Topock Project Executive Abstract

Document Title: Wetlands and Waters of the United States, Delineation for the Topock Compressor Station Groundwater Remediation Project (PGE20130822A) Submitting Agency: DTSC, DOI Final Document? ☒ Yes ☐ No	Date of Document: August 22, 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 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, that 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.

Written by: PG&E

Recommendations:
This report is for your information only.

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

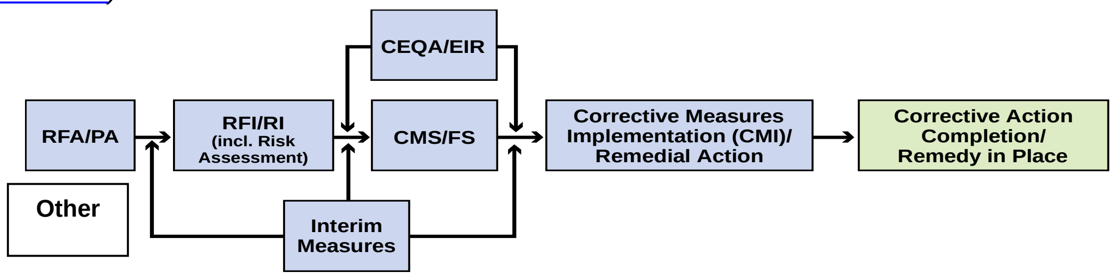
This report presents data collected for use with the remedy design. The Wetlands and Waters of the U.S. Delineation Report complies with EIR mitigation measure BIO-1.

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

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August 22, 2013

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, 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, 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.

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, 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, Delineation for the Topock Compressor Station Groundwater Remediation Project
San Bernardino County, California

Prepared for

Pacific Gas and Electric Company

August 2013

Contents

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.

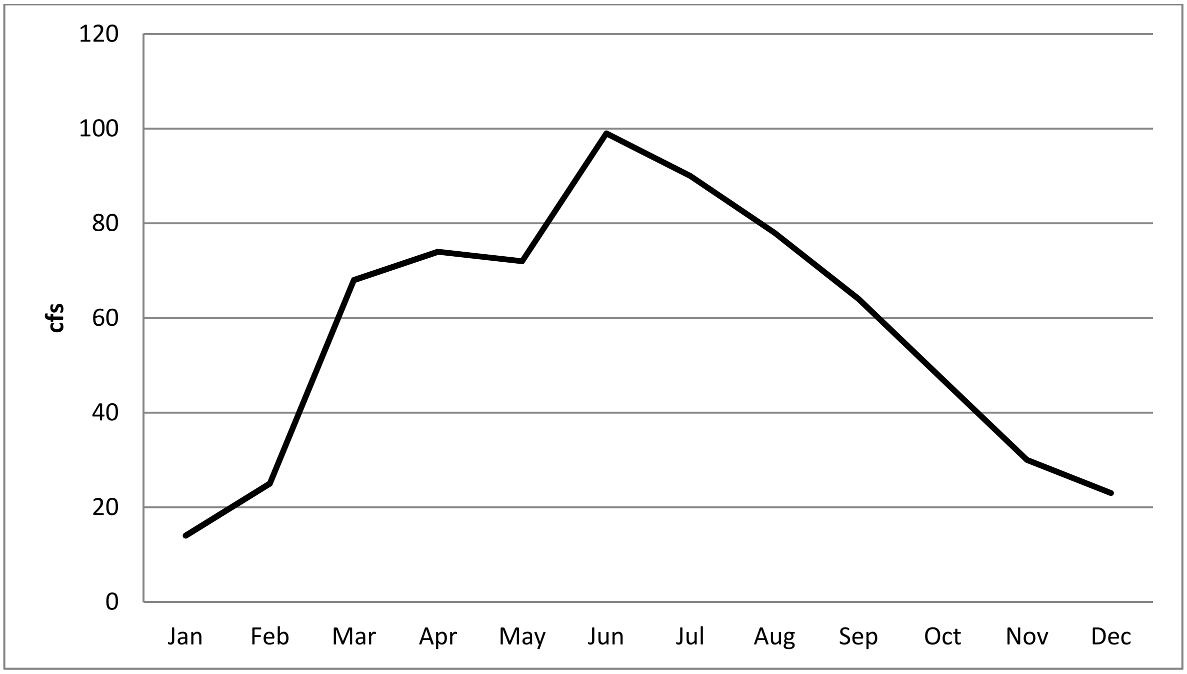

Figure 3-10. Average flow rate (cfs) for the Colorado River as measured at the USGS River Gauge (09423550) at the Topock Marsh Inlet near Needles, California between January 1967 and September 2011.

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

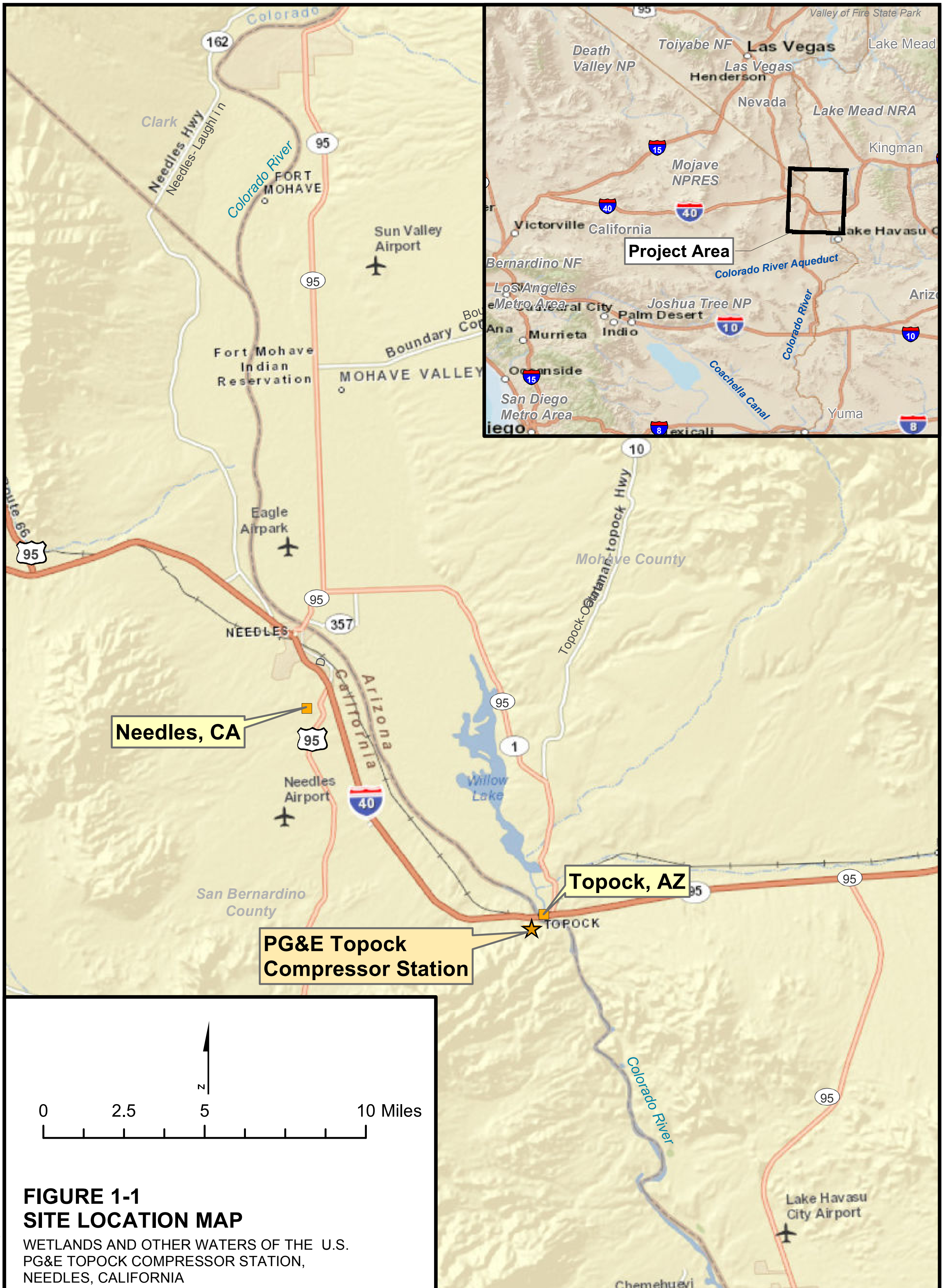

FIGURE 1-1
SITE LOCATION MAP

WETLANDS AND OTHER WATERS OF THE U.S.
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

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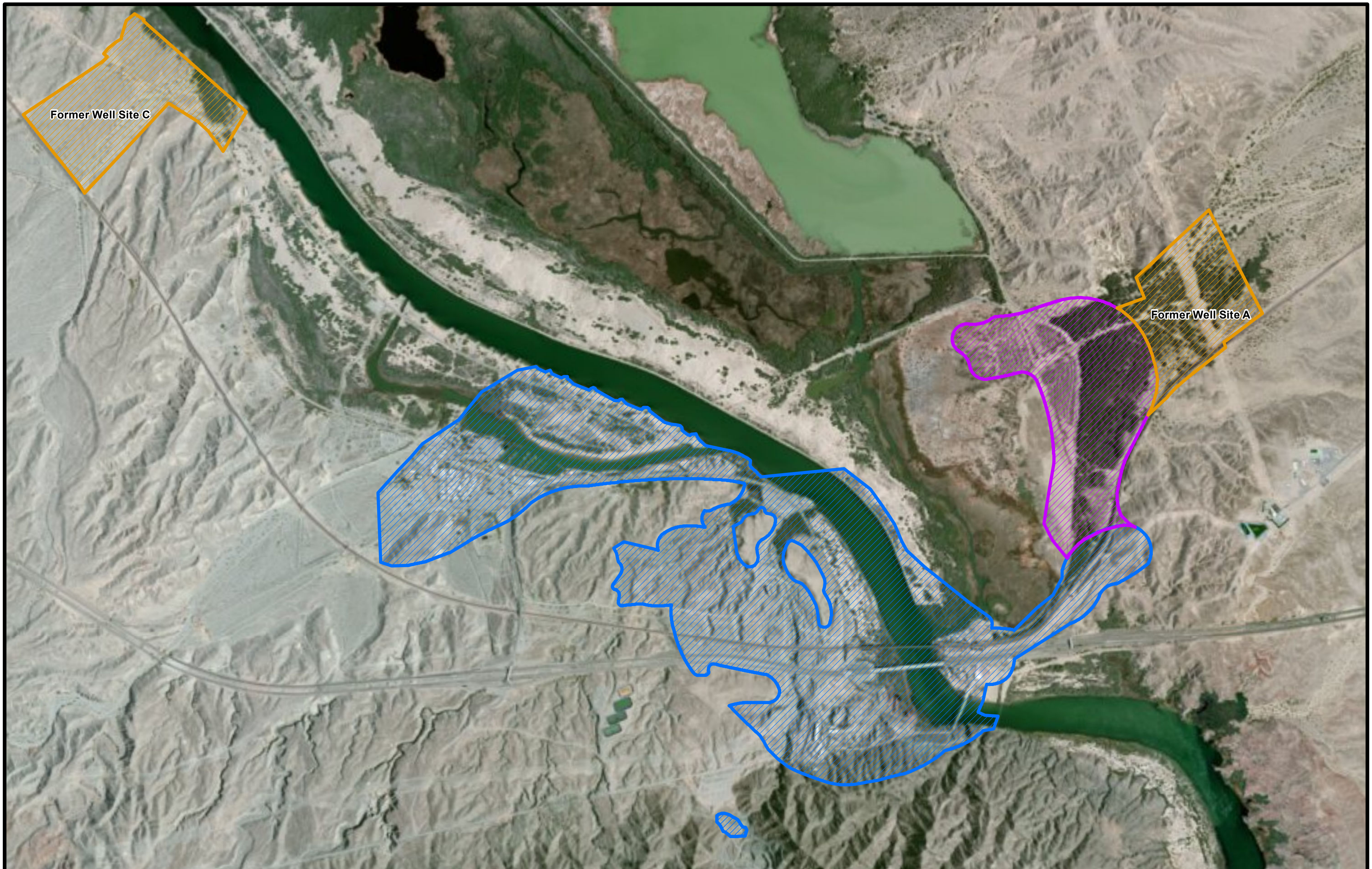

LEGEND

- 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

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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

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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]

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[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.

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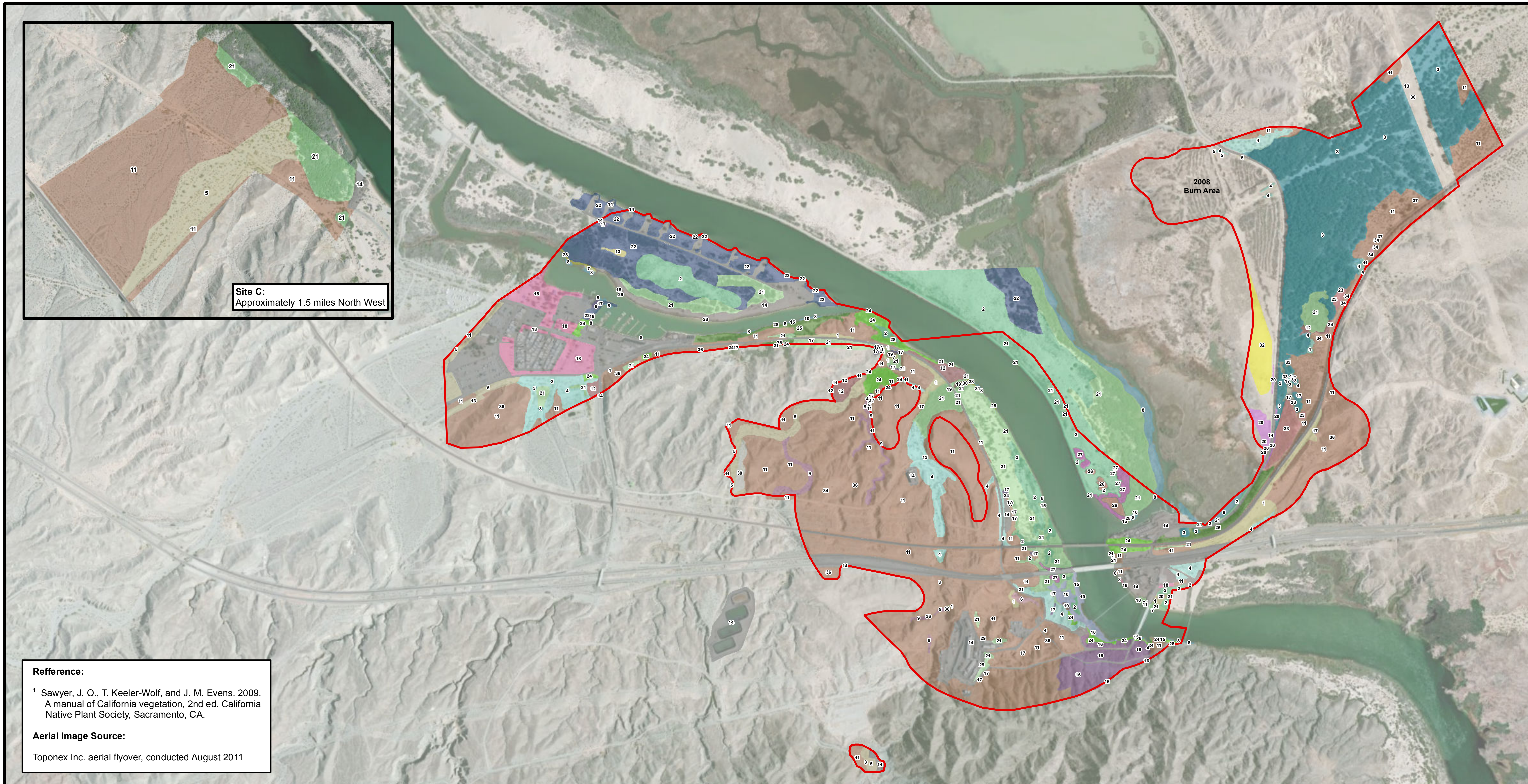
[9] Consent Agreement, Section VII (Definitions). "Work" is defined in the Consent Agreement as "all response actions and corrective actions associated with releases of hazardous substances at the Site performed by PG&E, including all activities to be performed by PG&E as described in Article IX (Work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

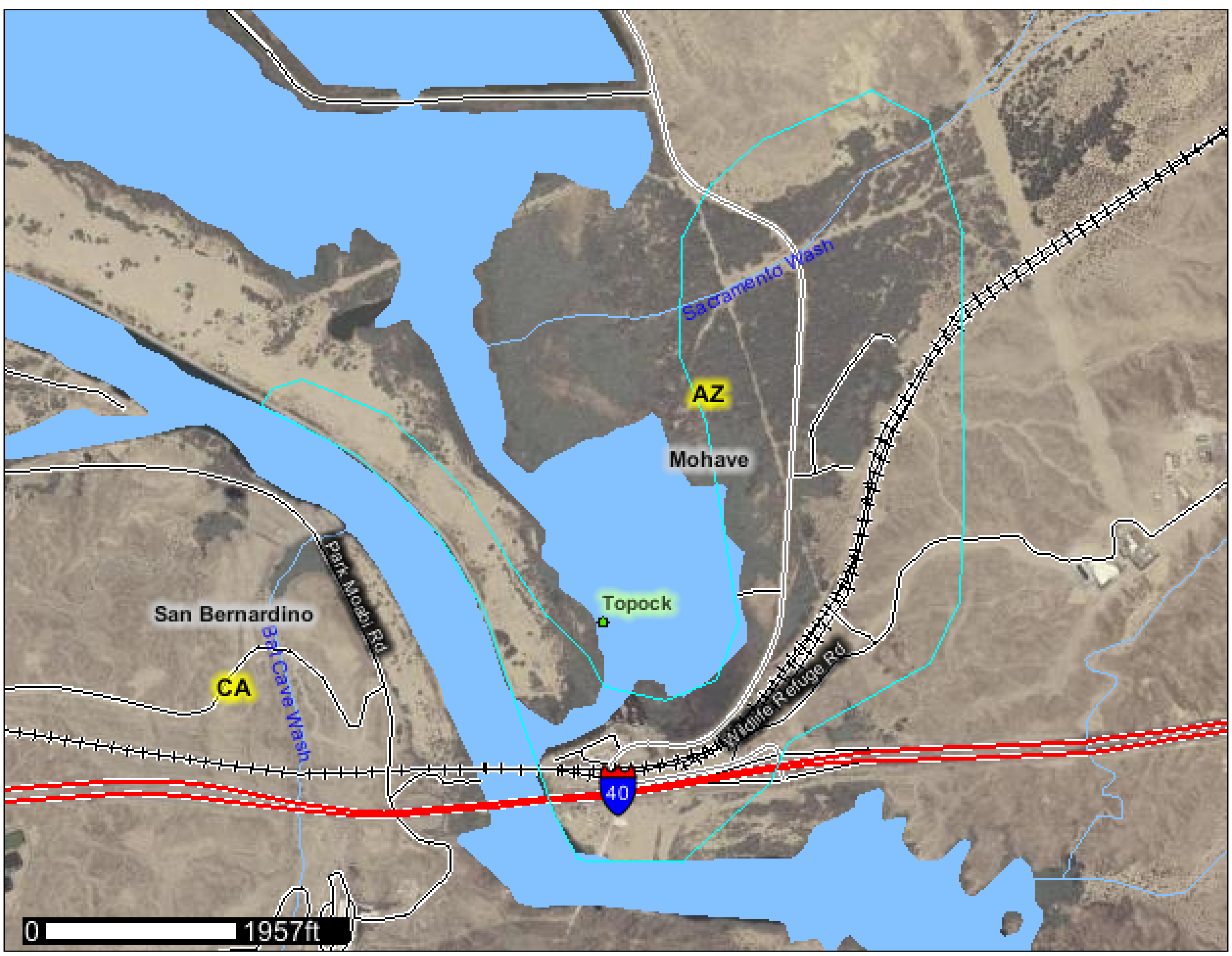
NRCS

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.

