
23:00	Night	47	70	30	60	45	37	33	1
Overall	Max	59	85	39	69	58	49	43	7
	Median	52	74	33	64	55	39	36	1
	Min	40	59	27	49	42	36	32	1
Daytime	Max	59	85	39	69	58	49	43	7
7am-10pm	Median	55	75	35	67	56	42	37	1
	Min	47	70	28	59	45	36	32	1
Nighttime	Max	54	76	31	66	58	41	35	1
10pm-7am	Median	48	68	29	60	50	37	33	1
	Min	40	59	27	49	42	36	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/1/2013

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 55 dBA

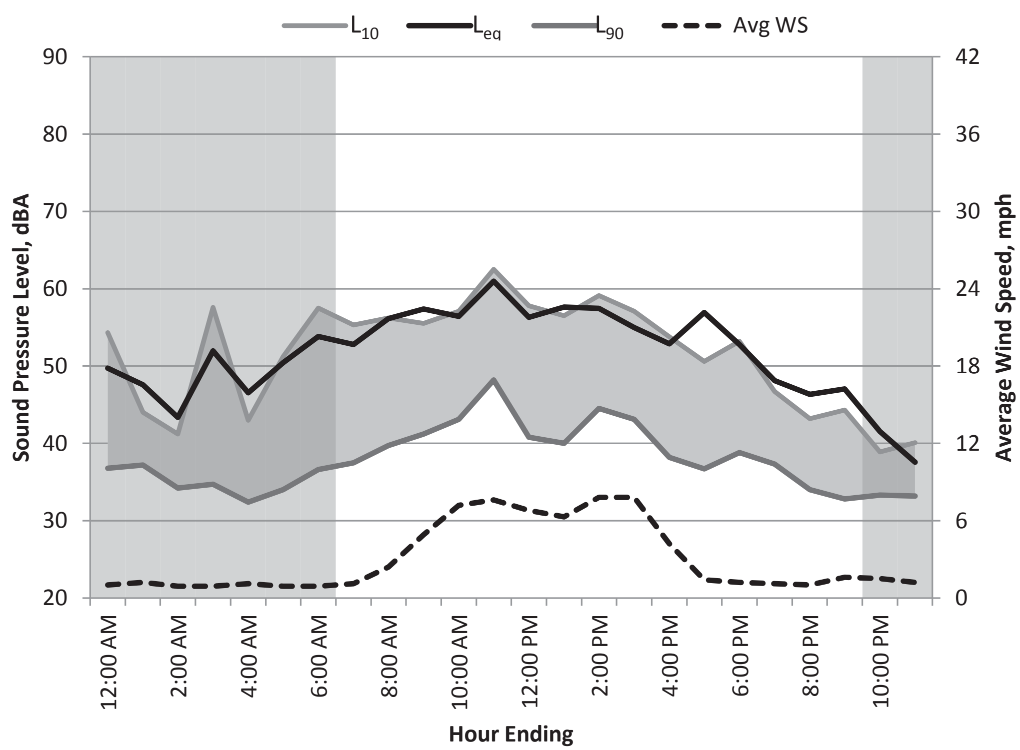


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	69	29	62	49	38	34	1
1:00	Night	46	65	28	57	49	38	34	1
2:00	Night	48	65	28	62	44	36	31	1
3:00	Night	49	69	31	60	54	38	34	1
4:00	Night	50	72	29	60	55	38	33	1
5:00	Night	48	74	31	59	47	38	34	1
6:00	Night	52	67	34	62	58	43	37	1
7:00	Day	54	73	32	67	50	40	36	1
8:00	Day	57	80	36	69	56	43	39	1
9:00	Day	56	78	36	69	53	40	38	1
10:00	Day	59	86	38	71	53	45	40	5
11:00	Day	56	76	39	69	56	48	42	7
12:00	Day	59	78	38	72	61	49	43	7
13:00	Day	58	78	42	71	60	52	47	8
14:00	Day	59	85	41	71	60	52	46	8
15:00	Day	55	77	39	65	57	50	43	7
16:00	Day	53	74	39	65	54	46	42	5
17:00	Day	52	79	35	65	50	39	37	2
18:00	Day	61	89	36	74	61	40	38	2
19:00	Day	40	63	34	45	40	37	36	1
20:00	Day	50	71	33	61	55	39	36	1
21:00	Day	45	61	32	58	44	38	36	1
22:00	Night	51	69	33	63	55	39	36	1
23:00	Night	49	66	33	63	49	38	36	1
Overall	Max	61	89	42	74	61	52	47	8
	Median	52	73	34	64	54	39	36	1
	Min	40	61	28	45	40	36	31	1
Daytime	Max	61	89	42	74	61	52	47	8
7am-10pm	Median	56	78	36	69	55	43	39	2
	Min	40	61	32	45	40	37	36	1
Nighttime	Max	52	74	34	63	58	43	37	1
10pm-7am	Median	49	69	31	62	49	38	34	1
	Min	46	65	28	57	44	36	31	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/2/2013

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 54 dBA



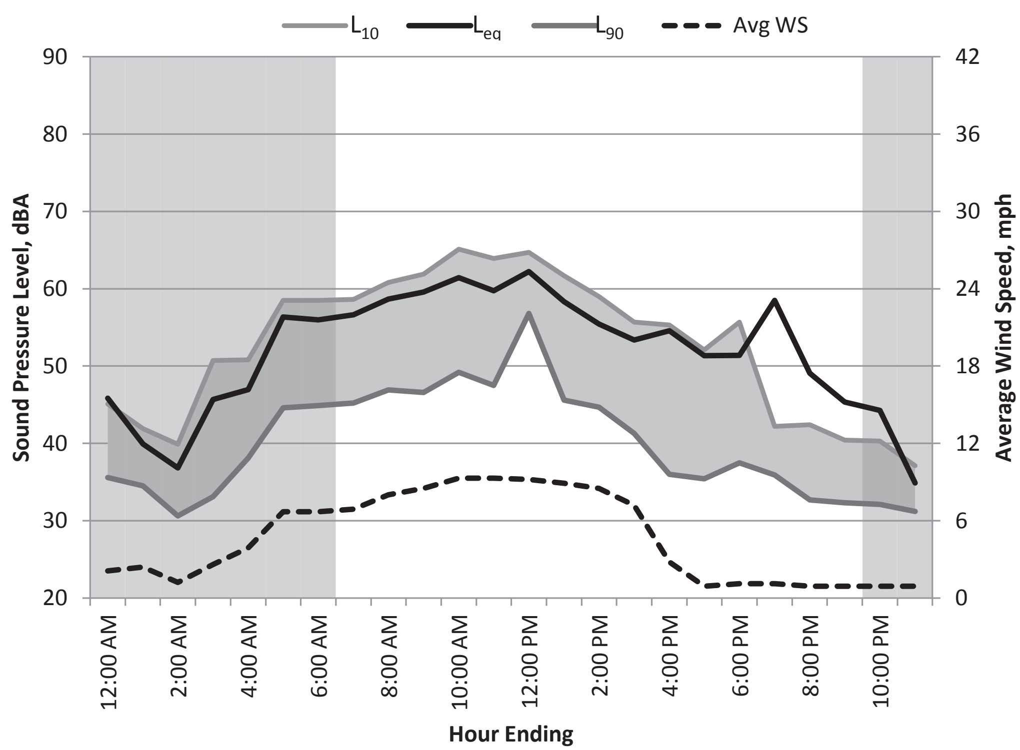
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	50	72	33	60	54	40	37	1
1:00	Night	48	64	34	62	44	40	37	1
2:00	Night	43	61	31	57	41	37	34	1
3:00	Night	52	66	32	62	58	39	35	1
4:00	Night	47	76	30	56	43	35	32	1
5:00	Night	50	69	32	64	51	37	34	1
6:00	Night	54	75	33	66	58	40	37	1
7:00	Day	53	77	35	64	55	42	38	1
8:00	Day	56	79	37	67	56	44	40	2
9:00	Day	57	82	37	69	56	45	41	5
10:00	Day	56	81	39	68	57	49	43	7
11:00	Day	61	87	41	71	63	56	48	8
12:00	Day	56	78	37	68	58	47	41	7
13:00	Day	58	83	36	69	57	45	40	6
14:00	Day	57	77	41	70	59	50	45	8
15:00	Day	55	75	39	67	57	49	43	8
16:00	Day	53	75	36	65	54	43	38	4
17:00	Day	57	86	35	64	51	38	37	1
18:00	Day	53	80	37	64	53	41	39	1
19:00	Day	48	70	35	60	47	40	37	1
20:00	Day	46	69	29	58	43	37	34	1
21:00	Day	47	74	30	58	44	37	33	2
22:00	Night	42	67	30	47	39	36	33	2
23:00	Night	38	46	30	43	40	37	33	1
Overall	Max	61	87	41	71	63	56	48	8
	Median	53	75	35	64	54	40	37	1
	Min	38	46	29	43	39	35	32	1
Daytime	Max	61	87	41	71	63	56	48	8
7am-10pm	Median	56	78	37	67	56	44	40	4
	Min	46	69	29	58	43	37	33	1
Nighttime	Max	54	76	34	66	58	40	37	2
10pm-7am	Median	48	67	32	60	44	37	34	1
	Min	38	46	30	43	39	35	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/3/2013

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 56 dBA



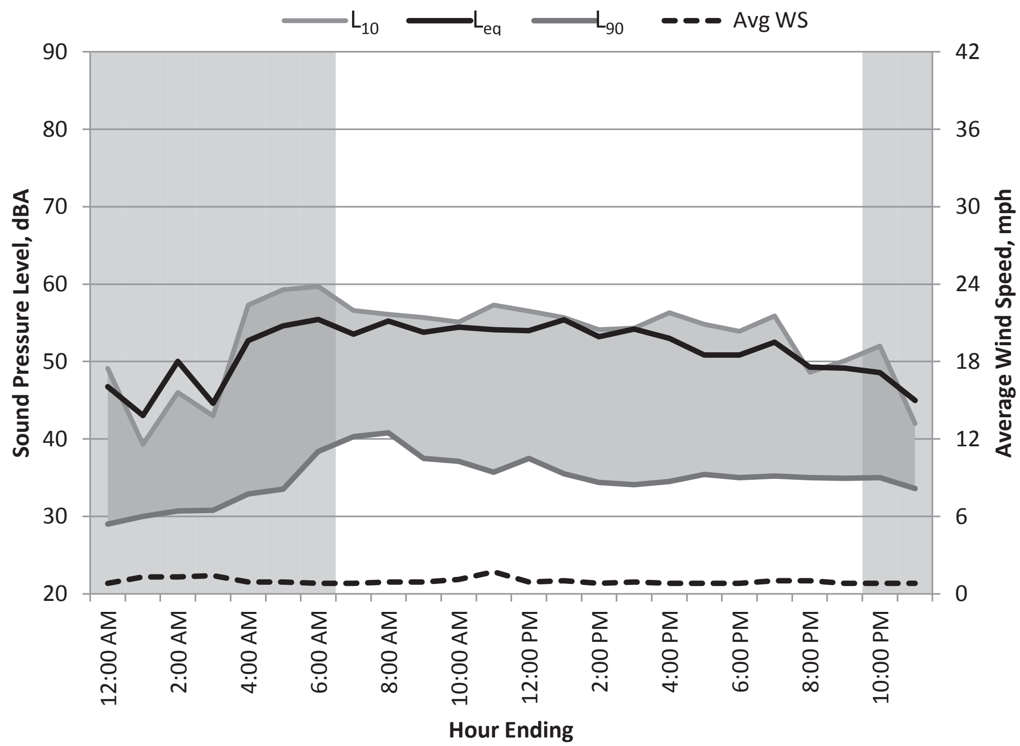
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	46	61	33	59	45	38	36	2
1:00	Night	40	58	32	50	42	37	35	2
2:00	Night	37	49	26	44	40	35	31	1
3:00	Night	46	60	29	56	51	39	33	3
4:00	Night	47	65	35	57	51	42	38	4
5:00	Night	56	77	40	67	59	51	45	7
6:00	Night	56	76	40	67	59	50	45	7
7:00	Day	57	77	41	69	59	50	45	7
8:00	Day	59	78	42	71	61	52	47	8
9:00	Day	60	86	42	70	62	52	47	9
10:00	Day	61	81	45	71	65	56	49	9
11:00	Day	60	75	42	70	64	54	48	9
12:00	Day	62	79	53	71	65	60	57	9
13:00	Day	58	77	42	69	62	52	46	9
14:00	Day	55	70	40	66	59	50	45	9
15:00	Day	53	71	37	65	56	47	41	7
16:00	Day	55	78	35	67	55	43	36	3
17:00	Day	51	74	34	65	52	37	35	1
18:00	Day	51	70	35	62	56	40	38	1
19:00	Day	59	90	34	61	42	38	36	1
20:00	Day	49	76	29	59	42	37	33	1
21:00	Day	45	73	29	55	40	35	32	1
22:00	Night	44	68	29	58	40	35	32	1
23:00	Night	35	44	27	41	37	34	31	1
Overall	Max	62	90	53	71	65	60	57	9
	Median	54	74	35	65	56	42	38	3
	Min	35	44	26	41	37	34	31	1
Daytime	Max	62	90	53	71	65	60	57	9
7am-10pm	Median	57	77	40	67	59	50	45	7
	Min	45	70	29	55	40	35	32	1
Nighttime	Max	56	77	40	67	59	51	45	7
10pm-7am	Median	46	61	32	57	45	38	35	2
	Min	35	44	26	41	37	34	31	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/4/2013

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 53 dBA



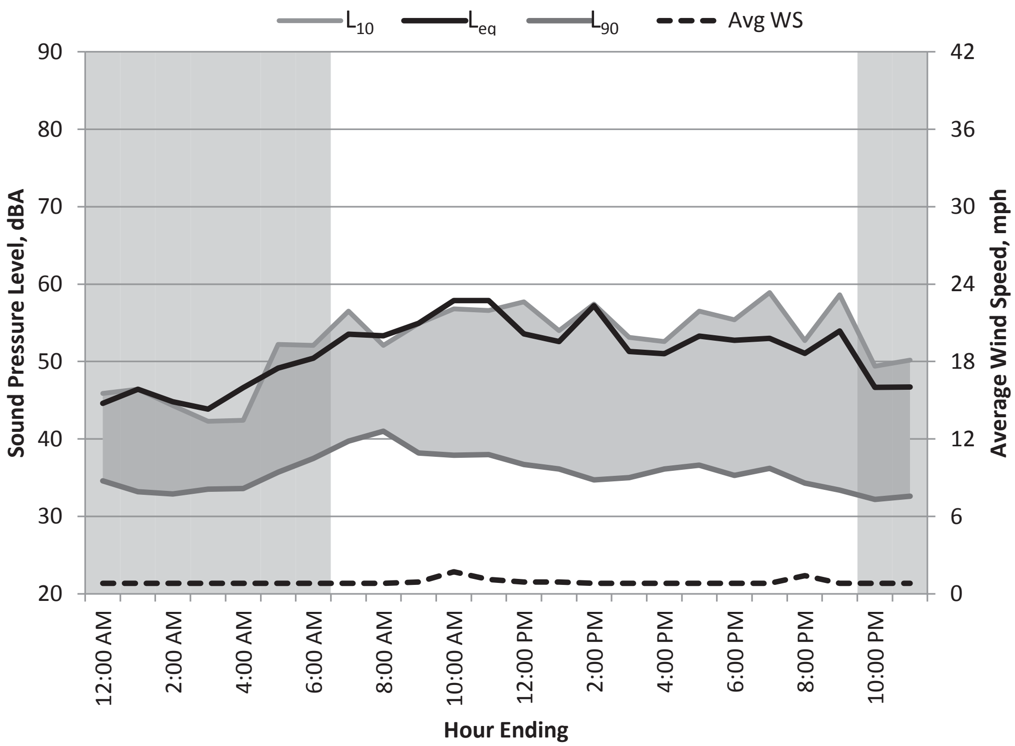
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	64	26	60	49	32	29	1
1:00	Night	43	58	27	56	39	33	30	1
2:00	Night	50	67	27	63	46	35	31	1
3:00	Night	45	63	26	59	43	35	31	1
4:00	Night	53	67	27	64	57	39	33	1
5:00	Night	55	71	29	67	59	40	34	1
6:00	Night	55	74	34	67	60	45	38	1
7:00	Day	54	73	35	66	57	46	40	1
8:00	Day	55	78	37	67	56	46	41	1
9:00	Day	54	78	35	65	56	43	38	1
10:00	Day	54	77	35	67	55	42	37	1
11:00	Day	54	74	34	67	57	41	36	2
12:00	Day	54	74	31	66	57	46	38	1
13:00	Day	55	79	34	67	56	41	36	1
14:00	Day	53	74	33	66	54	39	34	1
15:00	Day	54	79	33	66	54	39	34	1
16:00	Day	53	70	33	65	56	40	35	1
17:00	Day	51	73	34	62	55	38	35	1
18:00	Day	51	68	34	63	54	37	35	1
19:00	Day	53	77	34	64	56	37	35	1
20:00	Day	49	73	32	60	49	38	35	1
21:00	Day	49	75	30	61	50	40	35	1
22:00	Night	49	70	32	60	52	39	35	1
23:00	Night	45	63	30	59	42	37	34	1
Overall	Max	55	79	37	67	60	46	41	2
	Median	53	73	33	65	55	39	35	1
	Min	43	58	26	56	39	32	29	1
Daytime 7am-10pm	Max	55	79	37	67	57	46	41	2
	Median	54	74	34	66	56	40	35	1
	Min	49	68	30	60	49	37	34	1
Nighttime 10pm-7am	Max	55	74	34	67	60	45	38	1
	Median	49	67	27	60	49	37	33	1
	Min	43	58	26	56	39	32	29	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/5/2013

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 56 dBA | $L_{eq(24hr)}$ = 53 dBA



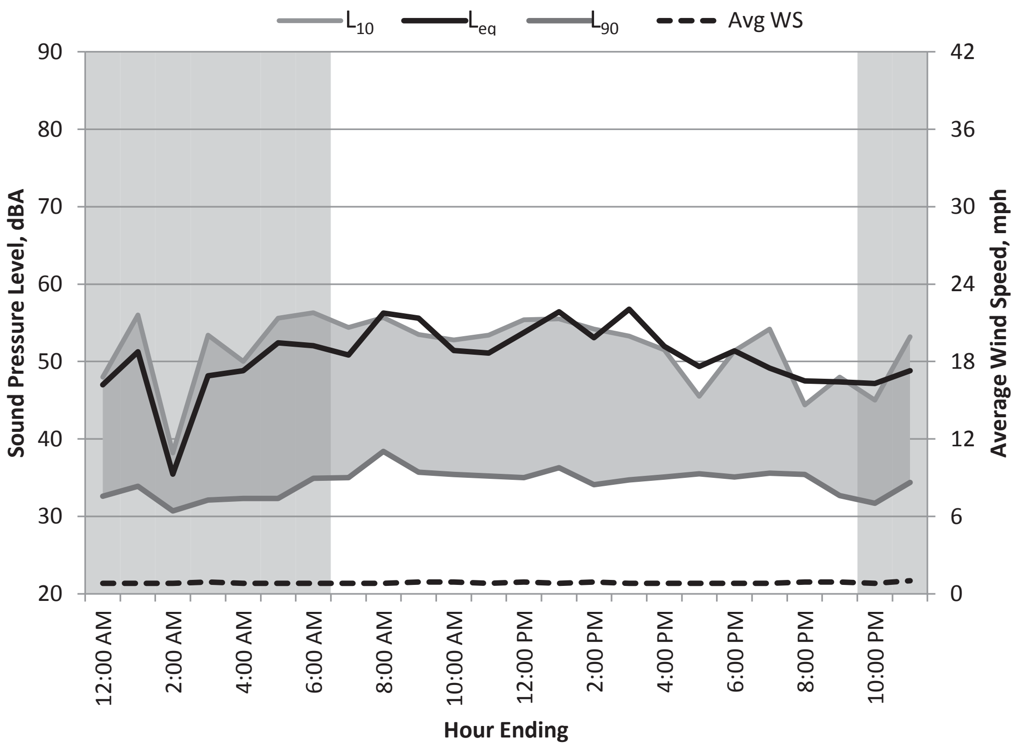
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	45	61	29	57	46	38	35	1
1:00	Night	46	62	30	60	46	37	33	1
2:00	Night	45	60	28	59	44	37	33	1
3:00	Night	44	63	32	58	42	37	34	1
4:00	Night	47	76	32	54	42	37	34	1
5:00	Night	49	69	32	60	52	40	36	1
6:00	Night	50	70	34	64	52	41	38	1
7:00	Day	54	77	36	65	57	44	40	1
8:00	Day	53	79	39	65	52	44	41	1
9:00	Day	55	79	36	67	55	43	38	1
10:00	Day	58	84	36	69	57	44	38	2
11:00	Day	58	85	36	69	57	44	38	1
12:00	Day	54	74	35	65	58	41	37	1
13:00	Day	53	78	34	64	54	41	36	1
14:00	Day	57	83	33	68	57	39	35	1
15:00	Day	51	76	33	64	53	38	35	1
16:00	Day	51	74	34	63	53	39	36	1
17:00	Day	53	75	34	65	57	41	37	1
18:00	Day	53	75	34	65	55	37	35	1
19:00	Day	53	68	34	63	59	39	36	1
20:00	Day	51	72	28	63	53	39	34	1
21:00	Day	54	73	27	65	59	41	33	1
22:00	Night	47	67	27	58	49	38	32	1
23:00	Night	47	61	29	59	50	37	33	1
Overall	Max	58	85	39	69	59	44	41	2
	Median	52	74	34	64	53	39	36	1
	Min	44	60	27	54	42	37	32	1
Daytime	Max	58	85	39	69	59	44	41	2
7am-10pm	Median	53	76	34	65	57	41	36	1
	Min	51	68	27	63	52	37	33	1
Nighttime	Max	50	76	34	64	52	41	38	1
10pm-7am	Median	47	63	30	59	46	37	34	1
	Min	44	60	27	54	42	37	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/6/2013

