*Final*

# Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions

Prepared for

**Pacific Gas and Electric Company**

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# Acronyms and Abbreviations

| | |
|---|---|
| APE | Area of Potential Effects |
| ATV | all-terrain vehicle |
| BLM | United States Bureau of Land Management |
| BNSF | Burlington Northern-Santa Fe Railroad |
| USBR | United States Bureau of Reclamation |
| CDFG | California Department of Fish and Game |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CMP | compliance monitoring program |
| COPC | chemicals of potential concern |
| DOI | United States Department of Interior |
| DTSC | Department of Toxic Substances Control |
| ESA | Endangered Species Act |
| GMP | groundwater monitoring program |
| GPS | global positioning system |
| HNWR | Havasu National Wildlife Refuge |
| IM | Interim Measure |
| IMPM | Interim Measures Performance Monitoring |
| msl | mean sea level |
| PBA | programmatic biological assessment |
| PG&E | Pacific Gas and Electric Company |
| PMP | performance monitoring program |
| RCRA | Resource Conservation and Recovery Act |
| RFI | RCRA facility investigation |
| RI | CERCLA Remedial Investigation |
| SWCA | Steven W. Carothers and Associates |

| | |
|---|---|
| SWFL | southwestern willow flycatcher |
| USFWS | United States Fish and Wildlife Service |

# 1.0 Introduction

Pacific Gas and Electric Company (PG&E) is conducting a Remedial Investigation (RI) and a RCRA Facility Investigation (RFI) to investigate the release of hazardous substances and hazardous wastes at or from the Topock Compressor Station. The RI is being performed under the oversight of the United States Department of Interior (DOI), the United States Bureau of Land Management (BLM), the United States Fish and Wildlife Service (USFWS), and the United States Bureau of Reclamation (USBR) (collectively "the Federal agencies") in accordance with a Consent Agreement entered between the Federal agencies and PG&E pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The RFI is being performed under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in accordance with corrective action orders entered pursuant to State law. This programmatic biological assessment (PBA) has been prepared to determine any potential effect on species protected under the federal Endangered Species Act (ESA) resulting from past, present, or planned remedial and investigative activities. The Topock Compressor Station site is located in eastern San Bernardino County, California, about 15 miles southeast of Needles (Figure 1).

Activities relate to investigation and remediation of soil, sediments, surface water, and groundwater resulting from historic operations at the Topock Compressor Station. As described further in Section 2.0, historic operations primarily involved the use of chromium in the compressor station cooling water. Subsequent discharge of the cooling water resulted in chromium entering the groundwater aquifer. The activities addressed in this PBA include all RI and RFI activities taken prior to the selection and implementation of a final remedial action and corrective action to address chromium in groundwater, as well as other chemicals of potential concern (COPC) in all environmental media related to historical operations. PG&E is requesting ESA coverage for these activities through the end of 2012. Selection and implementation of a final remedial action/corrective action will be the subject of additional analysis and ESA consultation at a future date.

The action area, also generally referred to here as the Area of Potential Effects (APE), includes lands under the jurisdiction of the Federal agencies and private lands potentially affected by released hazardous substances requiring RI/RFI actions (Figure 2). The "action area" is "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). Because of the federal nexus, activities undertaken pursuant to the investigative remedial program that require discretionary federal review and approval are evaluated for potential project effects to species listed under the ESA.

This PBA serves as supportive documentation by the Bureau of Land Management Lake Havasu Field Office as the lead federal agency, under the provisions of Title 50 Code of Federal Regulations Part 402, the ESA of 1973, as amended, for the evaluation of Project effects to listed species and resulting determinations.

## 1.1 Consultation to Date

Consultation to date has occurred on a project specific basis. In January 2000, PG&E was issued a no-jeopardy biological opinion for ongoing maintenance activities on the PG&E gas pipeline system in the California desert on lands managed by the BLM and the pipeline's effects on the desert tortoise and its critical habitat. That biological opinion specifically addressed maintenance of the gas pipeline and is not considered applicable to past, present, or planned remedial and investigative activities within the APE.

In September 2004, the BLM Lake Havasu Office initiated informal consultation with the USFWS Ventura Office on behalf of PG&E regarding potential impacts to the desert tortoise and southwestern willow flycatcher (SWFL) related to a time-critical removal action/interim measure within the APE. The anticipated biological impacts were addressed in the *Final Biological Resources Investigations for Interim Measures No. 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System San Bernardino County, California* (CH2M HILL, 2004b). Based on the proposed activities, which included a proposed groundwater treatment system, a "no effect" determination was considered appropriate for that project. To date, Interim Measure (IM) No. 3 has been working under this determination with no effect on listed species.

In addition, a biological assessment and Section 7 ESA informal consultation was completed in December 2005 related to construction of the PE-1 groundwater pipeline and implementation of the floodplain *in-situ* pilot study, both located on the floodplain of the Colorado River. The applicable *Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions* (CH2M HILL, 2005j) was completed in November 2005. The subsequent consultation resulted in a determination of "may affect, not likely to adversely affect" the SWFL, and a "no effect" finding for all other listed species potentially occurring in the APE.

In 2006, informal consultation was conducted for the *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Revision 3, Topock Compressor Station (Technical Memorandum, April 20, 2006)* (CH2M HILL, 2006b). A determination of "may affect, but not likely to adversely affect" was concurred upon by the USFWS. These access and sampling procedures are currently being implemented and will be carried forward in subsequent years. They are included within the scope of this PBA, which covers activities through the end of 2012.

As part of the interim measures on federal lands, Action Memoranda were issued by the Federal Agencies pursuant to Section 104 of the CERCLA. These Action Memoranda include general mitigation measures (outlined in Section 3.4) to manage biological resources. In addition, several measures were subsequently specified or clarified (e.g., migratory bird dates, SWFL dates, access routes) to address the management of ESA-listed species and their habitats.

## 1.2 Content and Scope

At the direction of the DTSC and DOI, activities are ongoing in the APE and are expected to continue, and in some cases expand, prior to the selection of a final remedy. As such, the

BLM and PG&E believe that it is prudent to pursue programmatic ESA coverage for ongoing, as well as future, RI/RFI activities that are anticipated to occur in the APE prior to the selection and implementation of the final remedy.

The scope of this PBA will address past, present, and planned activities up to the selection and implementation of the final remedy. ESA coverage of the activities described in this PBA is requested through the end of 2012. It is anticipated that this PBA and associated Section 7 consultation will also lay a foundation for a separate Section 7 consultation that will occur prior to implementation of the final remedy.

The content of a biological assessment is at the discretion of the federal agency and depends on the nature of the action for which consultation is requested. The term "action" refers to discretionary activities or programs that are authorized, funded, or carried out, in whole or in part, by federal agencies. In coordination with PG&E, BLM is initiating consultation with USFWS to comply with agency responsibilities to consider the effects of activities to ESA-listed species within the APE. This request for consultation includes information in several basic areas encompassing the nature and scope of the action, the action area, species and habitat description, effects of the action, and relevant reports.

This consultation does not preclude future consultations or additional management restrictions by the BLM or USFWS beyond the measures presented in this document, nor authorize final ESA coverage on current or future response or corrective actions. The primary purpose of this PBA is to put into context the status and management of ESA species within or near the APE and to better evaluate the effects of current and future proposed activities on those species and habitats. It is anticipated that subsequent ESA evaluations/consultations will move more efficiently through the work plan review/approval process as project-specific proposals come forward.

Under the scope of this PBA, ESA consultation will be applied to species and habitat located within or near the APE. If future activities are proposed to occur outside the APE, consultation will be required to be reinitiated with the USFWS.

"Action area" refers to all lands directly or indirectly affected by the action and not merely the immediate area involved in the action. Past, present and planned response activities take place on BLM- and USFWS-managed lands. The action area also applies to related activities on nonfederal lands.

"Species" and "habitat description" refers to all potentially affected listed species, or species proposed to be listed, and the habitat to be considered. Several federally-listed species that are known to or may occur within or near the action area have been identified.

"Effects of the action" include direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area; the anticipated impacts of all proposed federal projects in the action area that have already undergone Section 7 consultation; and the impact of state or private actions that are contemporaneous with the consultation in process. The environmental baseline does not include future or

ongoing response or other investigative or interim activities in the APE. For purposes of this PBA, these activities are assessed for their potential effect on species listed under the ESA.