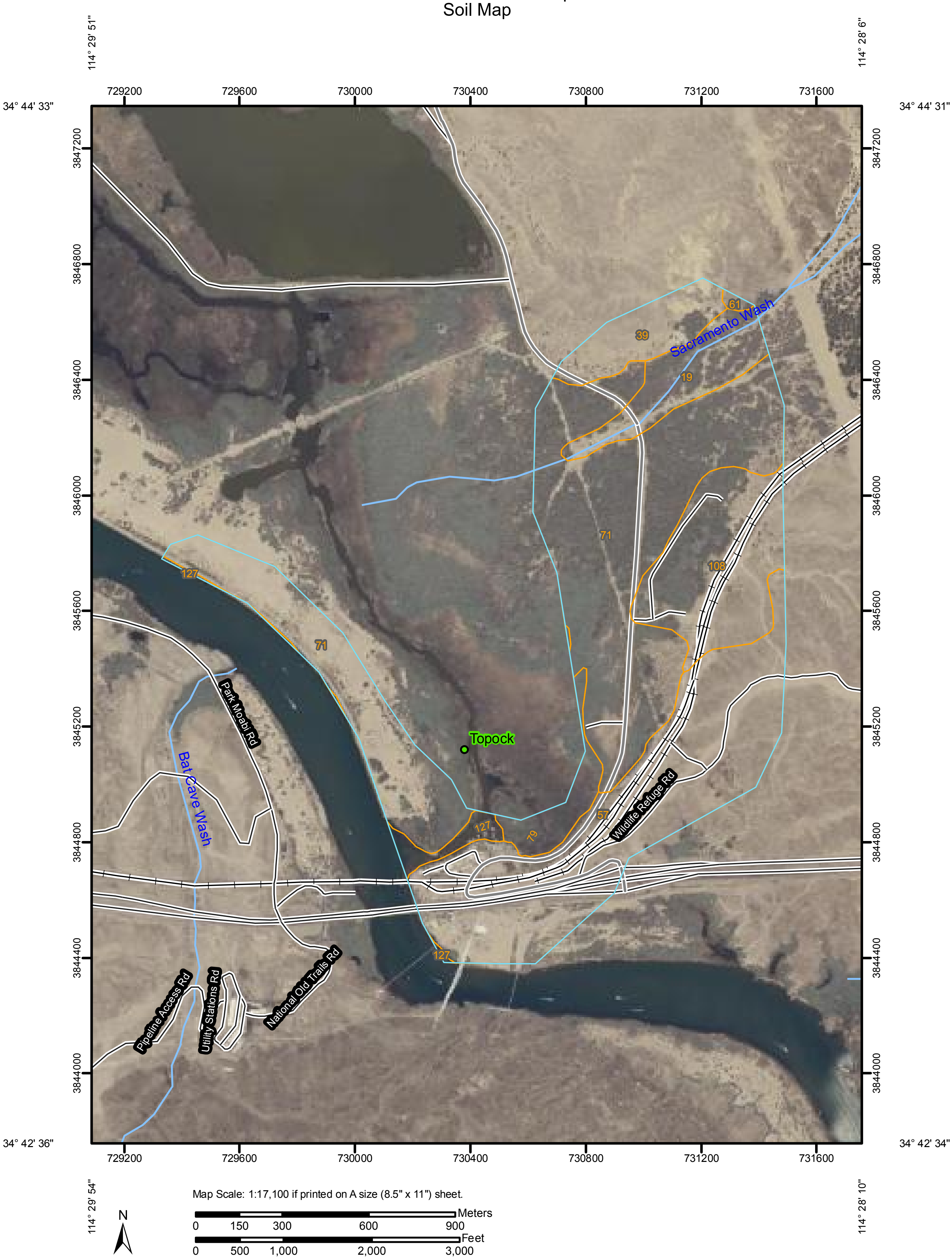
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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"
39
61
19
Sacramento Wash
71
108
127
Park Moabi Rd
Topock
Bat Cave Wash
Wildlife Refuge Rd
57
79
National Old Trails Rd
Pipeline Access Rd
Utility Stations Rd
114° 29' 54"
114° 28' 10"
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 A-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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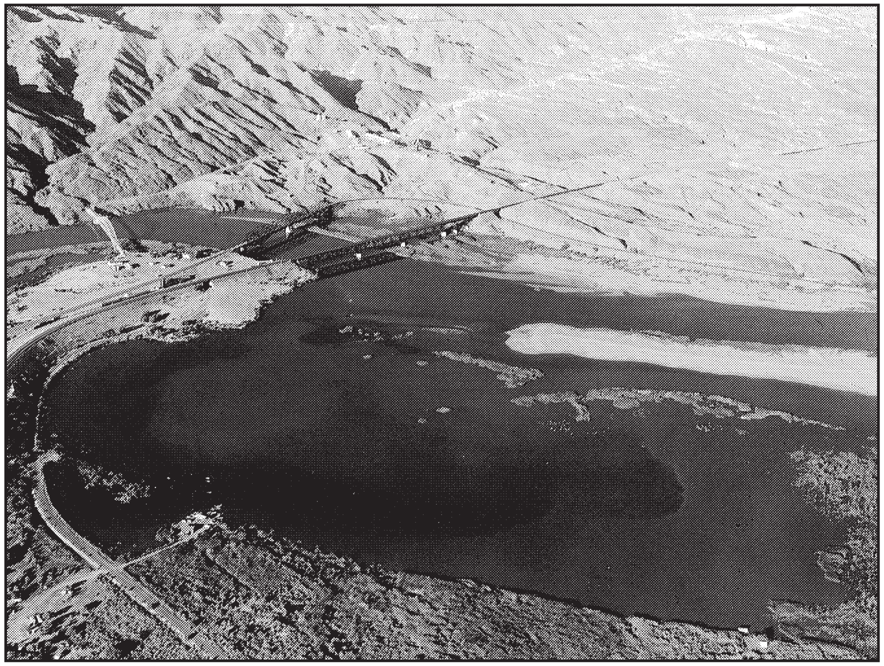

P423-306-371A-CRFW&LS – Topock Bridges. August 1956.

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 A-2
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
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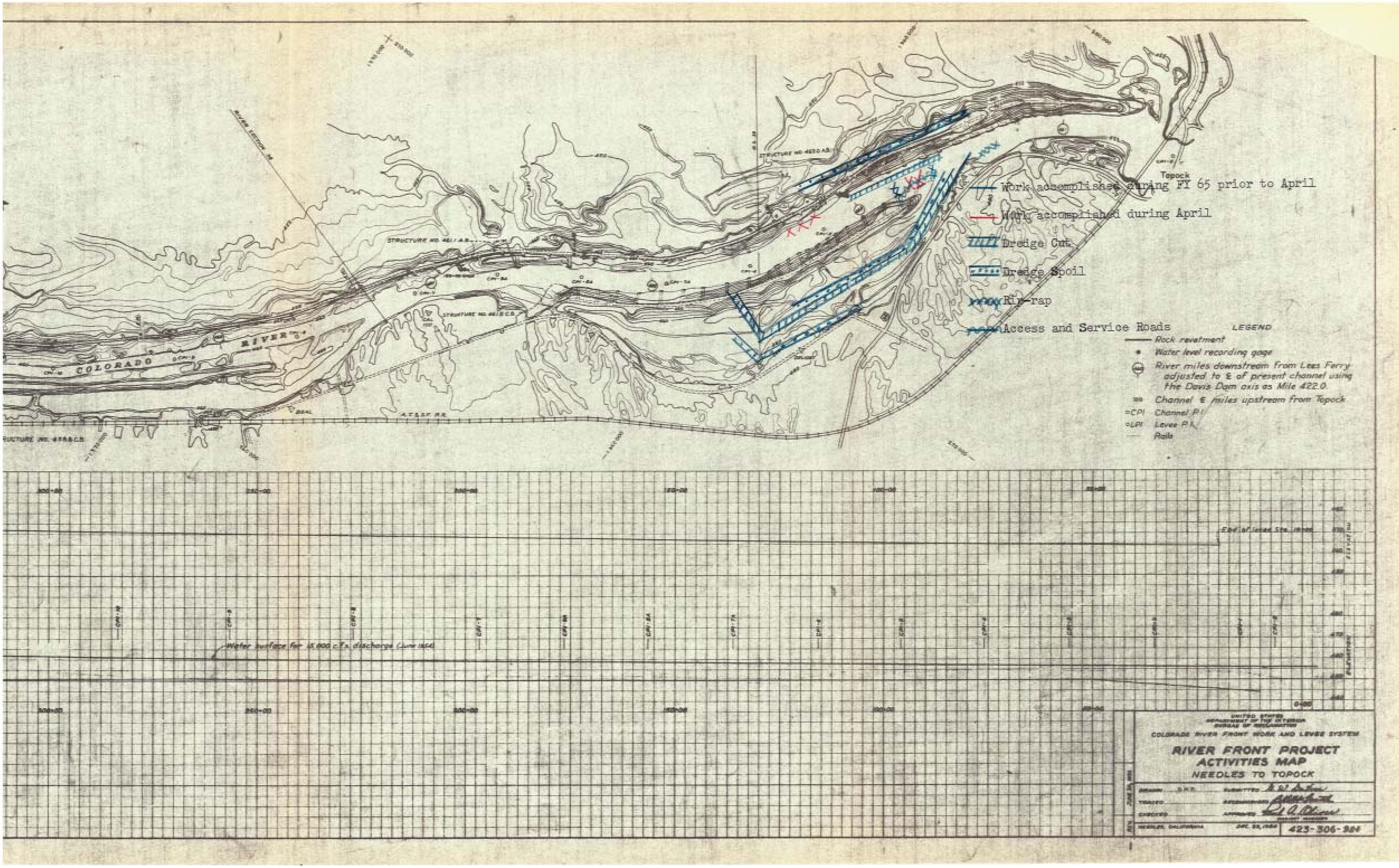

APPENDIX A-3
COLORADO RIVER FRONT ACTIVITIES MAP, APRIL 1965

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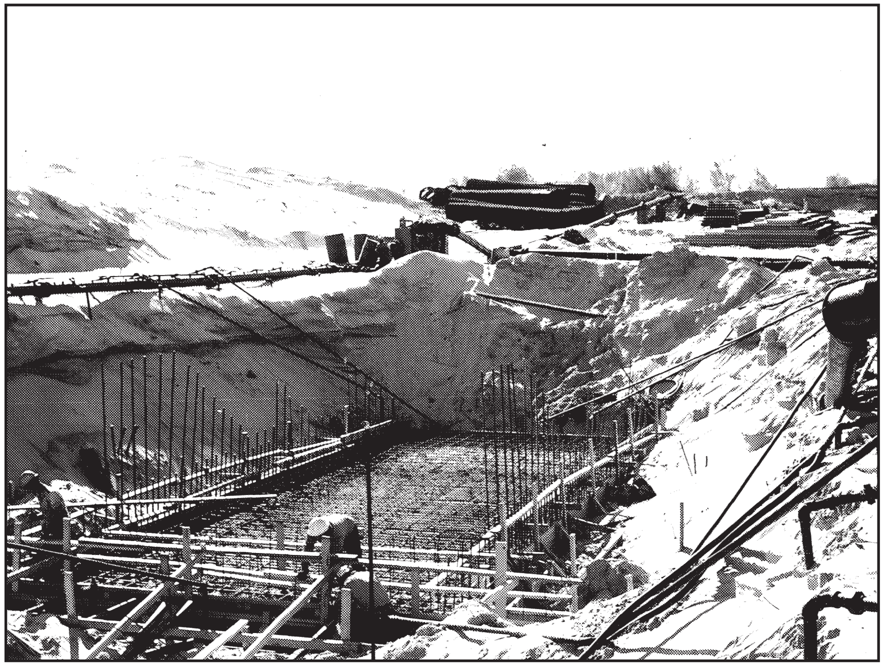
APPENDIX A-4
COLORADO RIVER FRONT ACTIVITIES MAP, JUNE 1965



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 A-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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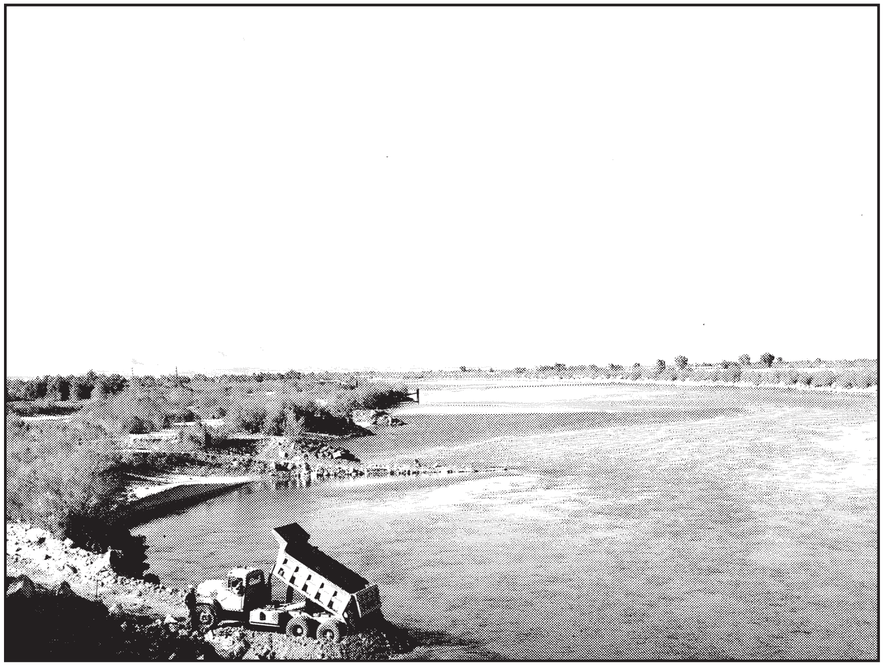

P423-306-4340 NA. Colorado River Front Work and Levee System, Region 3. Needles to Topock Division. Government forces constructing jetty to narrow the width of channel. The channel was narrowed to cause the water to scour sand bar at entrance to Topock Marsh inlet channel structure. Truck at Station 558, California bank. 12/1/65. Bureau of Reclamation photo by Fred Burley.

APPENDIX A-6
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

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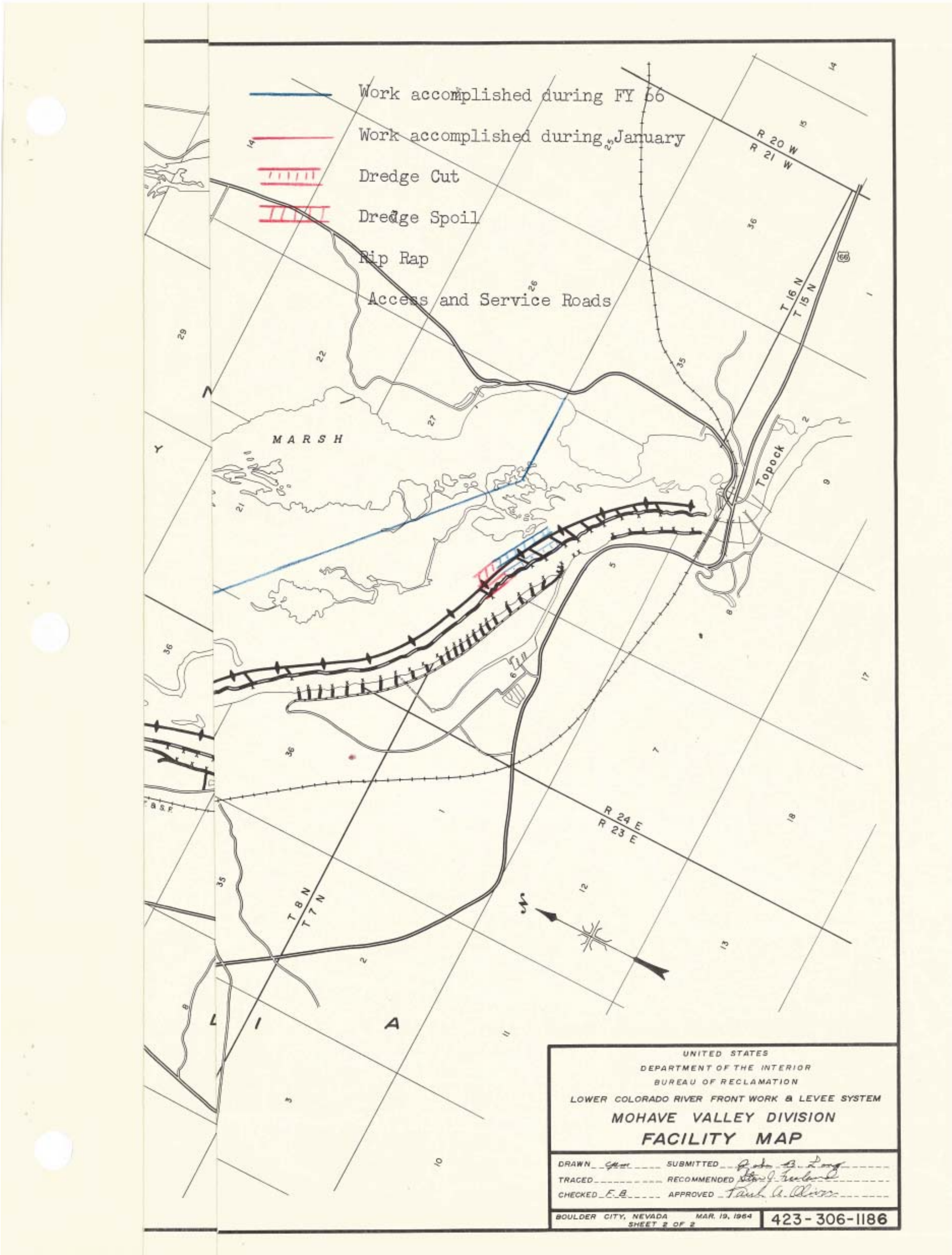
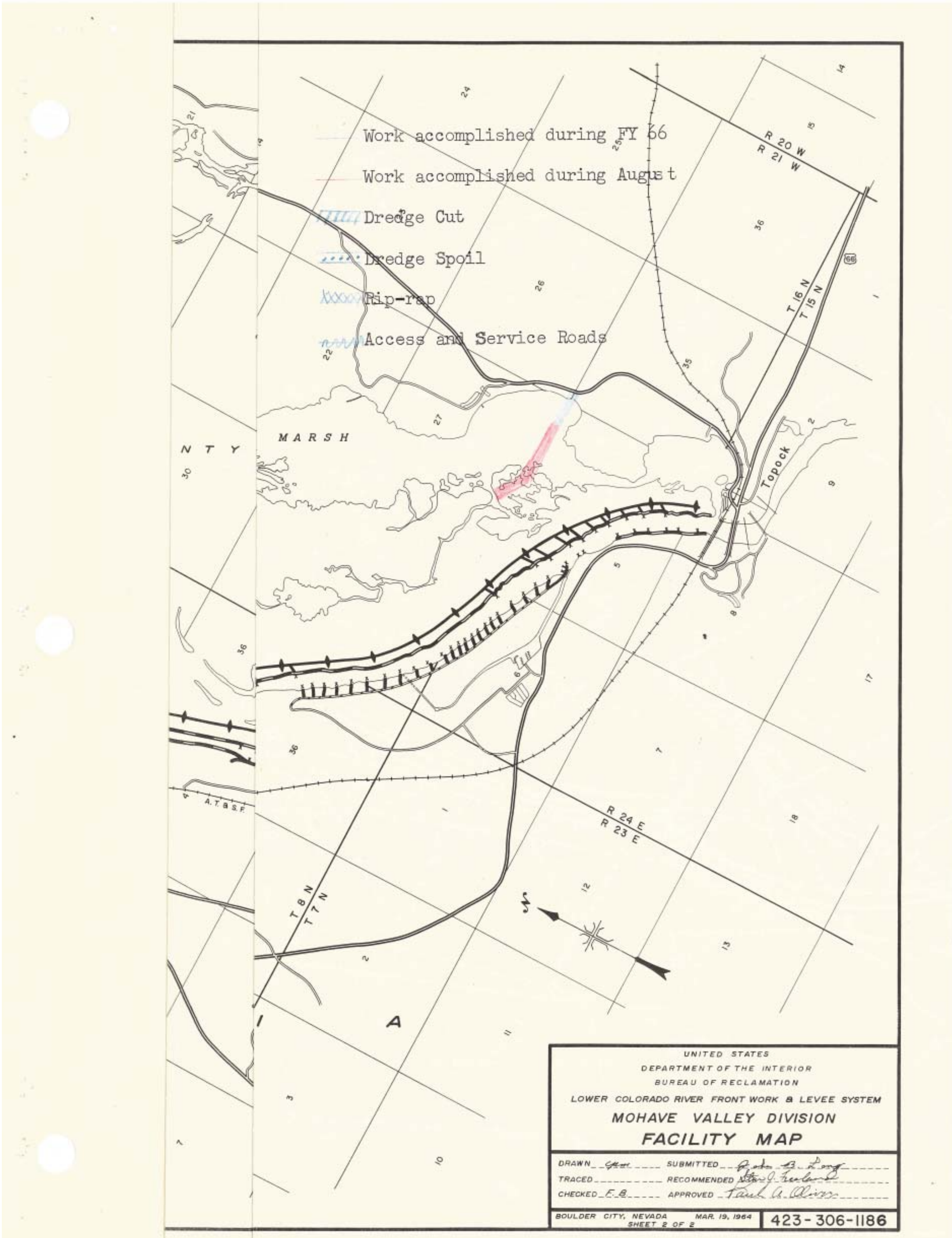
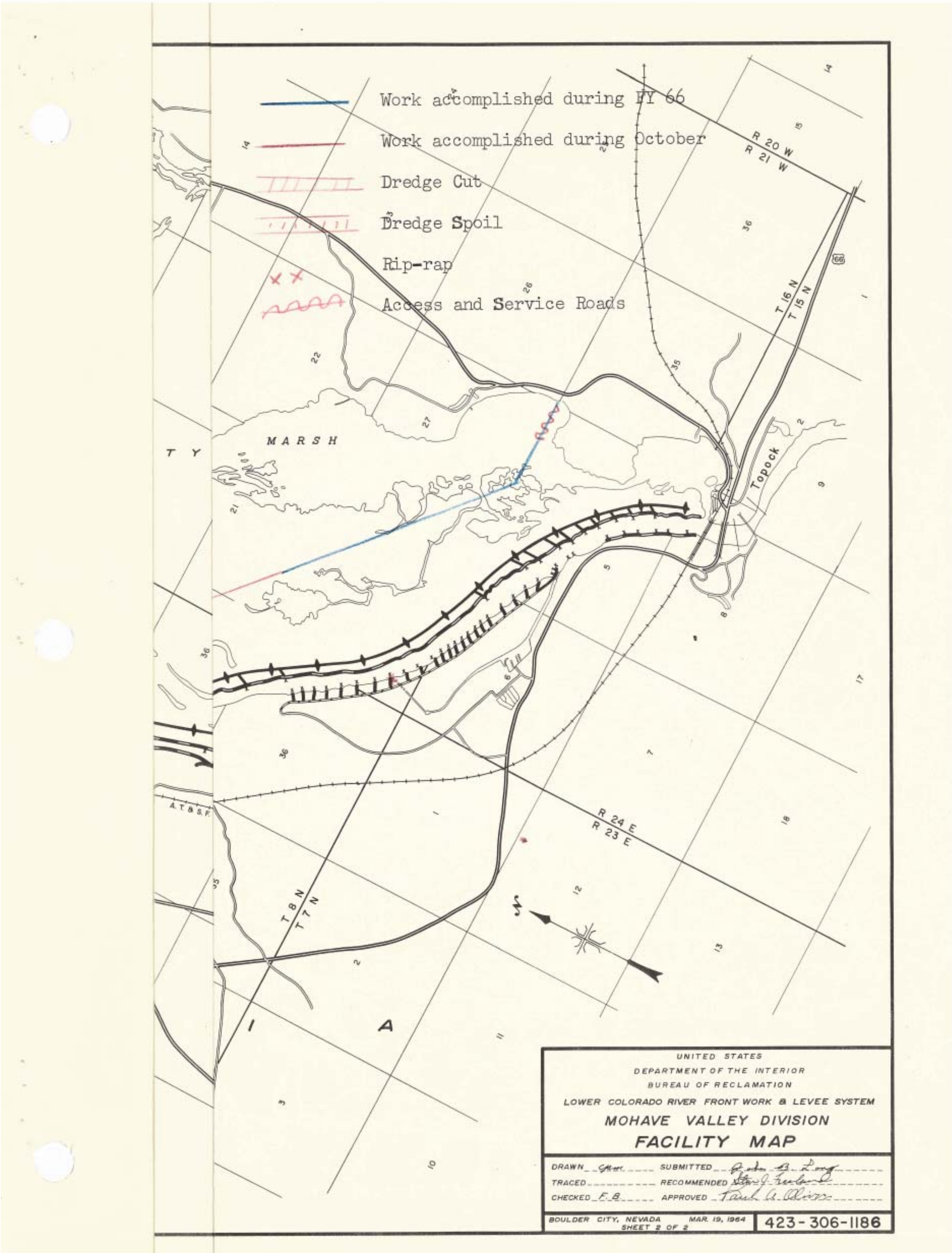