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 52 dBA

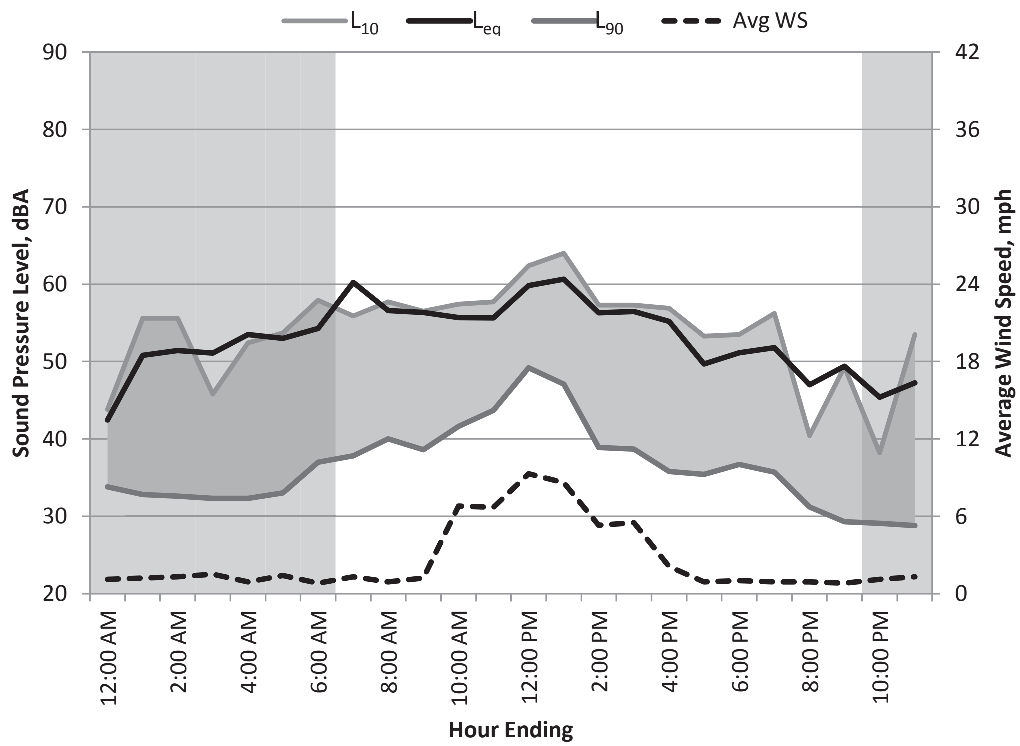


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	61	29	60	48	36	33	1
1:00	Night	51	65	30	63	56	39	34	1
2:00	Night	35	46	27	42	38	34	31	1
3:00	Night	48	65	28	59	53	37	32	1
4:00	Night	49	70	30	60	50	35	32	1
5:00	Night	52	76	28	65	56	39	32	1
6:00	Night	52	74	32	64	56	39	35	1
7:00	Day	51	72	31	62	54	39	35	1
8:00	Day	56	79	36	69	56	43	38	1
9:00	Day	56	81	34	66	54	39	36	1
10:00	Day	51	72	34	64	53	38	35	1
11:00	Day	51	70	33	64	53	40	35	1
12:00	Day	54	75	33	66	55	41	35	1
13:00	Day	56	83	34	67	56	46	36	1
14:00	Day	53	73	33	67	54	38	34	1
15:00	Day	57	86	33	65	53	41	35	1
16:00	Day	52	74	34	66	52	38	35	1
17:00	Day	49	74	34	62	46	38	36	1
18:00	Day	51	73	34	65	51	37	35	1
19:00	Day	49	65	34	61	54	38	36	1
20:00	Day	47	71	30	60	44	38	35	1
21:00	Day	47	69	28	59	48	38	33	1
22:00	Night	47	63	27	62	45	37	32	1
23:00	Night	49	66	30	60	53	39	34	1
Overall	Max	57	86	36	69	56	46	38	1
	Median	51	72	32	63	53	38	35	1
	Min	35	46	27	42	38	34	31	1
Daytime	Max	57	86	36	69	56	46	38	1
7am-10pm	Median	51	73	34	65	53	38	35	1
	Min	47	65	28	59	44	37	33	1
Nighttime	Max	52	76	32	65	56	39	35	1
10pm-7am	Median	49	65	29	60	53	37	32	1
	Min	35	46	27	42	38	34	31	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/7/2013

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 55 dBA

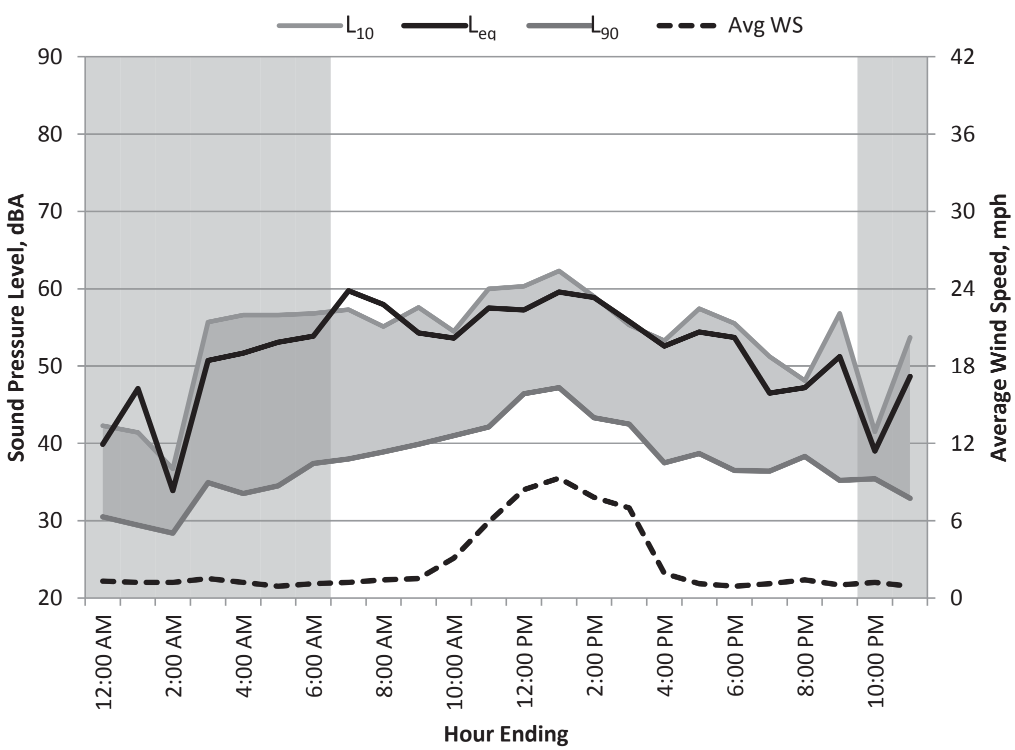


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	42	63	29	54	44	38	34	1
1:00	Night	51	66	29	63	56	38	33	1
2:00	Night	51	66	30	63	56	38	33	1
3:00	Night	51	71	28	66	46	36	32	2
4:00	Night	53	70	29	66	52	37	32	1
5:00	Night	53	76	29	65	54	39	33	1
6:00	Night	54	76	33	66	58	43	37	1
7:00	Day	60	90	35	67	56	42	38	1
8:00	Day	57	81	37	68	58	44	40	1
9:00	Day	56	78	36	69	57	43	39	1
10:00	Day	56	77	36	68	57	48	42	7
11:00	Day	56	75	40	68	58	49	44	7
12:00	Day	60	80	43	70	62	55	49	9
13:00	Day	61	81	41	71	64	55	47	9
14:00	Day	56	77	36	68	57	47	39	5
15:00	Day	56	79	35	68	57	46	39	6
16:00	Day	55	79	34	68	57	40	36	2
17:00	Day	50	71	34	61	53	38	35	1
18:00	Day	51	74	35	63	54	39	37	1
19:00	Day	52	76	34	61	56	39	36	1
20:00	Day	47	71	29	60	40	36	31	1
21:00	Day	49	72	27	62	49	32	29	1
22:00	Night	45	61	26	60	38	33	29	1
23:00	Night	47	63	24	58	54	33	29	1
Overall	Max	61	90	43	71	64	55	49	9
	Median	53	75	34	66	56	39	36	1
	Min	42	61	24	54	38	32	29	1
Daytime	Max	61	90	43	71	64	55	49	9
7am-10pm	Median	56	77	35	68	57	43	39	1
	Min	47	71	27	60	40	32	29	1
Nighttime	Max	54	76	33	66	58	43	37	2
10pm-7am	Median	51	66	29	63	54	38	33	1
	Min	42	61	24	54	38	33	29	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	1/8/2013

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 55 dBA

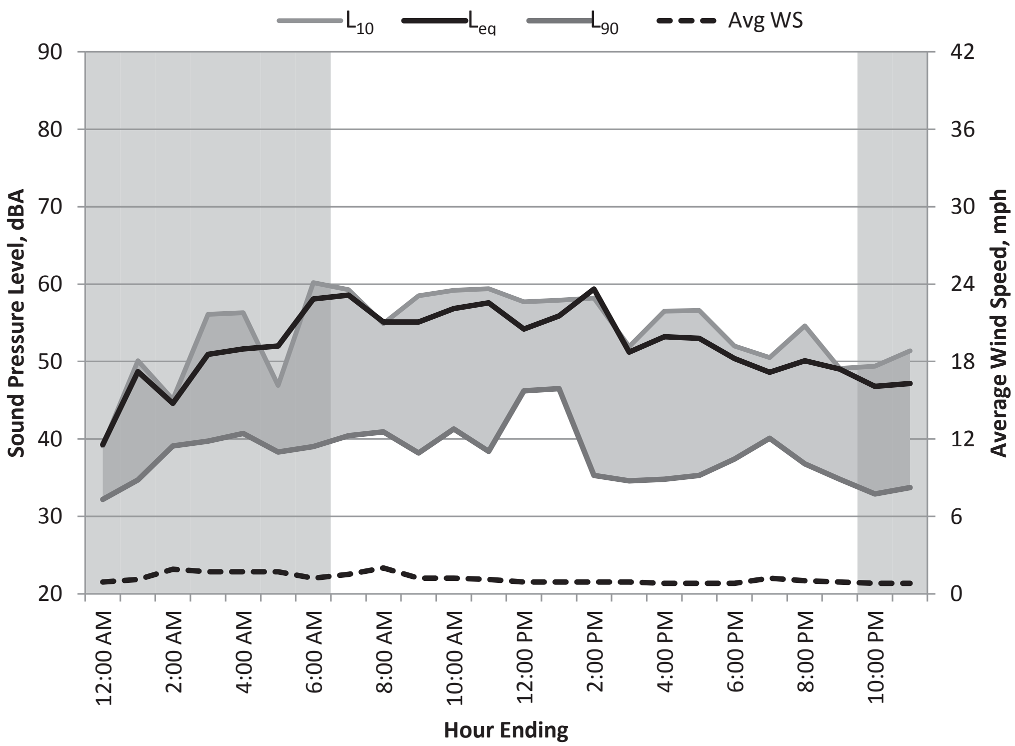


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	40	56	26	51	42	35	31	1
1:00	Night	47	64	25	62	41	34	29	1
2:00	Night	34	45	24	39	37	33	28	1
3:00	Night	51	64	29	62	56	39	35	2
4:00	Night	52	69	30	62	57	38	34	1
5:00	Night	53	76	30	66	57	38	35	1
6:00	Night	54	74	33	66	57	43	37	1
7:00	Day	60	90	35	69	57	42	38	1
8:00	Day	58	84	37	69	55	44	39	1
9:00	Day	54	77	37	66	58	43	40	2
10:00	Day	54	77	37	67	55	45	41	3
11:00	Day	57	78	39	69	60	50	42	6
12:00	Day	57	78	43	68	60	52	46	8
13:00	Day	60	79	43	71	62	53	47	9
14:00	Day	59	82	40	71	59	49	43	8
15:00	Day	56	84	37	65	55	48	43	7
16:00	Day	53	76	36	65	53	41	38	2
17:00	Day	54	76	36	65	57	46	39	1
18:00	Day	54	78	35	63	56	41	37	1
19:00	Day	46	65	35	58	51	39	36	1
20:00	Day	47	71	35	56	48	41	38	1
21:00	Day	51	64	32	62	57	39	35	1
22:00	Night	39	46	32	44	42	38	35	1
23:00	Night	49	61	30	60	54	37	33	1
Overall	Max	60	90	43	71	62	53	47	9
	Median	53	76	35	65	56	41	37	1
	Min	34	45	24	39	37	33	28	1
Daytime	Max	60	90	43	71	62	53	47	9
7am-10pm	Median	54	78	37	66	57	44	39	2
	Min	46	64	32	56	48	39	35	1
Nighttime	Max	54	76	33	66	57	43	37	2
10pm-7am	Median	49	64	30	62	54	38	34	1
	Min	34	45	24	39	37	33	28	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	1/9/2013

24hr Summary

L_{DN} = 59 dBA C_{NEL} = 59 dBA $L_{eq(24hr)}$ = 54 dBA

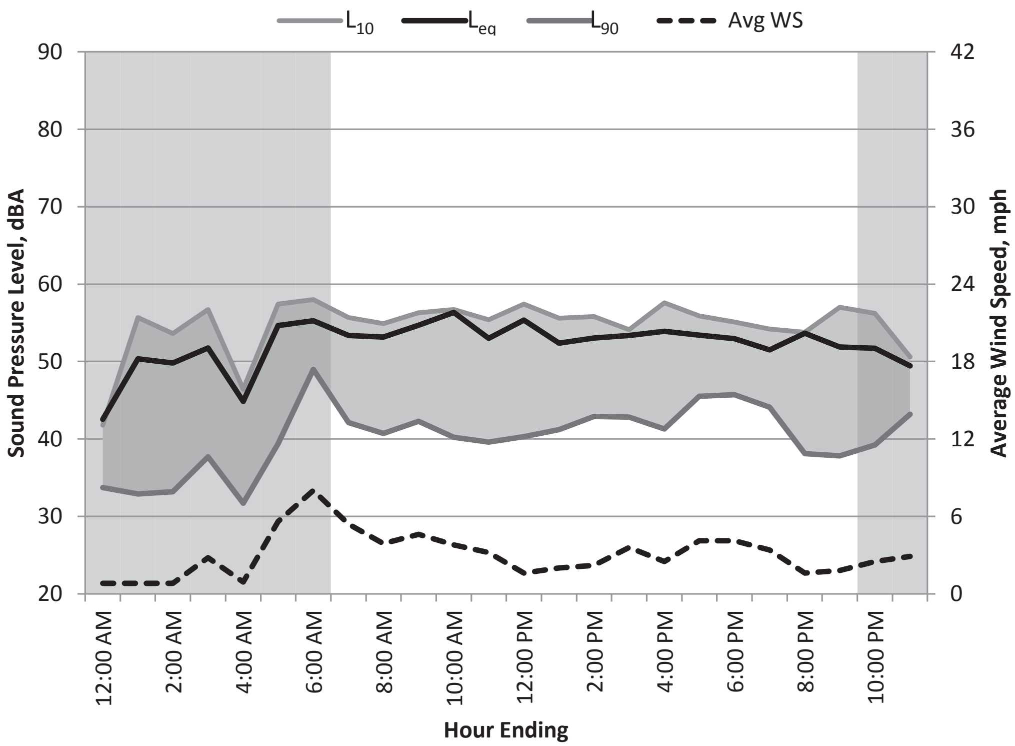


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	39	61	29	51	39	35	32	1
1:00	Night	49	65	32	61	50	38	35	1
2:00	Night	45	57	37	55	45	41	39	2
3:00	Night	51	65	36	62	56	42	40	2
4:00	Night	52	74	38	62	56	43	41	2
5:00	Night	52	72	35	67	47	42	38	2
6:00	Night	58	84	35	67	60	42	39	1
7:00	Day	59	89	34	67	59	45	40	2
8:00	Day	55	78	38	68	55	45	41	2
9:00	Day	55	70	36	64	59	53	38	1
10:00	Day	57	76	35	66	59	55	41	1
11:00	Day	58	77	35	71	59	51	38	1
12:00	Day	54	77	43	63	58	49	46	1
13:00	Day	56	79	35	67	58	50	47	1
14:00	Day	59	88	33	70	58	42	35	1
15:00	Day	51	71	33	64	52	38	35	1
16:00	Day	53	72	33	66	57	38	35	1
17:00	Day	53	76	34	63	57	39	35	1
18:00	Day	50	70	35	63	52	42	37	1
19:00	Day	49	67	37	60	51	44	40	1
20:00	Day	50	69	28	61	55	44	37	1
21:00	Day	49	73	30	60	49	40	35	1
22:00	Night	47	67	28	58	49	36	33	1
23:00	Night	47	65	30	58	51	38	34	1
Overall	Max	59	89	43	71	60	55	47	2
	Median	52	72	35	63	56	42	38	1
	Min	39	57	28	51	39	35	32	1
Daytime 7am-10pm	Max	59	89	43	71	59	55	47	2
	Median	54	76	35	64	57	44	38	1
	Min	49	67	28	60	49	38	35	1
Nighttime 10pm-7am	Max	58	84	38	67	60	43	41	2
	Median	49	65	35	61	50	41	38	1
	Min	39	57	28	51	39	35	32	1

TITLE:	PGE Topoc
PROJECT:	423575
POSITION:	ST-3
DATE:	1/10/2013

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 59 dBA | $L_{eq(24hr)}$ = 53 dBA

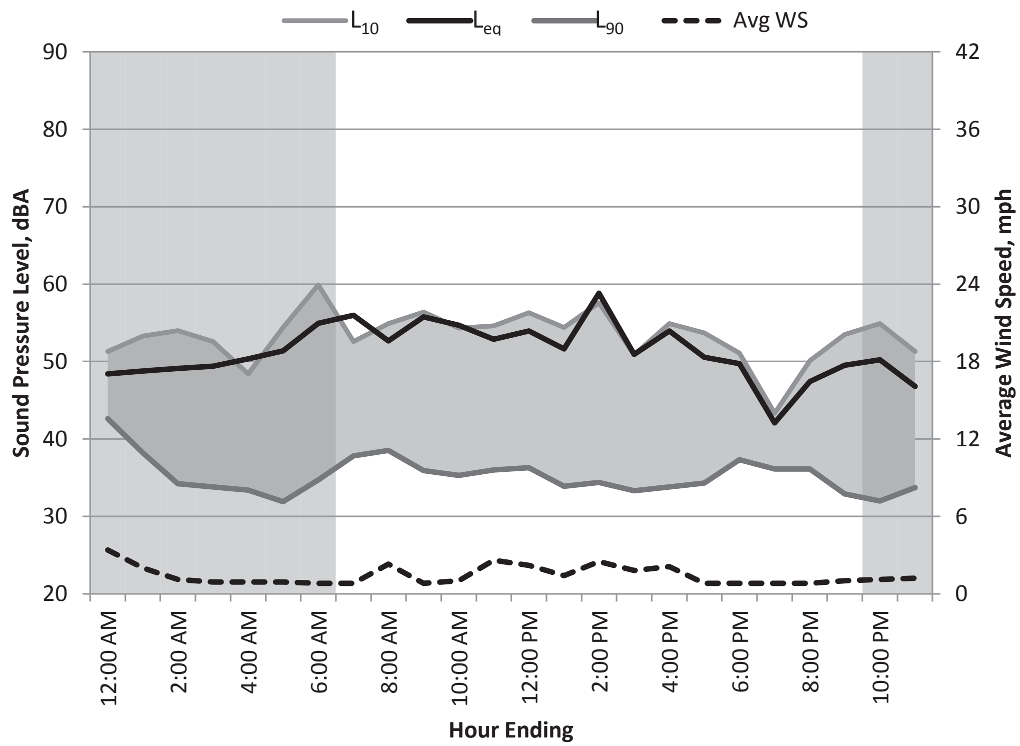


Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	43	61	28	56	42	37	34	1
1:00	Night	50	62	30	61	56	38	33	1
2:00	Night	50	66	29	62	54	37	33	1
3:00	Night	52	67	33	62	57	44	38	3
4:00	Night	45	68	29	56	46	37	32	1
5:00	Night	55	72	34	66	57	49	39	6
6:00	Night	55	75	44	64	58	53	49	8
7:00	Day	53	75	39	65	56	47	42	5
8:00	Day	53	75	38	65	55	45	41	4
9:00	Day	55	77	39	67	56	46	42	5
10:00	Day	56	82	36	68	57	46	40	4
11:00	Day	53	71	36	66	55	44	40	3
12:00	Day	55	74	37	68	57	46	40	2
13:00	Day	52	71	38	63	56	47	41	2
14:00	Day	53	73	39	65	56	47	43	2
15:00	Day	53	74	39	65	54	49	43	4
16:00	Day	54	72	38	65	58	45	41	3
17:00	Day	53	77	41	63	56	49	46	4
18:00	Day	53	73	43	63	55	49	46	4
19:00	Day	51	65	41	61	54	49	44	3
20:00	Day	54	82	33	65	54	42	38	2
21:00	Day	52	74	34	61	57	43	38	2
22:00	Night	52	66	35	63	56	46	39	3
23:00	Night	49	64	40	61	51	46	43	3
Overall	Max	56	82	44	68	58	53	49	8
	Median	53	72	37	64	56	46	41	3
	Min	43	61	28	56	42	37	32	1
Daytime	Max	56	82	43	68	58	49	46	5
7am-10pm	Median	53	74	38	65	56	46	41	3
	Min	51	65	33	61	54	42	38	2
Nighttime	Max	55	75	44	66	58	53	49	8
10pm-7am	Median	50	66	33	62	56	44	38	3
	Min	43	61	28	56	42	37	32	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/11/2013