"Indirect effects" are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. For example, an action that results in subsequent changes to land use patterns would be considered an indirect effect.

"Cumulative effects" are those effects of future state or private activities that are reasonably certain to occur within the action area of the federal action subject to consultation.

"Direct effects" include the direct or immediate effect of the action on the species or it's habitat.

"Relevant reports" include any available information on the action, action area, affected listed species, or critical habitat. The Reference Section of this document includes a list of works cited—specific references to relevant reports are provided throughout this PBA. In addition, Appendix E of this PBA includes a series of biological reports and analyses prepared specifically for these activities.

# 2.0 Background

In December 1951, the Topock Compressor Station began operations to compress natural gas supplied from the southwestern United States 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 an active facility 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. Facility operations involve treatment of cooling water.

From 1951 to 1985 chromium-based products were added to cooling water to inhibit corrosion, minimize scale, and control biological growth. From 1951 to 1964 untreated wastewater ("blowdown") containing chromium was discharged to Bat Cave Wash. Beginning in 1964, PG&E began to treat the wastewater. At about this time, PG&E also constructed a percolation bed in the wash by creating soil berms that impounded the discharged wastewater and allowed it to percolate into the ground and/or evaporate. Beginning in May 1970, the majority of treated wastewater was discharged to an injection well located on PG&E property. In 1973, PG&E discontinued use of this injection well, and wastewater was discharged exclusively to a set of four, single-lined evaporation ponds, located about 1,600 feet west of the compressor station.

PG&E replaced the chromium-based cooling water treatment products with phosphate-based products in 1985, at which time PG&E discontinued operation of the wastewater treatment system. Use of the four, single-lined evaporation ponds continued from 1985 to 1989. In 1989, the single-lined ponds were replaced with four new, Class II (double-lined) ponds on BLM-managed lands. The wastewater treatment system and the single-lined ponds were physically removed and "clean-closed" between 1988 and 1993. The four Class II double-lined ponds are still in use and are operated under the jurisdiction of the Colorado River Basin Regional Water Quality Control Board.

In 1996, PG&E entered into a Corrective Action Consent Agreement with DTSC to govern the investigation and remediation of the Topock Compressor Station site under California state law. DTSC is the California state lead agency charged with directing 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 a Consent Agreement that outlined the process by which PG&E would comply with CERCLA requirements during the investigation and remediation of the action area. Activities under both agreements proceeded with active stakeholder input, facilitated through the Topock Consultative Workgroup. PG&E, and DTSC, have also made commitments to engage in consultation with interested tribes. The BLM will consult with potentially affected tribes in accordance with applicable laws, regulations and policies.

Additional activities that pre-date current interim measures include prior RFI wells installed to identify and monitor groundwater conditions at the compressor station. Between 1997

and 2004, such activities included the installation of monitoring wells at 32 locations within the APE. In addition, approximately 300 soil samples were collected and analyzed. Since 2004, interim investigative and remedial actions have continued and include the installation of additional monitoring wells throughout the site and construction and operation of a temporary water treatment system (IM No. 3). Where applicable, ESA consultation for these activities has occurred on a project-specific basis as identified in Section 1.1.

Under the purview of the DTSC and DOI, PG&E is in the process of finalizing the RI/RFI. This report will comprehensively characterize the nature and extent of hazardous substance contamination in the affected area and provide the basis for formulating alternative remedial actions/corrective measures to be considered for the final remedy. The Feasibility Study/Corrective Measure Study will follow the RI/RFI Report, culminating in a proposed final remedy to remediate chromium (and potentially other hazardous substances) to appropriate cleanup levels. As noted above, it is expected that additional consultation with USFWS will occur pursuant to Section 7 of the ESA prior to selection and implementation of the final remedy.

# 3.0 Description of Activities

## 3.1 Area of Potential Effects (APE)

The action area is generally defined by the approximately 1,528-acre APE (Figure 2) and includes lands in both California and Arizona. The APE was originally defined by the BLM and DTSC to facilitate a cultural resources assessment (Applied Earthworks, 2005). An identical boundary was subsequently used to define the area in which annual protocol surveys are conducted for listed species (CH2M HILL, 2005b). The approximately 1.6-mile reach of the Colorado River within the APE generally defines the boundary between California and Arizona.

The Topock Compressor Station occupies approximately 65 acres of PG&E-owned land within the APE. PG&E also owns a 100-acre parcel located about 0.25 mile north of the compressor station, which was purchased to facilitate interim remedial measures. The area surrounding these parcels within the APE includes land owned and/or managed by a number of government agencies including the BLM, USFWS, and USBR.

The APE lies within a larger cultural landscape of significance to federally recognized tribes. In addition, the Colorado River itself is of spiritual and cultural importance to local tribes in the region. The continued contemporary traditional and spiritual use of the area and the management of the land, animals, plants, and water are of great importance to the tribes.

Primary access to the California portion of the APE is provided by Park Moabi Road and National Trails Highway, a two-lane paved roadway extending for approximately 2 miles across the APE. Park Moabi Road connects with Interstate 40 in the western portion of the APE and extends to Moabi Regional Park in the northwest. At Moabi Regional Park, the roadway connects to National Trails Highway, which extends eastward and then southward along the Colorado River to the Topock Compressor Station. Various unnamed roadways traverse the APE, including abandoned segments of former Historic U.S. Route 66 and National Old Trails Road.

Access to the Havasu National Wildlife Refuge (HNWR) in Arizona is provided from Interstate 95. The levee road along the eastern shore of the Colorado River provides access to the northeast portion of the APE. The Topock Marina to the south is accessed from Interstate 40. Land use in the APE is primarily open space with several prominent exceptions. Interstate 40 and the Burlington Northern-Santa Fe (BNSF) railway run east-west, roughly bisecting the APE. The compressor station and associated evaporation ponds are located in the southern portion of the APE. Moabi Regional Park in the northwestern portion of the APE includes numerous mobile home sites, boat docks, and associated infrastructure. The Topock Marina is located on the Arizona side of the river, north of the railway. The Topock Marina and nearby lands encompass approximately 29 acres of private land north and south of Interstate 40 Arizona (see Figure 2). Various gas transmission pipelines traverse the APE. These are primarily subsurface pipelines, with occasional surface expressions (e.g., to bridge ravines or the river).

Developed facilities associated with interim measures and time critical removal actions include numerous groundwater wells and an interim groundwater treatment system (IM No. 3). Between Park Moabi Road and the Colorado River floodplain is an approximately 1-acre area, referred to as the MW-20 bench (see Figure 2), which has been the site of past and present interim measures/removal actions. These activities are described further in Section 3.2.

Land ownership and management in the APE is depicted on Figure 2. The BLM manages the federally owned land north of the BNSF railway and west of the Colorado River. This includes lands managed on behalf of the USBR. The USFWS manages the HNWR located in California immediately north, south, west, and east of the Topock Compressor Station. The HNWR is also located in the southern and eastern portions of the APE and includes most lands located on the Arizona-side of the Colorado River. Outside of the APE, the 37,515-acre HNWR extends for approximately 26 miles along the Colorado River, from Needles, California, to Lake Havasu City, Arizona.

Recreational activities within the HNWR include sightseeing, boating, bird watching, fishing, hunting, and camping. Prior damming and channelization of the Colorado River have significantly altered the aquatic, marsh, and riparian habitats associated with the river. These water control and diversion actions have also contributed to increased housing development along the river and facilitated an increase in the intensity of river-related recreation (including watercraft, fishing, and hunting) (BOR, 1996, 2000, 2002, 2004).

The Colorado River flows southeast between California and Arizona and provides the primary aquatic habitat within the APE. The river is approximately 700 to 900 feet wide and 8 to 15 feet deep through the APE. The adjacent river floodplain averages about 500 feet in width but narrows at the Topock Gorge, approximately 4 miles south of the APE. The topography of the floodplain in California is relatively flat with a gentle slope toward the river. The Arizona floodplain is more mound-like creating a low divide between the Colorado River and the wetlands of the Topock Marsh

The Colorado River has been stocked with various game fish that have been linked to predation of native listed fish species (BOR, 2004). The invasion of salt cedar along the Colorado River has significantly altered riparian habitat. This exotic tree dominates and displaces native plant communities. The BOR is responsible for managing the river and has consulted with USFWS on its actions (BOR, 1996, 2000, 2002, 2004). Several biological opinions have been issued to the BOR (USFWS, 1997a-b, 2002, 2005a). A Multi-Species Conservation Plan (MSCP) and Multi-Species Habitat Conservation Plan (MSHCP) recently have been developed for the Colorado River (BOR, 2004).