APPENDIX A-7
COLORADO RIVER FRONT ACTIVITIES MAP, JANUARY 1966

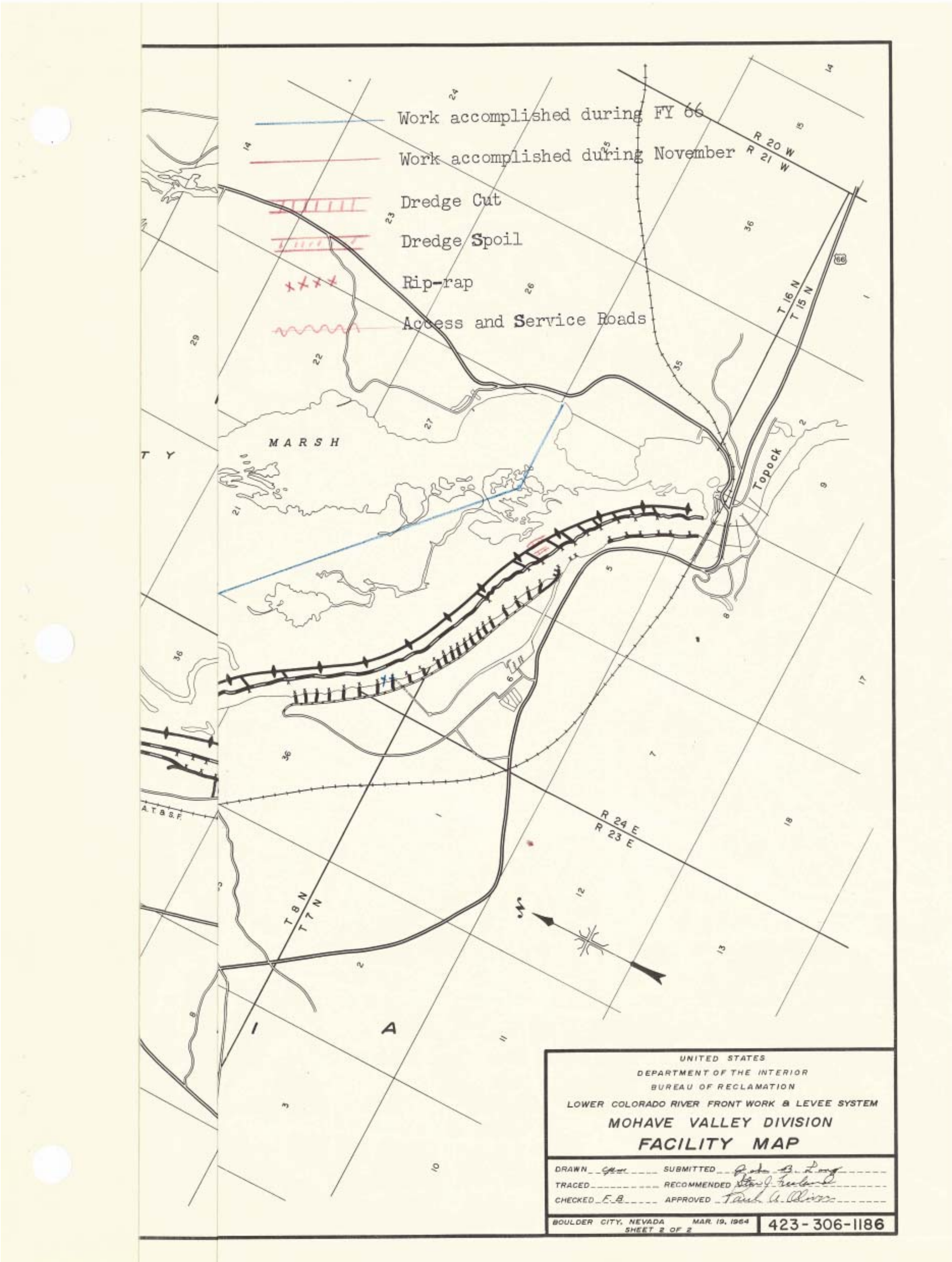


APPENDIX A-8
COLORADO RIVER FRONT ACTIVITIES MAP, AUGUST 1966

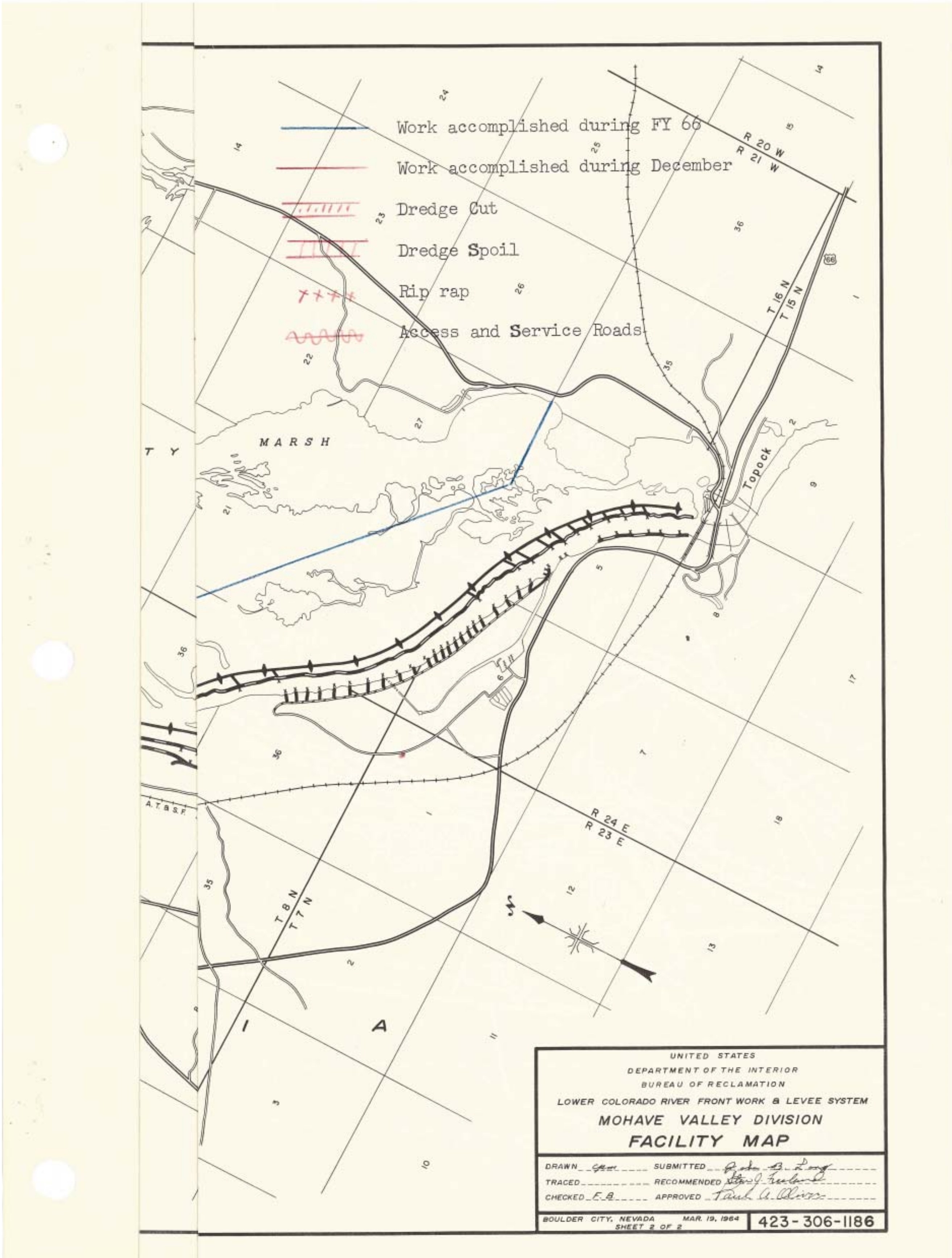


APPENDIX A-9
COLORADO RIVER FRONT ACTIVITIES MAP, OCTOBER 1966

CH2MHILL



APPENDIX A-10
COLORADO RIVER FRONT ACTIVITIES MAP, NOVEMBER 1966



APPENDIX A-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 A-12
PHOTOS OF THE COLORADO RIVER TAKEN DURING CHANNEL IMPROVEMENTS, 1956 – 1969

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT (VOLUME 2 ADDENDUM)
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P423-300-7747 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 A-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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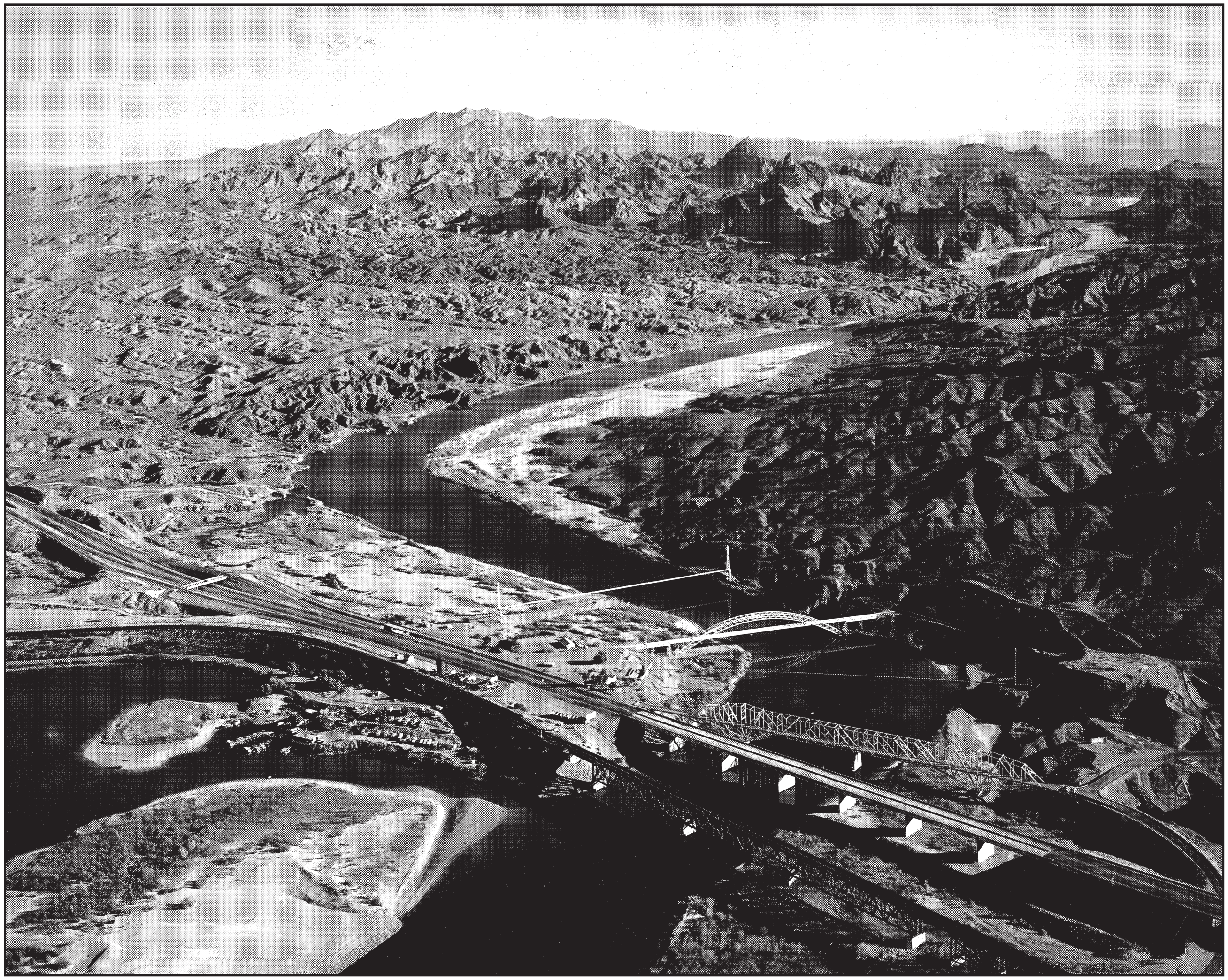

P423-300-8736 NA Mohave Valley Division – Colorado River Front Work & Levee System, Arizona-California. Looking downstream at the end of the Mohave Division and the starting point for the Topock Gorge Division. The bridge crossing the Colorado River at Topock, Arizona, is the dividing point. Golden Shores 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 A-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 A-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

CH2MHILL

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 A-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

CH2MHILL

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 A-17
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 E
USGS River Gauge (09423550) at the Topock Marsh Inlet Near Needles, California

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

	Output formats
Mohave County, Arizona Hydrologic Unit Code 15030101 Latitude 34°50'10", Longitude 114°35'03" NAD27 Gage datum 400 feet above NGVD29	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?
Feedback on this web site
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U.S. Department of the Interior | U.S. Geological Survey
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

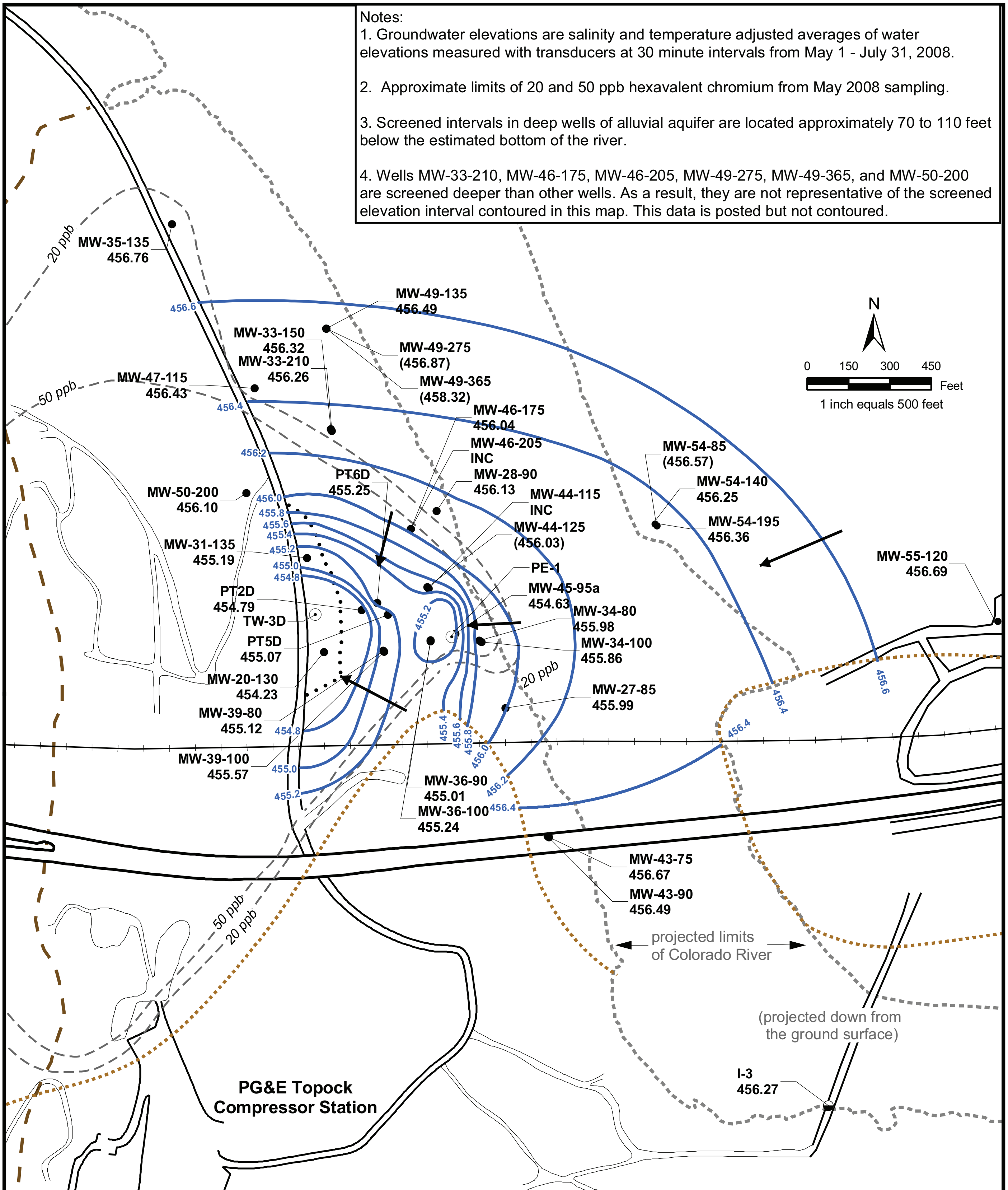
Appendix F
Information from on Site Ground Water Monitoring Wells and Surface Water Elevation Data