24hr Summary

L_{DN} = 58 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 53 dBA



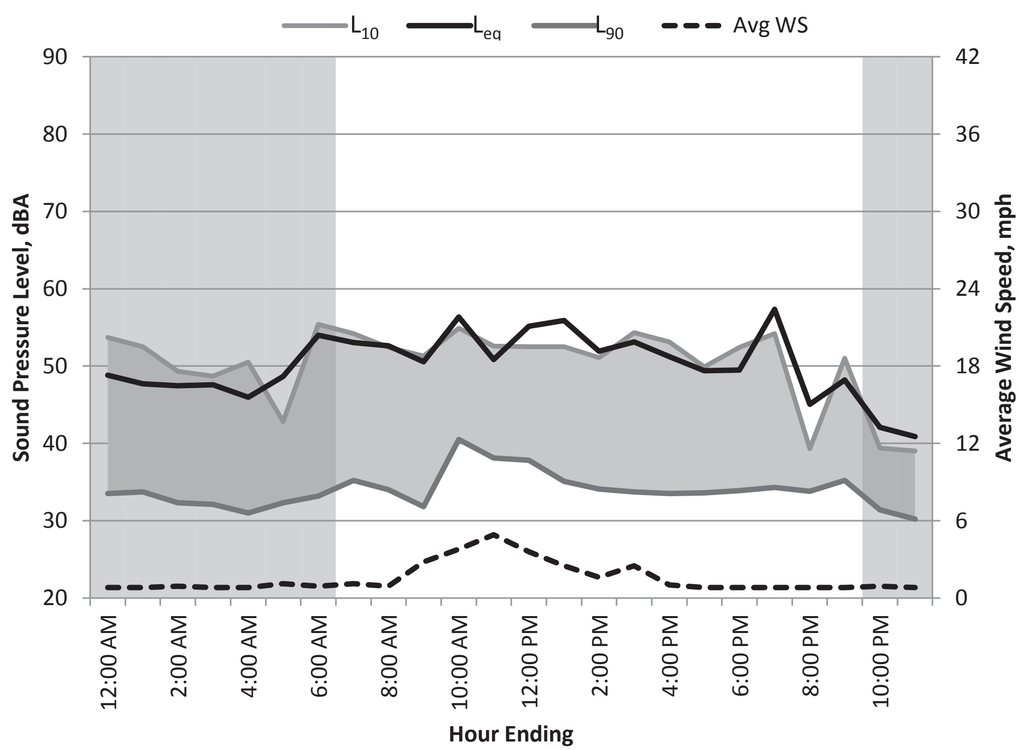
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	60	40	58	51	46	43	3
1:00	Night	49	64	36	60	53	41	38	2
2:00	Night	49	64	31	61	54	38	34	1
3:00	Night	49	67	31	62	53	37	34	1
4:00	Night	50	73	30	63	48	36	33	1
5:00	Night	51	69	30	65	54	37	32	1
6:00	Night	55	76	32	66	60	41	35	1
7:00	Day	56	81	32	67	53	43	38	1
8:00	Day	53	73	35	65	55	44	39	2
9:00	Day	56	79	28	67	56	46	36	1
10:00	Day	55	79	33	68	54	39	35	1
11:00	Day	53	74	33	65	55	41	36	3
12:00	Day	54	75	33	67	56	44	36	2
13:00	Day	52	71	32	64	54	40	34	1
14:00	Day	59	86	33	69	58	43	34	3
15:00	Day	51	72	32	64	51	38	33	2
16:00	Day	54	75	33	67	55	37	34	2
17:00	Day	51	74	32	62	54	38	34	1
18:00	Day	50	69	34	63	51	41	37	1
19:00	Day	42	60	34	52	43	38	36	1
20:00	Day	47	72	29	57	50	42	36	1
21:00	Day	50	74	30	60	54	37	33	1
22:00	Night	50	64	29	62	55	37	32	1
23:00	Night	47	60	28	58	51	39	34	1
Overall	Max	59	86	40	69	60	46	43	3
	Median	51	72	32	63	54	39	35	1
	Min	42	60	28	52	43	36	32	1
Daytime	Max	59	86	35	69	58	46	39	3
7am-10pm	Median	53	74	33	65	54	41	36	1
	Min	42	60	28	52	43	37	33	1
Nighttime	Max	55	76	40	66	60	46	43	3
10pm-7am	Median	49	64	31	62	53	38	34	1
	Min	47	60	28	58	48	36	32	1

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/12/2013

CH2MHILL

24hr Summary

L_{DN} = 56 dBA | C_{NEL} = 57 dBA | $L_{eq(24hr)}$ = 52 dBA



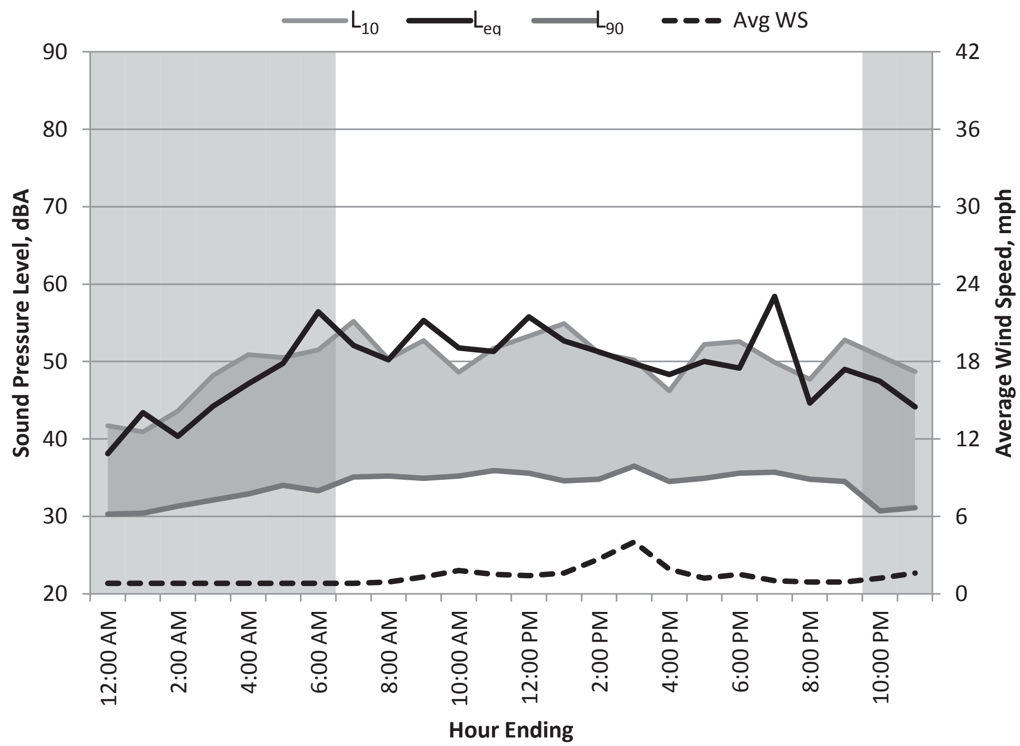
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	49	62	30	59	54	39	34	1
1:00	Night	48	61	30	59	53	38	34	1
2:00	Night	47	61	26	59	49	38	32	1
3:00	Night	48	64	29	60	49	37	32	1
4:00	Night	46	60	28	58	51	36	31	1
5:00	Night	49	77	29	62	43	36	32	1
6:00	Night	54	78	29	67	55	37	33	1
7:00	Day	53	77	33	66	54	39	35	1
8:00	Day	53	79	31	64	52	38	34	1
9:00	Day	51	73	29	63	51	43	32	3
10:00	Day	56	82	36	67	55	45	41	4
11:00	Day	51	71	36	63	53	45	38	5
12:00	Day	55	83	34	65	53	44	38	4
13:00	Day	56	83	34	67	53	40	35	3
14:00	Day	52	72	32	65	51	37	34	2
15:00	Day	53	71	32	67	54	38	34	3
16:00	Day	51	74	32	64	53	41	34	1
17:00	Day	49	76	32	60	50	36	34	1
18:00	Day	49	72	32	61	52	36	34	1
19:00	Day	57	89	33	61	54	36	34	1
20:00	Day	45	71	33	58	39	35	34	1
21:00	Day	48	73	34	60	51	37	35	1
22:00	Night	42	60	28	56	39	35	31	1
23:00	Night	41	59	28	53	39	33	30	1
Overall	Max	57	89	36	67	55	45	41	5
	Median	50	72	32	62	52	37	34	1
	Min	41	59	26	53	39	33	30	1
Daytime	Max	57	89	36	67	55	45	41	5
7am-10pm	Median	52	74	33	64	53	38	34	1
	Min	45	71	29	58	39	35	32	1
Nighttime	Max	54	78	30	67	55	39	34	1
10pm-7am	Median	48	61	29	59	49	37	32	1
	Min	41	59	26	53	39	33	30	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/13/2013

24hr Summary

L_{DN} = 56 dBA　　C_{NEL} = 57 dBA　　$L_{eq(24hr)}$ = 52 dBA



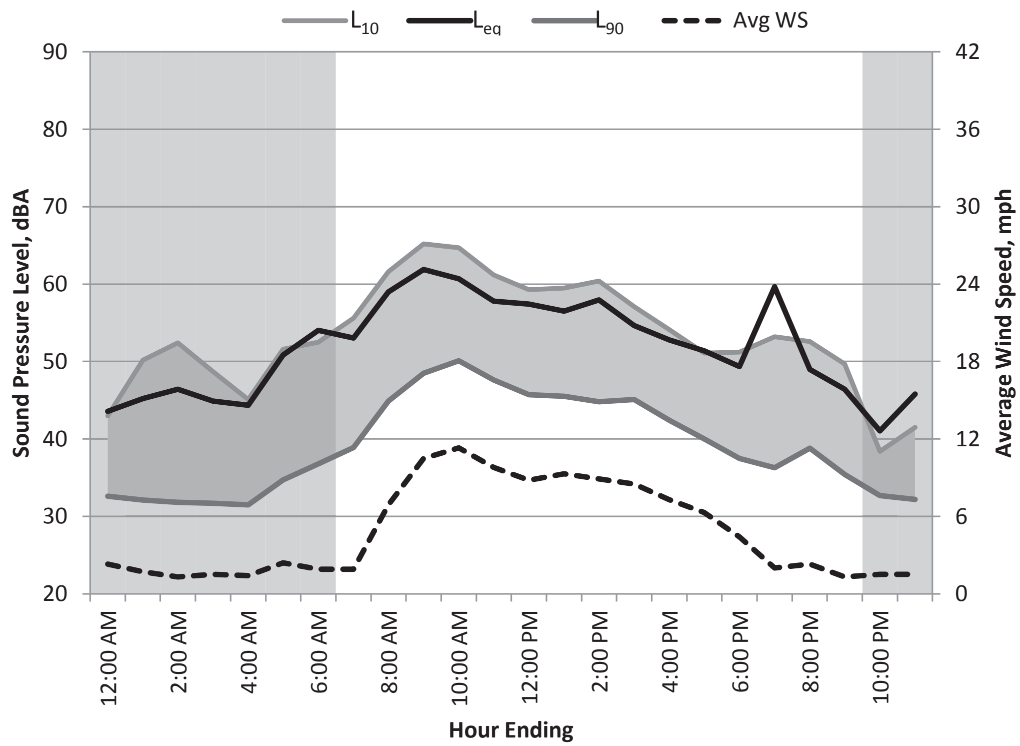
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	38	54	28	49	42	33	30	1
1:00	Night	43	66	28	56	41	33	30	1
2:00	Night	40	56	29	52	44	33	31	1
3:00	Night	44	58	30	55	48	36	32	1
4:00	Night	47	68	31	59	51	37	33	1
5:00	Night	50	78	30	60	51	39	34	1
6:00	Night	56	84	30	67	52	39	33	1
7:00	Day	52	69	32	64	55	42	35	1
8:00	Day	50	72	31	64	50	41	35	1
9:00	Day	55	81	32	66	53	39	35	1
10:00	Day	52	78	34	65	49	37	35	2
11:00	Day	51	74	34	64	52	39	36	2
12:00	Day	56	83	34	66	53	42	36	1
13:00	Day	53	73	33	65	55	40	35	2
14:00	Day	51	74	33	63	51	40	35	3
15:00	Day	50	70	34	63	50	41	37	4
16:00	Day	48	71	33	62	46	36	35	2
17:00	Day	50	77	33	58	52	37	35	1
18:00	Day	49	70	34	60	53	38	36	2
19:00	Day	58	90	35	60	50	38	36	1
20:00	Day	45	70	33	54	48	36	35	1
21:00	Day	49	74	33	61	53	36	35	1
22:00	Night	47	64	28	60	51	34	31	1
23:00	Night	44	58	28	56	49	34	31	2
Overall	Max	58	90	35	67	55	42	37	4
	Median	50	72	32	61	51	38	35	1
	Min	38	54	28	49	41	33	30	1
Daytime	Max	58	90	35	66	55	42	37	4
7am-10pm	Median	51	74	33	63	52	39	35	1
	Min	45	69	31	54	46	36	35	1
Nighttime	Max	56	84	31	67	52	39	34	2
10pm-7am	Median	44	64	29	56	49	34	31	1
	Min	38	54	28	49	41	33	30	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/14/2013

24hr Summary

L_{DN} = 58 dBA | C_{NEL} = 58 dBA | $L_{eq(24hr)}$ = 55 dBA



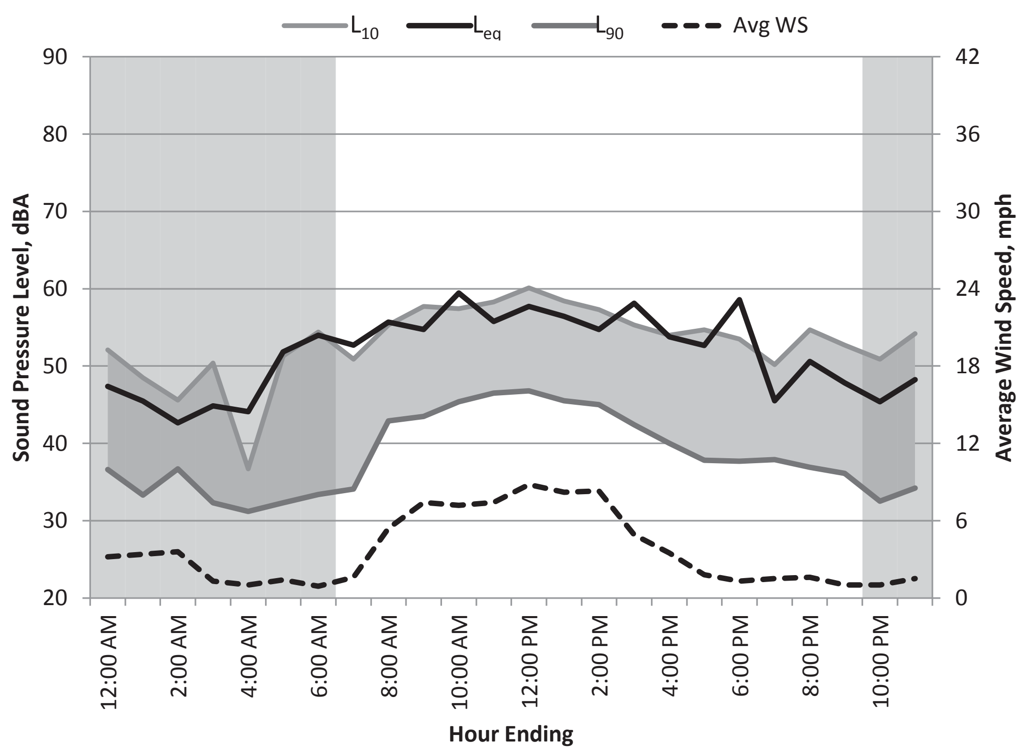
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	44	66	29	55	43	37	33	2
1:00	Night	45	60	28	57	50	35	32	2
2:00	Night	46	61	30	57	52	34	32	1
3:00	Night	45	61	29	56	49	35	32	2
4:00	Night	44	71	28	52	45	34	32	1
5:00	Night	51	76	32	64	52	38	35	2
6:00	Night	54	76	34	67	53	41	37	2
7:00	Day	53	73	36	66	56	44	39	2
8:00	Day	59	77	37	71	62	52	45	7
9:00	Day	62	79	42	73	65	55	49	11
10:00	Day	61	77	45	70	65	56	50	11
11:00	Day	58	73	43	69	61	53	48	10
12:00	Day	57	79	39	70	59	51	46	9
13:00	Day	57	76	41	68	60	51	46	9
14:00	Day	58	79	40	69	60	52	45	9
15:00	Day	55	76	40	66	57	49	45	9
16:00	Day	53	73	38	65	54	47	42	7
17:00	Day	51	78	37	62	51	44	40	6
18:00	Day	49	72	36	61	51	42	38	4
19:00	Day	60	92	34	61	53	38	36	2
20:00	Day	49	70	37	59	53	42	39	2
21:00	Day	46	70	34	55	50	38	35	1
22:00	Night	41	57	30	55	38	35	33	2
23:00	Night	46	61	29	60	42	36	32	2
Overall	Max	62	92	45	73	65	56	50	11
	Median	52	73	36	63	53	42	38	2
	Min	41	57	28	52	38	34	32	1
Daytime	Max	62	92	45	73	65	56	50	11
7am-10pm	Median	57	76	38	66	57	49	45	7
	Min	46	70	34	55	50	38	35	1
Nighttime	Max	54	76	34	67	53	41	37	2
10pm-7am	Median	45	61	29	57	49	35	32	2
	Min	41	57	28	52	38	34	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/15/2013

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 57 dBA $L_{eq(24hr)}$ = 54 dBA