The terrestrial portions of the APE are characterized by arid conditions (precipitation averages less than 5 inches/year) and high temperatures (routinely exceeding 110 degrees Fahrenheit in the summer) typical to the Mojave Desert. The landscape in the California portion of the APE is considerably eroded by natural processes resulting from the effects of wind and water erosion. The result in part is land forms characterized by alluvial terraces and incised drainage channels. One of the largest incised channels is Bat Cave Wash, which runs from the Chemehuevi Mountains in the south toward the Colorado River in the north. Terraces occurring onsite are homogeneous, comprised of rocky soils with very sparse

vegetation. Of tribal concern and spiritual importance, these terraces are also where the physical evidence of the Maze is most observable. Elevations in the APE range from about 450 feet mean sea level (msl) at the river floodplain to 550 feet msl at the compressor station. The area north of Topock Marina in the Arizona portion of the APE is within the HNWR; the landscape in this area is dominated by dredge spoils and bordered by the Colorado River to the west and the Topock Marsh to the east.

The local geology consists of recent and older river deposits progressing westward to older alluvial deposits associated with the local mountains. Sand, gravel, and cobblestone dominate these deposits, comprising the principal groundwater aquifer at the site. The main surface water drainage channel from the APE toward the Colorado River is Bat Cave Wash and a large unnamed desert wash with several tributaries located to the west. These ephemeral desert washes are dry most of the year, but during heavy precipitation events the washes can have surface flow.

Structurally diverse vegetation is primarily limited to the Colorado River floodplain and ephemeral washes near the river. The uplands consist primarily of a sparse creosote bush scrub community, whereas the floodplains on the California and Arizona shorelines are composed of sandy soils with tamarisk (*Tamarix* sp.), mesquite (*Prosopis* sp.), palo verde (*Cercidium* sp.), and arrowweed (*Pluchea sericea*). A more detailed description of the flora and fauna in the APE, including species listed under the federal ESA, are described in Section 4.0.

## 3.2 Past and Present Activities

Past and present activities have been limited to the California portion of the APE and the Colorado River. These activities include the installation and sampling of numerous groundwater monitoring wells, as well as Interim Measure (IM) No. 1, IM No. 2, and IM No. 3, which generally involve plume characterization and control including pumping and treating impacted groundwater. For each of the IM's, activities on federal land were authorized as CERCLA time-critical removal actions pursuant to Action Memoranda issued by the BLM.

Additional activities which pre-date current interim measures include prior RFI wells and wells installed to monitor groundwater conditions at the compressor station. Between 1997 and 2004, RFI activities included the installation of monitoring wells at 32 locations within the APE. In addition, approximately 300 soil samples were collected and analyzed at locations within and surrounding the Topock Compressor Station, and impacted soil was removed during removal of former wastewater treatment structures within the compressor station. The locations of the previously constructed RFI well facilities, compressor station monitoring wells, and those associated with IM Nos. 1 through 3, are shown on Figure 3.

Past and present activities discussed below have been authorized by BLM and/or the HNWR. Informal consultation with the USFWS occurred in September 2004, prior to the approval by BLM of the IM No. 3 activities occurring on federal land (CH2M HILL, 2004b). In addition, the PE-1 pipeline project and floodplain *in-situ* pilot study was the subject of a biological assessment (CH2M HILL, 2005j) and subsequent consultation with USFWS in November 2005. Completion reports addressing the implementation of several of the past

projects discussed below have documented no known take of any species listed under the ESA (CH2M HILL, 2005c, d, g, and 2006a).

### 3.2.1 General Activity Categories

Past and present response and investigative activities have occurred throughout the California portion of the APE and have typically comprised one or more of the following categories of activity:

1. Well installation, maintenance, and operation. This includes access to injection, extraction, and monitoring well sites for surveys, drilling, installation of wellheads, pumps and equipment, monitoring, testing, well maintenance, and sampling. The number of required staff and duration of these activities is provided in the sections that follow.

2. Pipeline installation, maintenance, and operation. This includes above- and belowground piping and appurtenances to and from wells, water treatment, and water and waste management facilities.

3. Facility installation, maintenance, and operation. This includes water treatment facilities, such as IM No. 2 batch treatment plant and the IM No. 3 treatment facility and related injection wells, water and waste management facilities, and *in-situ* treatment operations.

4. Colorado River and soil sampling. This includes open water sample collection from shore and by boat, as well as pore water sampling using techniques including, but not limited to, those described for the Pore Water Sample Study (see Section 3.2.7). Also includes sediment and soil sampling, and seismic surveys.

5. Road maintenance. This includes maintenance of roads and/or paths to project facilities (wells, pipelines, and treatment facilities) within the APE on public and private land.

6. Restoration and mitigation activities. This includes biological restoration or revegetation activities to restore ecological values to areas where project activities/facilities are no longer necessary or have been removed.

### 3.2.2 Topock Compressor Station Wells

Groundwater monitoring wells have been installed in the vicinity of the existing and former evaporation ponds associated with the Topock Compressor Station. These wells are not associated with corrective actions but are used to monitor operation of the existing ponds. The locations of Topock Compressor Station wells are included on Figure 3. These facilities and the associated activities fall within Category No. 1 described in Section 3.2.1.

### 3.2.3 Groundwater and Surface Water Monitoring Program

Routine groundwater and surface water monitoring activities were initiated in 1998 as a continuation of the RFI, through the ongoing groundwater monitoring program (GMP). The number of groundwater well and surface water sampling locations, as well as the frequency of sampling from each location, have varied since the GMP inception and will continue to be refined in the future as data needs are evaluated. As of September 2006, monitoring occurs semiannually, quarterly, monthly, biweekly, and biennially, as follows:

- Fourteen groundwater wells are sampled semiannually.
- Sixty-two groundwater wells are sampled quarterly.
- Twelve groundwater wells on the floodplain are sampled monthly.
- Four groundwater wells on the floodplain are sampled biweekly.
- One extraction well, one injection well, and two inactive supply wells are sampled biennially.
- Nine shoreline surface water stations along the Colorado River are sampled monthly.
- Nine depth-specific sampling stations within the Colorado River channel are sampled quarterly (except during winter low-river stage conditions, when the stations are sampled monthly).

The locations of the GMP wells are included on Figure 3. The sampling frequency of wells currently included in the program is in the process of being evaluated by DTSC. The more frequent GMP events focus on wells located on the Colorado River floodplain.

Access to monitoring wells typically occurs via a pickup truck or all-terrain vehicle (ATV) with a trailer. On average, two field personnel are engaged in sampling activities for each individual well. Sampling procedures require purging the wells before sampling can be conducted. Depending on the well characteristics, between 15 and 200 gallons of water are typically purged and subsequently transported to the IM No. 3 treatment facility. Pumping of purge water often involves the use of a portable generator to power a well pump. Several wells on the Colorado River floodplain have dedicated pumps installed that are powered from an electrical power source at the PE-1 wellhead. The time frame to complete field sampling activities at an individual well ranges from approximately 15 minutes to 1 hour. Several monitoring sites include clusters of two to three wells sampled at different groundwater depths. The total time frame to complete a sampling event ranges from 2 days for biweekly events to 7 days for a biennial event.

Vehicles traveling throughout the APE use existing roads and/or predetermined routes to access each of the monitoring wells.

Further details of the GMP program are provided in Appendix A1.

The facilities and the associated activities discussed above fall mainly within Category No. 1 and partially within Category No. 4 (surface water sampling), as described in Section 3.2.1.

#### 3.2.3.1 Floodplain Sampling Procedures

In June 2005, modified sampling procedures were developed due to concerns regarding the potential affects to the SWFL. Floodplain sampling and access procedures during the 2005 SWFL nesting season were modified to include limited use of ATVs and staging of equipment and tanks within specified areas for the purpose of reducing potential impacts to SWFL. These procedures to avoid any potential effects to SWFL comprised a "no effect" avoidance strategy.