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)		Monitoring Well
MW-29 (455.85)	Average Groundwater Elevation at Monitoring Station (ft AMSL) Not Used for Contouring		River Station
	Interpreted Groundwater Flow Direction		Extraction Well
	Approximate Bedrock Contact at 395 ft AMSL		Groundwater Elevation Contour 0.2 ft
			Inferred Groundwater Elevation Contour 0.2 ft
		INC	Data incomplete for reporting period

FIGURE 2-5c
AVERAGE GROUNDWATER ELEVATIONS DEEP WELLS MAY THROUGH JULY 2008

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Ground Water Levels from Selected Monitoring Wells and Colorado River Surface Elevations

Table D-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

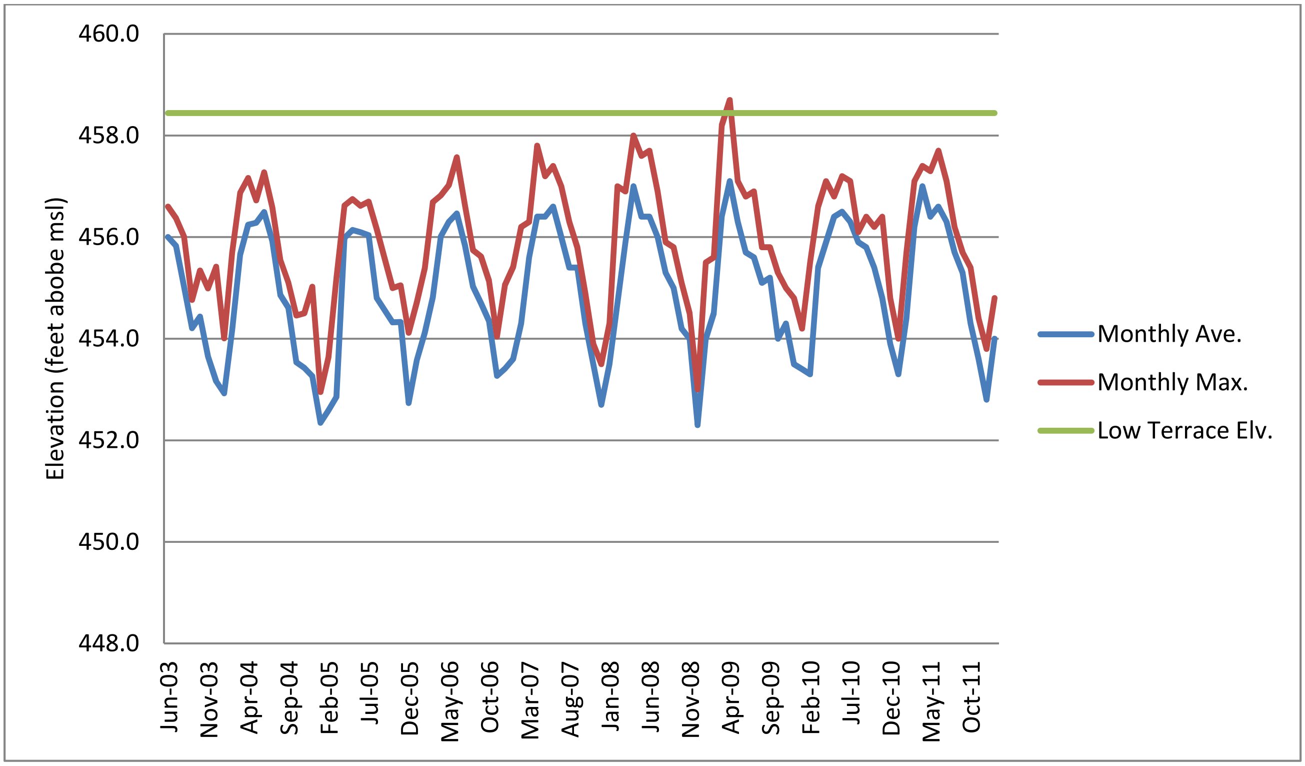


Figure D-1. Colorado River surface water elevations measured at I-3 between June 2003 and January 2012. The low terrace elevation of 458.4 represents the lowest topographic position along the Colorado River. The mean high water mark as determined by water elevations measured during peak flows during the summer months is 457.0 feet.

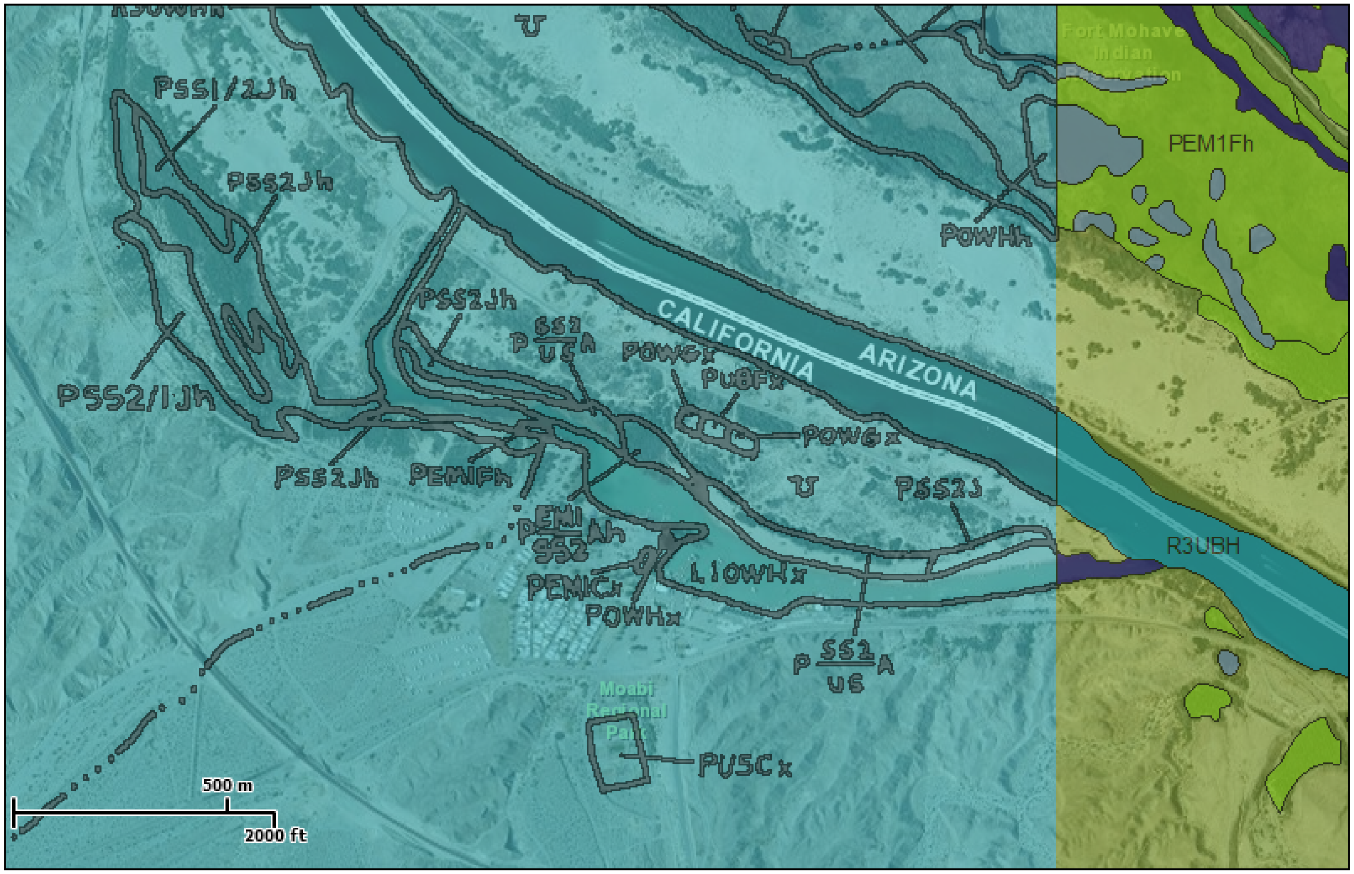
Appendix G
National Wetlands Inventory Maps

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:

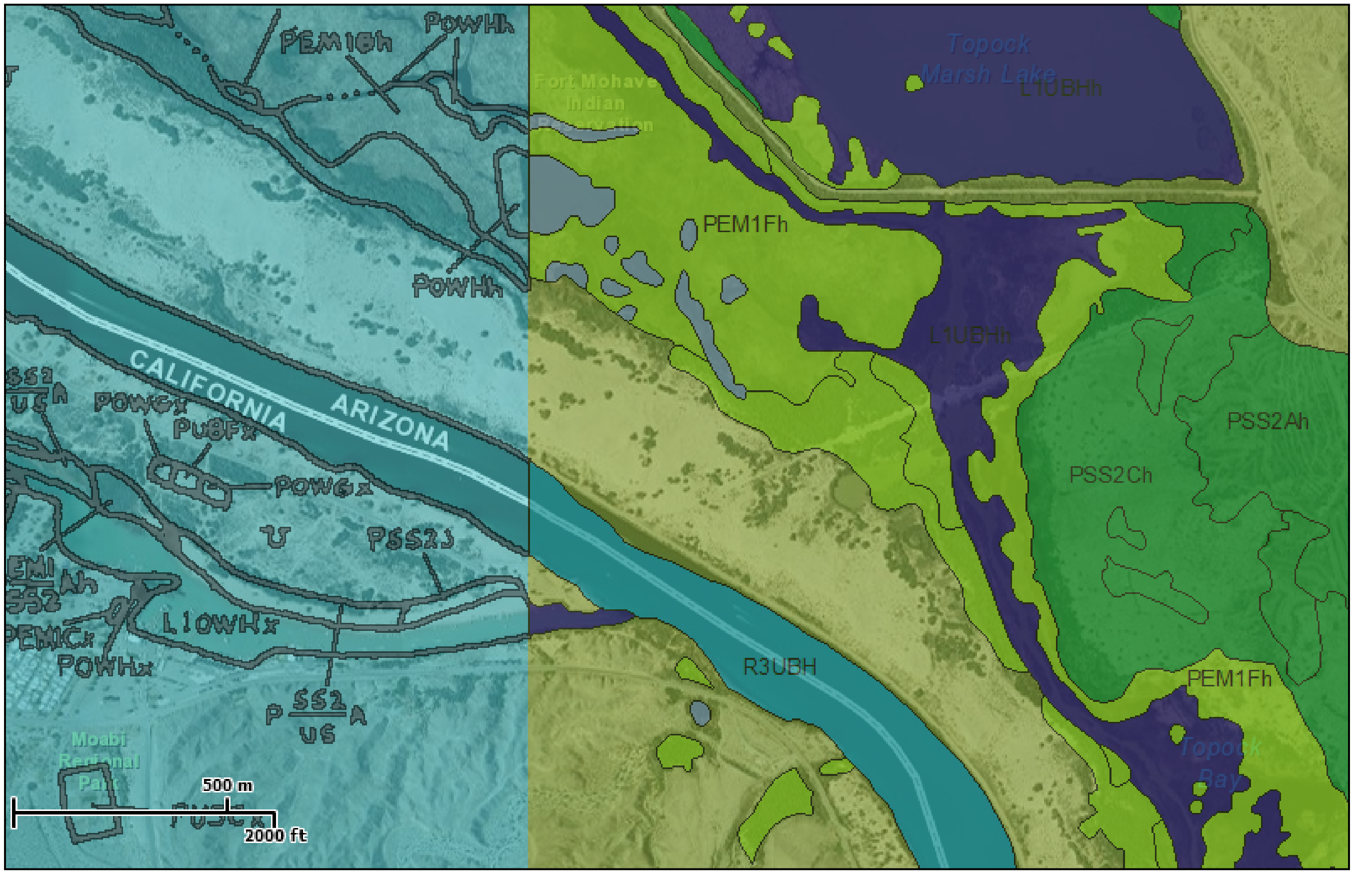
Topock

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.

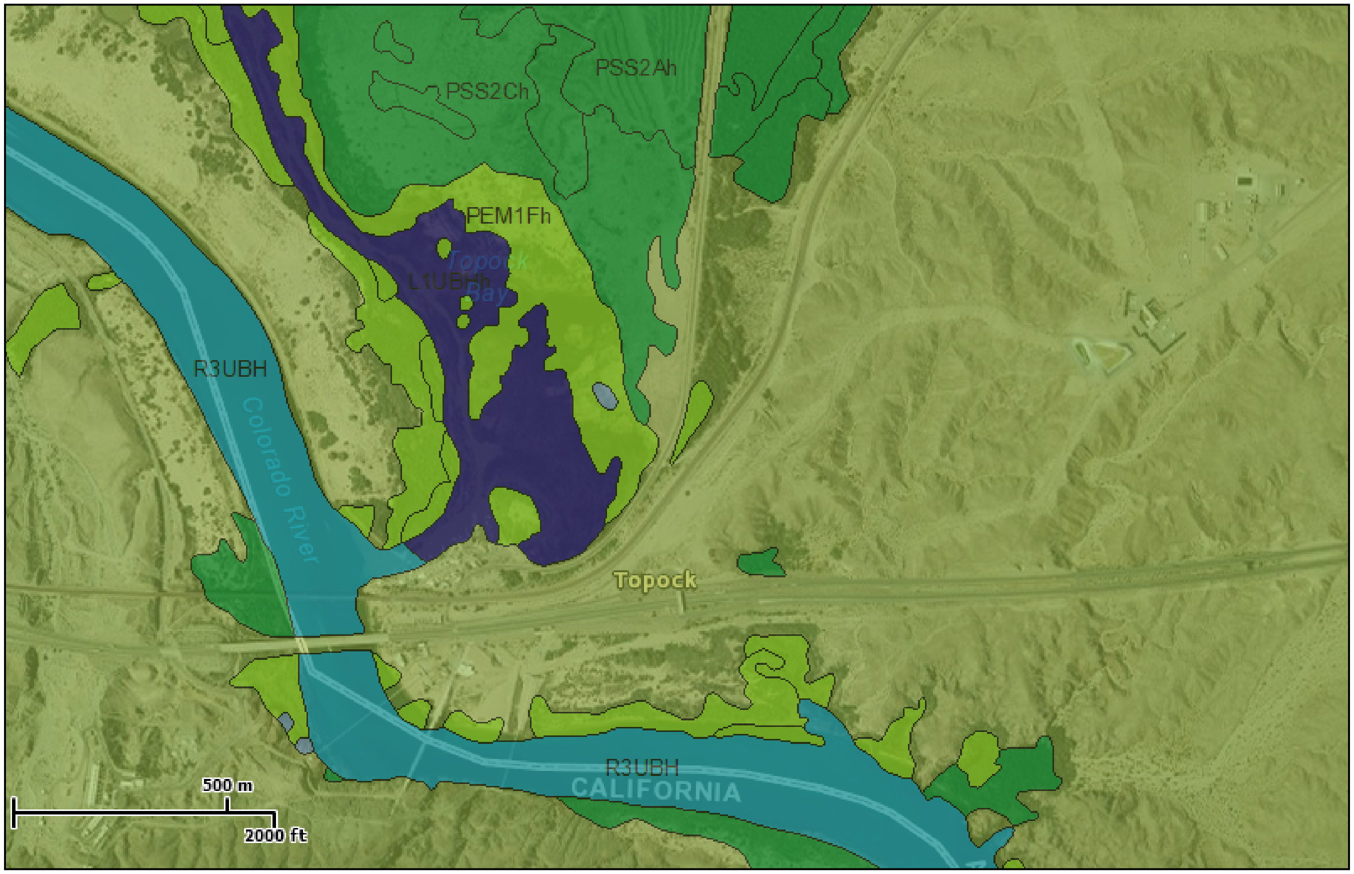
User Remarks:

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

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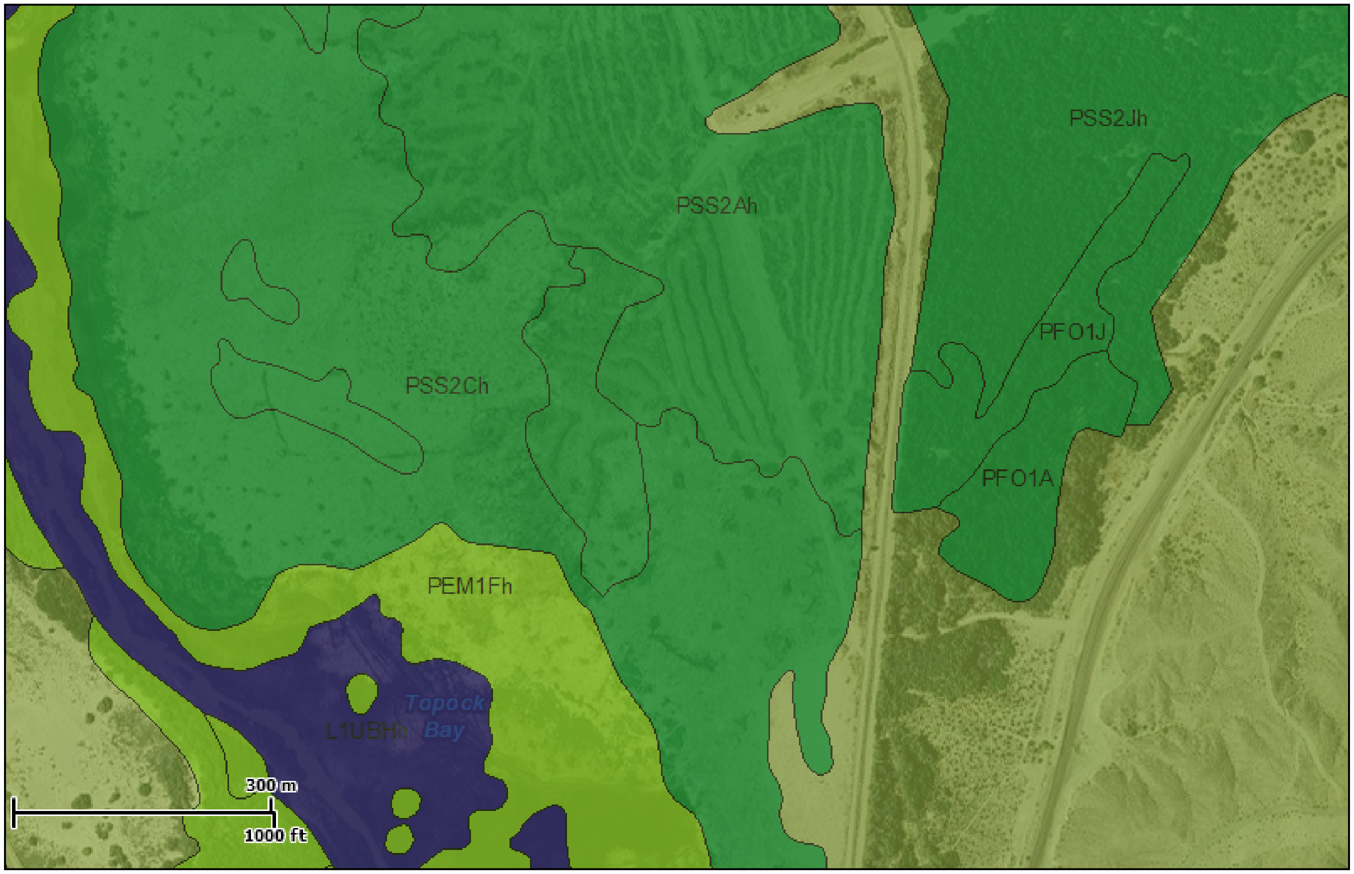
User Remarks:

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
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- No Data