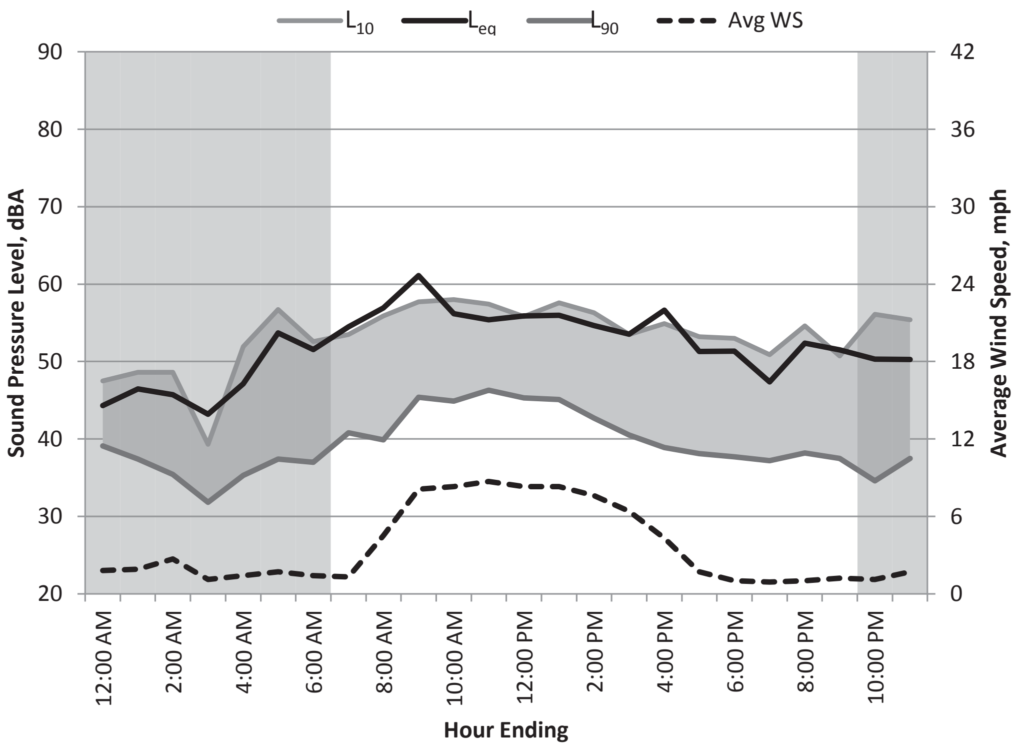
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	47	61	34	57	52	41	37	3
1:00	Night	45	65	29	56	49	41	33	3
2:00	Night	43	59	33	50	46	40	37	4
3:00	Night	45	59	29	55	50	36	32	1
4:00	Night	44	71	29	56	37	34	31	1
5:00	Night	52	77	29	66	51	35	32	1
6:00	Night	54	78	30	67	54	41	33	1
7:00	Day	53	76	31	66	51	39	34	2
8:00	Day	56	79	39	69	55	48	43	5
9:00	Day	55	71	36	66	58	49	44	7
10:00	Day	59	86	40	70	57	50	45	7
11:00	Day	56	75	42	67	58	51	47	7
12:00	Day	58	77	43	69	60	52	47	9
13:00	Day	56	79	41	67	58	51	46	8
14:00	Day	55	73	41	66	57	50	45	8
15:00	Day	58	88	40	65	55	47	42	5
16:00	Day	54	75	37	67	54	43	40	4
17:00	Day	53	76	36	64	55	41	38	2
18:00	Day	59	90	36	65	54	41	38	1
19:00	Day	46	58	35	54	50	41	38	2
20:00	Day	51	71	35	60	55	41	37	2
21:00	Day	48	67	35	58	53	38	36	1
22:00	Night	45	62	30	56	51	37	33	1
23:00	Night	48	62	31	59	54	38	34	2
Overall	Max	59	90	43	70	60	52	47	9
	Median	53	74	35	65	54	41	37	3
	Min	43	58	29	50	37	34	31	1
Daytime	Max	59	90	43	70	60	52	47	9
7am-10pm	Median	55	76	37	66	55	47	42	5
	Min	46	58	31	54	50	38	34	1
Nighttime	Max	54	78	34	67	54	41	37	4
10pm-7am	Median	45	62	30	56	51	38	33	1
	Min	43	59	29	50	37	34	31	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/16/2013

24hr Summary

L_{DN} = 57 dBA C_{NEL} = 58 dBA $L_{eq(24hr)}$ = 54 dBA



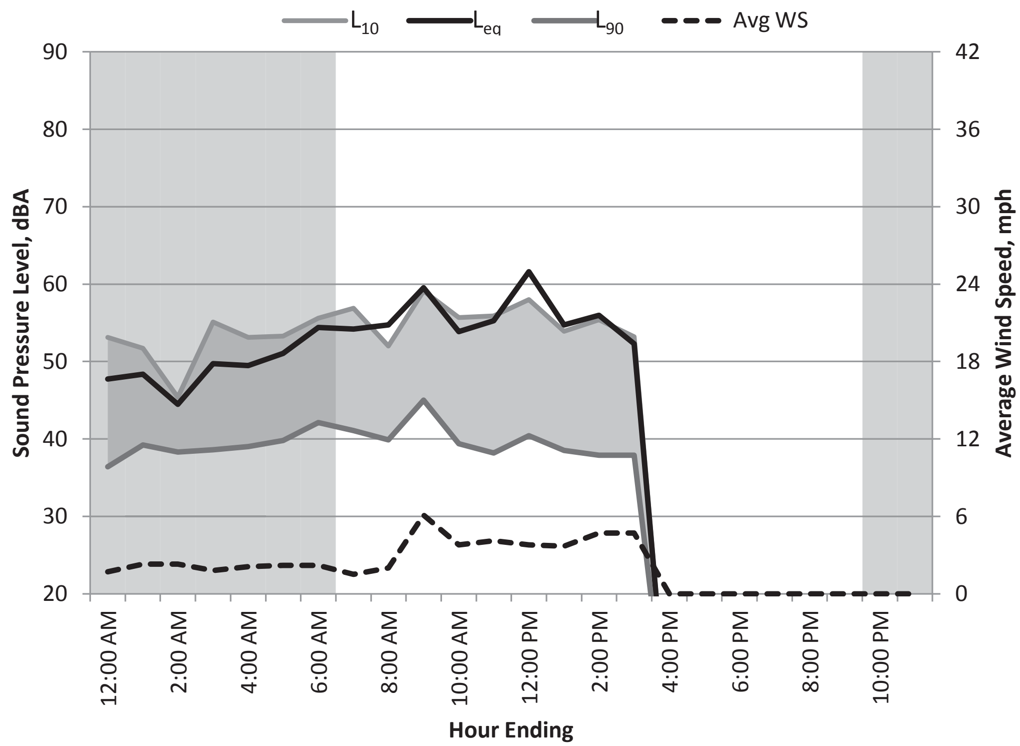
Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	44	54	35	53	48	42	39	2
1:00	Night	46	63	35	58	49	40	37	2
2:00	Night	46	62	33	56	49	39	35	3
3:00	Night	43	63	30	58	39	34	32	1
4:00	Night	47	62	32	57	52	40	35	1
5:00	Night	54	76	35	65	57	41	37	2
6:00	Night	52	72	33	65	53	41	37	1
7:00	Day	54	78	34	66	54	46	41	1
8:00	Day	57	81	35	69	56	48	40	5
9:00	Day	61	91	41	68	58	51	45	8
10:00	Day	56	74	41	68	58	51	45	8
11:00	Day	55	77	43	66	57	51	46	9
12:00	Day	56	79	42	67	56	49	45	8
13:00	Day	56	76	42	68	58	50	45	8
14:00	Day	55	75	39	66	56	48	43	8
15:00	Day	54	76	38	65	54	46	41	6
16:00	Day	57	78	37	70	55	43	39	4
17:00	Day	51	74	36	64	53	41	38	2
18:00	Day	51	76	35	64	53	41	38	1
19:00	Day	47	69	36	58	51	39	37	1
20:00	Day	52	74	36	66	55	42	38	1
21:00	Day	51	75	35	63	51	40	38	1
22:00	Night	50	63	31	61	56	39	35	1
23:00	Night	50	65	35	62	55	40	38	2
Overall	Max	61	91	43	70	58	51	46	9
	Median	52	75	35	65	54	42	38	2
	Min	43	54	30	53	39	34	32	1
Daytime	Max	61	91	43	70	58	51	46	9
7am-10pm	Median	55	76	37	66	55	46	41	5
	Min	47	69	34	58	51	39	37	1
Nighttime	Max	54	76	35	65	57	42	39	3
10pm-7am	Median	47	63	33	58	52	40	37	2
	Min	43	54	30	53	39	34	32	1

CH2MHILL

TITLE: PGE Topoc
PROJECT: 423575
POSITION: ST-3
DATE: 1/17/2013

24hr Summary

L_{DN} = -- dBA C_{NEL} = -- dBA $L_{eq(24hr)}$ = -- dBA



Hour Starting	Time Period	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}	L_{90}	Avg WS (mph)
0:00	Night	48	66	33	58	53	40	36	2
1:00	Night	48	65	36	60	52	43	39	2
2:00	Night	44	60	35	56	45	42	38	2
3:00	Night	50	62	36	60	55	42	39	2
4:00	Night	49	64	35	61	53	43	39	2
5:00	Night	51	71	37	64	53	42	40	2
6:00	Night	54	77	38	66	56	48	42	2
7:00	Day	54	74	35	66	57	46	41	2
8:00	Day	55	80	38	67	52	44	40	2
9:00	Day	60	82	41	70	59	53	45	6
10:00	Day	54	75	37	66	56	45	39	4
11:00	Day	55	75	36	69	56	42	38	4
12:00	Day	62	92	37	69	58	49	40	4
13:00	Day	55	81	36	67	54	43	39	4
14:00	Day	56	81	36	67	55	44	38	5
15:00	Day	52	71	36	65	53	43	38	5
16:00	Day	--	--	--	--	--	--	--	--
17:00	Day	--	--	--	--	--	--	--	--
18:00	Day	--	--	--	--	--	--	--	--
19:00	Day	--	--	--	--	--	--	--	--
20:00	Day	--	--	--	--	--	--	--	--
21:00	Day	--	--	--	--	--	--	--	--
22:00	Night	--	--	--	--	--	--	--	--
23:00	Night	--	--	--	--	--	--	--	--
Overall	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Daytime 7am-10pm	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--
Nighttime 10pm-7am	Max	--	--	--	--	--	--	--	--
	Median	--	--	--	--	--	--	--	--
	Min	--	--	--	--	--	--	--	--

Specific Comments – Appendix A8 (Supplemental Baseline Sound Level Measurement Technical Memorandum) *Source: Appendix I, Response to 60% Design Comments*									
Item	**Comment Number**	**Section/ Page**	**Reference Text**	**60% Design Comment**	**PG&E Response to 60% Design Comments**	**DTSC Response to 60% Design Comments**	**DOI Response to 60% Design Comments**	**Tribe Response to 60% Design Comments**	**Final Comment Resolution**
317	FMIT-50 Hualapai-36 Chemehuevi-36 Cocopah-36 CRIT-36	Append A8		There needs to be a narrative that explains how these baseline data will be used in any decision-making process(es), and as a part of Mitigation Measures NOISE-1, NOISE-2 or NOISE-3.	The purpose of the supplemental sound data (collected in 2012 and 2013) was to augment the then existing noise data set (collected during the EIR development period) which is comprised of data collected over a single 15-minute period in December 2008 at the short-term measurement locations in the FEIR (shown in Exhibit 4.9-2 as ST-1, ST-2, and ST-3). As with other existing environmental conditions (e.g., water quality, site topography, vegetation communities, etc.), the purpose of the data is to document site conditions prior to remedy implementation. In compliance with mitigation measure NOISE-1 and NOISE-2, PG&E has designated disturbance coordinators who will manage any project-related complaints. In addition, PG&E will comply with mitigation measure CUL-1a-8h, protocols to reduce auditory impacts as part of the future CIMP. The above noise data is available for use, if needed and as appropriate. See also response to TRC's (Charlie Schlinger) memorandum dated December 10, 2013, included in **Attachment H**, at the end of this table.	The noise data collected for the EIR was used to determine the threshold sound energy for the project. No additional decisions will be made based on the long term or short term survey results.		Comment resolved. Tribal concerns regarding noise may be different than applied regulatory standards.	Comment resolved. PG&E will insert the Appendix A8 RTCs at the end of Appendix A8.
318	FMIT-51 Hualapai-37 Chemehuevi-37 Cocopah-37 CRIT-37	Append A8		A tabular inventory and map of noise source locations (inclusive of sound power levels, with time dependencies noted) is needed in order to assess the noise impact(s) of this project. There should be an inventory and map for each of the construction and operational periods.	Comment noted. This information will be provided at 90% BOD once the infrastructure locations/alignment are settled. See also response to TRC's (Charlie Schlinger) memorandum dated December 10, 2013, included in **Attachment H**, at the end of this table.			Comment resolved pending review of the 90% design.	Comment resolved.
319	FMIT-52 Hualapai-38 Chemehuevi-38 Cocopah-38 CRIT-38	Append A8		It is not clear whether and how the selection and specification of noise-generating equipment, such as transformers, above-ground pumps, and motors, etc., will utilize noise-restrictive criteria.	The majority of pumps and motors will be located either underground, inside a well, or inside an enclosure (e.g., building). Power supply equipment/backup generator also will be located inside enclosures or buildings. Placing pumps, motors, and power supply/ backup generators in these locations effectively minimizes the sound emissions. The remaining non-emergency above ground equipment is limited to transformers which are similar in size to the one already operating at IM-3, and communication/control panels. Selection of this equipment will be reviewed by the Noise Engineer for conformance with the noise design criteria (see Section C.11).			Comment resolved pending review of the 90% design.	Comment resolved.

Specific Comments – Appendix A8 (Supplemental Baseline Sound Level Measurement Technical Memorandum) *Source: Appendix I, Response to 60% Design Comments*									
Item	**Comment Number**	**Section/ Page**	**Reference Text**	**60% Design Comment**	**PG&E Response to 60% Design Comments**	**DTSC Response to 60% Design Comments**	**DOI Response to 60% Design Comments**	**Tribe Response to 60% Design Comments**	**Final Comment Resolution**
					See also response to TRC's (Charlie Schlinger) memorandum dated December 10, 2013, included in **Attachment H**, at the end of this table.				
320	FMIT-53 Hualapai-39 Chemehuevi-39 Cocopah-39 CRIT-39	Append A8		The important effect(s) of meteorological conditions on the long-range propagation of sound should be addressed.	Meteorological effects are most pronounced for elevated sources or very loud sources, particularly those with strong low frequency content (such as a train). The operational sources of noise associated with this project are primarily located within buildings or underground, therefore their sound emissions are minimized and are not elevated. This project does not utilize equipment which is known to emit high levels of low frequency noise (such as train engines or unsilenced simple-cycle combustion exhaust stacks). See also response to TRC's (Charlie Schlinger) memorandum dated December 10, 2013, included in **Attachment H**, at the end of this table. Below is PG&E's response to the suggested language to close this comment: 1. The methodology for noise measurement in Topock Project Sound Level Measurements Protocol complies San Bernardino County Code 83.01.080(a) – Noise Measurement, and the EIR. The County requirements include the use of a sound level meter that meets ANSI standard, Type 1 or 2, and use the "A" weighted sound pressure level with unit of measurement as dB(A). The dB(A) is the sound pressure level as measured on a meter using the A-weighting filter network. Noise standards are expressed as Leq which is the equivalent energy level of a time varying signal over a given period of time, typically, 1, 8, or 24 hrs. Further, the EIR identified the applicable criteria as A-weighted. There is no technical or regulatory basis to revise the measurement protocol or to further clarify the existing sources. For the above reasons, PG&E believes that it is not necessary to collect additional measurements or noise recordings to be consistent with the EIR. However, PGE recognizes the importance of the area to the Tribes, and should a concern about the actual noise generated by remedy operations arise, PG&E will work with the Tribes, agencies, and stakeholders to	DTSC recognizes that meteorological conditions generally have the potential to result in increased, or decreased, noise exposure at known sensitive receptors. CEQA requires lead agencies to consider whether a project would have a substantial permanent increase in ambient noise levels above levels existing without the project, or a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. Here, construction noise for the project was appropriately identified as a potentially significant impact and mitigation measures were imposed in "Mitigation Measure NOISE-2: Project Generated Construction-Related Noise Levels". This issue will be considered further if needed based on the final design.		. See the following language in the Hualapai Tribe's letter (3/10/14) – Use the following language for closure of this comment: 1. Revise the noise measurement protocol in consultation with the Tribes. Specifically, the protocol needs to include the collection and archiving of noise measurements that include spectral content (noise level as a function of frequency, which consists of unfiltered and un-weighted, or un-averaged, raw data, aka band spectra), and noise recordings accompanied by a spoken or written narrative addressing what noise and sounds are being heard. 2. Following the above revised protocol, collect additional noise data during the summer and early winter of 2014. 3. Adopt the protocol for use on the project, going forward.	Written comments on the responses to this comment were received from the TRC (Charlie Schlinger) on November 15, 2013. PG&E provided a response to the written comment on December 10, 2013 (see memo included in **Attachment H**, at the end of this table). The TRC (Charlie Schlinger) presented draft proposed language to this comment at the February 11, 2014 TWG meeting. On March 10, 2014, the Hualapai Tribe provided a letter with language to close out the unresolved noise and vibration-related comments (see **Attachment H**, at the end of this table).

Specific Comments – Appendix A8 (Supplemental Baseline Sound Level Measurement Technical Memorandum) *Source: Appendix I, Response to 60% Design Comments*									
Item	**Comment Number**	**Section/ Page**	**Reference Text**	**60% Design Comment**	**PG&E Response to 60% Design Comments**	**DTSC Response to 60% Design Comments**	**DOI Response to 60% Design Comments**	**Tribe Response to 60% Design Comments**	**Final Comment Resolution**
					thoroughly investigate and resolve the issue appropriately. 2 & 3. See response to #1 above.				
321	FMIT-54 Hualapai-40 Chemehuevi-40 Cocopah-40 CRIT-40	Append A8 p. 1 and Figure 1	*The sound measurement locations were selected near the short term measurement locations in the Final Environmental Impact Report (FEIR) (DTSC,2011).*(shown in Exhibit 4.9-2 as ST-1, ST-2, and ST-3) (see Figure 1)	The three sites, ST-1, ST-2 & ST-3, have quite different levels of background sound levels and time—distributions, but this is not discussed. The report as it stands provides practically no quantitative evidence about the nearby noise sources and their (expected/measured) spatial contribution to the background noise. Such information is crucial to properly analyze and understand the highly variable background noise which was measured across the three sites. Further, it is unclear as to why these sites were chosen. *"PGE asked for clarification of this comment prior to response. The following clarification of comment was obtained from TRC on October 17, 2013. Response addresses the clarified comment.* *It is unclear what the data entries included in Appendix A8 Tables (1 & 2) represent? It is assumed that these data represent averages of other numbers presumably numbers in the Appendices (C-H) of Appendix A8. Please confirm if this assumption is correct. In addition it is not clear what the numbers in Appendices C-H represent? Presumably, they too are "averages" of other numbers - these latter numbers probably being what was actually measured. Please provide additional detail that allows the reader to understand what was actually measured and for what duration(s). That is, what are the basic measurements for this baseline sound characterization, and what "averaging" methods were used to develop the tabular summary information?*	American National Standards Institute (ANSI) S1.4 Type 1 (precision) sound level meters were used to monitor ambient sound levels. The sound level meters were programmed to report the average (L_{eq}) and statistical sound level metrics (Leq, L50, and L90) at hourly intervals. The sound level meters continuously monitor the sound levels during each hourly interval and automatically calculate and report the average and statistical levels at the conclusion of the hourly interval. This process repeats continuously until the meters are manually turned off or the batteries are depleted and the meter automatically turns off. Appendices C through H present the data reported by the sound level meters in tabular and graphical format. The data in Table 1 is a summary of the data presented in Appendices C through H. Table 1 presents the maximum and minimum hourly Leq sound pressure level and corresponding wind speed for each monitoring location during both the daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods for both the summer and winter monitoring events. For example, the data presented in Appendix C (ST-1, August 2012) was reviewed to identify the maximum and minimum L_{eq} during the daytime and nighttime periods. These maximum and minimum levels were summarized for in Table 1 along with the wind speed that occurred during those maximum and	A specific rationale for the selection of individual sites for noise measurements was not provided in the Groundwater Final EIR. Based on the locations of the monitoring locations, the following can be inferred: ST 1 was chosen for its proximity to Maze Loci A; ST 2 was chosen for its proximity to Maze Loci C; ST 3 was chosen for its proximity to residences and traffic intersection at Park Moabi; LT A was chosen to provide ambient noise data from I-40; and LT B was chosen to provide ambient noise data from the BNSF rail line. It can also be inferred from the text in the Final EIR that the five locations were identified in recognition of the existing noise environment associated with the site (i.e., the diversity of background sound levels that exist on the site) and the existing noise-sensitive land uses. Further, because intervening topography exists between the compressor station and other portions of the project areas in the form of mesas that generally shield noise-sensitive receptors from full exposure of current on-site operations, multiple representative sites for ambient noise measurements were necessary. To accurately describe potential noise related impacts, the Final EIR used the ambient noise survey data from the individual locations to determine impacts to nearest sensitive receptors from the proposed project (i.e., the data collected for the three sites was not averaged). The normalization of the data described above, was conducted for individual sites only.		The Tribe was not involved in the selection of the sites in the FEIR and the 2012-2013 study. The Tribe also note that there is no noise monitoring plan. See the following language in the Hualapai Tribe's letter (3/10/14) – Use the following language for closure of this comment: 1. Revise the noise measurement protocol in consultation with the Tribes. Specifically, the protocol needs to include the collection and archiving of noise measurements that include spectral content (noise level as a function of frequency, which consists of unfiltered and un-weighted, or un-averaged, raw data, aka band spectra), and noise recordings accompanied by a spoken or written narrative addressing what noise and sounds are being heard. 2. Following the above revised protocol, collect additional noise data during the summer and early winter of 2014. 3. Adopt the protocol for use on the project, going forward.	Written comments on the responses to this comment were received from the TRC (Charlie Schlinger) on November 15, 2013. PG&E provided a response to the written comment on December 10, 2013 (see memo included in **Attachment H**, at the end of this table). The TRC (Charlie Schlinger) presented draft proposed language to this comment at the February 11, 2014 TWG meeting. On March 10, 2014, the Hualapai Tribe provided a letter with language to close out the unresolved noise and vibration-related comments (see **Attachment H**, at the end of this table).