In April 2006, PG&E proposed modifications to the floodplain sampling procedures implemented during the SWFL nesting season (May 1 through September 30). The modified procedures include the use of lower-noise ATVs, dedicated well pumps, electrical power supply outlets on the floodplain in lieu of portable generators, reduced sampling frequencies at certain wells, use of 4-inch "lay-flat" hose to purge water outside of potentially sensitive areas, and additional staging areas to limit equipment movement. These procedures are detailed in the *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 3* (CH2M HILL, 2006b) provided to the BLM on April 20, 2006.

Based on the above-referenced technical memo and the biological analysis provided therein, BLM and HNWR initiated informal consultation with the USFWS. In a letter dated April 28, 2006, USFWS provided their concurrence with the BLM determination that the proposed sampling procedure modification "may affect, but not likely to adversely affect" the SWFL. The USFWS also concurred with the BLM determination that implementation of these sampling procedures would have "no effect" to the razorback sucker, bonytail chub, Colorado pikeminnow, desert tortoise, and Yuma clapper rail. The sampling procedures described in the April 20, 2006, technical memorandum were subsequently approved by BLM in a letter dated May 1, 2006, and by HNWR in a letter dated May 11, 2006. Figure 4 depicts the approved ATV access routes and staging areas to be used during the SWFL nesting season. No take has been reported to date as a result of implementing these access and sampling procedures.

It is PG&E's intent to carry these or similar access and sampling procedures forward and to consider them as general management measures through 2012.

#### 3.2.3.2 Surface Water Sampling

Sampling procedures for surface water sampling on the Colorado River involve the use of a motorized boat and a global positioning system (GPS) device. At each sample location, river samples are taken from 1 foot off the river bottom, at the mid-point of the water column, and 1 foot below the river surface. Shoreline surface water samples are taken at a depth of approximately 6 inches below the water surface from the shoreline or from a boat. To date, these activities have occurred with no known take of listed species.

The facilities and the associated activities discussed above fall mainly within Category No. 1 and partially within Category No. 4 (surface water sampling), as described in Section 3.2.1.

### 3.2.4 Interim Measures No. 1

The IM No. 1 project was authorized in March 2004 and provided for additional groundwater monitoring wells at eight locations to complement the existing network of monitoring wells in the APE (see Appendices A2 and A3). IM No. 1 also included several potential extraction wells. However, the extraction portion of IM No. 1 was subsequently supplanted by IM No. 2 (Section 3.2.5), which provided a more comprehensive program to extract, treat, and haul groundwater containing chromium. In early 2005, a second phase of IM No. 1 was implemented involving the development of groundwater wells at five additional locations on the Colorado River floodplain (see Appendices A4 through A6). An assessment of the land used during the second phase of IM No. 1 construction activities was

prepared for BLM and USFWS HNWR, per stipulations provided in their approval. That analysis is provided in Appendix A7.

Typical well installation activities involved the use of a rotosonic drilling rig, forklift, and support vehicle for equipment and material transfer to each drill site. Materials temporarily stored at well sites included drilling equipment and well construction materials (casing, sand, bentonite, cement grout). Drill cuttings generated from drilling were transferred by forklift to lined steel rolloff soil bins. The water produced from drilling was temporarily stored in 55-gallon steel drums placed on pallets or portable storage tanks at each drill site. After installation, the injection and monitoring wells were developed by a combination of surging, bailing, and pumping to remove sediment from the well casing. All waste generated was disposed of at a permitted disposal facility.

Well installation activities involved an average of three drill crew members, two to three staff specialists to collect and record core samples, one biologist, and one archaeologist (if required). The amount of time to install a well varies depending on whether the facility is a single well or well cluster. On average, about 15 days are required to install and develop a well cluster. Well development time may vary, depending on whether conducted by the drill crew or other dedicated staff immediately subsequent to the drilling activity.

Authorization for IM No. 1 was provided by BLM via an Action Memorandum in March 2004 (Appendix A3). To date, these activities have occurred with no known take of listed species.

Monitoring wells installed under IM No. 1 included wells used for both the Groundwater Monitoring Program (see Section 3.2.3) and Performance Monitoring Program (see Section 3.2.6.1). The facilities and activities discussed above fall within Category No. 1, as described in Section 3.2.1.

### 3.2.5 Interim Measures No. 2

IM No. 2 was authorized by BLM and DTSC in March 2004 and in May 2004. IM No. 2 involved the extraction, treatment, and hauling of treated water to an offsite disposal facility (see Appendices B1 and B2). Groundwater was extracted at rates of up to approximately 90 gallons per minute and pumped into a series of Baker tanks. A batch treatment process to remove chromium occurred within the Baker tanks, resulting in a 99 percent reduction in the volume of hazardous waste (see Appendices B3 and B4). The treated water was pumped into tanker trucks for disposal at a permitted treatment facility in Los Angeles. Groundwater treatment operations at IM No. 2 were phased out in July 2005 following commencement of groundwater treatment at the IM No. 3 plant. Groundwater extraction and hauling of brine continues at the same site as a part of IM No. 3, discussed in Section 3.2.6.

The extraction, treatment, and truck-loading facilities and operations were limited to an approximately 1-acre area on BLM land (referred to as the MW-20 bench) due to the proximity to monitoring well MW 20. This area is bounded by Park Moabi Road to the west and the Colorado River floodplain to the east. This site was selected based on various factors that included proximity to Park Moabi Road, available space, lack of vegetation/habitat, existing groundwater wells, and flat topography. The MW-20 bench and IM No. 2 project area are shown on Figure 3.

The facilities and activities discussed above fall within Category No. 3, as described under Section 3.2.1. Two extraction wells (TW-2S and TW-2D) were installed on the MW-20 bench as part of IM No. 2, and installation of these wells falls within Category 1, as described under Section 3.2.1. Details of the IM No. 2 program and related federal authorizations, including applicable biological stipulations, are provided in Appendix B. Authorization for IM No. 2 was provided by BLM via an Action Memorandum in March 2004 (Appendix B2) and a subsequent Action Memorandum provided in May 2004 (Appendix B4). To date, these activities have occurred with no known take of listed species.

### 3.2.6 Interim Measures No. 3

IM No. 3 was designed to provide greater groundwater extraction and management capacity to maintain hydraulic control of groundwater near the Colorado River. Under IM No. 3, the pumped water is treated in a treatment plant on property owned by PG&E, with treated water also managed onsite, through re-injection into the groundwater aquifer. IM No. 3 operations provide a significantly higher rate of extraction and treatment than IM No. 2. Details of the IM No. 3 project are described in the work plans provided in Appendices C1 through C3. The BLM approval, including biological stipulations, is provided in Appendix C4.

IM No. 3 facilities include extraction, treatment, conveyance, injection, and monitoring facilities, shown on Figure 3. Construction of IM No. 3 commenced in September 2004 and was completed in July 2005. An analysis of IM No. 3 construction and the total area used by IM No. 3 is provided in Appendix C5. Prior consultation between BLM and USFWS regarding IM No. 3 construction and operation resulted in a determination of no effect to the desert tortoise, a species listed as threatened under the federal ESA. The biological investigation of the IM No. 3 project is provided in Appendix C6. Following construction, a report of IM No. 3 construction and operation was prepared (Appendix C7). This document includes the applicable approvals and stipulations provided by BLM.

Access to IM No. 3 is provided by roads extending from the east and west off Park Moabi Road and National Trails Highway. These access roads have been improved to facilitate effective transportation to the treatment plant and to protect key cultural resources. The roads will continue to require maintenance several times each year to repair storm damage and control dust. This will require the use of graders, backhoes, and water trucks (for example) to complete the maintenance. The IM No. 3 treatment plant occupies an approximately 1-acre site. Double-walled influent conveyance piping is subsurface and generally follows the eastern access road. Effluent piping from the treatment system to the injection wells is mostly located aboveground, along the shoulder of the western IM No. 3 access road. The subsurface and aboveground piping extend for approximately 3,000 and 1,900 feet, respectively.