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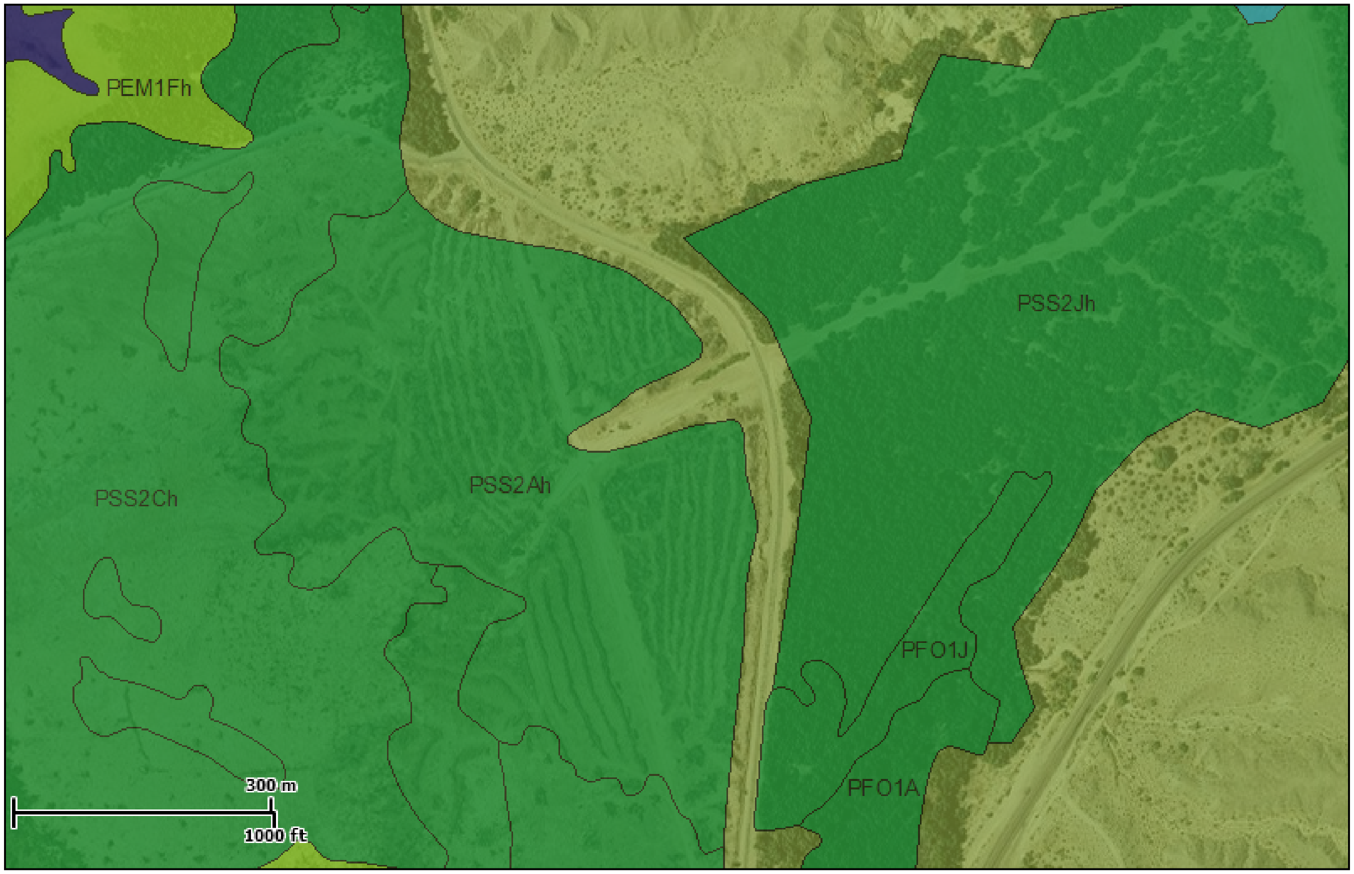
User Remarks:

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

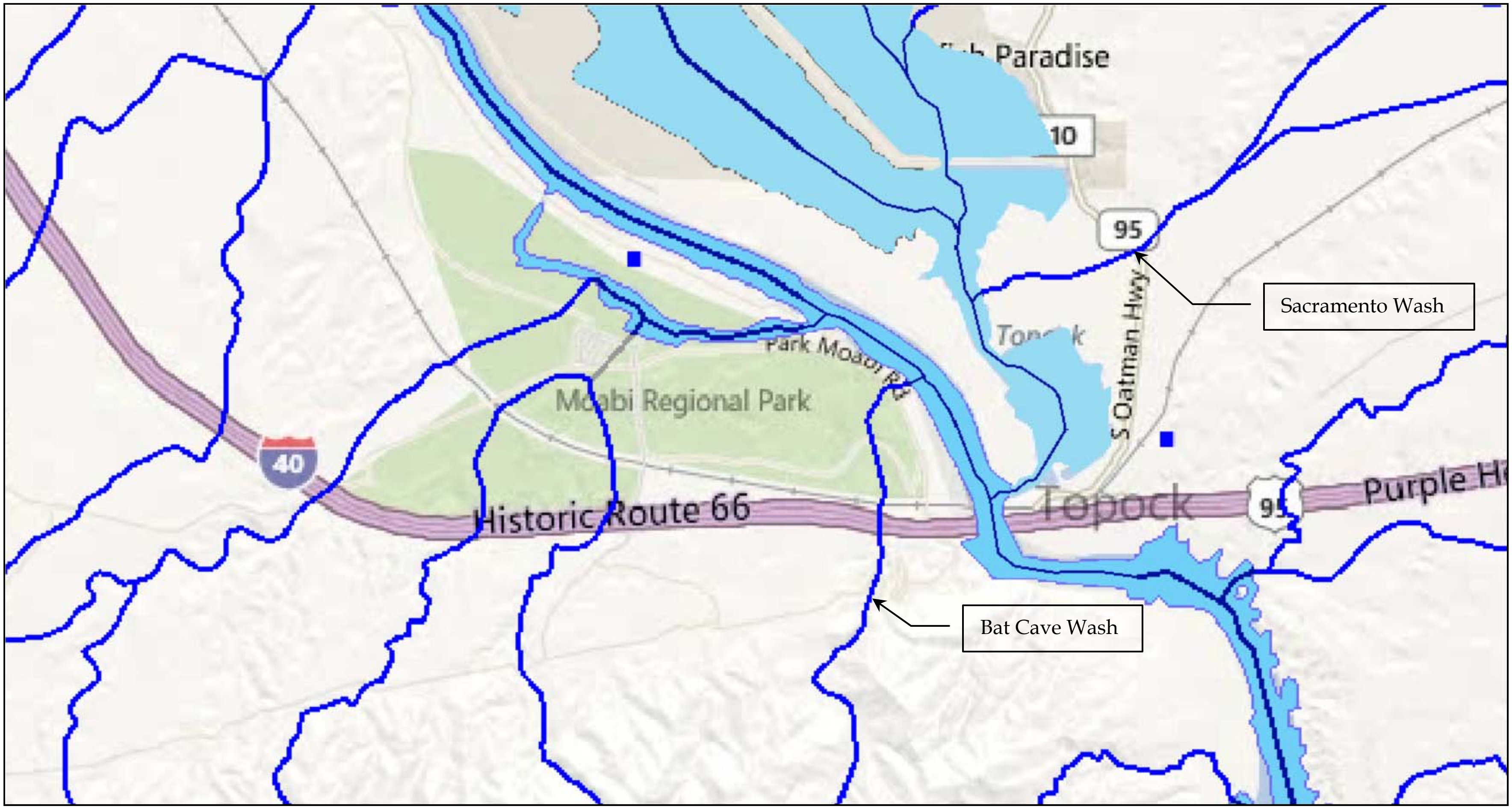
Status

- 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=/

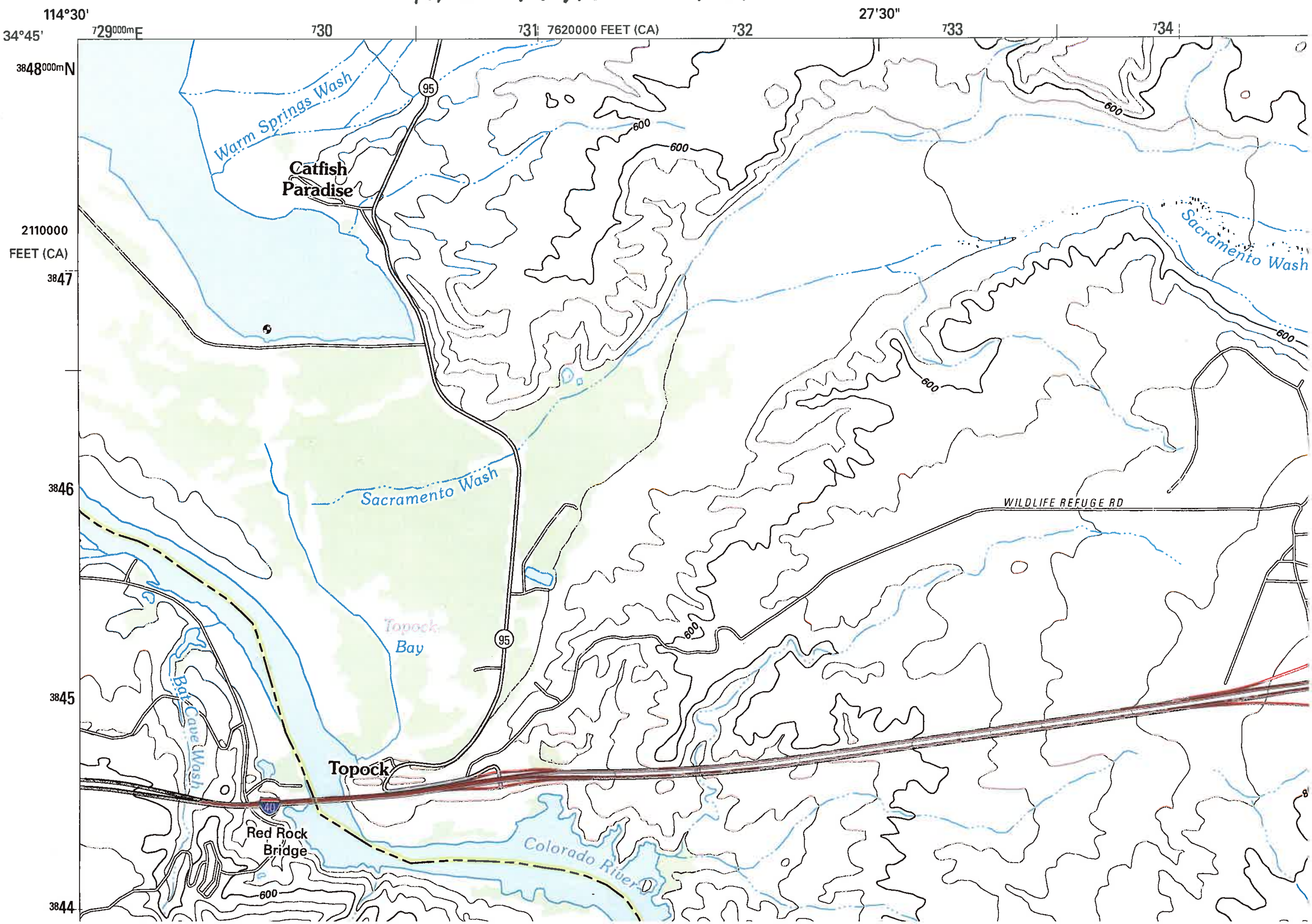
Appendix I
USGS Topock and Whale Mountain Topographic Quadrangle Maps

USGS
science for a changing world

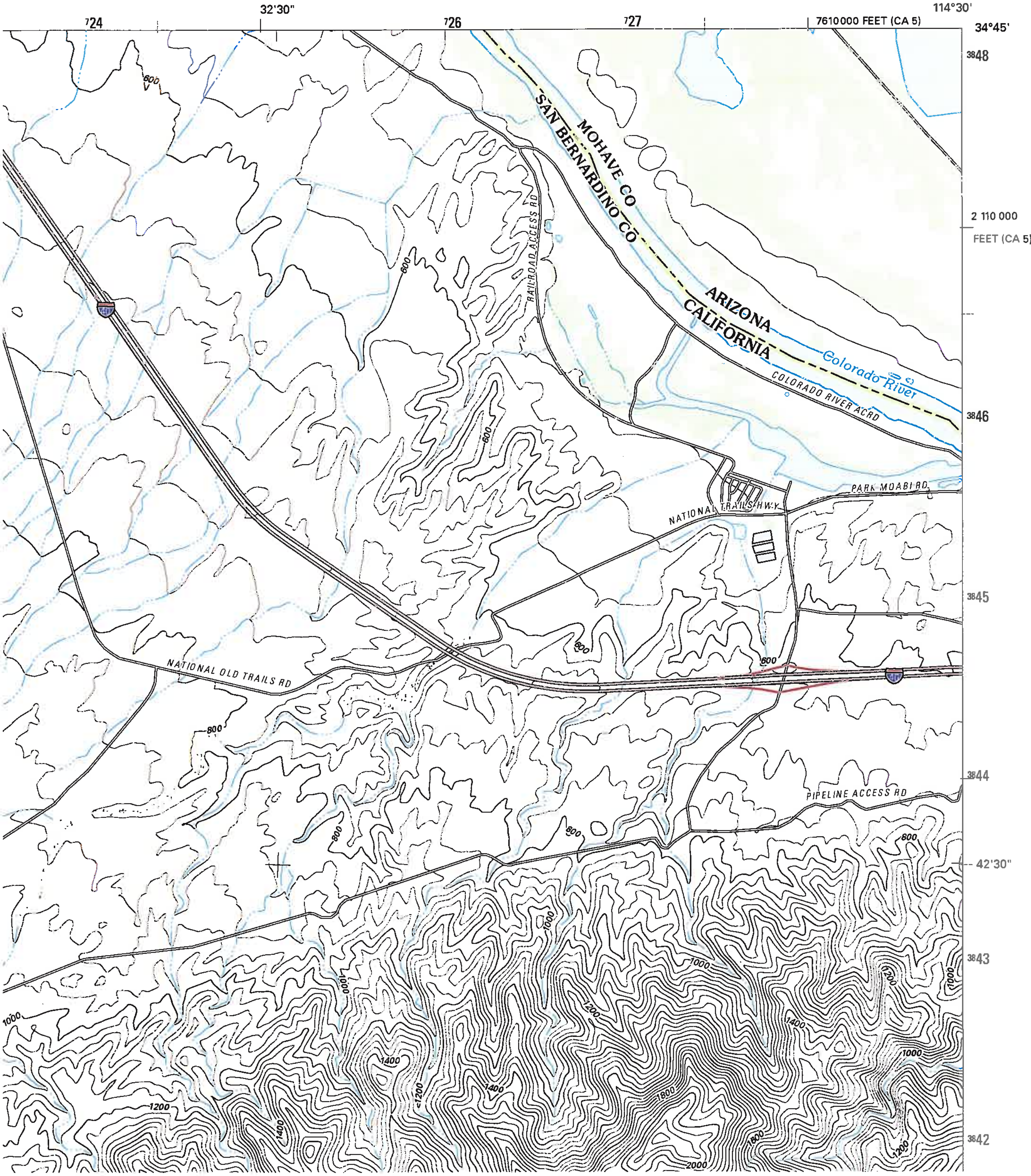
U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

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 %	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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?	X		11
Saturation Present? (includes capillary fringe)	X		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 %	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:

	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: 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? 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: 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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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? (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-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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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 noted otherwise.)

___ 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 %	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.

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, 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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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 Features Color (moist)	Redox Features %	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 %	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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>25
Saturation Present? (includes capillary fringe)		X	>25

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	**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 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? (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: 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
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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:

Surface Water Present? Yes ___ No X Depth (inches): ______
Water Table Present? Yes ___ No X Depth (inches): >30
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >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 ramossissima* 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 %	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:

	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: 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
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? 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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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:

	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-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 %	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	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X		
Wetland Hydrology Present?	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:

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 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 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: 2/17/2012

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:

	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 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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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? Yes ___ No ___ Depth (inches): ___
(includes capillary fringe)

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	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	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 ____	**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 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		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[a]	Loc[b]		
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? (includes capillary fringe)	Yes		No	X	Depth (inches):	>35

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 %	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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?	X		15
Saturation Present? (includes capillary fringe)	X		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:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): >36

Saturation Present? Yes ___ No X Depth (inches): >36 **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: 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.

Hydrophytic Vegetation Present?	Yes ___ No XX	**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 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:

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 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	**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 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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	>28
Saturation Present? (includes capillary fringe)		X	>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 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 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
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **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 Features %	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:

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:

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
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 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.

	Yes	No
Hydrophytic Vegetation Present?	X	
Hydric Soil Present?		X
Wetland Hydrology Present?		X
Is the Sampled Area within a Wetland?		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 ___
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 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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[a]	Loc[b]	Texture	Remarks
0-24	10YR 5/3+	100	--	--	--	--	S	Soil pH = 8.0 – 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:

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 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 ____
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 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? 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:

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

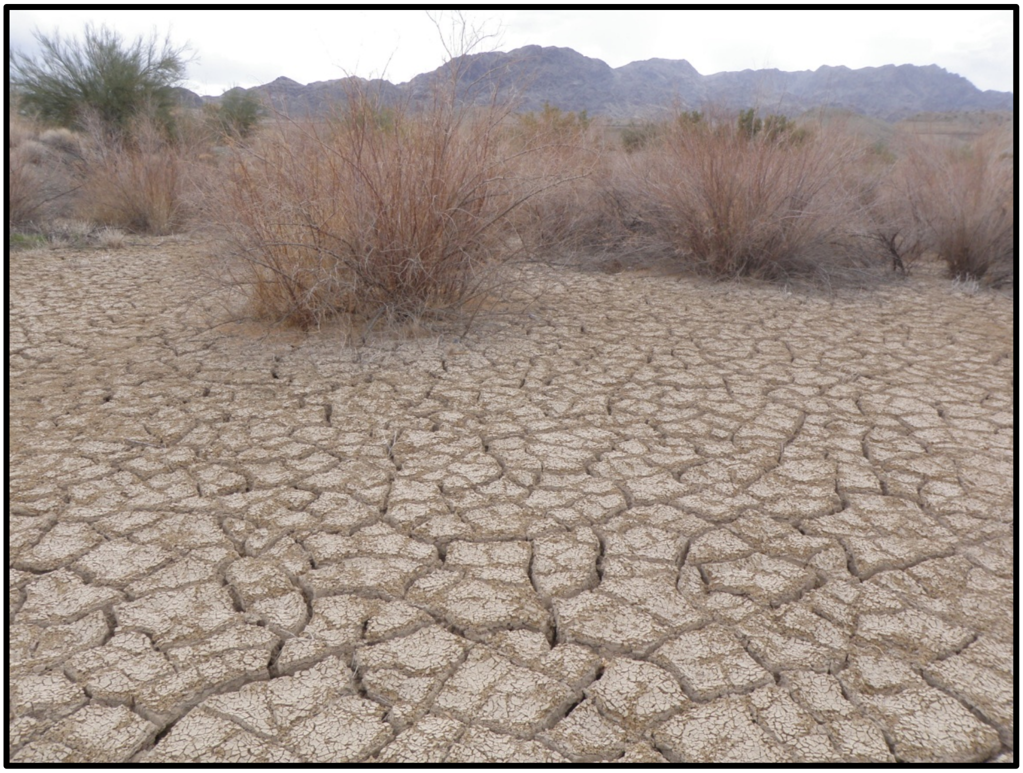
Park Moabi Slough (R2UB2x), Looking west from the confluence with the Colorado River

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

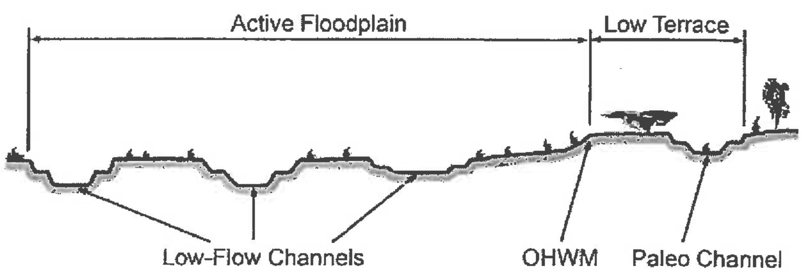
Brief site description: CONFINED CHANNEL - STEEP ROCKY SIDE SLOPES - SPARSE VEGETATION WITHIN CHANNEL ROCKY SUBSTRATE

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

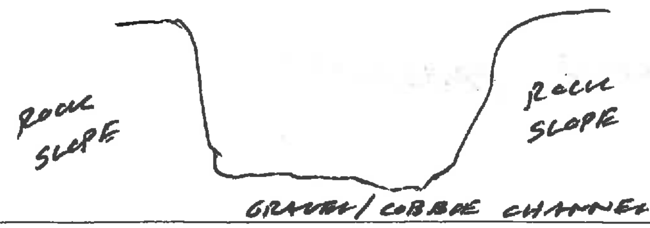


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
- [x] 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

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: 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

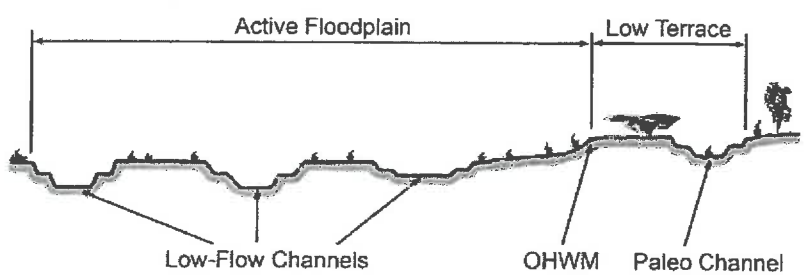
Brief site description: BROAD CHANNEL WITH MULTIPLE LOW FLOW CHANNELS STEEP SIDE SLOPES - SPARSE VEGETATION WITHIN THE ACTIVE FLOODPLAIN AREA