Specific Comments – Appendix A8 (Supplemental Baseline Sound Level Measurement Technical Memorandum) *Source: Appendix I, Response to 60% Design Comments*									
Item	**Comment Number**	**Section/ Page**	**Reference Text**	**60% Design Comment**	**PG&E Response to 60% Design Comments**	**DTSC Response to 60% Design Comments**	**DOI Response to 60% Design Comments**	**Tribe Response to 60% Design Comments**	**Final Comment Resolution**
				Site selection is a critical matter when it comes to developing a baseline. In the case of noise on this project, 3 sites were selected, with very little basis/justification provided in the FEIR. (The initial response to comments for this comment goes a long way in providing some explanation, but it is not complete, as ST-1 and ST-2 are indeed located on "mesa" tops (upland areas) and one, ST-3, is located down off of the "mesa", at a street intersection.) Please provide additional detail regarding what is it about these sites that is representative and meaningful when it comes to baseline noise measurements? Why are these locations appropriate for	minimum periods for ST-1 during August 2012. Table 2 presents the same sound pressure level data that is in Table 1 alongside the data collected from the 2008 EIR (the wind speed which was reported in Table 1 was omitted from Table 2 to enhance readability of Table 2). Table 2 shows that the short-term data collected for the 2008 EIR is within the range of the longer-term data collected over both a summer and winter period. Had the 2008 EIR sound level data fallen substantially outside the range of that recorded during this longer term monitoring event, its reproducibility could have been questioned. This did not occur. That is, there was nothing anomalous or spurious occurring during the time the sound level data reported in the 2008 EIR was collected. These sites were chosen by the EIR preparer for noise measurements because mesas that generally shield noise sensitive receptors from full exposure of operations that were occurring when the EIR was prepared, exist between the compressor station and other portions of the project areas (see FEIR, page 4.9-5). Additional data was collected in proximity to these sites in 2012 – 2013. Agencies, Tribes, and Stakeholders were informed of this selection as documented in the *Sound Level Measurements Protocol Technical Memorandum* (Appendix B to the 60% BOD Appendix A8). See also response to comment #322 FMIT-55/Hualapai-41. The *Sound Level Measurements Technical Memorandum* in Appendix A8 is intended to report the supplemental data collected during the 2012-2013 event. Since the existing site conditions (e.g., noise environment, topographic condition) are well documented in the FEIR, that body of information is intentionally not repeated in this technical memorandum. If helpful, additional references to the FEIR can be added to this technical memorandum. See responses to comment #317 FMIT-50/Hualapai-36 and #319 FMIT-52/ Hualapai-38, as well as TRC's (Charlie Schlinger) memorandum dated December 10, 2013, included in **Attachment H**, at the end of this table. For PG&E's response to suggested language to close this comment, see RTC #320.				

Specific Comments – Appendix A8 (Supplemental Baseline Sound Level Measurement Technical Memorandum) *Source: Appendix I, Response to 60% Design Comments*									
Item	**Comment Number**	**Section/ Page**	**Reference Text**	**60% Design Comment**	**PG&E Response to 60% Design Comments**	**DTSC Response to 60% Design Comments**	**DOI Response to 60% Design Comments**	**Tribe Response to 60% Design Comments**	**Final Comment Resolution**
				developing the baseline sound characterization? *The reporting in Appendix A8 is too clinical and terse; there are no more than a half-dozen sentences given to the discussion of results, mainly with an eye toward wind effects on noise measurements. While there are essential footnotes related to measured wind speed, which is highly relevant to noise measurements, there is no interpretation and discussion of the numerical values in Tables 1-2, or in the Tables in Appendices C-H in terms of individual site location and proximity to known noise sources, time of day, actual noise from these sources, season, atmospheric conditions, topographic conditions, or any other factor known to influence the measurements.* *There needs to be clear communication, in the design documents, of how these most recent noise data, together with the FEIR noise data collected in 2008, will be used as part of the project design.*					
322	FMIT-55 Hualapai-41 Chemehuevi-41 Cocopah-41 CRIT-41	Append A8 p.1 and Photo 1 & 2		The 60% BOD Report Appendix A-8 noise measurement locations are reported to be "near" and "in proximity to" the certified EIR noise measurement locations. The meanings of these terms are ambiguous and need clarification. Why were the certified EIR noise measurement locations not used?	Precise GPS locations were not available for the locations used in the certified EIR. The 2012 – 2013 noise measurement locations were selected based on their suitability for a longer term noise measurement. All of these locations are within approximately 100 feet of the EIR noise measurement locations and are well within the same acoustical environment.			The Tribes were not involved in the selection of the sites in the FEIR and the 2012-2013 study. The Tribes also note that there is no noise monitoring plan.	This comment and response were discussed at the October 16-17, 2013 TWG meeting. Comment resolved.

Appendix A9
Paleontological Resources Management Plan: MMRP CUL-3

Topock Project Executive Abstract

Document Title: Paleontological Resources Management Plan, Topock Groundwater Remediation Project, San Bernardino County, California and Mohave County, Arizona Submitting Agency/Authored by: PG&E Final Document? ☒ Yes ☐ No	Date of Document: February 28, 2013 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E Document ID: PGE20140228A
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 ☐ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR) ☐ Interim Measures ☒ Other / Explain: MMRP Requirement (CUL-3) per the Environmental Impact Report (EIR)	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 satisfies the Environmental Impact Report (EIR) Mitigation Measure CUL-3	Other Justification/s: ☐ Permit ☐ Other / Explain:

Brief Summary of attached document:

The report provides a paleontological survey and summary for areas included in the Project Area. The study was specifically intended to identify the potential for paleontological resources and determine if paleontological monitors would be necessary during the groundwater remediation implementation activities.

Written by: ARCADIS and Parus Consulting on behalf of PG&E

Recommendations:

A paleontologist should be on call to respond in the unlikely event that fossils are encountered during construction or drilling, so that they may be evaluated to determine whether they meet significance criteria.

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

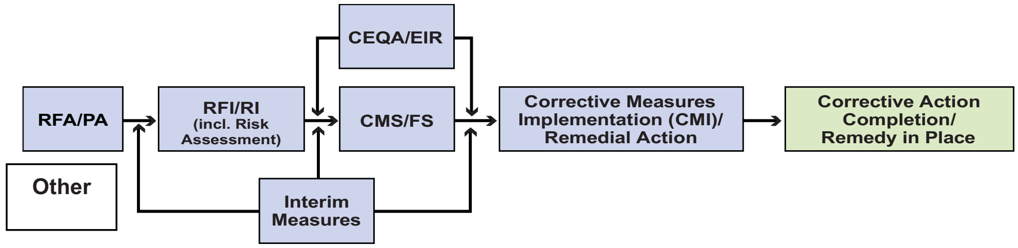
This report was prepared in response to mitigation measure CUL-3.

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). **The link to the Documents Library is currently UNDER CONSTRUCTION.**



Version 8

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

Imagine the result

Paleontological Resources Management Plan: MMRP CUL-3

Topock Groundwater Remediation Project
San Bernardino County, California, and
Mohave County, Arizona

February 28, 2014

Sherri Gust
Principal Investigator

Paleontological Resources Management Plan

Topock Groundwater Remediation Project
San Bernardino County, California, and
Mohave County, Arizona

Prepared for:
Pacific Gas and Electric Company

Prepared by:
ARCADIS U.S., Inc.
2033 North Main Street
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Tel 925 274 1100
Fax 925 274 1103

Our Ref.:
RC000753.0009

Date:
February 28, 2014

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Tables

Figures

Acronyms and Abbreviations

AOC	Area of Concern
BLM	Bureau of Land Management
CACA	Corrective Action Consent Agreement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Compressor Station	Topock Compressor Station
DOI	Department of the Interior
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
LACM	Natural History Museum of Los Angeles County, Vertebrate Paleontology Section
LACMIP	Natural History Museum of Los Angeles County, Invertebrate Paleontology Section
MMRP	Mitigation Monitoring and Reporting Program
my	million years
mya	million years ago
PG	Professional Geologist
PFYC	Potential Fossil Yield Classification
PG&E	Pacific Gas and Electric Company
RCRA	Resource Conservation and Recovery Act
SBCM	San Bernardino County Museum
SWMU	Solid Waste Management Unit

UCMP	University of California Museum of Paleontology
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator

1. Executive Summary

This Paleontological Resources Management Plan is being prepared as required by the Mitigation Monitoring and Reporting Program (MMRP) document for the Topock Remediation Project at the for Pacific Gas & Electric (PG&E) Topock Compressor Station. The following protocol describes the paleontological evaluation and survey results and provides protocols for PG&E and their subcontractors during construction. PG&E is implementing the selected groundwater remedy for chromium in groundwater at the Topock Compressor Station, which is located within eastern San Bernardino County, California, and western Mohave County, Arizona.

There is both public and private land ownership in the project area. Substantial portions are owned by the BLM or managed by the BLM on behalf of the Bureau of Reclamation. A portion of the project area also includes the Havasu National Wildlife Refuge, which is administered by the USFWS. No BLM paleontology permit and fieldwork authorization will be required for any paleontological fieldwork in these areas due to the CERCLA exemption.

Substrate beneath the PG&E Topock Compressor Station is mapped as Holocene alluvium of sand, river, lake, and floodplain deposits; Pleistocene Chemehuevi Formation and Pleistocene older alluvium; Pliocene Bouse Formation; Miocene fanglomerate; Cretaceous or Jurassic Whale Mountains quartz monzonites; and Precambrian igneous and metamorphic rocks. Paleontological records searches were conducted by the Natural History Museum of Los Angeles County, the San Bernardino County Museum, in online databases, and in the literature. Within the project area near locations proposed for new wells, the San Bernardino County Museum reported collecting unidentified mollusk shell fragments in the Chemehuevi Formation. Pleistocene and Pliocene localities near the groundwater project in Topock/Golden Shores and upriver at Needles have produced fossils.

Geological setting and fossil localities were considered in determining paleontological sensitivity according to the Potential Fossil Yield Criteria (PFYC). No deposits within the facility boundaries have consistently produced abundant fossils and thus, none is ranked 4 (High) or 5 (Very High). In addition, a large percentage of the project area is known to have disturbed surface sediments. Both the Chemehuevi Formation and the Bouse Formation are known to produce vertebrate fossils or scientifically significant nonvertebrate fossils but only as unpredictable scatters or isolates resulting in a ranking of 3a (Moderate and unevenly distributed). The Pleistocene alluvial fan deposits are also ranked as 3a because they are similar to the Chemehuevi Formation but have not been formally described. Types of fossils that may be recovered include Ice Age megafauna such as extinct mammoth, horse, and camel; microvertebrate fossils; invertebrate fossils such as mollusk shells; and trace fossils including root casts and animal burrows. Holocene youngest alluvium, Holocene young alluvium, Holocene dune and river sands, and the Miocene fanglomerate are ranked 2 (Low). The Holocene sediments are too young to contain fossils, and the Miocene fanglomerate is too coarse-grained to contain fossils. Igneous and metamorphic rocks are ranked

1 (Very Low) due to their heat and pressure of formation. This includes the Cretaceous/Jurassic Whale Mountains quartz monzonites, the Early Proterozoic gneiss, and the Precambrian igneous and metamorphic rocks.

Site specific geologic information from available borehole data was reviewed from the existing well network on site. It is anticipated that trenching would be all within recent alluvium. Deeper excavations for the groundwater remediation project are limited to exploratory boreholes and extraction and injection wells to depths of up to 400 feet with diameters of approximately 42 inches.

A paleontological reconnaissance survey was conducted on July 25, 2012. Only areas ranked PFYC 3a were considered for survey and previously disturbed areas were not included. No fossils were observed during the reconnaissance survey, however, sediments with the potential to contain fossils were observed within the proposed impact area. Of the sediments observed, the fine grained deposits of the Chemehuevi Formation sands/Pleistocene older alluvium and the sediments of the Bouse Formation have the highest potential for fossil resources.

The potential to impact any fossils varies with depth of impacts, previous disturbance and presence of non-fossiliferous sediments. Shallow grading and shallow trenching are unlikely to impact any fossils in areas mapped as Holocene alluvium as the surface sediments are too young to contain fossils. Drilling may impact older sediments that might contain fossils. Generally the potential to recover fossils that meet significance criteria will be unlikely since the specimens will not be associated with necessary contextual information such as formation of origin, depth and exact location.

Only the Chemehuevi Formation sands/Pleistocene older alluvium and the Bouse Formation appear to have potential to produce fossils. No portion of the proposed groundwater remediation project will impact Bouse Formation sediments. Trenching for the groundwater remediation project to the proposed depth of nine feet appears to be entirely in Holocene alluvium (not in the Pleistocene older alluvium) without potential for fossils. Therefore, no paleontological monitoring is required during construction for the proposed groundwater remediation project. All borings, regardless of depth, have a low potential to produce fossils meeting significance criteria. It is recommended that paleontological awareness training be completed by all personnel so they will understand the procedures to follow in the event of a find. PG&E recommends that a paleontologist should be on call to respond in the unlikely event that fossils are encountered during construction so that they may be evaluated to determine whether they meet significance criteria.

2. Introduction

The protocols presented in this document have been developed in accordance with the Mitigation Monitoring and Reporting Program (MMRP) for the Topock Remediation Project. MMRP CUL-3 requires that a paleontological investigation, including a detailed survey, be completed for the area. The following protocol describes the paleontological evaluation and survey results and provides protocols for Pacific Gas & Electric (PG&E) and their subcontractors during construction.

The project will provide for compliance with the MMRP by PG&E and all subcontractors during the construction, operations and maintenance, and decommissioning phases, specifically with mitigation measures CUL-3 (Department of Toxic Substances Control [DTSC] 2011):

> ***A paleontological investigation, including a detailed survey of the project area by a qualified paleontologist, shall be conducted to refine the potential impacts on unique paleontological resources within the final design area and determine whether preconstruction recovery of sensitive resources and/or construction monitoring would be warranted. If construction monitoring is determined to be warranted, ground-altering activity would be monitored by a qualified paleontologist to assess, document, and recover unique fossils. Monitoring shall include the inspection of exposed surfaces and microscopic examination of matrix in potential fossil bearing formations. In the event microfossils are discovered, the monitor shall collect matrix for processing. In the event paleontological resources are encountered during earthmoving activities, recovered specimens shall be prepared by the paleontologist to a point of identification and permanent preservation. PG&E shall retain a Qualified Paleontologist to observe ground-disturbing activities where determined necessary based on the results of the paleontological investigation and shall be required to request the participation of tribal monitors during those activities, including steps necessary during operations and decommissioning activities to ensure that historically significant resources are avoided to the maximum extent feasible, as determined by DTSC, during actual construction.***
>
> ***Paleontological resources of scientific value shall be identified and curated into an established, accredited, professional museum repository in the region with permanent retrievable paleontological storage. This measure does not apply to the activities included as part of the East Ravine Revised Addendum, Groundwater Investigation.***

See Final Environmental Impact Report (EIR) at 4.4-72. The paleontological investigation under Mitigation Measure CUL-3 is to be implemented before construction activities begin. If deemed necessary, monitoring of ground-disturbing activities in areas that could contain unique paleontological resources would be conducted during construction. Under Comprehensive Environmental Response, Compensation, and

Liability Act (CERCLA), the selected groundwater remedy and other site activities must also comply with the substantive requirements of all Applicable or Relevant and Appropriate Requirements (ARARs).

3. Background

This Paleontological Resources Management Plan is being prepared as required by the MMRP document for the Topock Remediation Project at the PG&E Topock Compressor Station, which is located within eastern San Bernardino County, California, and western Mohave County, Arizona (Figure 1).

The Colorado River runs through the eastern portion of the facility property and also forms a portion of its northern border. The project area is situated within Sections 5, 6, 8, and 9 of Township 7 North and Range 24 East of the Topock and Whale Mountain United States Geological Survey (USGS) 7.5-minute quadrangles, San Bernardino Base and Meridian (Figure 2). The total Groundwater Remediation project area is 779.2 acres (DTSC 2011).

Figure 1. Project Vicinity

3.1 Project Description

PG&E is implementing the selected groundwater remedy for chromium in groundwater at the Topock Compressor Station (the Compressor Station) in San Bernardino County, California. The existing chromium contamination in groundwater near the Compressor Station is largely attributable to the historical wastewater discharge from Compressor Station operations to Bat Cave Wash, designated as Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1, and within the East Ravine, designated as AOC 10, and within the East Ravine, designated as AOC 10 (CH2M Hill, 2012).

Remedial activities at the Topock site are being performed in conformance with the requirements of the Resource Conservation and Recovery Act (RCRA) Corrective Action pursuant to a Corrective Action Consent Agreement (CACA) entered into by PG&E and the California Department of Toxic Substances Control (DTSC) in 1996, as well as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) pursuant to the Administrative Consent Agreement entered into between PG&E and the federal agencies (U.S. Department of the Interior [DOI], Bureaus of Land Management [BLM] and Reclamation [Reclamation] and the United States Fish and Wildlife Service [USFWS]) in 2005. A Record of Decision was issued by the United States Department of Interior under CERCLA in Jan. 2011 and DTSC's remedy decision letter to PG&E dated January 31, 2011 approved the groundwater remedy consistent with applicable state and federal law.

There is both public and private land ownership in the project area. Substantial portions are owned by the BLM or managed by the BLM on behalf of the Bureau of Reclamation. A portion of the project area also includes the Havasu National Wildlife Refuge, which is administered by the USFWS. No BLM paleontology permit and fieldwork authorization will be required for any paleontological fieldwork in these areas due to the CERCLA exemption.

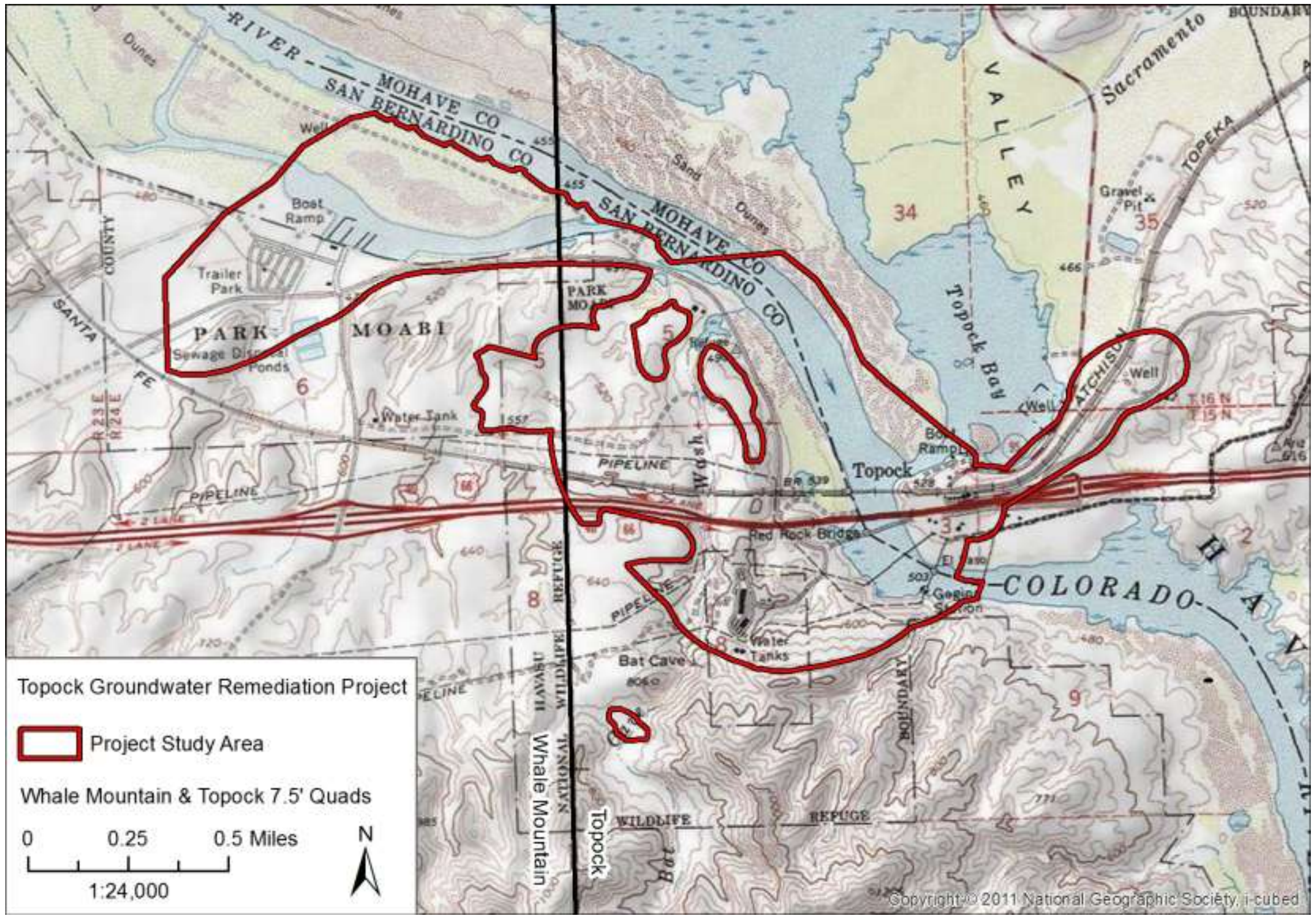


Figure 2. Topock Remediation Project Map

3.2 Project Personnel

Cogstone Resource Management Inc. prepared this report. Cogstone holds California Statewide BLM Paleontology permit CA-10-00-004P. The permit names Sherri Gust as Principal Investigator and Kim Scott as Field Director.