There are four existing extraction wells available for operation of IM No. 3. Currently, the system operates using two wells: TW-3D located on the MW-30 bench, and PE-1 located on the floodplain. Construction of the pipeline between the PE-1 site and the MW-20 bench was recently completed, and extraction operations began in January 2006 (see Figure 3 and Section 3.2.6.3). Installation of TW-3D was completed in late 2005 and extraction operations began in December 2005 (see Figure 3 and Section 3.2.6.4). The other two extraction wells (TW-2S and TW-2D) were installed on the MW-20 bench as part of IM No. 2 and are available for backup,

but are not currently in operation. The injection wellfield consists of two wells (IW-02 and IW-03) located on PG&E property west of the treatment plant, installed in 2004. Construction and development of the extraction and injection wells was similar to the typical well installation activities described above in Section 3.2.4

Operation of IM No. 3 commenced in late July 2005. Continuing operations require one to two operations staff to manage and monitor IM No. 3 functions 24 hours per day, primarily at the IM No. 3 treatment plant. The operations staff drives to the injection well area and the extraction well locations several times each day to monitor the condition of the wells and conveyance piping. In addition to the operations staff, a security company has been employed to provide 24-hour-a-day patrolling of the IM No. 3 project area.

Periodic maintenance activities include routine repairs, waste removal, and deliveries of supplies and treatment compounds. Maintenance activities may also involve enhancement of existing facilities to optimize operations (e.g., upgrading or replacing equipment). Delivery of supplies and materials occurs several times per week. Repair activity includes recent repairs to the IM No. 3 access road. These repairs mainly involved the installation of sufficiently sized culverts to convey stormwater below the roadway and the addition of fill material to eroded sections. As part of the BLM mitigation for HR66, which is the primary access route to IM-3, approximately 5 inches of road base must be maintained over the original HR66 surface to protect the historic landmark from potential vehicular impacts.

During IM No. 3 operations, brine wastewater from the water treatment process is pumped back to the MW-20 bench and trucked to an offsite disposal facility. Currently, the offsite disposal facility receiving the brine wastewater is located in Los Angeles, California. Approximately 24 trucks per week are required to haul brine waste at the extraction rate of 135 gallons per minute. The required trucking activity varies throughout the year as the flow rate requirements change. In the future, the brine may be hauled to the existing Topock Compressor Station evaporation ponds currently utilized for compressor station operations. These operations would continue but would also involve discharge of IM No. 3 brine waste in the compressor station ponds in lieu of transport to an offsite facility. Alternatively, in the future, brine wastewater may be disposed at an offsite disposal facility in Nevada, Arizona, or alternate location in California.

In September 2004, BLM initiated informal Section 7 consultation with USFWS related to implementation of IM No. 3. Specifically, the consultation addressed potential effects to the Desert Tortoise and SWFL during construction and operation of this project. The anticipated biological impacts of the project, including potential impacts to sensitive species, were assessed in the *Biological Resources Investigation for Interim Measures No. 3* (CH2M HILL, 2004b) provided in Appendix C6. Based on this analysis and the consultation between BLM and USFWS, a "no effect" determination was provided for IM No. 3. The 2004 Action Memorandum providing BLM authorization to implement IM No. 3 included numerous biological stipulations (see Appendix C4). To date, the project has been working under the "no effect" determination with no take of listed species. A report documenting the completion of IM No. 3 construction activities (CH2M HILL, 2005d) is provided in Appendix C7.

These facilities and activities fall within Category Nos. 1, 3, and 5, as described in Section 3.2.1.

#### 3.2.6.1 Performance Monitoring Program

The performance monitoring program (PMP) involves monitoring, data evaluation, reporting, and response actions associated with the IM No. 3 pumping, treatment, transport, and disposal of extracted groundwater near the floodplain area. The network of groundwater wells used for performance monitoring includes the monitoring and extraction wells in the floodplain and adjoining area, as shown on Figure 3. The network of groundwater wells used for performance monitoring includes monitoring wells in the floodplain, the MW-20 bench/Park Moabi Road area, and the upland interior plume area.

As part of the PMP, a network of pressure transducers are maintained and operated to continuously monitor water levels and assess hydraulic gradients (horizontal and vertical) in the floodplain area. The transducer data are downloaded biweekly to the PMP database. Manual water levels are measured periodically at the monitoring wells, river locations, and extraction wells to calibrate and supplement the pressure transducer data. The majority of the PMP wells used for hydraulic data and groundwater sampling are clusters consisting of two or three individual wells installed at one monitoring location. The PMP activities and standard operating procedures are detailed further in Appendix C2.

The PMP uses existing monitoring wells, equipped with transducers and data loggers. To the extent that the PMP is a component of the IM No. 3 project, it is included in the prior Section 7 ESA consultation for IM No. 3 described above.

The facilities and activities discussed above fall within Category No. 1, as described in Section 3.2.1.

#### 3.2.6.2 Compliance Monitoring Program

The compliance monitoring program (CMP) monitors the aquifer in the IM No. 3 injection well area to ensure that injection of treated groundwater is not causing an adverse effect on the aquifer water quality. Groundwater levels are measured in the vicinity of the injection wells, and groundwater samples are collected and analyzed. Groundwater analyses are performed to ensure that the distribution and concentrations of constituents of concern remain consistent with the baseline sampling results. The CMP monitoring well network consists of both observation wells and compliance monitoring wells. The CMP plan is provided in Appendix C3.

The December 2004 BLM letter of approval (Appendix A5) for the CMP facilities makes reference to prior authorization provided under the March 2004 IM No. 1/2 Action Memorandum and applies all stipulations included in the September 2004 IM No. 3 Action Memorandum.

The facilities and activities discussed above fall within Category No. 1, as described under Section 3.2.1.

### 3.2.6.3 PE-1 Pipeline

IM No. 3 operation was planned to process groundwater influent from extraction well PE-1, located approximately 400 feet east of the MW-20 bench on the Colorado River floodplain (Figure 3). The PE-1 extraction well was installed in March 2005. Construction of a double-walled conveyance pipeline to connect the PE-1 extraction well with existing conveyance pipeline at the MW-20 bench was completed in January 2006. The pipeline alignment extends for approximately 500 feet between PE-1 and the MW-20 bench (Figure 3). The alignment also includes power conduit for use during activities in the floodplain, including the well sampling program. The PE-1 extraction well is currently operational. The *Design Plan Conveyance Piping and Power Supply for Extraction Well PE-1* (CH2M HILL, 2005e) is provided in Appendix C8.

Potential biological impacts associated with this facility were covered under the *Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions* (CH2M HILL, 2005j) prepared in November 2005 and an ESA Section 7 consultation process completed in December 2005. The result of that consultation was a finding of "may affect, not likely to adversely affect" for the SWFL, and a "no effect" finding for all other listed species. As documented in the completion report for PE-1 (CH2M HILL, 2006a), the construction activities were completed with no take of any listed species.

The facilities and activities discussed above fall within Category No. 2, as described in Section 3.2.1.

### 3.2.6.4 Well TW-3D

An additional IM No. 3 extraction well was installed at the MW-20 bench site in late 2005 and is currently in operation. This well is referred to as TW-3D, and is located approximately 15 feet west of the TW-2D extraction well, which was originally installed as the primary extraction well for IM No. 2. The work plan detailing installation of extraction well TW-3D is provided in Appendix C9.

Construction and development of this well was similar to the typical well installation activities described above in Section 3.2.4. In addition, approximately 50 feet of underground piping were constructed to connect TW-3D to the existing IM No. 3 groundwater conveyance system. TW-3D construction activities occurred entirely within the MW-20 bench.

The October 2005 BLM letter of approval for TW-3D indicated that the facilities were authorized via the IM No. 3 Action Memo of September 2004 (Appendix C4).

These facilities and activities fall within Category Nos. 1 and 2, as described in Section 3.2.1.

### 3.2.6.5 Interim Measures Performance Monitoring Wells

In 2005, DTSC requested the installation of eight groundwater well clusters within and in the vicinity of the Colorado River floodplain to further characterize the nature and extent of the chromium plume in this area and to assess the performance of interim measures. The *Well Installation Work Plan for Interim Measures Performance Monitoring Program,* describing the installation and operation of five well clusters on the river floodplain and three well

clusters immediately upland from the floodplain, is provided in Appendix A10. The eight well cluster locations are included on Figure 3.

BLM and HNWR approval of the eight Interim Measures Performance Monitoring (IMPM) well clusters was provided in a letter dated February 21, 2006, pursuant to prior authorization provided by the September 2004 Action Memorandum related to IM No. 3 activities. Construction of the IMPM well clusters commenced in February 2006 and concluded in May 2006. Construction and development of these wells was similar to the typical well installation activities described above in Section 3.2.