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

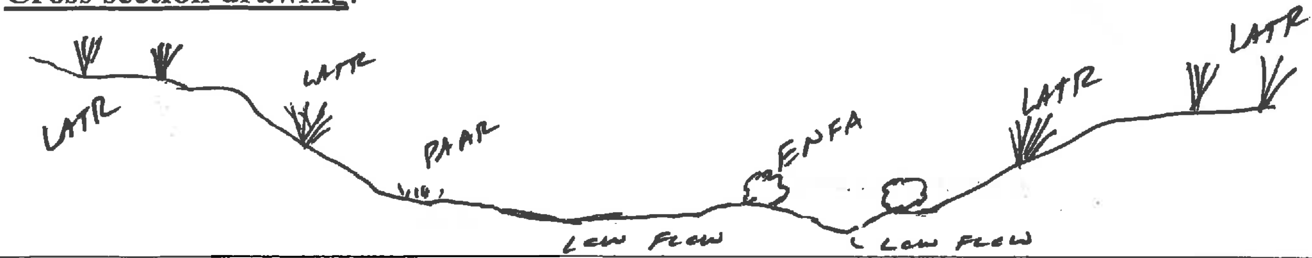


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
   - ☐ Digitized on computer
   - ☑ GPS 2005
   - ☐ 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 ☒ 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
- ☒ 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 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

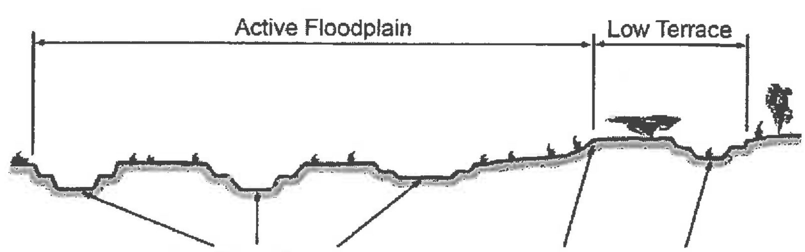
Potential anthropogenic influences on the channel system: UPSTREAM CULVERTS - THIS PORTION OF THE WASH USED AS AN ACCESS ROAD

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

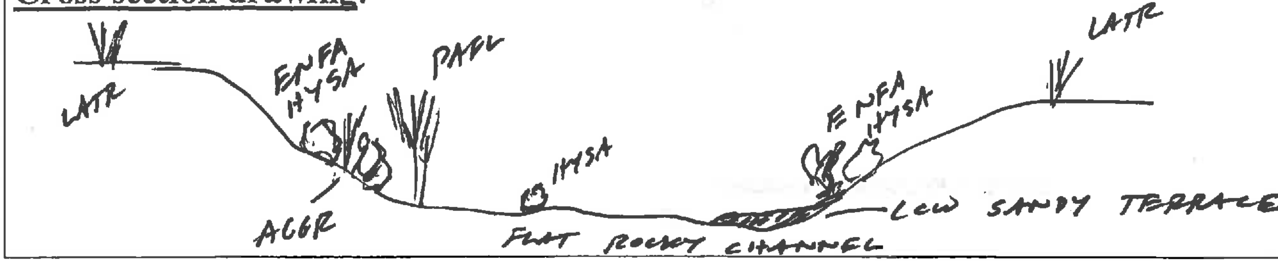


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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 [x] 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)
- [x] Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- [x] Drift and/or debris
- ☐ Presence of bed and bank
- [x] Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments: - SPARSE SHRUBS - EDGES OF THE CHANNEL ENCELIA FARINOSA, HYMENOCLEA SALSOLA - YOUNG ACACIA GREGGII

Floodplain unit: [x] 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
- [x] 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
Date: 2/13/2012 **Time:** 1:00 PM
Project Number:
Town: NEEDLES **State:** CA
Stream: BAT CAVE WASH T-4
Photo begin file#: 377 US **Photo end file#:** 378 DS
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-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

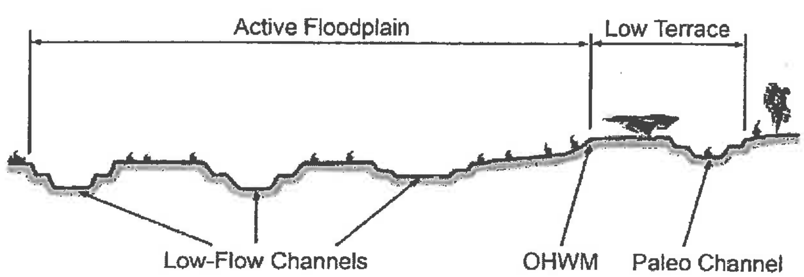
Brief site description: BROAD WASH WITH MULTIPLE LOW FLOW CHANNELS INTERMIXED WITH IN CHANNEL BARS - SCATTERED VEGETATION THROUGHOUT THE ACTIVE FLOODPLAIN

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

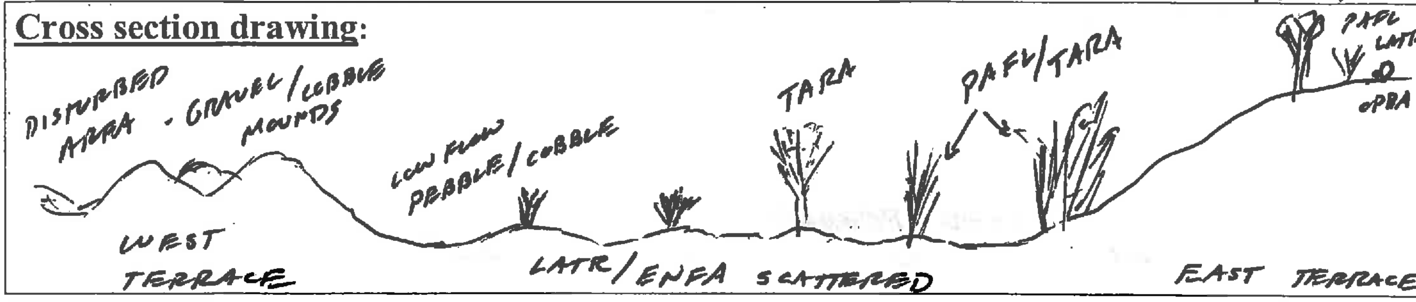


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
   - ☑ GPS 2005 DATA
   - ☐ Digitized on computer
   - ☐ 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
- ☒ Break in bank slope
- ☒ 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 ☒ 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)
- ☒ 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: 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	**Date:** 2/14/2012	**Time:** 9:00 AM
Project Number:	**Town:** NEEDLES	**State:** CA
Stream:	**Photo begin file#:**	**Photo end file#:**
Investigator(s): R. HUDDLESTON, K STEINER	359, 360 US	361 DS

Y ☒ / N ☐ Do normal circumstances exist on the site?	**Location Details:** T-5
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD 83 **Datum:** WGS 84 **Coordinates:** 34.722014 -114.501232

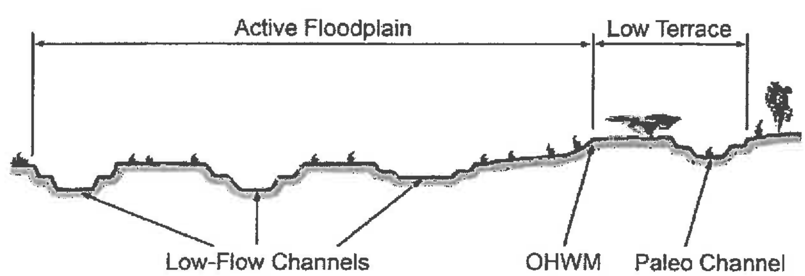
Potential anthropogenic influences on the channel system: - BNSF RR TRACKS UPSTREAM ROADWAY AND 6 48"-DIAMETER CULVERTS DOWNSTREAM

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, W. 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

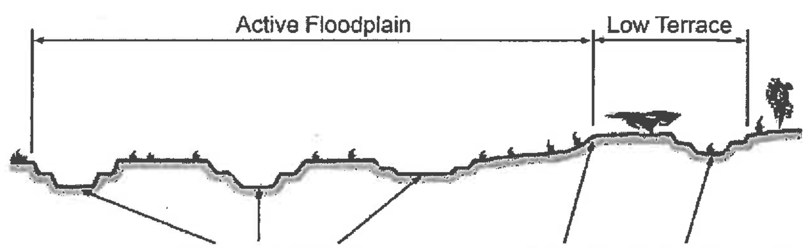
Brief site description: - SOMEWHAT OF A CONFINED FLOODPLAIN - STEEP ADJACENT HILL SLOPES - MULTIPLE LOW FLOW CHANNELS SCATTERED MATURE UPLAND SHRUBS PRESENT

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

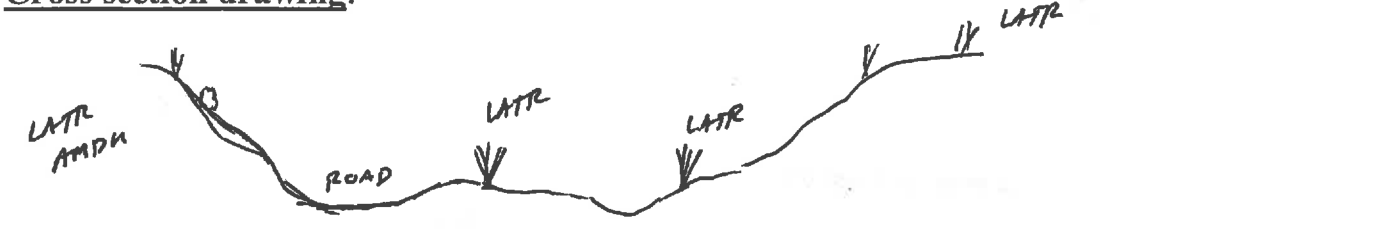


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: 7-7

Projection: NAD83 **Datum:** WGS 84
Coordinates: 34.724877 -114.497954

Potential anthropogenic influences on the channel system: EARTHEN DAM UPSTREAM OF THIS TRANSECT

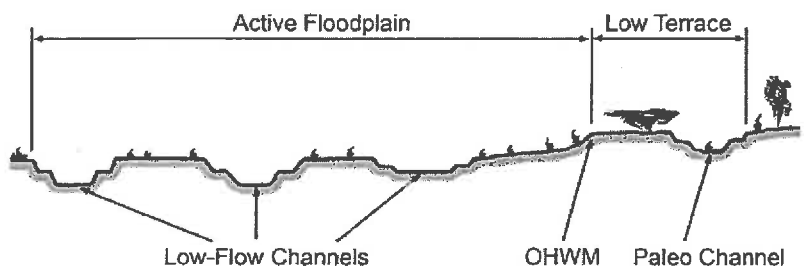
Brief site description: - BROAD CHANNEL IN CONFINED BED - STEEP SLOPES ADJACENT TO THE ACTIVE FLOOD PLAIN - MULTIPLE LOW FLOW CHANNELS AMONG VEGETATION

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 [x] 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: [X] 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:

- [X] NA
- [ ] 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: SCOURING
- [X] 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

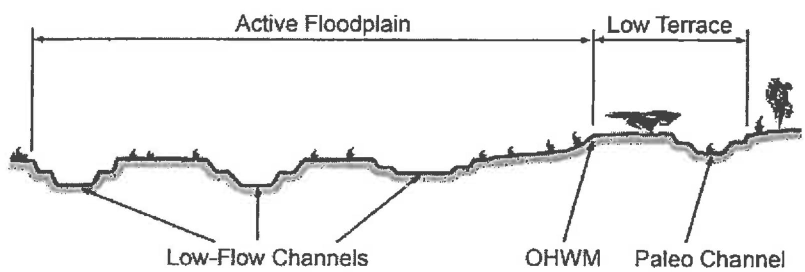
Brief site description: BROAD ACTIVE FLOOD PLAIN WITH SCATTERED VEGETATION THROUGHOUT - SANDY - GRAVEL - COBBLE SUBSTRATE MULTIPLE LOW FLOW CHANNELS

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

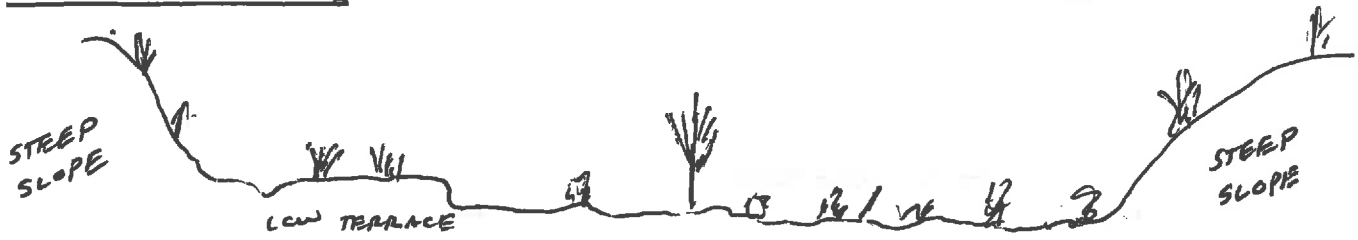


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
   - ☐ Digitized on computer
   - ☒ GPS -2005
   - ☐ Other:

Project ID: TOPOCK **Cross section ID:** T-8 **Date:** 2/14/2012 **Time:** 11:50AM

Cross section drawing:



OHWM

HIGHER VEGETATION DENSITY AND DIVERSITY ON ACTIVE FLOOD PLAIN RELATIVE TO LOW TERRACE AND HILL SLOPES

GPS point: ______________________

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 ☒ 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

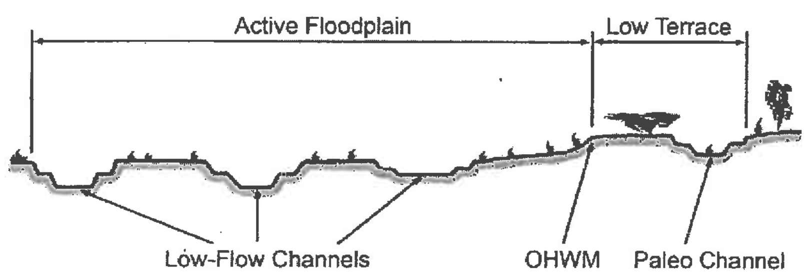
Brief site description: BROAD SANDY-COBBLE-GRAVEL CHANNEL WITH SCATTERED TREES AND SHRUBS, MULTIPLE LOW FLOW CHANNELS GENERALLY BOUNDED BY STEEP SLOPES

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



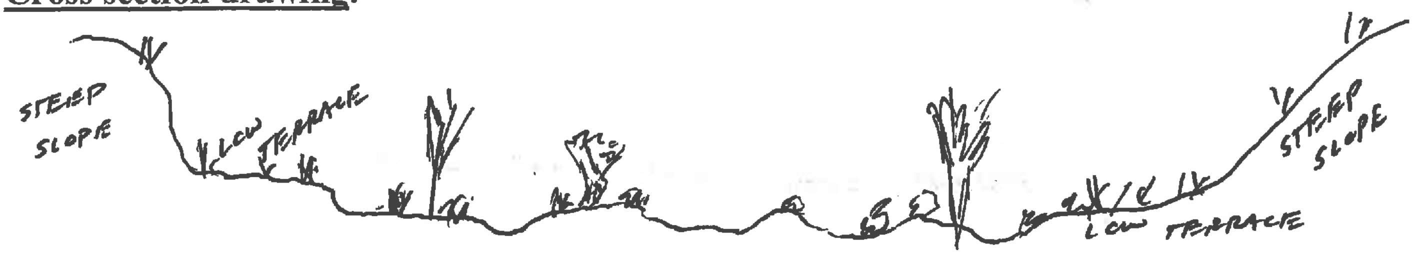
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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 [x] 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: ☒ 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
- ☒ 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: 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 ☒ 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: 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

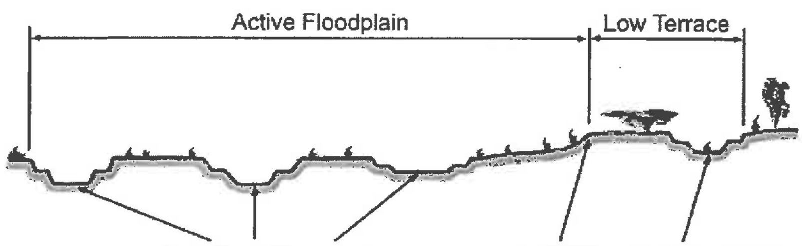
Brief site description: BROAD CHANNEL WITHIN DEFINED BANKS - MULTIPLE LOW FLOW CHANNELS, SCATTERED VEGETATION IS PRESENT THROUGHOUT THE ACTIVE FLOODPLAIN

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

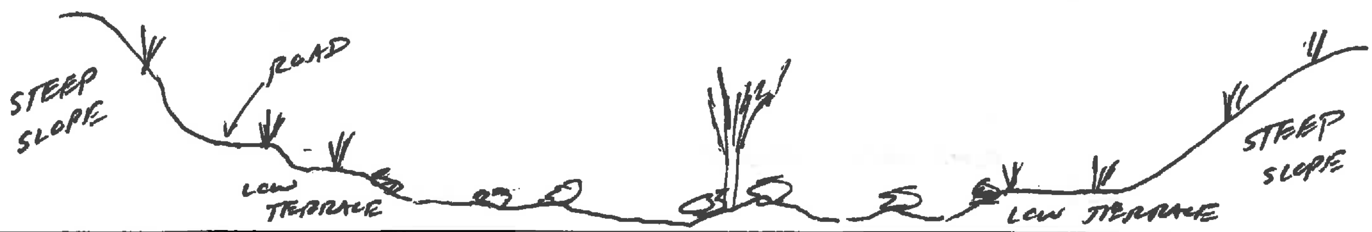


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ 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 ☒ 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)
- ☒ 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: BROAD FLOODPLAIN W/ SCATTERED PARKINSONIA FLORIDA, ACACIA GREGGII, HYMENOCLEA SALSOLA, BEBBIA JUNCEA STREPHANOMERIA PAUCIFLORA, SARCOSTEMMA HIRTELLUM

HERBS: MOSTLY CHAMAESYCE SP.

Project ID: TOPOCK **Cross section ID:** T-16 **Date:** 2/14/2012 **Time:** 2:15 PM

Floodplain unit: [x] 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:

- [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
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [x] 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 [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: 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
Date: 2/14/2012
Time: 2:35 PM
Project Number:
Town: NEEDLES
State: CA
Stream:
Photo begin file#: 434
Photo end file#: 443
Investigator(s): R. HUDDLESTON, K. STEINER

Y [x] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [x] Is the site significantly disturbed?