Sherri Gust served as the Principal Investigator for the project, wrote the management plan, and edited the report. Gust is an associate of the Vertebrate Paleontology and Rancho La Brea sections of the Natural History Museum of Los Angeles County. She has an M.S. in Anatomy (Evolutionary Morphology) from the University of Southern California, a B.S. in Anthropology from the University of California, Davis, and over 30 years of experience.

Kim Scott conducted the research and literature review and field survey. She wrote the background and survey results. Scott has a B.S. in Geology with an emphasis in Paleontology from the University of California, Los Angeles, as well as an M.S. in Biology from California State University San Bernardino and over 18 years of experience in California paleontology and geology. Todd Wirths reviewed the bore logs. Wirths is a Professional Geologist (PG) 7588 and has a M.S. in Geology from San Diego State University. He has more than 15 years of experience as a geologist and over two as a paleontologist. Courtney Richards prepared portions of this report. She has a M.S. in Biological Sciences with an emphasis in Paleontology from Marshall University.

Molly Valasik prepared the maps for the report. Valasik has an M.A. in Anthropology from Kent State University in Ohio and experience in Southern California archaeology with cross training in paleontology.

4. Regulatory Environment

The selected remedy is being conducted under the authority of CERCLA Section 104 and is therefore exempt from obtaining federal, state, or local permits or complying with other administrative requirements, pursuant to CERCLA Section 121(e). However, PG&E will comply with the substantive requirements of all applicable laws.

4.1 Federal Potential Fossil Yield Classification System

The federal Potential Fossil Yield Classification (PFYC) system was developed by the U.S. Forest Service and refined by the BLM (2007). Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used to assess the potential for the occurrence of paleontological resources.

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis, and should be used to assist in determining the need for further mitigation assessment or actions.

The descriptions for the classes listed below are written to serve as guidelines rather than as strict definitions. Knowledge of the geology and conditions for preservation, and hence, the paleontological potential for individual units should be considered when determining the appropriate class assignment. Assignments are best made by collaboration between land managers and knowledgeable researchers.

Class 1 Very Low. Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.

- Units that are Precambrian in age or older.

(1) Management concern for paleontological resources in Class 1 units is usually negligible or not applicable. (2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is nonexistent or extremely rare.

Class 2 Low. Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

(1) Management concern for paleontological resources is generally low. (2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

Class 3 Moderate or Unknown. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low.
- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

Class 3a Moderate Potential. Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or to impact a significant fossil locality is low, but is somewhat higher for common fossils.

Class 3b Unknown Potential. Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

(1) Management concern for paleontological resources is moderate; or cannot be determined from existing data. (2) Surface-disturbing activities may require field assessment to determine appropriate course of action.

This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

Class 4 High. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface-disturbing activities may adversely affect paleontological resources in many cases.

Class 4a. Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than 2 acres. Paleontological resources may be susceptible to adverse impacts from surface-disturbing actions. Illegal collecting activities may impact some areas.

Class 4b. These are areas underlain by geologic units with high potential but have lowered risk of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.

- Areas of exposed outcrop are smaller than 2 contiguous acres.

- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.

- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action. (2) A field survey by a qualified paleontologist is often needed to assess local conditions. (3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered. (4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys before authorizing surface-disturbing actions will usually be necessary. On-site monitoring or spot-checking may be necessary during construction.

Class 5 Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

Class 5a. Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than 2 contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface-disturbing actions. Unit is frequently the focus of illegal collecting activities.

Class 5b. These are areas underlain by geologic units with very high potential but have lowered risk of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

- Extensive soil or vegetative cover; bedrock exposures limited or not expected to be impacted.

- Areas of exposed outcrop smaller than 2 contiguous acres.

- Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.

- Other characteristics that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 5 areas is high to very high. (2) A field survey by a qualified paleontologist is usually necessary prior to surface-disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. (3) Official designation of areas of avoidance, special interest, and concern may be appropriate.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys will usually be necessary before authorizing any surface-disturbing activities. Onsite monitoring may be necessary during construction (BLM 2007).

5. Background

5.1 Regional Setting

The physiographical, geological, and ecological zones represented in the project area are best described as the mountains and alluvial valleys of the eastern Mojave Desert Geomorphic Province. Local extension has created subparallel, fault-bounded mountains with steeply climbing western slopes and shallowly dipping eastern slopes throughout the eastern Mojave Desert. These north-south trending ranges are interrupted by valleys with internal drainage systems, resulting in the formation of lakes during Ice Ages and playas during interglacials (Wagner 2002). The Colorado River formed along the California-Arizona corridor from a series of naturally dammed lakes that filled and failed sequentially starting approximately 6 million years ago (Spencer and Pearthree 2001, 2005).

5.2 Stratigraphy

Substrate beneath the PG&E Topock Compressor Station is mapped as Holocene alluvium of sand, river, lake, and floodplain deposits; Pleistocene Chemehuevi Formation and Pleistocene older alluvium; Pliocene Bouse Formation; Miocene fanglomerate; Cretaceous or Jurassic Whale Mountains quartz monzonites; and Precambrian igneous and metamorphic rocks (Table 1, Figure 3; Bishop 1963; Howard et al. 1997; John 1987; Stone and Howard 1979; Wilson et al. 1959).

5.2.1 Holocene Deposits

Holocene alluvial deposits (Qal, Qs, Qya) include silts, sands, and conglomerates exist in the form of drainage fill, alluvial fans, and dunes (Figure 3; Bishop 1963; Howard et al. 1997; John 1987; Stone and Howard 1979; Wilson et al. 1959). The character of river deposits (Qal) differs depending on stream flow energy and distance from the source. In the Colorado River area, river deposits consist of poorly to moderately sorted sands and gravels having angular to subangular clasts composed of igneous and metamorphic rock (Howard et al. 1997).

The younger alluvial fan deposits (Qya) cap older deposits. Sediments consist of poorly to moderately sorted, undissected sands and gravels composed of angular to subangular, igneous and metamorphic clasts (Howard et al. 1997). Windblown dune sands (Qs) are typically well-sorted, fine to medium-grained sand.

Table 1. Geological Deposits in Chronological Order

Era	Period	Time (million years ago [mya])	Epoch	Project Geologic Deposit
Cenozoic	Quaternary	< 0.01	Holocene	Holocene alluvium and sands (Qal, Qya, Qs)
		2.60	Pleistocene	Chemehuevi Formation (Qrg, Qrs, Qc)
	Tertiary	5.30	Pliocene	Bouse Formation (Tb)
		23.00	Miocene	Miocene fanglomerate (Tf)
		33.90	Oligocene	
		55.80	Eocene	
		65.50	Paleocene	
Mesozoic	Cretaceous	145.50		Cretaceous or Jurassic Whale Mountains quartz monzonites (KJqm, KJqd)
	Jurassic	199.60		
	Triassic	251.00		
Paleozoic	Permian	299.00		
	Carboniferous	359.20		
	Devonian	416.00		
	Silurian	443.70		
	Ordovician	488.30		
	Cambrian	542.00		
Precambrian		2500.00		Early Proterozoic gneiss (pЄg), Precambrian igneous and metamorphic rocks (pЄc)

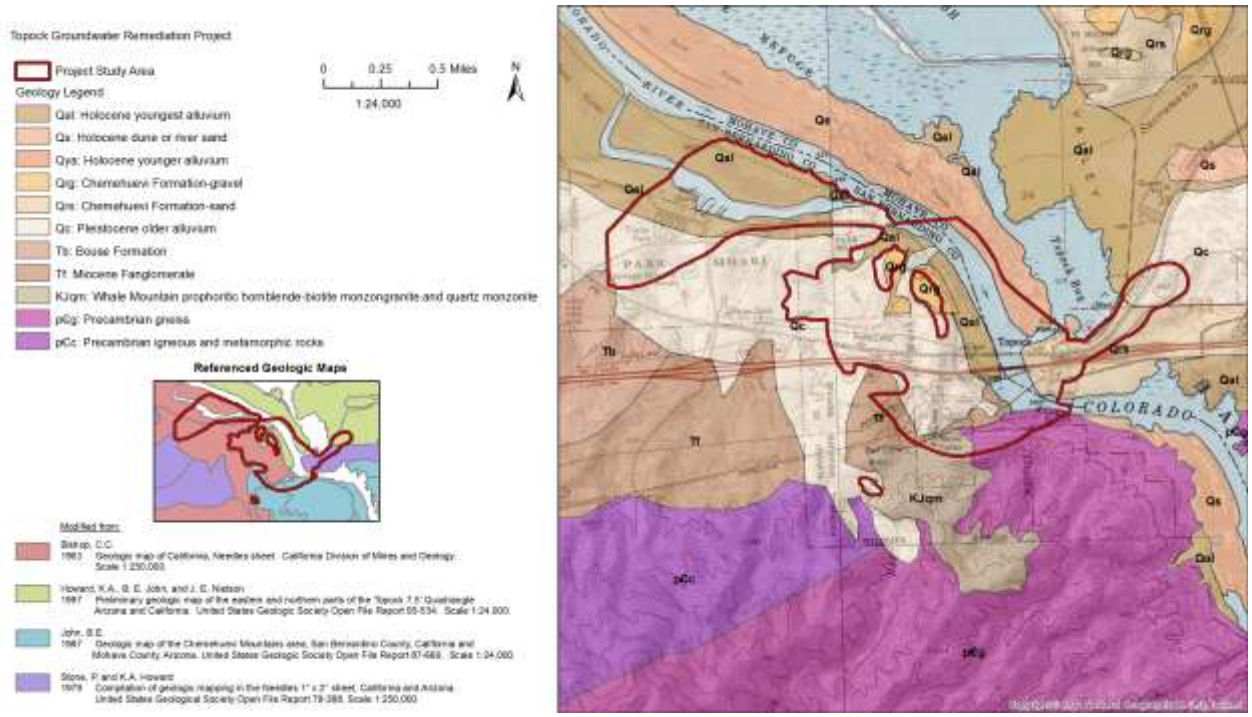


Figure 3. Geology of the Remediation Project Area

5.2.2 Pleistocene to Pliocene Deposits

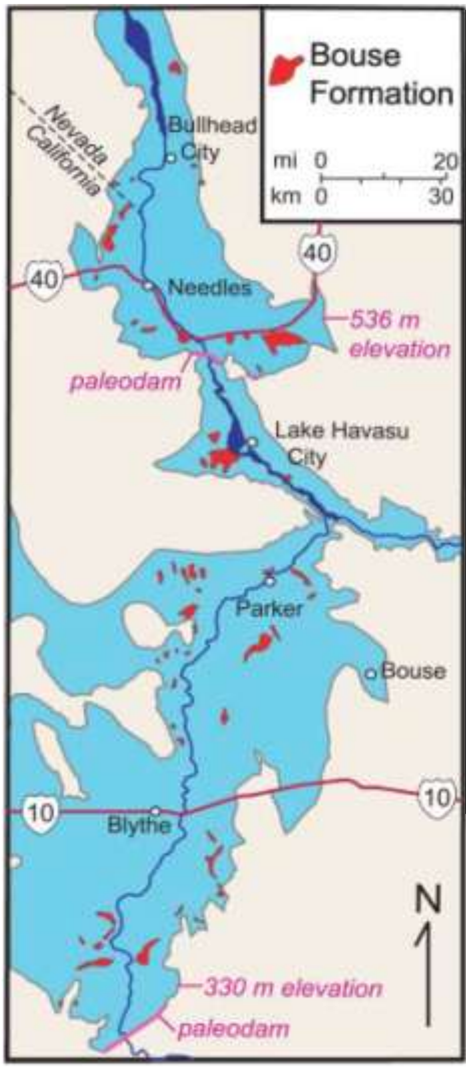
The Pleistocene Chemehuevi Formation (Qrg, Qrs, Qc) and the earliest Pliocene to latest Miocene Bouse Formation (Tb) (Howard et al. 1997; John 1987; and Stone and Howard 1979) occur on the project. At Topock, Golden Shores, and in Needles, the Chemehuevi Formation and Bouse Formation have produced mammoth (*Mammuthus meridionalis, Mammuthus* sp.; Agenbroad et al. 1992; Howard et al. 1997), mollusks, animal burrows, and plant remains (Scott 2010).

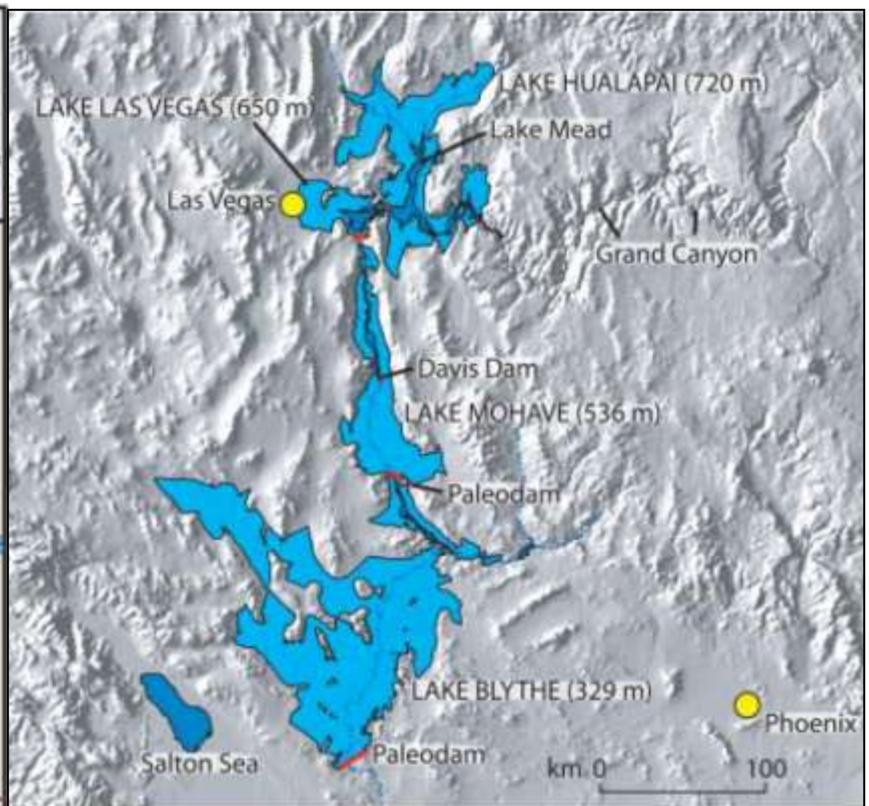
Ancestral Colorado River deposits include the Pleistocene (11,000 years to 2.6 million years [my]) Chemehuevi Formation, described by some geologists as alluvial fan deposits, and the Pliocene (5 to 2.6 my) Bouse Formation. Sediments of the Chemehuevi Formation consist of about 800 feet of sands and gravels from the ancestral Colorado River that forms terraces along the river valleys. These are capped by a 4-million-year-old volcanic ash (Spencer and Pearthree 2005). Chemehuevi Formation gravels (Qrg) are interbedded with Chemehuevi Formation sands (Qrs). The Chemehuevi Formation gravels consist of well sorted sands and gravels composed of well-rounded clasts of limestone, quartzite, and chert, much of which is derived as erosional debris from the Colorado Plateau. Locally derived clasts of gneiss and volcanic rocks are also present and include boulders up to 3 feet in diameter (Howard et al. 1997). The Chemehuevi

Formation sands (Qrs) consist of pink to tan, weakly to moderately indurated clays, silts, and sands interbedded with well-sorted, well-rounded pebble conglomerates. Near Topock, Arizona, this unit contains charcoal and root casts (Howard et al. 1997).

The Pleistocene older alluvial fan deposits (Qc) are up to tens of meters thick, and consists of poorly sorted sands to boulder conglomerates, and is dissected by younger stream channels. The Pleistocene fan deposits can be distinguished from similar Holocene deposits by the Pleistocene fans' deep dissection, varnishing, terracing, thickness, and presence of clasts of basalt from the Black Mountains and gneiss from the Hualapai Mountains (Howard et al. 1997).

The Bouse Formation (Tb) of Pliocene (2.6 to 5.3 my) to Miocene (5.3 to 23.3 my) age occurs at the base of the Colorado River deposits. This 10- to 250-foot-thick, green to tan to pinkish, limey claystone to siltstone contains green nodules and yellowish-brown to white concretions (Howard et al. 1997; Spencer and Pearthree 2005). The unit was deposited as a result of a series of overspilling lakes that drained into the Salton Trough about 5.3 million years ago (Figure 4; Spencer and Pearthree 2005). The Bouse Formation overlies volcanic ash dated at 5.5 my, placing the age of the formation to be approximately 5.3 to 5.5 million years old, making it earliest Pliocene or latest Miocene in age (Spencer and Pearthree 2005).





Source: Spencer and Pearthree 2005

Figure 4. Map of Paleolakes and Paleodams Associated with Bouse Formation.

5.2.3 Miocene Fanglomerate

Miocene (5.3 to 23.0 my) nonmarine deposits within the project area consist of a gneiss-rich fanglomerate (Tf). These are dark-red to brown, poorly sorted alluvial fan deposits having subangular to subrounded clasts of Proterozoic gneiss, granite, and amphibolite from the Chemehuevi Mountains (John 1987; Stone and Howard 1979).

5.2.4 Cretaceous or Jurassic Whale Mountain Quartz Monzonites

Two Cretaceous (65.5 to 145.5 my) or Jurassic (145.5 to 299.6 my) granitoid bodies (quartz monzonites) of the Whale Mountain sequence occur within the project area (KJqm and KJqd). KJqm, a porphyritic hornblende-biotite monzogranite and quartz monzonite, is tan to pale-pink, medium- to coarse-grained with feldspar crystals of up to 1.25 inches long. KJqd, a hornblende biotite quartz diorite and quartz monzonite, consists of dark-grey to brown intrusive bodies up to 0.6 mile wide by 2.5 miles long (John 1987).

5.2.5 Precambrian Igneous and Metamorphic Rocks

Two Precambrian (542 my to 4.6 by) units are present in the project area – Early Proterozoic (1.6 to 2.5 by) gneiss (pЄg) and Precambrian igneous and metamorphic rocks (pЄc) (Bishop 1963; John 1987). The highly metamorphosed rocks (pЄg) include augen gneiss, granitic to dioritic gneiss, and several named gneisses (Bishop 1963; John 1987). The Precambrian igneous and metamorphic rocks (pЄc) include granite to diorite igneous rocks mixed with gneisses (Bishop 1963). Although Bishop (1963) mapped all these rocks as Precambrian, Bishop states that the gneisses may be younger.

6. Record Search Results

A paleontological records search was conducted in 2010 by the Natural History Museum of Los Angeles County, Vertebrate Paleontology Section (LACM; McLeod 2010) and the San Bernardino County Museum (SBCM) (Scott 2010). Additional searches were conducted in online databases of the Natural History Museum of Los Angeles County, Invertebrate Paleontology Section (LACMIP 2011), in the University of California Museum of Paleontology database (UCMP 2011), and in the literature (Hay 1927; Jefferson 1991a, 1991b).

No localities were reported by LACM or UCMP. Within the project area near locations proposed for new wells, SBCM reports collecting unidentified mollusk shell fragments (Figure 5) on the surface at 600 to 640 feet of elevation in the Chemehuevi Formation (SBCM 1.39.3; Scott 2010). Root casts and animal burrows were also reported by SBCM (SBCM 1.39.1; Scott 2010); however, none were collected or photographed. No additional fossils have been reported from Topock since the SBCM survey. Pleistocene and Pliocene localities near the groundwater project in Topock/Golden Shores and upriver at Needles have produced fossils (Table 2).