These facilities and activities fall within Category No. 1 described above in Section 3.2.1.

### 3.2.7 Pore Water Study and Seismic Survey

The pore water study focused on water within pore spaces in sediments immediately beneath the Colorado River. Samples from the river were taken along approximately 16 transects—eight downstream of the groundwater plume and eight upstream of the groundwater plume. Pore water transects within the APE are shown on Figure 3. Approximately four samples were taken at each transect. In addition, approximately 10 core samples of river sediment were taken. Sampling depths ranged from 2 to 6 feet below the riverbed. The *Pore Water and Seepage Study Work Plan* detailing project activities is provided in Appendix A8.

Prior to implementation of the pore water study, the United States Geologic Survey (USGS) conducted a seismic survey within the Colorado River to better understand bedrock characteristics below the riverbed. This survey involved the use of a small watercraft utilizing equipment similar to a fish finder to conduct the seismic bedrock survey.

Prior review and approval by the USFWS HNWR concluded that no effect to sensitive fish species would result from implementation of the pore water study (USFWS 2005e). Authorization and approval for the pore water study provided by the USFWS HNWR on November 15 included a prohibition on take of any wildlife, particularly threatened and/or endangered species.

The pore water study sampling activities were planned to coincide with low water levels within the river, which generally occur in the months of December and January. The study field activities commenced in December 2005 and were completed in early January 2006. Further details regarding the pore water study are described in the work plan, provided in Appendix A8.

These activities fall within Category No. 4, as described in Section 3.2.1.

### 3.2.8 *In-situ* Floodplain Pilot Study

The *in-situ* floodplain pilot study activities involve injection of food-grade compounds into the groundwater aquifer and measurement of the reduction of chromium levels. The pilot study is located on the floodplain within an approximately 0.25-acre area 300 feet east of the MW-20 bench. Facilities at the site include one injection well cluster and six monitoring well nests. The permanent nested well structures have a surface expression of less than 500 square feet (0.01 acre). The floodplain pilot study project wells are included on Figure 3.

The *In-situ Hexavalent Chromium Reduction Pilot Test Work Plan, Floodplain Reductive Zone Enhancement* (MWH, 2005a) is provided in Appendix A9.

The pilot study wells were installed in early 2006, prior to the SWFL nesting season. Construction of the injection and monitoring wells occurred over approximately 2 months. Typical well installation activities associated with the pilot study are similar to those described above in Section 3.2.4.

Beyond the project wells, no other permanent equipment or facilities are required for *in-situ* pilot study operations; temporary hoses connect the injection well to temporary containers during injection activities. Operations commenced in April 2006, and involve injection of reagents at up to four separate times over the 8-month operation period and groundwater monitoring. Groundwater monitoring occurs as frequently as daily over the first week of operations, and then weekly to monthly until the end of the study, anticipated to be late 2006. Monitoring activities are similar to those described above for the GMP project. Details of the *in-situ* floodplain pilot study are described in the work plans for these activities, provided in Appendix A9.

Potential biological impacts associated with these activities were covered under the *Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions* (CH2M HILL, 2005j) prepared in November 2005 and an ESA Section 7 consultation process completed in December 2005. The result of that consultation was a finding of "may affect, not likely to adversely affect" for the SWFL, and a "no effect" finding for all other listed species. As documented in the completion report for these facilities (CH2M HILL, 2006a), the construction activities were completed with no take of any listed species.

These facilities and activities fall within Category Nos. 1 and 3, as described in Section 3.2.1.

### 3.2.9 Restoration

To date, restoration activities primarily have involved revegetation of the area affected by installation of monitoring well MW-43, and decommissioning of the IM-2 batch treatment system at the MW-20 bench. Restoration at MW-43 involved the planting of approximately 100 mesquite trees along the approximately 250-foot access corridor to MW-43. Decommissioning of the IM No. 2 batch treatment system to date has involved cleaning tanks and associated containment structures, removal of support facilities (including the field trailer, field laboratory, generator, ice machine and potable water tanks, etc.), securing batch treatment pumps, piping and appurtenances, and modifying the security fencing to reduce the footprint of the secured area. Decommissioning of the MW-20 bench is being performed in phases, as described in the *MW-20 Bench Decommissioning Work Plan,* submitted to BLM on August 8, 2005 (CH2M HILL 2005g).

These restoration activities fall under Category No. 6 described above in Section 3.2.1. Additional and future restoration efforts are currently in planning, as discussed in Section 3.3.8.

## 3.3 Planned Activities

Various investigative and remedial activities are currently planned prior to implementation of the final remedy. It is expected that DTSC and DOI will require additional investigatory and/or response activities as part of the RI/RFI prior to the selection of the final remedy, which is currently unspecified. Such activities are likely to fall within the general activity categories described below. Where information is currently available, specific planned activities are also described. Table 1 provides a list of planned activities and a summary of the area estimated to be used during implementation. Overall, future activities are anticipated to be substantially similar to past and current activities, particularly those conducted since 2004.

### 3.3.1 Planned Activity Categories

The planned investigative and remedial activities occur throughout the APE and may comprise any one or more of the following activity types listed below. Where necessary, staging of equipment and materials will typically occur at the MW-20 bench, an area approximately 1,200 feet to the north between Park Moabi Road and the MW-35 well, and/or at the Topock Compressor Station. Further details regarding equipment, personnel, and time frames are provided as available for the planned activities described below in Sections 3.3.2 through 3.3.8.

1. Well installation, maintenance, operation, and decommissioning. Includes access to existing and future injection, extraction, and monitoring well sites for surveys, drilling, installation of well heads, pumps and equipment, aquifer testing, monitoring, well maintenance, retro-fitting, decommissioning (e.g., well abandonment), and sampling. Approximately 30 new well clusters may be installed throughout the APE. Also includes related improvements such as dedicated well pumps to facilitate well sampling activities. Access to well locations would use existing access roads and/or pre-defined travel corridors wherever possible.

2. Pipeline installation, maintenance, and operation. Includes above- and belowground piping and appurtenances to and from wells, water treatment, and water and waste management facilities. Potential pipelines include a connection from the MW-20 bench to the Topock Compressor Station to convey brine waste from the IM No. 3 treatment plant operations.

3. Facility maintenance and operation. Includes water treatment facilities, such as IM No. 2 batch treatment, IM No. 3 treatment facilities, water and waste management facilities, and *in-situ* treatment operations. Periodic maintenance activities include routine repairs, well maintenance, waste removal, and deliveries of supplies and treatment compounds.

4. Colorado River and soil sampling. Includes open water sample collection from shore and by boat, as well as pore water sampling using techniques including, but not limited to, those and similar techniques as described in the Pore Water Sample Study (see Section 3.2). This category also includes soil sampling activities via a number of collection methods including, but not limited to: boring, augers, trenching, and such sampling methods conducted via track- and truck-mounted apparatus. Other sampling

activities may include seismic studies and/or bedrock sampling using drilling equipment. Non-intrusive test methods (i.e., geophysical methods) may also be employed if useful data can be collected by such means. Access to soil sampling locations would use existing access roads and/or pre-defined travel corridors wherever possible.

5. Road maintenance. Includes maintenance of roads and/or paths to project facilities (wells, pipelines, and treatment facilities) within the APE on public and private land. Examples include regrading and/or re-paving of existing access routes, and the installation of stormwater culverts to limit roadway erosion during storm events.

6. Restoration and mitigation activities. Includes activities to restore spiritual, cultural, ecological, aesthetic, or other values to areas where project activities/facilities are no longer necessary or have been removed. Also includes revegetation and removal of debris located within the APE (e.g., scrap metal, wood, brick, plastic, or similar materials). Some restoration sites will require removal or addition of soil and rocks to re-contour the landscape and drainage ditches that may require barriers and irrigation facilities. Reasonably foreseeable planned restoration areas are shown on Figure 5. Other additional restoration and mitigation areas may be identified by BLM and USFWS, including restoration outside of the APE as investigative and response activities continue at a 2:1 ratio (restored:lost).

7. Emergency activities. Includes any activity that cannot be reasonably foreseen but, due to public health/safety concerns, requires immediate response and/or corrective action. Examples of such activity include, but are not limited to, response of police, fire, ambulance or other personnel to the site, and subsequent work, in the event of explosion, fire, vehicle accident, spill, natural disaster, equipment failure, chemical reaction, heat illness, heart attack, or other medical emergencies.