Location Details: T-11

Projection: NAD 83
Datum: WGS 84
Coordinates: 34.723188 -114.503157

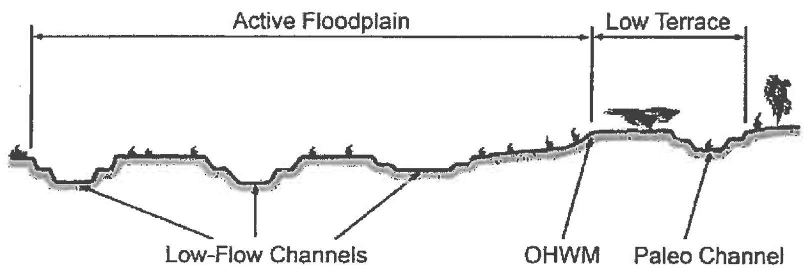
Potential anthropogenic influences on the channel system:
4 - 48" - DIAMETER CULVERTS UPSTREAM
EARTHEN DAM AT DOWNSTREAM END OF THE WASH

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):

- [x] Aerial photography
  Dates:
- [x] Topographic maps
- [x] Geologic maps
- [x] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [x] 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



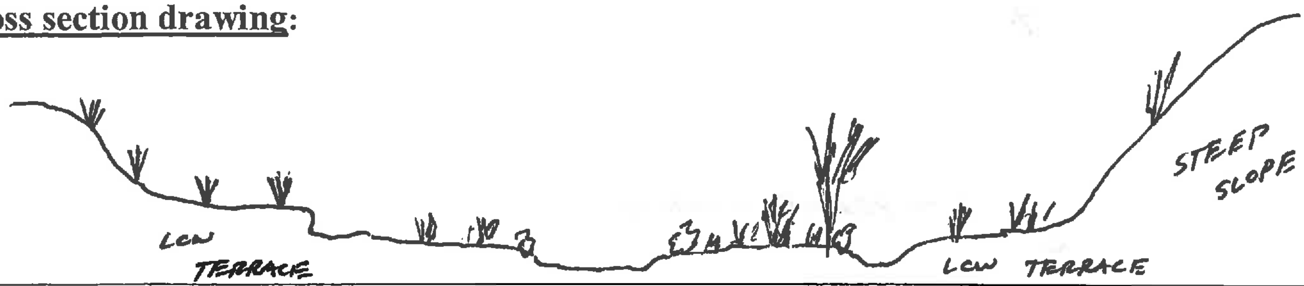
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
- [x] 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?	**Location Details:** T-12
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD83 **Datum:** WGS 84 **Coordinates:** 34.715490 -114.495808

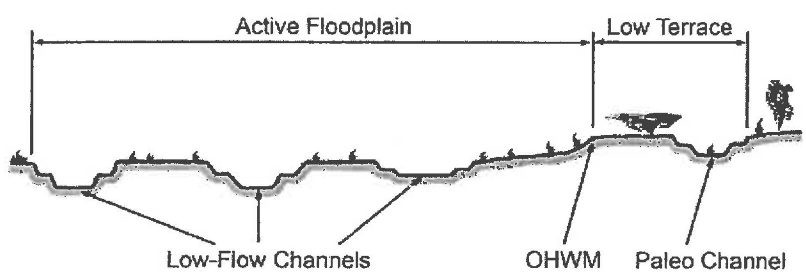
Potential anthropogenic influences on the channel system: 4 - 10' DIAMETER CULVERTS DOWNSTREAM UNDER HWY 40, LARGE BOX CULVERT UNDER BNSF RR TRACKS

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

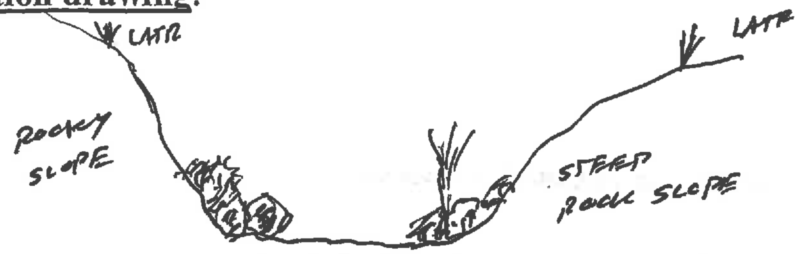


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
   - ☑ GPS 2005
   - ☐ Digitized on computer
   - ☐ 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

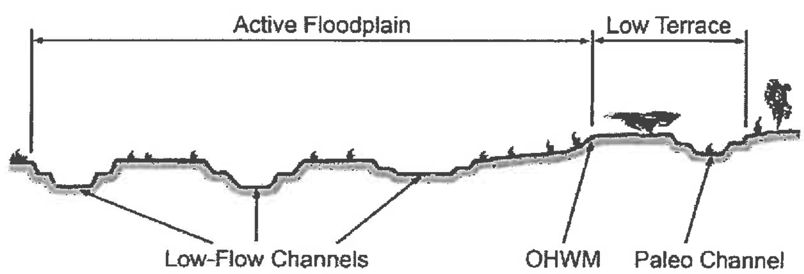
Brief site description: GRAVEL - COBBLE CHANNEL - SPARSE VEGETATION PRESENT - MOST OCCURS ON LOW RIDGE WITHIN ACTIVE FLOODPLAIN STEEP CUT BANKS ALONG THE SIDES OF THE CHANNEL

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

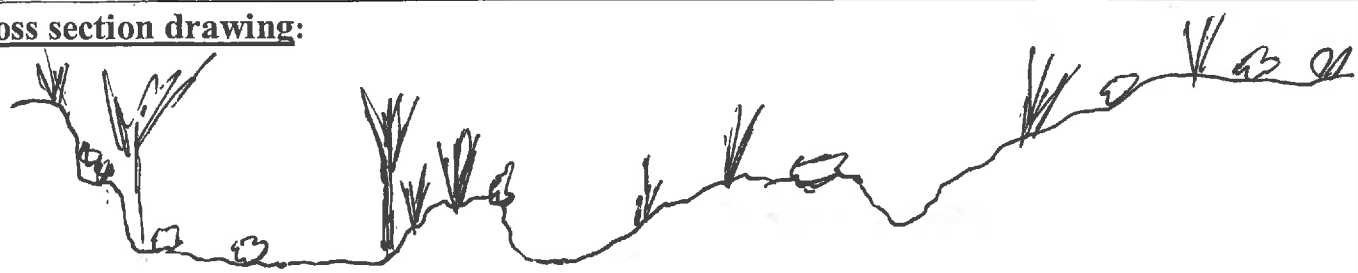


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ 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 ☒ 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
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ 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?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-14

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

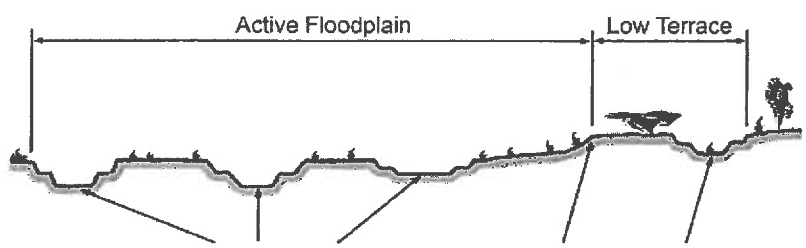
Brief site description: DEFINED PEBBLE - COBBLE SUBSTRATE /CHANNEL SCATTERED TREES AND SHRUBS PRESENT WITHIN THE ACTIVE FLOODPLAIN

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

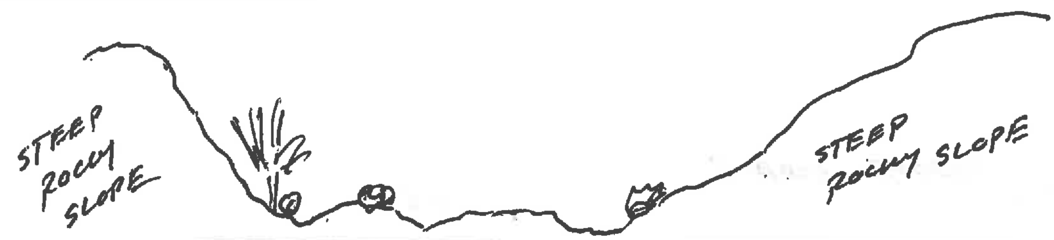


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
   - ☑ GPS -2005
   - ☐ Digitized on computer
   - ☐ 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

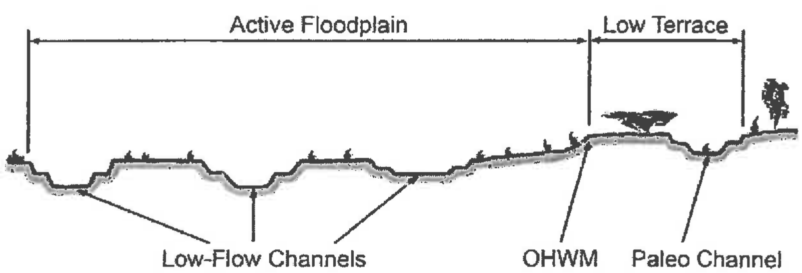
Potential anthropogenic influences on the channel system: - impoundment of two natural drainages - upstream hydrology altered by railroad and highway construction. Down stream culverts under roadway

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

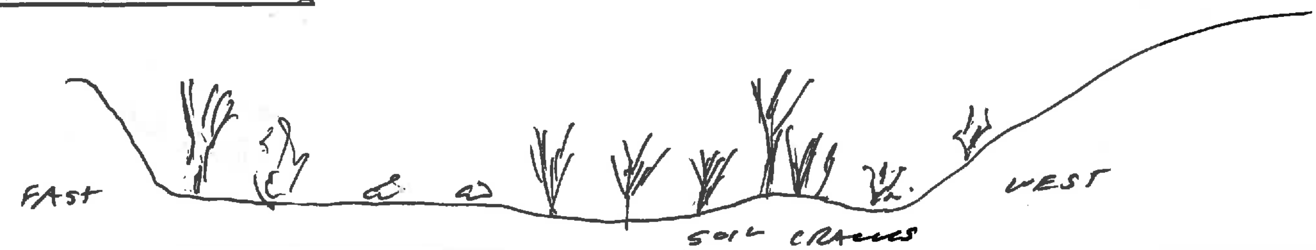


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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: TOPO CK **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 [x] 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?	**Location Details:** T-16
Y ☐ / N ☒ Is the site significantly disturbed?	**Projection:** NAD83 **Datum:** WGS 84 **Coordinates:** 34.723832 -114.574149

Potential anthropogenic influences on the channel system:

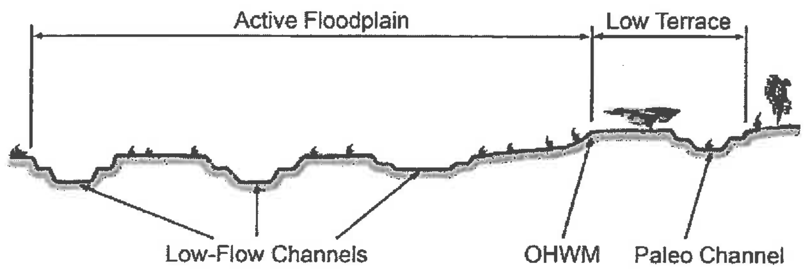
FLOWS INTO LARGE IMPOUNDMENT SOUTH OF PARK MOABI

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:

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-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
Date: 4/15/2012
Time: 3:03pm
Project Number:
Town: NEEDLES
State: CA
Stream:
Photo begin file#:
Photo end file#: 399-400
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-17

Projection: NAD 83
Datum: WGS 84
Coordinates: 34.724106 -114.513444

Potential anthropogenic influences on the channel system: -FLOWS INTO LARGE RETENTION BASIN SOUTH OF PARK MOABI
- RR TRACKS / HIGHWAY TO SOUTH

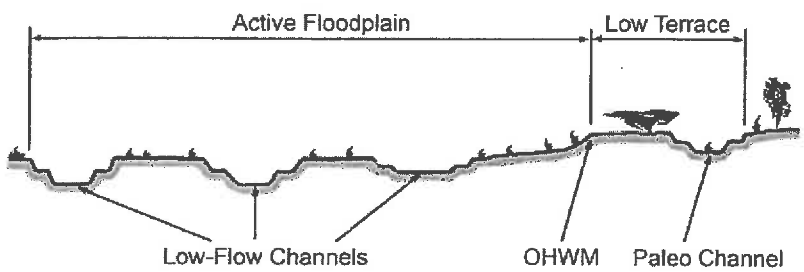
Brief site description: BROAD CHANNEL WITHIN STEEP SLOPES
NO LOW TERRACE PRESENT

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

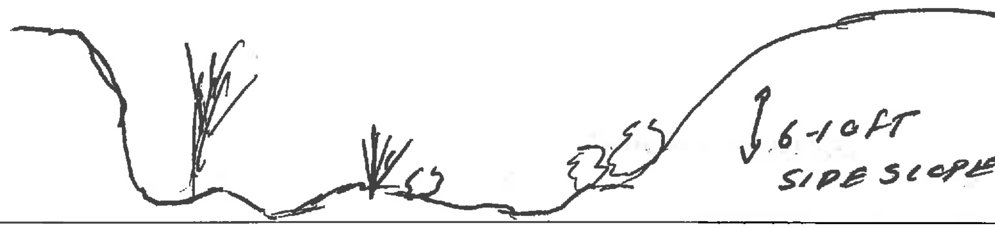


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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: [x] 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:

- [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: ABSENCE OF VEGETATION
- [x] Other: SCOURING / FLOW LINES
- [x] 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 **Coordinates:** 34.726451 -114.512272	**Datum:** WGS 84

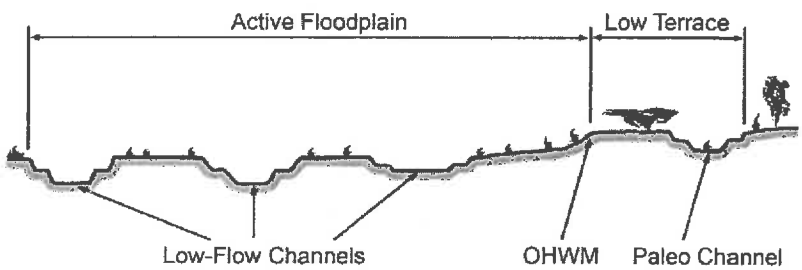
Potential anthropogenic influences on the channel system: - ROUTINELY MAINTAINED STORM WATER CHANNEL / BASIN IN PARK MOABI APPEARS VEGETATION HAS RECENTLY BEEN CLEARED

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

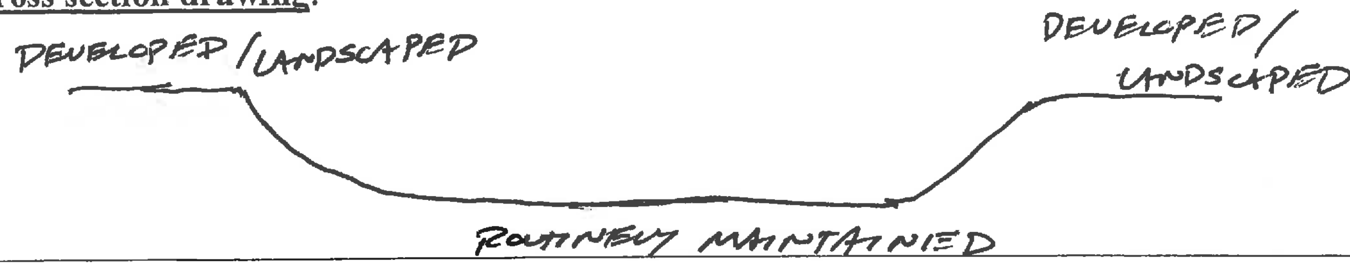


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
   - ☐ Digitized on computer
   - ☑ GPS 2005
   - ☐ 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 NEARBY - CLEARED OF VEGETATION

Floodplain unit: ☐ Low-Flow Channel ☒ 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:

- ☒ 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:

Project ID: Topam **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

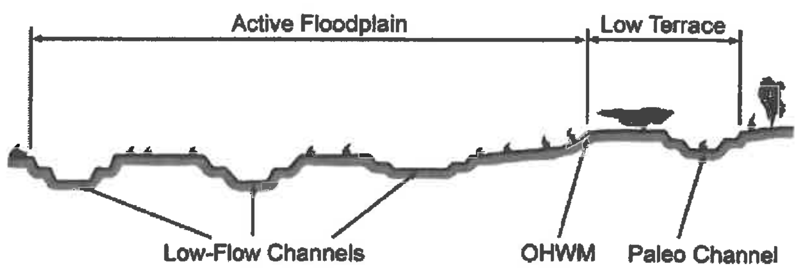
Brief site description: MAJOR TRIBUTARY CHANNEL TO THE SACRAMENTO WASH - LOW, BROAD CHANNEL THROUGH DENSE TAMARIX THICKET CHANNEL IS DEVOID OF VEGETATION -SANDY -COBBLE -GRAVEL

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

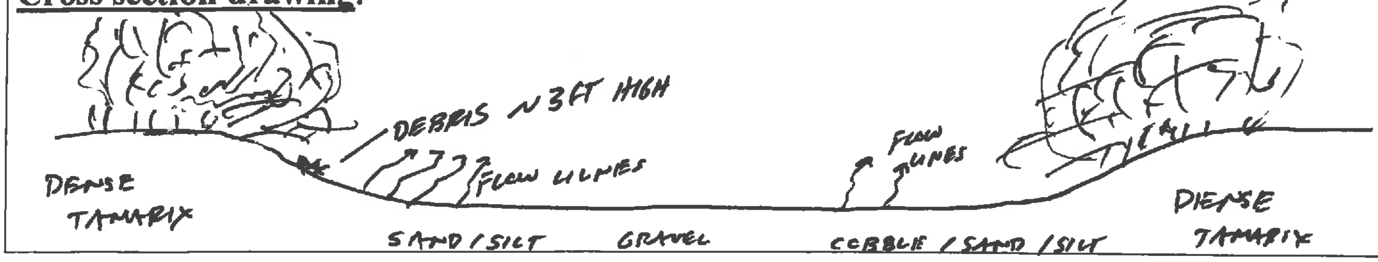


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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 [x] 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)
- [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: 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 [x] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [x] Is the site significantly disturbed?

Location Details: T-20

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

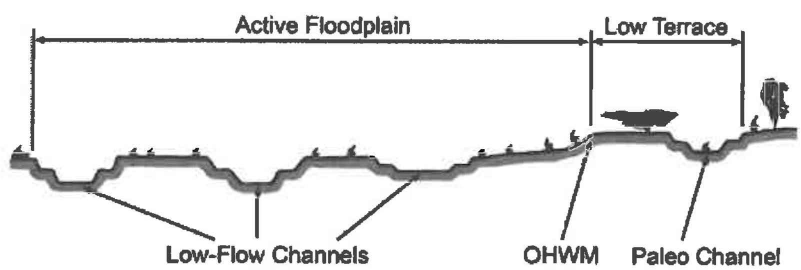
Brief site description: BROAD OPEN CHANNEL - DEVOID OF VEGETATION W/EXCEPTION OF SCATTERED TAMARIX ALONG LEVEES SANDY SUBSTRATE W/ SOME GRAVEL AND COBBLE

Checklist of resources (if available):

- [x] Aerial photography
  Dates:
- [x] Topographic maps
- [ ] Geologic maps
- [x] Vegetation maps
- [x] 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

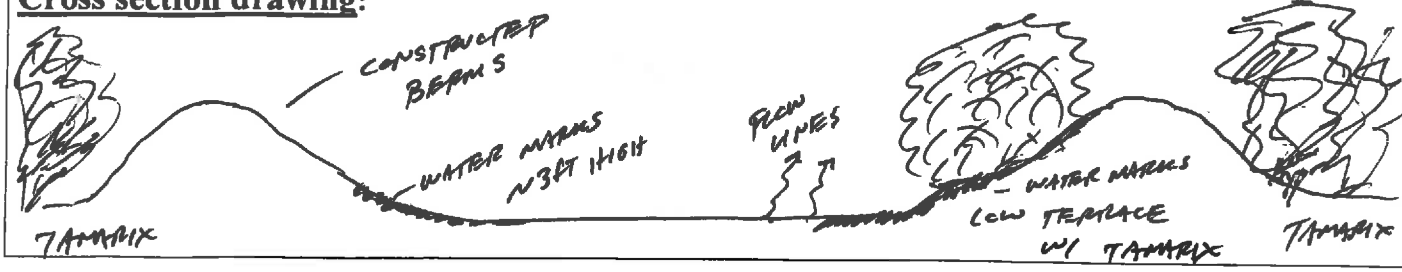


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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-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
- ☒ Change in vegetation cover
- ☐ Break in bank slope
- ☒ Other: WATER MARKS (MOIST SOIL)
- ☒ 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: ☒ 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:

- ☒ 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: FLOW LINES
- ☒ 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
- ☐ 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 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
- ☐ 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: WATER MARKS-MOIST SOIL
- ☐ Other: ____________
- ☐ 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

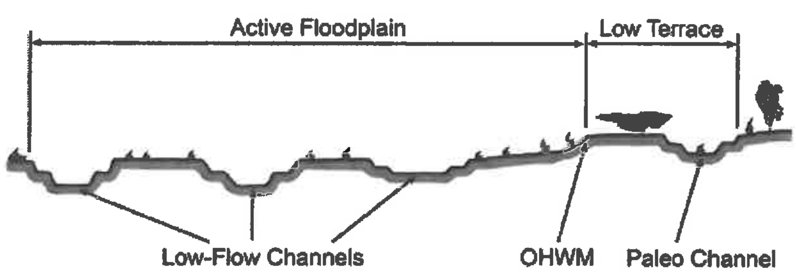
Potential anthropogenic influences on the channel system: - CONSTRUCTED LEVEES ALONG THE SIDES OF THE WASH

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

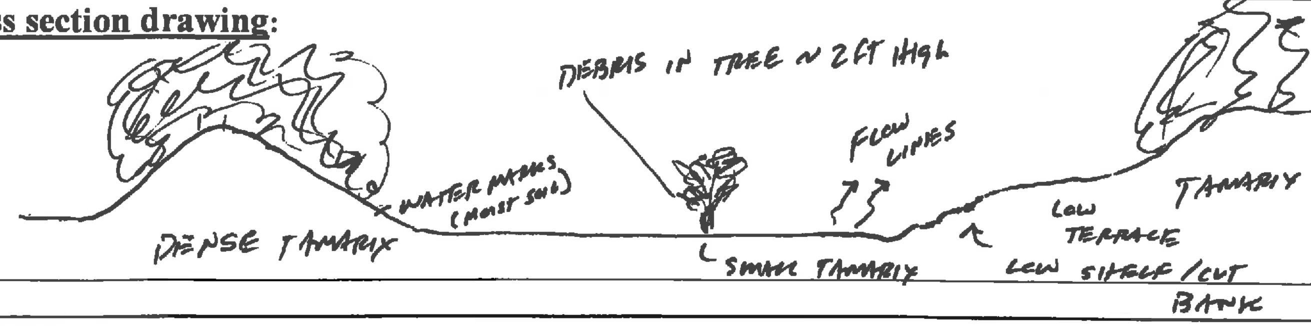


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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: ☒ 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
- [ ] 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 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 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: 963E 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?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: T-22

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

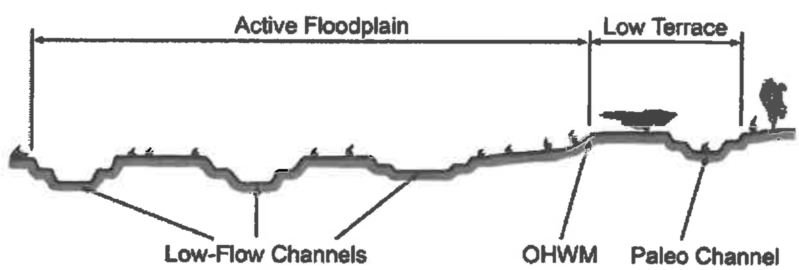
Brief site description: BROAD SANDY CHANNEL W/ SPARSE VEGETATION LARGE SAND LEVEES ALONG THE SIDE OF THE WASH IN THIS AREA

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: 0-5% 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: Topock **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 sedment 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 sedment 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?	**Location Details:** T-23
Y [ ] / N [x] Is the site significantly disturbed?	**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

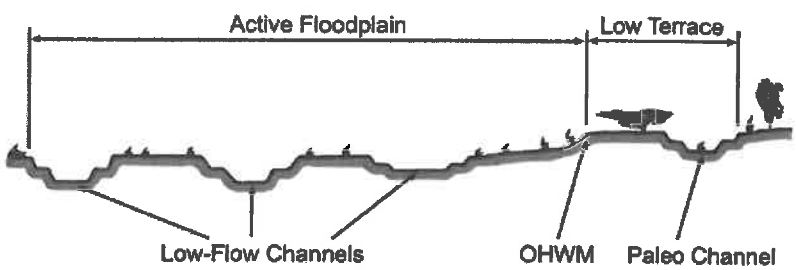
Brief site description: BROAD LOW CHANNEL DEVOID OF VEGETATION - LACKS DEFINED BANKS - MORE OF LOW FLOWING SWALE.