Figure 5. Mollusk Shell Fragments (photo courtesy of Eric Scott, SBCM)

Table 2. Pleistocene and Pliocene fossil localities near project area (no locality numbers assigned)

Common name, element	Taxon	Location; Institution	Reference	Figure
Mammoth, nearly complete skeleton	*Mammuthus meridionalis* or *imperator*	Golden Shores, AZ, elev. 645'; Northern Arizona University	Agenbroad et al. 1992	6
Mammoth, humerus, distal end	*Mammuthus* sp.	Needles, CA; Needles Museum	Agenbroad et al. 1992	7
Horse, molar, upper	*Equus* sp.	Needles, CA; Needles Museum	this report	8, 9
Bison, molar, lower, third	*Bison* sp.	Needles, CA; Needles Museum	this report	8, 9
Camel, vertebrae, partial	*Camelops* sp.	Needles, CA; Needles Museum	this report	10

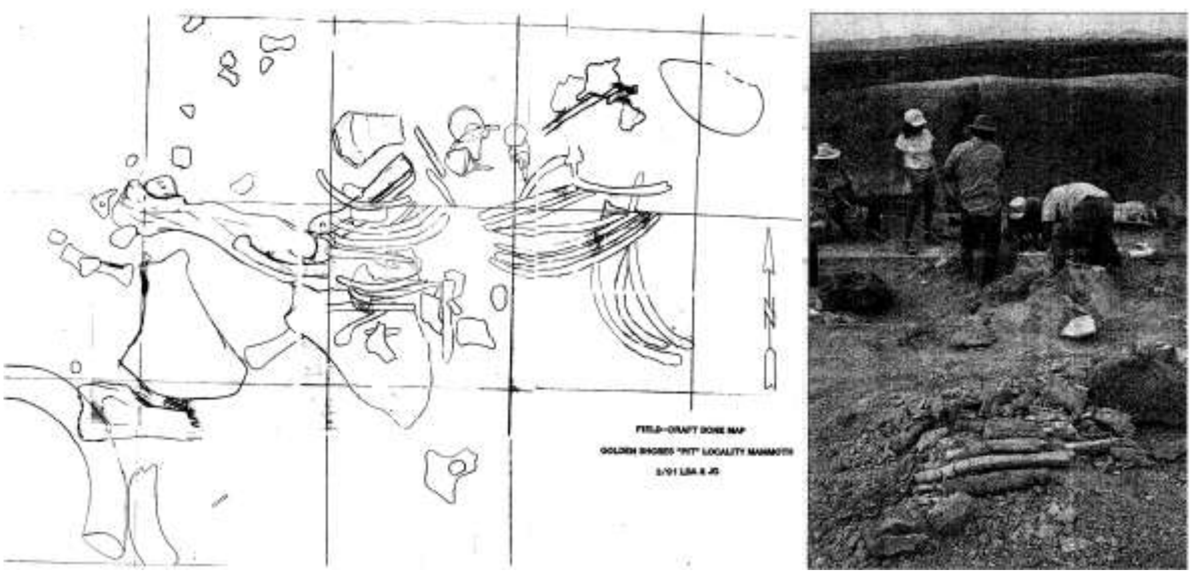


Figure 6. Field map and recovery of Golden Shores mammoth skeleton

Figure 7. Mammoth, humerus, distal end (elbow articulation)

Figure 8. Horse, upper molar tooth, and Bison, lower third molar, occlusal view

Figure 9. Horse, upper molar tooth, and Bison, lower third molar, lateral view

Figure 10. Camel, vertebrae

Kim Scott of Cogstone relocated the SBCM localities during the field survey, visited the Needles Museum to view the fossils held there, and visited the site of the Golden Shores mammoth with George Shannon of BLM. Additional information learned modifies the previous locality information, as discussed below.

A locality discovered by SBCM in 1991 was relocated during the survey. SBCM collected the specimens during their survey but provided Cogstone with exact coordinates to allow the locality to be re-located for evaluation. The SBCM 1.39.3 locality produced a specimen was a fragment of mollusk that was mapped in a channel to the north of a pipeline.

The Golden Shores mammoth, reported by Agenbroad et al. (1992) as being in the Bouse or Chemehuevi Formation, was actually in Chemehuevi/Pleistocene older alluvium sands as verified by a visit to the locality. Specimens from the Needles Museum that were reported by Agenbroad as being in the Chemehuevi Formation were actually found at the Golden Shore gravel quarry and no exact location information is known (Needles Museum Vice-President Corrine Moore, personal communication 2012). All of the specimens were donated by local citizens who found them. In addition to mammoth, fossils of camel, bison and horse are also known. These specimens were identified by Sherri Gust from photographs taken by Kim Scott during her visit.

7. Paleontological Sensitivity Analysis

Geological setting and fossil localities were considered in determining paleontological sensitivity according to PFYC criteria (Table 3, Figure 11). No deposits within the facility boundaries have consistently produced abundant fossils and thus, none is ranked 4 (High) or 5 (Very High). In addition, a large percentage of the project area is known to have disturbed surface sediments (Figure 12). Disturbed areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years.

Both the Chemehuevi Formation (Qrg, Qrs) and the Bouse Formation (Tb) are known to produce vertebrate fossils or scientifically significant nonvertebrate fossils but only as unpredictable scatters or isolates resulting in a ranking of 3a (Moderate and unevenly distributed). The Pleistocene alluvial fan deposits (Qc), as mentioned above, is also ranked as 3a because they are essentially similar to the Chemehuevi Formation but have not been formally described. Types of fossils that may be recovered include Ice Age megafauna such as extinct mammoth, horse, and camel; microvertebrate fossils; invertebrate fossils such as mollusk shells; and trace fossils including root casts and animal burrows (Scott 2010). Holocene youngest alluvium (Qal), Holocene young alluvium (Qya), Holocene dune and river sands (Qs), and the Miocene fanglomerate (Tf) are ranked 2 (Low). The Holocene sediments are too young to contain fossils, and the Miocene fanglomerate is too coarse-grained to contain fossils.

Igneous and metamorphic rocks are ranked 1 (Very Low) due to their heat and pressure of formation. This includes the Cretaceous/Jurassic Whale Mountains quartz monzonites (KJqm, KJqd), the Early Proterozoic gneiss (pЄg), and the Precambrian igneous and metamorphic rocks (pЄc).

Table 3. Potential Fossil Yield of Topock Geological Deposits

Geologic Deposit	PFYC Ranking			
	3a (Moderate with uneven distribution)	3b (Unknown with undemonstrated yield)	2 (Low)	1 (Very Low)
Holocene alluvium and sands (Qal, Qya, Qs)			x	
Chemehuevi Fm. (Qrg, Qrs, Qc)	x			
Bouse Fm. (Tb)	x			
Miocene fanglomerate (Tf)			x	
Cretaceous or Jurassic Whale Mountains quartz monzonites (KJqm, KJqd)				x
Early Proterozoic gneiss (pЄg)				x

Geologic Deposit	PFYC Ranking			
	3a (Moderate with uneven distribution)	3b (Unknown with undemonstrated yield)	2 (Low)	1 (Very Low)
Precambrian igneous and metamorphic rocks (pЄc)				x

Topock Project

- Project Study Area
- US Bureau of Land Management

Yield Classification (PFYC)

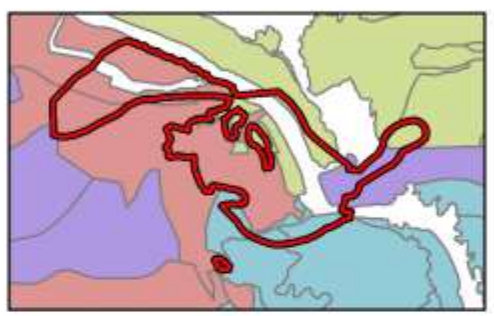
- 1 Very Low to none
- 2 Low Potential
- 3b Undemonstrated
- 3a Moderate
- 4b High- Unexposed
- 4a High- Exposed
- 5b Very High- Unexposed
- 5a Very High -Exposed

0 0.15 0.3 Miles

1:15,000

N

Referenced Geologic Maps



Modified from:

Bishop, C.C.
1963 Geologic map of California, Needles sheet. California Division of Mines and Geology. Scale 1:250,000.

Howard, K.A., B. E. John, and J. E. Nielson
1997 Preliminary geologic map of the eastern and northern parts of the Topock 7.5' Quadrangle Arizona and California. United States Geologic Society Open File Report 95-534. Scale 1:24,000.

John, B.E.
1987 Geologic map of the Chemehuevi Mountains area, San Bernardino County, California and Mohave County, Arizona. United States Geologic Society Open File Report 87-666. Scale 1:24,000.

Stone, P. and K.A. Howard
1979 Compilation of geologic mapping in the Needles 1° x 2° sheet, California and Arizona. United States Geological Society Open File Report 79-388. Scale 1:250,000.

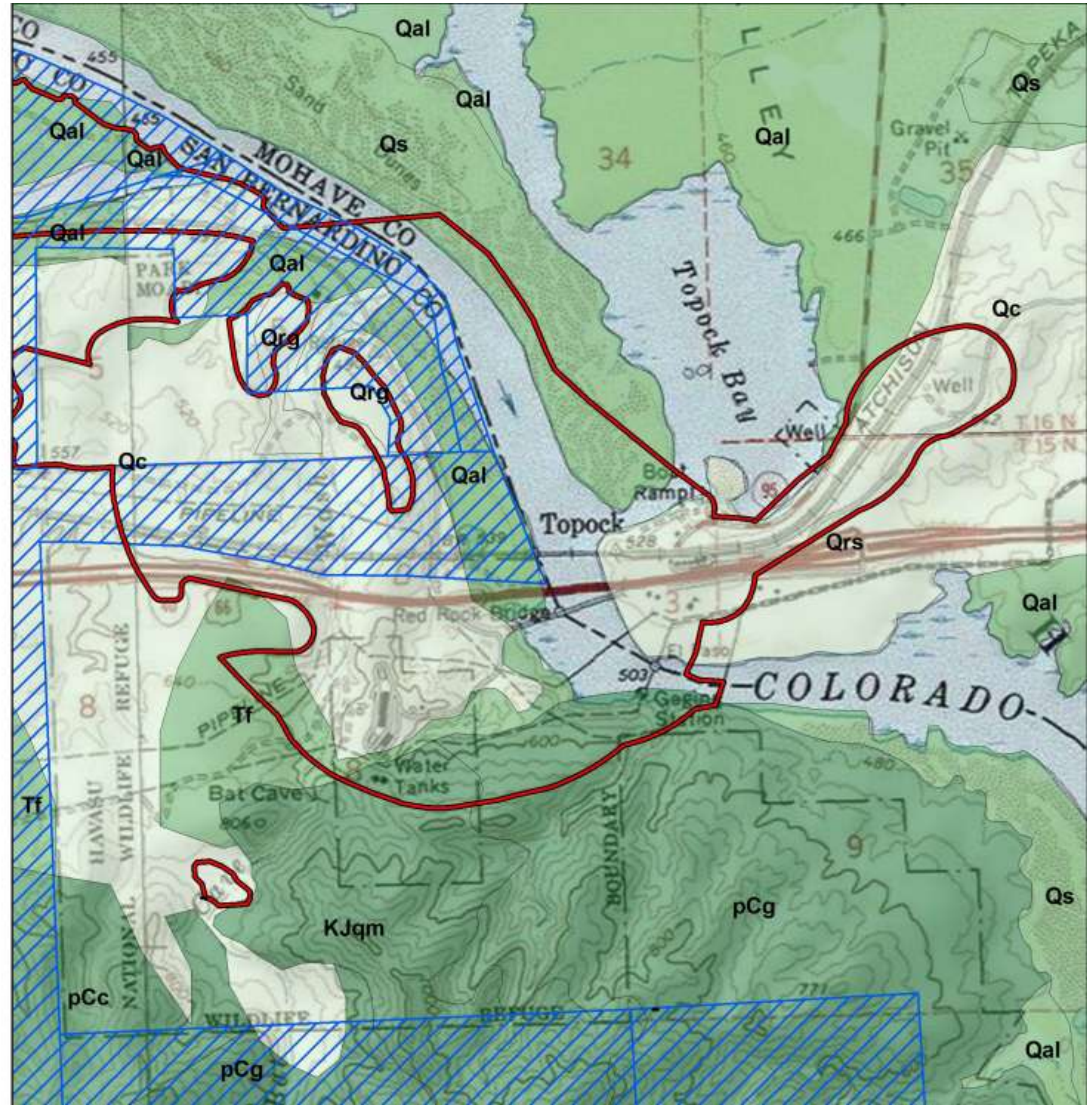


Figure 11. Remediation Project Paleontological Sensitivity Map

Topock Groundwater Remediation Project

Project Study Area

Yield Classification (PFYC)

- 1 Very Low to none
- 2 Low Potential
- 3b Undemonstrated
- 3a Moderate
- 4b High- Unexposed
- 4a High- Exposed
- 5b Very High- Unexposed
- 5a Very High -Exposed

Level of Disturbance of Areas with Moderate or Higher Fossil Potential

- Undisturbed
- Active Wash Channel
- Mechanical Soil Surface Damage

Information on extent and nature of disturbance provided by CH2M Hill

0 0.25 0.5 Miles

1:24,000

N

Referenced Geologic Maps

Modified from:

Bishop, C.C.
1963 Geologic map of California, Needles sheet. California Division of Mines and Geology. Scale 1:250,000.

Howard, K.A., B. E. John, and J. E. Nielson
1997 Preliminary geologic map of the eastern and northern parts of the Topock 7.5' Quadrangle Arizona and California. United States Geologic Society Open File Report 95-534. Scale 1:24,000.

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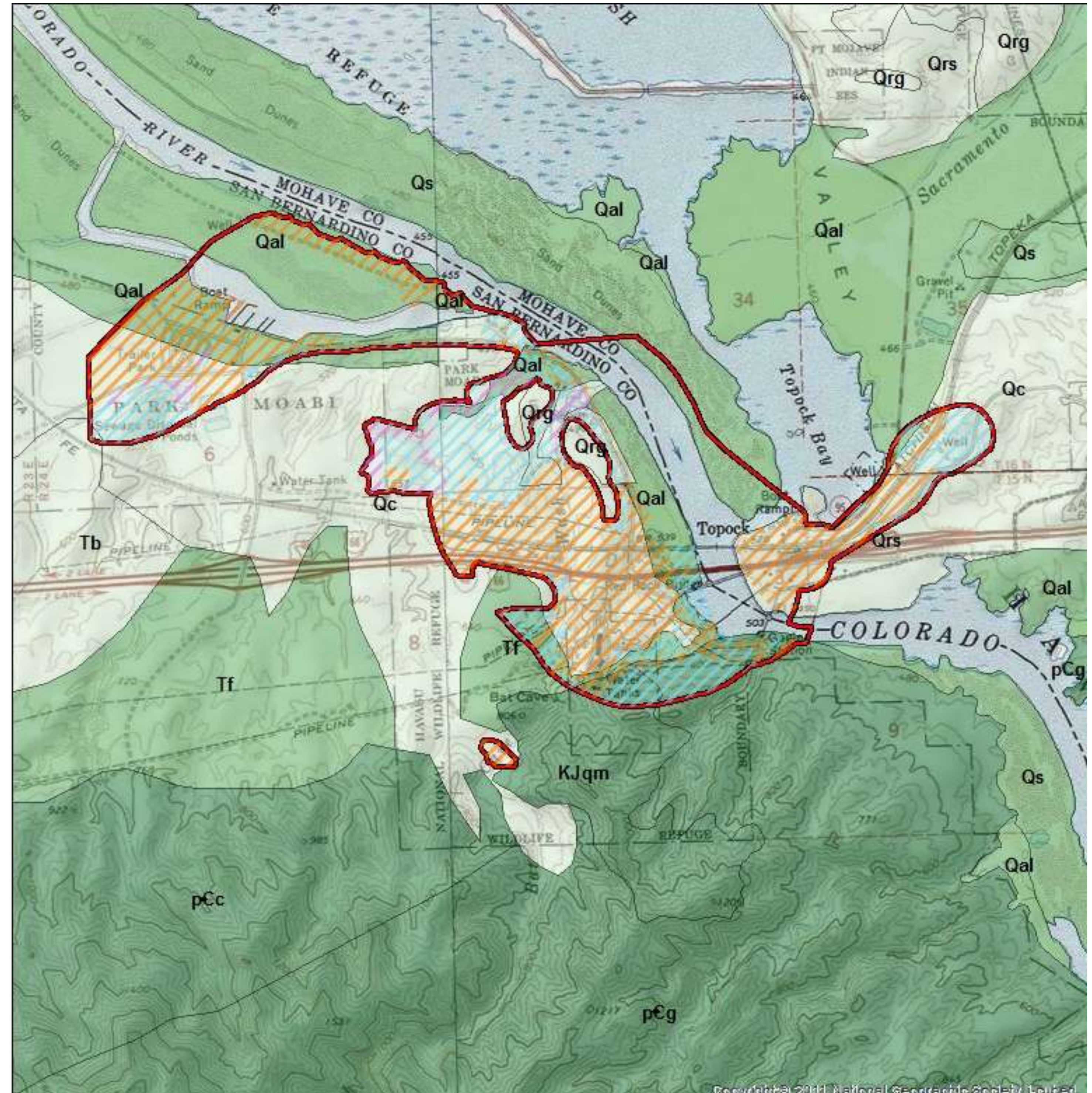

Figure 12. Project Surface Disturbance Map

8. Field Indicators

8.1 Borings Logs

Site specific geologic information from available borehole data was reviewed from the existing well network on site. The groundwater project remedy map was overlain onto the borehole location map and the project was divided into quadrants (Figure 13). Utilizing only those borehole locations near groundwater remediation impact areas, limited information resulted due to generic interpretations by the soil scientists who prepared the boring logs. For example, in the southwest quadrant a contact was reported between the recent and older alluvium at 10.5-12 feet and between Quaternary alluvium and Miocene sediments at 85 feet. In the southeast quadrant the Miocene contact is reported at 11 feet in one borehole and between 80-103 feet in others. No contacts are reported for the northwest quadrant until Miocene bedrock is encountered at 200 feet. In the northeast quadrant the contact between the recent and Quaternary alluvium is reported at 23-45 feet and the Miocene contact at 65-13 feet.

The dynamic fluvial environment of the project area probably accounts for these variations but a recent geo-archaeological study should define the stratigraphy in a manner more useful for paleontology. Currently, it appears that recent alluvium is widely present in all quadrants at depths of 10-25 feet. Metzger et al. (1973) estimated the depth of Holocene deposition in the Colorado River channel to be between 130 and 260 feet in the Parker area. Resistivity studies undertaken by CH2M Hill (2012) indicate that the thickness of fluvial sediments in wells near the Topock site indicate up to 150 feet of Holocene sediment above the older Tertiary alluvium, which is consistent with Metzger's observations near Parker (Metzger et al. 1973). Since the trenching for the groundwater remediation project is designed to have a maximum depth of 9 feet, it is anticipated that trenching would be all within recent alluvium. Deeper excavations for the groundwater remediation project are limited to exploratory boreholes and extraction and injection wells to depths of up to 400 feet with diameters of approximately 42 inches.

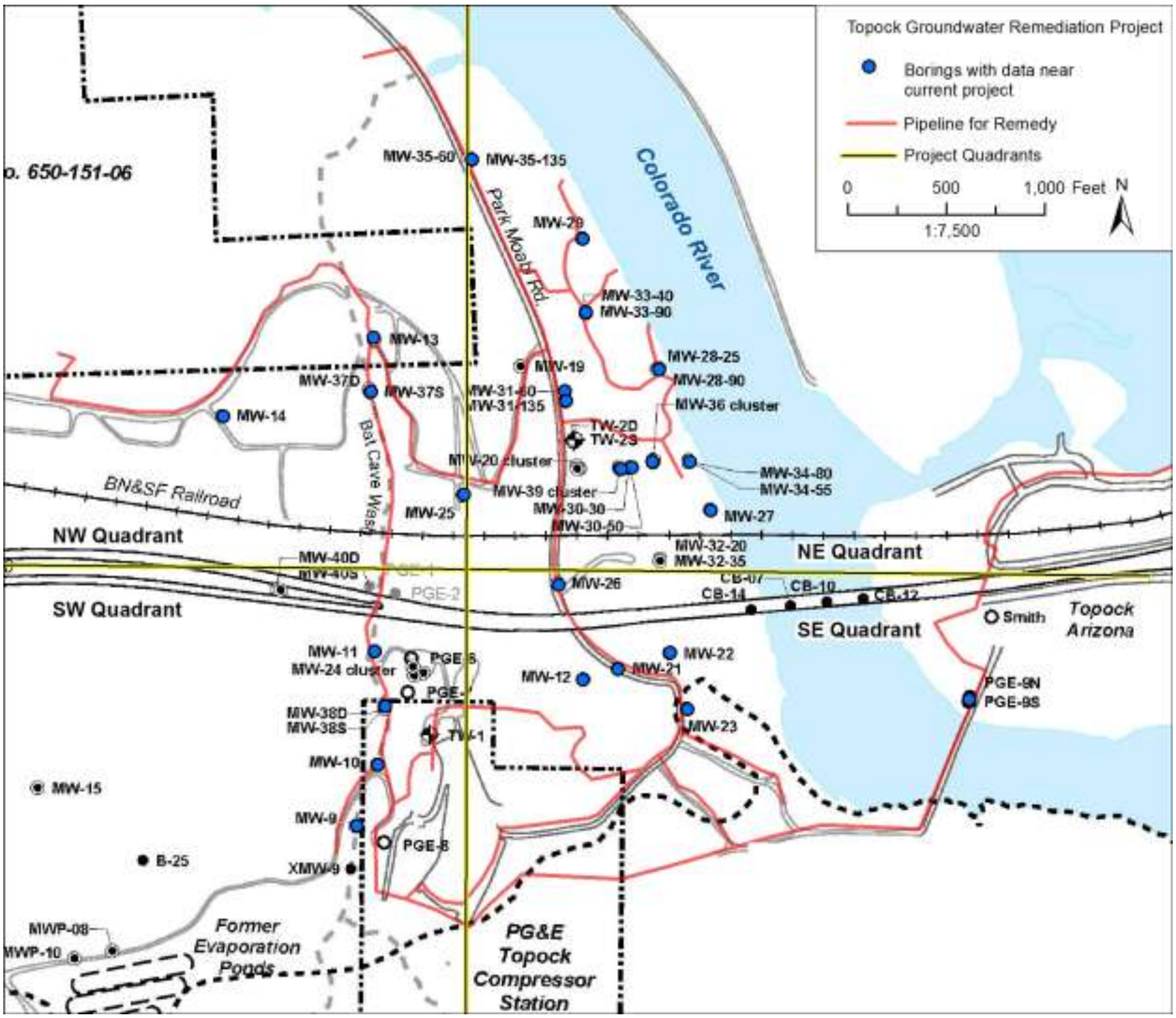

Figure 13. Prior Borings with Logs Available near Project

8.2 Survey

A paleontological reconnaissance survey was conducted on July 25, 2012 by Kim Scott of Cogstone. Only areas ranked PFYC 3a were considered for survey and previously disturbed areas were not included (Figure

14). A windshield survey was used to review the sediments to assess their overall potential. The paleontologist exited the vehicle and implemented pedestrian survey of areas likely to produce fossils. A 2-meter-rod with decimeter intervals of alternating colors was used in many photos for scale.