### 3.3.2 IM No. 3 Discharge Options

Treated water effluent from the IM No. 3 treatment plant is currently re-injected into the groundwater aquifer. Brine waste resulting from the treatment process is currently transported offsite to a facility located in Los Angeles, California. Potential changes to IM No. 3 operations include (1) transporting brine waste to the Topock Compressor Station ponds, (2) transporting brine waste to an alternate offsite disposal facility in Nevada, Arizona or elsewhere in California, and (3) using treated IM No. 3 water in the compressor station cooling towers.

Current IM No. 3 operations involve the transport of brine waste via truck from the MW-20 bench to an offsite disposal facility located in Los Angeles, California. Approximately 26 truckloads of brine waste per week are generated. Potential changes to IM No. 3 operations include transport of the brine waste along National Trails Highway to the compressor station evaporation ponds. This transfer can be accomplished by trucking the brine waste to compressor station tank facilities and commingling the brine waste with cooling water blowdown, which is subsequently piped to the evaporation ponds.

The potential transport of brine waste offsite to an alternate offsite disposal facility would involve little or no change in the onsite operations to access Interstate 40.

Potential use of treated IM No. 3 water in the compressor station cooling towers would partially offset, but not completely replace, existing potable water usage. The treated water would be hauled from the MW-20 bench to the compressor station and pumped into existing cooling water tank facilities. After use in the cooling towers, the treated water would ultimately be discharged to the existing evaporation ponds.

Implementation of both the brine waste and treated water options involve the transport of approximately 300 truckloads per week of treated water and brine waste from the MW-20 bench to the Topock Compressor Station. In addition, both of these options would require the construction of a small transfer facility at the discharge point to ensure proper management of brine waste and treated water pumping operations. Activities associated with the transport and use of brine water and treated water at the compressor station would be conducted within a predominantly industrial setting and would not require any expansion of the footprint of the existing industrial facilities.

In lieu of trucking brine waste and/or treated water from the MW-20 bench to the Topock Compressor Station described above, a conveyance pipeline may be constructed in National Trails Highway. PG&E maintains an existing agreement with the County of San Bernardino to construct such facilities within the existing roadway right-of-way. Use of a pipeline to transport brine waste and treated water would also require construction and operation of a pump station at the MW-20 bench. The conceptual pipeline alignment would follow the brine waste haul route shown on Figure 5 between the MW-20 bench and the entry to the Topock Compressor Station.

Details regarding potential pipeline installation activities are not currently specified, but could involve up to 12 construction staff over a period of 2 to 3 months. Typical equipment would include a backhoe, excavator, roller, and smaller support vehicles. Following pipeline installation, National Trails Highway would be repaved to pre-construction conditions.

These activities generally fall under Category Nos. 2, 3 and 5, as described in Section 3.3.1.

### 3.3.3 Soil Sampling

Several soil sampling programs are planned to further characterize COPCs in soil resulting from historic operations at the Topock Compressor Station and/or to characterize back ground soil conditions, as described below. Soil sampling is expected to primarily occur in the upland areas, but may involve some sampling in the Colorado River floodplain. Further soil sampling is expected to be required by DTSC and DOI to support site characterization or remedy selection and design. Details of currently planned sampling methods are provided in Appendix D1 and outlined further below. The activities described below fall under Category No. 4, as described in Section 3.3.1.

#### 3.3.3.1 IM No. 3 Soil Sampling

The primary objective of the IM No. 3 soil sampling program is to determine naturally-occurring background concentrations of metals, including hexavalent chromium, total chromium, and other inorganic compounds in soil in the direct vicinity of the IM No. 3 system. As part of future IM No. 3 closure activities, or in the event of a release of wastewater and/or treatment chemicals from the treatment system or pipelines during

operation, such baseline data would be used to assess impacts associated with the release, assess the appropriate level of site restoration, and guide remediation, if necessary.

Approximately 21 sample locations have been preliminarily identified, primarily along the pipeline alignment and Bat Cave Wash, as shown on Figure 5. Within the upland and Bat Cave Wash areas, approximately three samples will be taken from each location between 0 to 6 feet below ground surface. Within the floodplain area, approximately five samples will be taken from each location between 0 and 20 feet below ground surface. Mechanized sampling would use a Bobcat-mounted auger rig to drill and sample a borehole. This technique would involve two field personnel. Hand digging would occur with a hand auger, posthole digger, shovel, or pry bar and would require two to four field personnel. Field sampling activities for all of the locations shown on Figure 5 are expected to be completed in about 3 days.

Additional details of the IM No. 3 soil sampling, including proposed sampling methods, are described in the work plan provided in Appendix D1.

#### 3.3.3.2 RCRA Facility Investigation/CERCLA Remedial Investigation Soil Sampling

The Final RI/RFI Report, Volume 1 (Site Background and History) recommends soil sampling at 27 locations in the vicinity of the Topock Compressor Station to collect additional data needed to verify past closure activities, or to complete the RFI objectives of defining the nature and extent of contamination, characterize risks to human health and the environmental, and gather information for the Corrective Measures Study/Feasibility Study (CH2M HILL 2006d). Of these 27 locations, 17 are within the fence line of the compressor station. The remaining locations are on PG&E property surrounding the fenced area, or on HNWR property north, east, and west of the PG&E property. The areas of soil sampling are shown on Figure 5. Multiple samples will be taken at each of the 27 locations. In addition, future activities will include implementation of a background soil sampling program to assess naturally occurring concentrations of inorganic constituents in soil. Samples collected for the background study will be collected in areas removed from the sources of potential contamination at the compressor station.

Sampling activities would be similar to the IM No. 3 baseline soil sampling described above and could occur via a number of collection methods including, but not limited to, boring, augers, and trenching. Depending on the location, sampling activities may be conducted via track- and truck-mounted apparatus or using hand equipment. Approximately 200 soil samples would be obtained at multiple depths via the sampling methods described above for the RFI soil sampling and IM No. 3 baseline soil sampling. If substantial soil contamination is encountered during sampling activities, soil may be hauled off-site to an appropriate permitted disposal facility, in lieu of leaving or returning the soil in place.

### 3.3.4 Future Wells and Related Activities

#### 3.3.4.1 California and Arizona Floodplain Monitoring Wells

In 2005, DTSC requested the installation of five groundwater well clusters on the Colorado River floodplain in California to further characterize the nature and extent of the chromium plume in this area and to assess the performance of interim measures, as described in Section 3.2.6.5. Installation of these well facilities was completed in May 2006.

Approximately 15 additional floodplain well clusters may be installed prior to the final remedy. While the precise location of additional wells has not yet been identified, additional well clusters could be located in both the California and Arizona portions of the APE.

Typical well construction activities would be substantially similar to past activities, as described above under Section 3.2.4 (Interim Measures No. 1) and as documented in the construction completion report provided in Appendix A7 that addresses prior well installation activities in the APE (CH2M HILL, 2005c). Modifications to future well construction may include "slant drilling" where the mast of the drill rig is set to an angle off vertical, resulting in a boring that penetrates at a similar angle. This approach may be taken so that samples can be collected beneath a surface obstruction (e.g., the Colorado River). The surface expression of slant drilling activities is substantially similar to that associated with vertical drilling activities.

Sampling of future floodplain wells would occur per the existing GMP program, discussed in Section 3.2.3. As noted, due to potential concerns regarding the SWFL, floodplain sampling and access procedures were originally modified during the 2005 SWFL nesting season. Recent approvals provided by BLM and USFWS updated the sampling procedures implemented during the SWFL nesting season. These procedures include the use of lower-noise ATVs, dedicated well pumps, and electrical power supply sources, as described above in Section 3.2.3.1 and as shown on Figure 4. The current 2006 sampling procedures will be carried forward for implementation during future SWFL nesting seasons.

In addition to the monitoring wells discussed above, planned activities include the installation of slant wells below the Colorado River. A proposed drill site is located immediately south of Interstate 40 on the western shore of the Colorado River in California. This slant drill site is shown on Figure 5. In addition, a seismic survey of the Colorado River would precede the well installation activities to obtain additional detail regarding bedrock characteristics below the river. These proposed activities were addressed in a separate project-specific Biological Assessment (CH2M HILL 2006e) and ESA consultation.