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

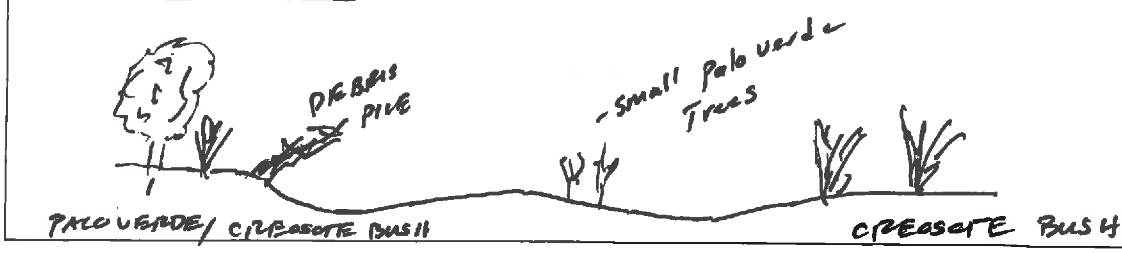


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

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
- [x] Change in vegetation cover
- [ ] Break in bank slope
- [x] 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:

- [x] 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
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] 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 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: ____________

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

ARID WEST EPHEMERAL AND INTERMITTENT STREAM SAMPLE POINT DATA SHEET

Project: PG&E Topock Compressor Station	Date: 2/13/2012 Time: 10:15AM
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: WGS 84
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

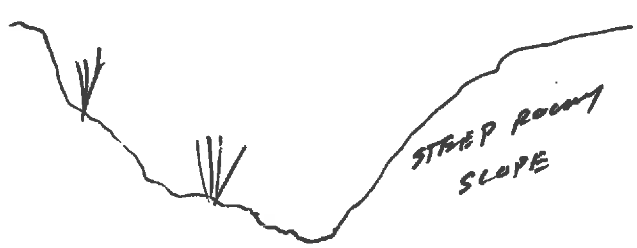
Geomorphic Feature: DRAINAGE | Width: 7.8 FT

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

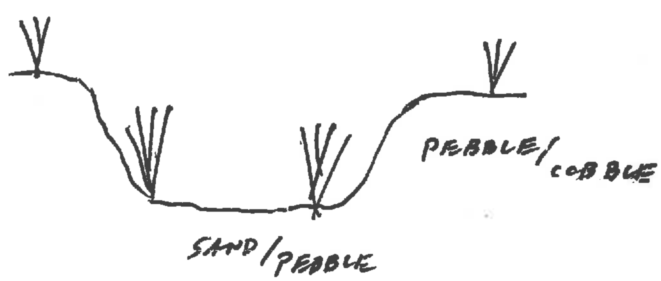
Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 11:02 AM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-3	Photos: 362, 363
Y [ ] N [X] Significantly Disturbed	GPS: 34.716823	Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.493729	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 ☒ N ☐ Normal Circumstances		Sample Point: TB-4	Photos: 372
Y ☐ N ☒ Significantly Disturbed		GPS: 34.720019	Datum: WGS 84
Geomorphic Feature:	DRAINAGE	-114.495183	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 | Datum: WGS 84

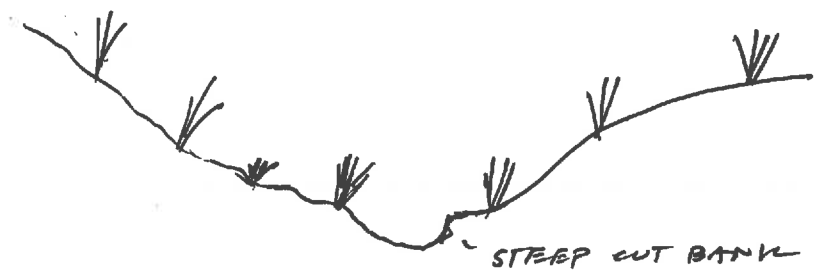
Geomorphic Feature: DRAINAGE | -114.496215 | Width: 3.3 FT

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

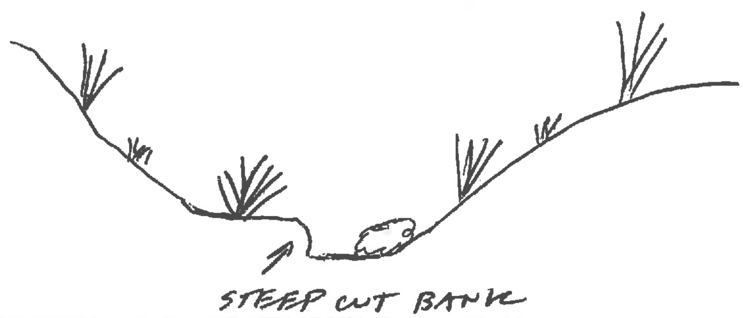
Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 2:00PM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-7	Photos: 385
Y [ ] N [X] Significantly Disturbed	GPS: 34.721099	Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.495173	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

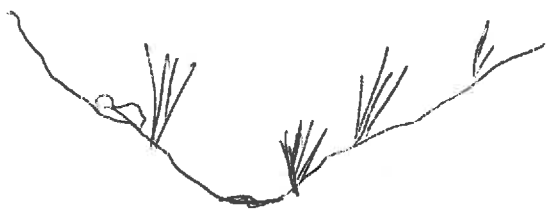
Project: PG&E Topock Compressor Station	Date: 2/13/2012	Time: 2:28 PM
Investigators: R. Huddleston, K Steiner	City: Needles	State: CA
Y [X] N [ ] Normal Circumstances	Sample Point: TB-8	Photos: 388-389
Y [ ] N [X] Significantly Disturbed	GPS: 34.720611	Datum: WGS84
Geomorphic Feature: DRAINAGE	-114.498822	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 [X] N [ ] Normal Circumstances — Sample Point: TB-9 — Photos: 390-391

Y [ ] N [X] Significantly Disturbed — GPS: 34.721169 — Datum: WGS 84

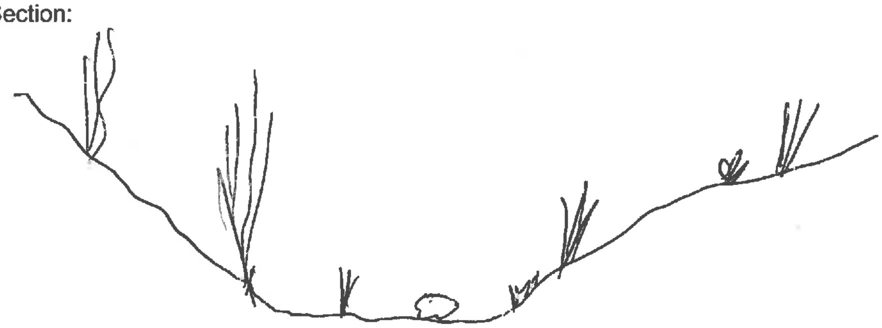
Geomorphic Feature: DRAINAGE — -114.498257 — Width: 16 FT

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 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.497948 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

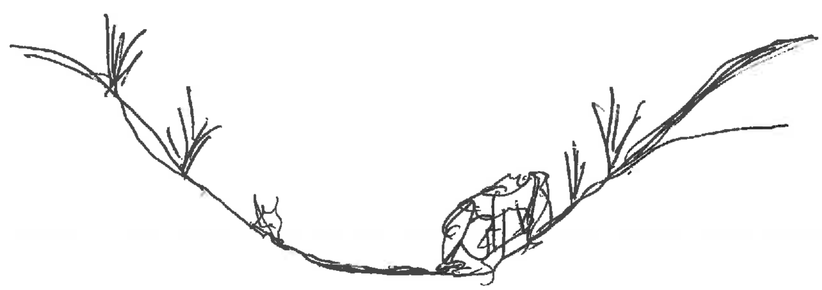
Project: PG&E Topock Compressor Station		Date: 2/13/2012	Time: 2:55PM
Investigators: R. Huddleston, K Steiner		City: Needles	State: CA
Y [X] N [ ] Normal Circumstances		Sample Point: TB-11	Photos: 394-395
Y [ ] N [X] Significantly Disturbed		GPS: 34.723050	Datum: WGS 84
Geomorphic Feature: DRAINAGE		-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

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

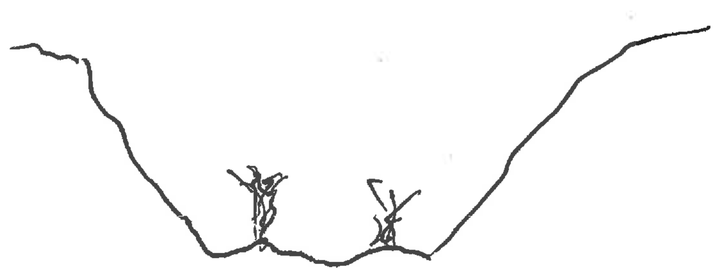
-SPARSE ; CHAMAESYCE, PALAFOXIA ARIDA

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 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.497479 Width: 23 FT
Flow Regime: EPHEMERAL	
Substrate: FINE GRAVEL / COBBLE	
Indicators: ABSENCE OF VEGETATION / SCOURING	

Cross-Section:



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 [ ] 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 ~~CHAE~~ 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 ☒ N ☐ Normal Circumstances | Sample Point: TB-15 | Photos: 414-415

Y ☐ N ☒ Significantly Disturbed | GPS: 34.719425 | Datum: WGS 84

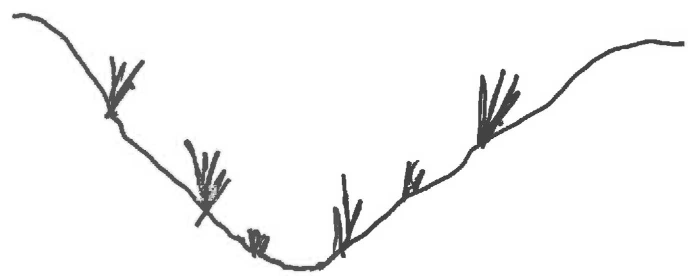
Geomorphic Feature: DRAINAGE | -114.499032 | Width: 8FT

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, POROPHYLLUM 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 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.498031 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:

Project: PG&E Topock Compressor Station | Date: 2/14/2012 | Time: 8:29 am

Investigators: R. Huddleston, K Steiner | City: Needles | State: CA

Y [x] N [ ] Normal Circumstances | Sample Point: TB-19 | Photos: 351-352

Y [ ] N [x] Significantly Disturbed | GPS: 34.723622 | Datum: WGS 84

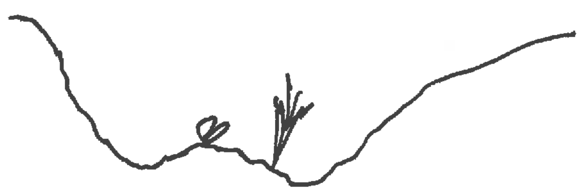
Geomorphic Feature: DRAINAGE | -114.497889 | Width: 26 FT

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, KRAMATIA 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 ☒ N ☐ Normal Circumstances		Sample Point: TB-20	Photos: 353-354
Y ☐ N ☒ 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 TRIDENTA, AMBROSIA DUMOSA, KRAMERIA GRAYI

Notes:

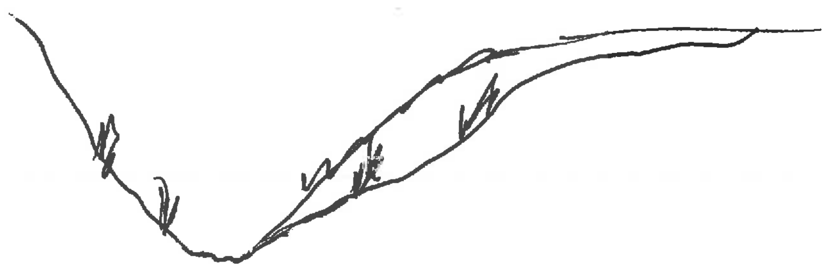
Project: PG&E Topock Compressor Station	Date: 2/14/2012 Time: 8:42AM
Investigators: R. Huddleston, K Steiner	City: Needles State: CA
Y ☒ N ☐ Normal Circumstances	Sample Point: TB-21 Photos: 355-356
Y ☐ N ☒ Significantly Disturbed	GPS: 34.722749 Datum: WGS 84
Geomorphic Feature: DRAINAGE	-114.499586 Width: 4FT

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 ☒ N ☐ Normal Circumstances		Sample Point: TB-22	Photos: 357, 358
Y ☐ N ☒ Significantly Disturbed		GPS: 34.722242 -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: ~~2.5 FT~~ 30 FT

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 -114.498143 | Datum: WGS 84

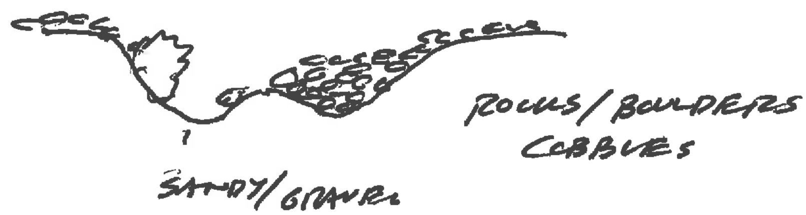
Geomorphic Feature: EROSIONAL FEATURE | Width: ~3 FT

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

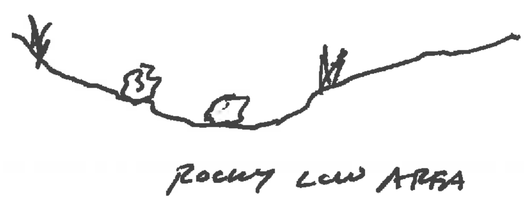
Geomorphic Feature: EROSIONAL DRAINAGE Width: 5FT

Flow Regime: EPHEMERAL

Substrate: ROCK - COBBLE

Indicators:
NO CLEAR EVIDENCE OF OHWM - TOPO LOW

Cross-Section:



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

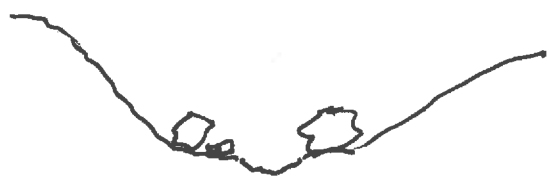
Investigators: R. Huddleston, K Steiner — City: Needles — State: CA

Y [X] N [ ] Normal Circumstances — Sample Point: TB-27 — Photos: 449

Y [ ] N [X] 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 ☒ N ☐ Normal Circumstances | Sample Point: TB-29 | Photos: 454 - 456

Y ☐ N ☒ Significantly Disturbed | GPS: 34.714866 -114.496452 | Datum: WGS 84

Geometric Feature: DRAINAGE / SWALE | Width: 8.5FT

Flow Regime: EPHEMERAL

Substrate: COARSE SAND, GRAVEL, COBBLE

Indicators: SCOURING, SOME CUT BANKS

Cross-Section:

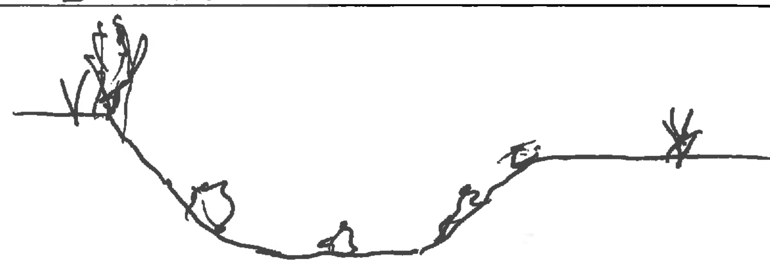
Vegetation in Channel: LARREA TRIDENTATA, STEPHANOMERIA PAUCIFLORA, BOUTELOUA ARISTIDOIDES

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 ☒ N ☐ Normal Circumstances	Sample Point: TB-30 Photos: 369-370
Y ☐ N ☒ Significantly Disturbed	GPS: 34.724560 Datum: WGS 84
Geomorphic Feature: STREAM	-114.517322 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 ☒ N ☐ Normal Circumstances		Sample Point: TB-31	Photos: ~~358-359~~, 360
Y ☐ N ☒ 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

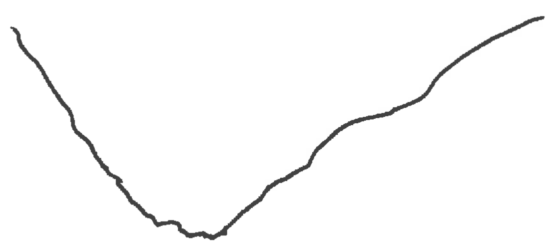
Geomorphic Feature: DRAINAGE — Width: 10 FT

Flow Regime: EPHEMERAL

Substrate: BEDROCK - COBBLE

Indicators: CULVERT, DEFINED BED-BANK CHANNEL

Cross-Section:



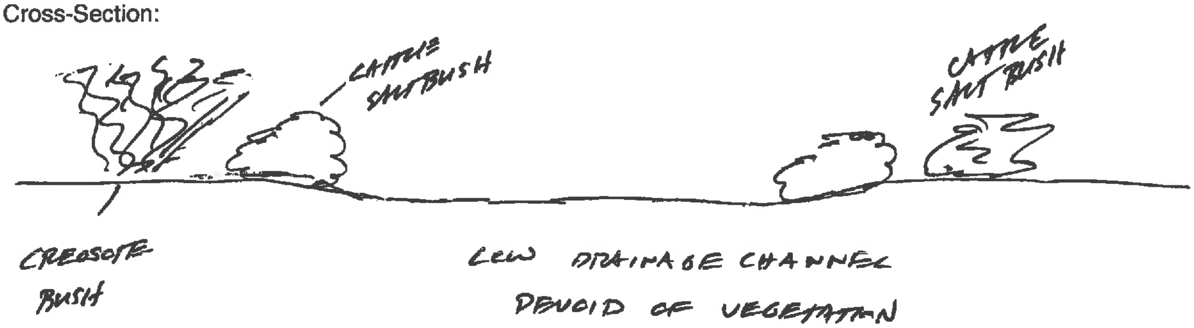
Vegetation in Channel: PERITYLE EMORYI, GERAEA CANSESCENS

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

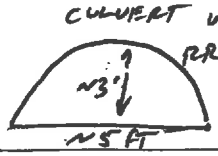
Low Terrace and Adjacent Vegetation:

- 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 VEGETATION BECOMES TAMARIX