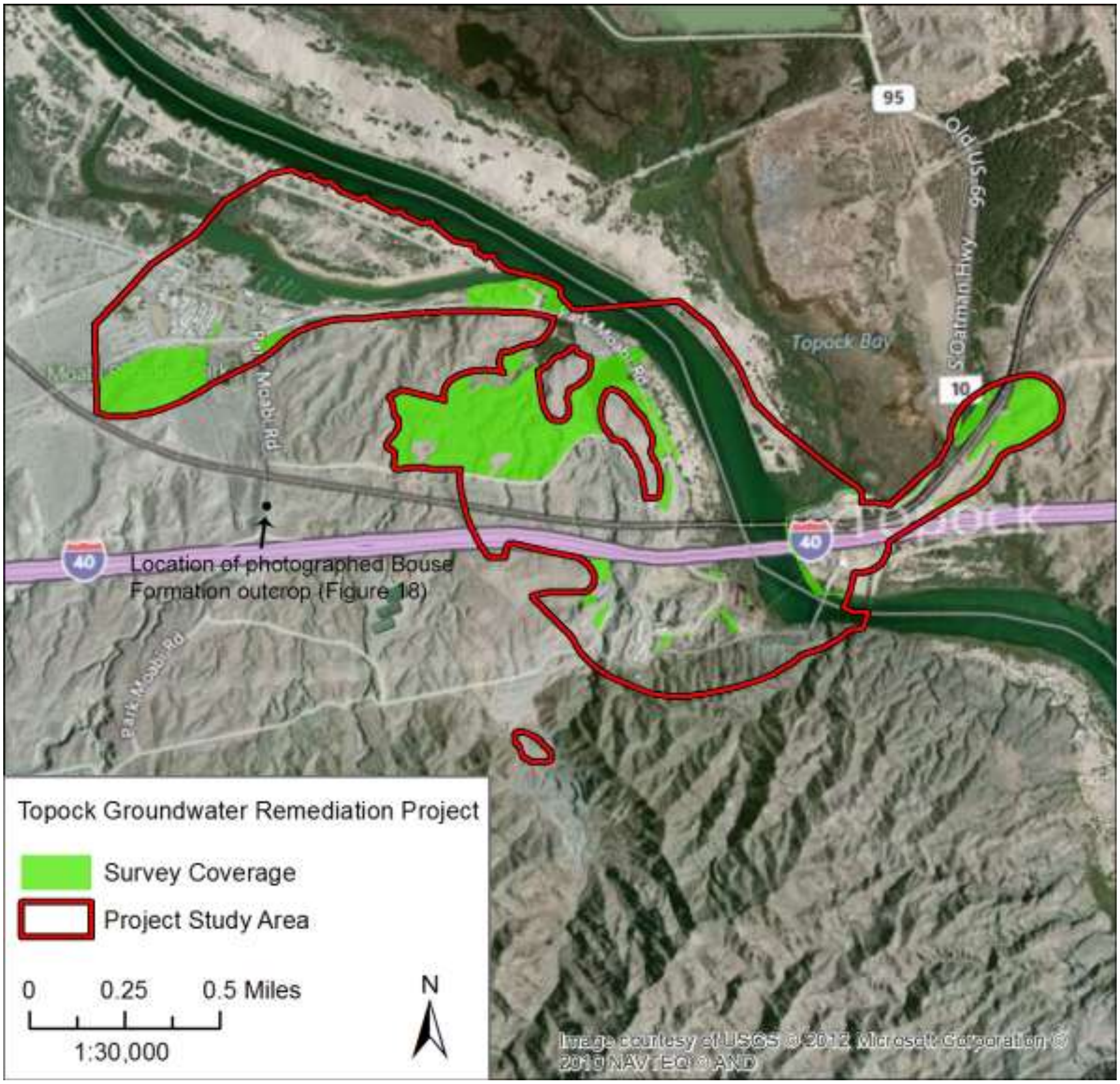

Figure 14. Survey Coverage Map

On the western shore of the Colorado River, the Chemehuevi/Pleistocene older alluvium existed as light pink silts to sands with occasional pebble to cobble channel conglomerates. This was covered by angular to subangular clast supported, pebble to cobble conglomerate of sheet floods and channels from a proximal alluvial fan (Figure 15).

Figure 15. Quaternary Silts and Sands Covered by Cobbles of the Alluvial Fan Deposits

On the eastern shore of the Colorado River, the finer sediments of the Chemehuevi/Pleistocene older alluvium are buff colored and are covered by a more distal alluvial fan of matrix supported, rounded pebbles to cobbles (Figure 16).

Figure 16. Pleistocene Older Alluvium under Cobbles, East Side, Colorado River

The Pleistocene Chemehuevi Formation gravels consist of imbricated, clast supported cobble to boulder conglomerate (Figure 17). No fine-grained sediments were observed in the small portion of these deposits within the project area along Route 66.

Figure 17. Imbricated Cobbles and Boulders of the Chemehuevi Formation Gravels

Only a small section of the Pliocene Bouse Formation is mapped at the surface of the area of potential effect. It is located along Park Moabi Road in the westernmost portion of the project study area (refer to Figure 3). Sediments consisted of greenish silts and sands (Figure 18). The representative photograph of the Bouse Formation (Figure 18) was taken from a road cut along Park Moabi Road just south of the area of potential effect (refer to Figure 14).

Figure 18. Greenish Silts and Sands of the Bouse Formation

Miocene Fanglomerate sediments were mapped in Bat Cave Wash and along the Colorado River. Those along the wash are indurated pebble to cobble conglomerates oxidized to a light pinkish grey (Figure 19a) or more fully oxidized to red along the river (Figure 19b).

Figure 19a. Miocene Fanglomerate along Bat Cave Wash

Figure 19b. Miocene Fanglomerate along the Colorado River

A couple of shallow caves including "Bat Cave" are present in Bat Cave Wash in the Cretaceous or Jurassic Whale Mountains quartz monzonite complex at the south end of the project area. Bat Cave only extended about 15 feet into the canyon wall (Figure 20). Most of the floor had been covered in breccia from a recent flood in the area. A second "cave" north of Bat Cave in the wash was filled with wood rat midden deposits of unknown age. As no impacts are planned in this area, these wood rat middens were not further investigated. Should impacts be planned in the future, these deposits should be fully investigated.

Figure 20. Bat Cave

No fossils were observed during the reconnaissance survey. While previous SBCM localities were relocated, the specimens had been previously removed. Sediments with the potential to contain fossils were observed within the proposed impact area. Of the sediments observed, the fine grained deposits of the Chemehuevi Formation sands/Pleistocene older alluvium and the sediments of the Bouse Formation have the highest potential for fossil resources.

9. Definition of Significance for Paleontological Resources

Only qualified, trained paleontologists with specific expertise in the type of fossils being evaluated can determine the scientific significance of paleontological resources. Fossils are considered to be significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;

2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;

3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;

4. The fossils demonstrate unusual or spectacular circumstances in the history of life; or

5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

As so defined, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer 2003, Scott et al. 2004).

PRELIMINARY SIGNIFICANCE EVALUATION

The potential to impact any fossils varies with depth of impacts, previous disturbance and presence of non-fossiliferous sediments. Shallow grading and shallow trenching are unlikely to impact any fossils in areas mapped as Holocene alluvium as the surface sediments are too young to contain fossils. Drilling may impact older sediments that might contain fossils. Generally the potential to recover fossils that meet significance criteria will be unlikely since the specimens will not be associated with necessary contextual information such as formation of origin, depth and exact location.

Unidentifiable fossils will generally not meet significance criteria and should not be collected unless the amount and preservation is sufficient for dating purposes (criteria 5 above). For identifiable fossils, significance will need to be assessed subsequent to recovery but generally single fossils are isolated finds that will not meet significance criteria unless they represent previously unknown species in the area or they provide a useful radiocarbon date that assists with local sedimentary sequencing (criteria 2 and 5 above).

This is because single fossils, such as a left bison tibia, do not have sufficient data potential to evaluate evolutionary relationships, development of biological communities, interaction between paleobotanical and paleozoological biotas, or unusual or spectacular circumstances in the history of life (criteria 1, 3 and 4 above). Associations of whole or partial skeletons of different animals are likely to meet multiple significance criteria.

The above discussion does not include cultural context or significance. Fossils are known in direct association with Holocene human deposits and thus project archaeologists should be aware that fossils may occur in archaeological sites.

10. Management Recommendations

10.1 Grading and Trenching Recommendations

Prior fossil recoveries in the vicinity and field survey indicate that only the Chemehuevi Formation sands/Pleistocene older alluvium and the Bouse Formation appear to have potential to produce fossils. No portion of the proposed groundwater remediation project will impact Bouse Formation sediments. Trenching for the groundwater remediation project to the proposed depth of nine feet appears to be entirely in Holocene alluvium (not in the Pleistocene older alluvium) without potential for fossils (refer to Figure 11). Therefore, no paleontological monitoring is required during construction for the proposed groundwater remediation project. It is recommended that paleontological awareness training (Section 10.4) be completed by all personnel so they will understand the procedures to follow in the event of a find. PG&E recommends that a paleontologist should be on call to respond in the unlikely event that fossils are encountered during construction so that they may be evaluated to determine whether they meet significance criteria.

10.2 Drilling Management Recommendations

All borings, regardless of depth or diameter, have a low potential to produce fossils meeting significance criteria since any fossils that rotate out on the auger during drilling activities will not have information on formation, depth or context. The only instance in which such fossils will meet significance criteria is if the fossil is a new species in the region. It is recommended that paleontological resources awareness training (Section 11.4) be completed by all personnel so they will understand the procedures to follow in the event of a find. PG&E recommends that a paleontologist be on call to respond in the unlikely event that fossils are encountered during drilling so that they may be evaluated to determine whether they meet significance criteria.

11. Paleontological Procedures

11.1 Introduction

The following paleontological monitoring procedures and personnel are established to ensure timely and accurate communication and implementation to minimize adverse effects on significant paleontological resources that may be discovered during earth-disturbing activities.

11.2 Personnel

The Principal Paleontologist will have a graduate degree with a specialization in Vertebrate Paleontology and more than ten years of experience as a principal investigator. The Principal Paleontologist is responsible for ensuring that all paleontological personnel are qualified and experienced and maintaining professional standards of work and conduct and meeting the substantive requirements of all ARARs. Qualified paleontological crew members will have a minimum of a bachelor's degree with paleontological training and experience. All paleontological personnel will receive safety training and environmental awareness training before performing any fieldwork on the project.

11.3 Communication

Paleontological surveyors and monitors will act to protect potentially significant paleontological resources (including direct notification to construction personnel onsite) and then notify the PG&E site manager and the paleontological field supervisor of any find. The surveyor or monitor will estimate the time required to recover the fossil as part of that notification. If work will be diverted for more than two hours, the PG&E site supervisor will make final decisions regarding formal work stoppage orders and disputes between parties. Temporary halt work conditions will be in effect until the PG&E site supervisor has made a decision regarding treatment. The Principal Paleontologist will notify the BLM contact when significant finds are discovered on BLM lands and the USFWS contact if significant finds are discovered on USFWS lands.

Site Manager: Curt Russell (760) 326-5582

11.4 Paleontological Resources Awareness Training

All project personnel involved in ground-disturbing activities will receive paleontological resources awareness training before beginning work. This is critical when paleontological monitors will not be present full-time. Attendance rosters will be submitted to verify training and hard hat stickers will be issued to demonstrate completion of the training. The training will be developed by the Principal Paleontologist and presented by the Principal Paleontologist or Field Director.

11.5 Surveys

A survey has been completed for the present project. If additional work is planned in the future, survey should be conducted for any areas ranked PFYC 3a or above. Generally, a paleontological survey is conducted by checking the unvegetated ground surface and both natural and man-made cuts but does not involve transects or comprehensive coverage. The project boundaries, project geology, and locations of any known fossil localities will be loaded to Trimble® GeoXH units to ensure that surveyors have all information necessary to accurately record field information. Detailed information on where sediments conducive to the preservation of fossils occur, any stratigraphy revealed in cuts, contacts between formations, and other important information will be recorded. If fossils are discovered, BLM locality forms (or other appropriate forms depending upon land ownership) will be completed and photographs will be taken.

11.6 Monitoring and On-Call Response

In the unanticipated event that sensitive sediments are impacted during grading and trenching activities, a paleontological monitor will observe and inspect all earthmoving in native sediments to potentially contain fossils (refer to Figure 11). This may include locations where depth of impacts will remove sediments of low paleontological sensitivity to reveal sediments of moderate paleontological sensitivity and in response to finds reported by construction personnel. This excludes drilling activities as any recovered fossils will lack information on formation, depth or context (Section 10.2). Monitoring will include inspection of exposed cut surfaces and microscopic examination of exposed sediments for microfossils.

The paleontological monitor is responsible for maintaining close communication with the on-site earthmoving personnel in order to maintain a safe working environment and to be fully apprised of the upcoming areas of impact and any schedule changes. The paleontological monitor is empowered to temporarily redirect earthmoving to permit recovery of potentially significant fossils. It is important that all earthmoving contractor personnel recognize the authority of the paleontological monitor to redirect them. The paleontological monitor will attempt to minimize schedule impacts. The monitor will stay with the fossil and utilize a cell phone to contact the site supervisor and paleontological field supervisor. If phone communication is problematic, the paleontological monitor will demarcate a buffer zone around the specimen using flagging on lath and speak personally with the site supervisor.

The paleontological monitor will complete daily documentation of monitoring presence, activities, location, observations of sediment type and distribution, observations of fossils, collection, and other information. A completed BLM Locality Form (or other appropriate forms depending upon land ownership) is required for all fossils recovered on federal lands. The paleontological monitor is responsible for photographing activities, sediments, and paleontological resources, and for filling out a Photograph Record Sheet for each digital roll. All documentation is submitted to the Principal Paleontologist weekly and will be submitted to the repository along with any significant fossils upon completion of the project with an electronic copy to PG&E.

11.7 Fossil Discovery and Recovery

Fossils observed will be treated differently depending on type and circumstance. Generally, discovery of identifiable invertebrate (shells, crustaceans, etc.) fossils requires that a scientifically significant sample be collected for identification and analysis and that the locality be documented (see below). Similar procedures are followed for microvertebrates such as rodents. Current professional standards call for testing 200 pounds of sample (five full 5-gallon buckets) from each locality followed by processing of up to 6,000 pounds of matrix if significant fossils are recovered by testing. Documentation of localities is required.

Larger fossils observed must be evaluated to determine their condition. Generally, the paleontological monitor will be able to quickly determine if the fossils are sufficiently well preserved to meet significance criteria (refer to section 9). If necessary, the paleontological monitor will cordon off the immediate area around the fossil to permit a safe work zone to recover the fossil and will notify the site manager. The monitor will also immediately notify the field supervisor if assistance is needed and sufficient personnel to perform the work will be fielded. Documentation of localities is required.

Discovery of a bone bed or other type of fossil sites containing multiple large fossils will likely require a formal Stop Work order but is considered unlikely. The paleontological monitor will cordon off the area until evaluation occurs. The project Principal Paleontologist will consult with the site supervisor regarding the amount of time necessary. This type of discovery requires a detailed field map, a sedimentary structure analysis, one or more stratigraphic columns, and data for taphonomic analysis.

Depending on the formations being impacted, additional samples collected may include specimens for dating analyses or materials for microfossil, botanical, or pollen analyses. All fossils and specimens are accompanied by a field tag with project and locality information, including a unique number.

11.8 Locality Documentation

Each fossil locality requires a standard set of data be taken. This includes one or more Universal Transverse Mercator (UTM) readings using a global positioning system unit, an accurate elevation measurement if possible, the depth below surface, a lithology, and true north reading. Additional information collected may include one or more stratigraphic columns, sedimentary structure analysis, taphonomic analysis, and photographs of the fossil *in situ*.

11.9 Fossil Preparation

Many fossils require only cleaning and stabilization through the use of hardeners. Others require lab excavation of plaster jackets with gradual cleaning and hardening. Sometimes larger fossils require a "cradle," usually a form-fitted plaster lined with acid-free cloth to provide support and prevent breakage during transport or storage. Depending on the hardness of the surrounding sediment, fossils may require more tedious preparation using mechanical devices such as zip scribes. Funding for fossil preparation will be the responsibility of PG&E.

Processing of matrix samples for microvertebrates varies depending on the nature of the sediments and may be washed using water, may require chemical agents to break apart the rock, or may require floatation using heavy liquids.

11.10 Fossil Identification

All fossils will be identified by experts. All identifications will be as specific as possible and include element, portion, side, sex, age, taphonomy, and notes. Cataloging, including identification information, is entered into a computer database. Each specimen in maintained with a tag specifying the provenience and identification information. Necessary funding for fossil identification and cataloguing of scientific value will be the responsibility of PG&E.

11.11 Fossil Analyses

Analyses conducted depend to a great extent on the number of fossils recovered and their condition. Guild analysis (relative number of carnivores, herbivores, and omnivores of various body weights in an ecosystem), demographic analysis (age and sex structure of populations), habitat analysis (e.g., certain types of animals indicate grasslands as opposed to deserts), paleoecology (use of botanical and/or pollen analysis to reconstruct the paleoenvironment), and comparative analysis (comparison to other faunas of the same time period regionally) are the most typical. Geological context analyses include stratigraphy of the fossil deposits, dating (to narrow the time range of the fossils), taphonomy (history of alteration of the fossils by scavengers, water transport, etc.), and other ancillary studies. Necessary funding for fossil analyses of scientific value will be the responsibility of PG&E.

11.12 Repository

The SBCM will be the primary repository for fossils recovered on this project (Figure 21). This museum is a federally accredited repository for fossils. Necessary funds for curation of paleontological resources of scientific value will be the responsibility of PG&E. The project Principal Paleontologist is authorized to submit fossils with accompanying deeds of gift for curation on behalf of PG&E.

29 September 2011

Sherri Gust
Cogstone
Paleontology Archaeology History
1518 W Taft Ave
Orange, CA 92865-4157

Dear Ms. Gust:

The San Bernardino County Museum (SBCM) is a professional, permanent repository for paleontologic resources collected from private and Federal lands, and is accredited by the American Association of Museums. Additionally, the SBCM upholds professional museum standards and has been recognized by the Federal Government as DM411compliant as set forth by the Department of the Interior's Departmental Manual. Our institution will accept and professionally curate paleontologic collections and accompanying samples, records, data, maps, photographs, field notes, and other documents derived from paleontologic work conducted by Cogstone, under the direction of Ms. Sherri Gust as the Principal Investigator. This repository letter is written specifically for the PG & E Topock Compressor Station, near Needles, San Bernardino County, California.

The SBCM further agrees to assume permanent curatorial responsibility for such materials collected during the course of this project. Curation costs and storage fees will be borne by the project proponent and will require a curation contract between Cogstone and the SBCM at that time.

Sincerely,

Kathleen Springer

Kathleen Springer, Senior Curator
Division of Geological Sciences
San Bernardino County Museum

Figure 21. Repository Letter

11.13 Reporting

The daily field documentation will be the basis for preparing the Weekly Summary of Activities for submittal to PG&E. If fossils are recovered, additional documentation regarding laboratory work will also be incorporated. These records and the field notes will be used to prepare a monthly letter report. The monthly reports will summarize the monitoring activities of the previous period, discoveries made, progress of laboratory work, incidents, and actions taken. PG&E will subsequently distribute copies of the monthly report to other stakeholders including the Tribes.

Upon the conclusion of earthmoving activities, a final report will be prepared. The final report will include the inclusive dates of monitoring, personnel utilized including qualifications, a summary of the monitoring effort and coverage using text and maps, documentation of paleontological localities discovered, paleontological resources identified, interpretation of fossils, non-compliance issues and their resolution, evaluation of the adequacy of this Paleontological Resources Management Plan, and suggestions for improving paleontological resource monitoring procedures. The final report will include all specialists' reports as appendices.

Copies of the final report will be submitted to PG&E, the BLM Needles field office, the Havasu National Wildlife Refuge, as well as with the repository. PG&E will subsequently distribute final report to other stakeholders including the Tribes.

12. References

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