The facilities and activities discussed above fall within Category No. 1, as described in Section 3.3.1.

#### 3.3.4.2 Upland Monitoring Wells

Additional monitoring wells may be required at upland locations throughout the APE. Recent construction activities completed in May 2006 involved the installation of three additional well clusters at upland locations in the APE (see Appendix A10). These three well locations are included on Figure 3. No other well facilities or locations have currently been specified by DTSC or DOI. However, approximately 15 additional well clusters may be installed within the upland portion of the APE, based on future monitoring well results and changing data needs. The potential locations include areas within both the California and Arizona portions of the APE.

Typical well installation activities would be substantially similar to past activities, as described above under Section 3.2.4 (IM No. 1) and as documented in the construction completion report provided in Appendix A7, which addresses prior well installation activities in the APE (CH2M HILL, 2005c). Given the typical management measures to be

applied at the site (see Section 3.4), including those associated with cultural resources, potential impacts to sensitive species such as the desert tortoise would also tend to be minimized.

Existing groundwater monitoring wells are located in the vicinity of the existing and former evaporation ponds associated with the Topock Compressor Station. These wells are not associated with corrective actions but are used to monitor closure of the former evaporation ponds and operation of the existing ponds. In the future, these wells may be sampled as part of the ongoing corrective action process.

The facilities and activities discussed above fall within Category No. 1, as described in Section 3.3.1.

#### 3.3.4.3 California and Arizona Floodplain Monitoring Well Improvements

Additional facilities may be constructed to support ongoing groundwater monitoring on the river floodplain. The purpose of these improvements would be to further limit noise and activity associated with the GMP, similar to past improvements described above in Section 3.2.3.1 (e.g., electrical power sources, dedicated well pumps, etc.). Approximately five additional dedicated well pumps would be installed in monitoring wells located in California on the Colorado River floodplain. The well sites have not yet been identified. Well site selection will be based on proximity to potentially-sensitive nesting habitat and frequency of sampling. Similar improvements may also be installed at future wells sites in Arizona.

These facilities fall under Category No. 1, as described in Section 3.3.1.

#### 3.3.4.4 Compliance Monitoring Wells

The IM No. 3 project included the construction of four compliance well (CW) clusters to monitor groundwater in the vicinity of the injection wellfields. The existing CW-1 through CW-4 clusters may be enhanced to include additional shallow-depth wells. Drilling at these four locations would involve the typical well installation activities described in Section 3.3.3.1. The work plan describing these activities is provided in Appendix D2. The well installation activities would occur directly adjacent to the existing CW clusters, in areas previously used for well installation activities.

The facilities and activities discussed above fall within Category No. 1, as described in Section 3.3.1.

#### 3.3.4.5 Well Decommissioning

Additional planned well activities include the decommissioning of well PGE-6 located north of the compressor station and south of Interstate 40 in an area referred to as the MW-24 bench, within the HNWR. This well is located within an area that has been previously graded and very sparsely vegetated. The associated activities involve the removal of the upper portion of the well casing, and filling of the well casing with inert materials. The well surface would be restored to the original grade.

The decommissioning work could be accomplished in 2 to 3 days. Because of the short duration of the work and the relatively small amount of materials needed, there will be no

need for an equipment or materials staging area. It may be necessary to locate some pallets of cement or sand at the work site during the decommissioning work. Buried gas pipelines cross PG&E property just outside the north gate of the Compressor Station. An earthen berm will need to be placed over top of these pipelines to allow the safe passage of heavy vehicles across them. This berm would be removed at the completion of the decommissioning work. The planned decommissioning of well PGE-6 is detailed in the work plan provided in appendix D3. Other wells within the APE may also be decommissioned by PG&E, if required.

The facilities and activities discussed above fall within Category No. 1, as described in Section 3.3.1.

#### 3.3.4.6 Well Maintenance and Testing

Planned activities include retrofitting and/or testing at existing monitoring wells PGE-7, PGE-8 and MW-48. PGE-8 is located within the compressor station. PGE-7 is located at the southern end of the MW-24 bench on the HNWR, and MW-48 is located northeast of the compressor station on the HNWR. A work plan will be prepared to describe retrofitting of PGE-7, performing a flow meter survey and/or spinner logging within PGE-7 and PGE-8 to evaluate vertical hydraulic gradients, and conducting aquifer testing in PGE-7, PGE-8 and MW-48 to further characterize the hydraulic properties of the aquifer. Aquifer testing involves pumping water at a controlled rate to measure aquifer properties. This testing requires temporary water containment tanks at the well location for storage prior to transport to IM-3 for treatment.

Retrofitting and testing at PGE-7, PGE-8 and MW-48 will occur over approximately 4 weeks. PG&E may conduct similar activities at other existing or future wells in the APE, if required.

The facilities and activities discussed above fall within Category No. 1, as described in Section 3.3.1.

#### 3.3.4.7 Seismic Studies

Additional seismic studies may be conducted to advance knowledge of bedrock conditions under the Colorado River. Similar to prior seismic studies (see Section 3.2.7), the survey would typically involve a small watercraft equipped with a measuring device similar to a recreational fish finder. The watercraft would move along the surface of the river only. No sub-surface activity is required.

The facilities and activities discussed above fall within Category No. 4, as described in Section 3.3.1.

### 3.3.5 *In-situ* Upland Pilot Study

A work plan for an *in-situ* upland pilot study has been drafted and is provided in Appendix D. This work plan has been submitted to regulatory agencies, but it is likely that specifics of the work could be modified in the future by oversight agencies or other requirements, and in such case, changes to the implementation activities described in this section would be necessary.

Information collected from the uplands pilot study will complement information provided by the *in-situ* floodplain pilot study currently underway on the Colorado River floodplain. Similar to the floodplain pilot study, the upland pilot study involves the injection of reductant compounds into the groundwater aquifer and measurement of the reduction of chromium levels. The upland pilot study would be conducted within an area of approximately 0.25 acre. The proposed study site is located within the HNWR north of the Topock Compressor Station, south of Interstate 40, and east of Bat Cave Wash in an area referred to as the MW-24 bench (see Figure 5).

Planned facilities include two recirculation wells with pumps, wellhead vaults, and pump controls. These wells will provide circulation of the groundwater and reductant, thereby facilitating the reduction of hexavalent chromium concentrations. In addition, three new monitoring well clusters would be developed. Pilot study operations may use existing monitoring wells at the site to collect data. These existing well facilities include MW-24, MW-11, and MW-38. Once constructed, the new pilot study well structures would have a surface expression of less than 500 square feet (0.01 acre).

The wells will be drilled using rotosonic techniques. The rotosonic drill rig will be equipped with drilling casing with an outside diameter of approximately 10 inches for the recirculation and monitoring well boreholes. Rotosonic drilling provides continuous highly representative, core samples that can be recovered in all formations without the use of air, water, or additives, thus minimizing the waste produced. Recirculation wells will be 6 inches in diameter and will be spaced approximately 150 feet apart. The monitoring well nests will be located between and in the vicinity of recirculation wells to monitor coverage of the injected reagents and the circulation between the wells. The monitoring well nests will consist of three separate 2-inch well completions in a single boring (if feasible). Activities and equipment required for well construction are similar to those described above under Section 3.2.4 (IM No. 1) and as documented in the construction completion report provided in Appendix A7 that addresses prior well installation activities in the APE (CH2M HILL, 2005c).

Pilot study implementation may require maintenance of an existing access road extending from the northern portion of the Topock Compressor Station to the MW-24 bench and pilot study site. Road maintenance would primarily involve minor grading. Construction of the upland pilot study recirculation and monitoring wells will last approximately 2 months.

Following construction, the proposed pilot test will be conducted by introducing a food-grade carbon source to be used by indigenous microbes coupled with the available electron acceptors in the aquifer to provide a reducing environment in the aquifer. Ethanol (denatured by methanol) is the preferred carbon substrate due to its solubility, low viscosity, and minimized potential for well biofouling. A total of 38,000 gallons of 40 percent ethanol solution will be injected in two recirculation wells in 6 months. Reagent tanks will be temporarily placed adjacent to each injection well during the pilot test. No other permanent aboveground equipment will be employed during the pilot test. Diluted ethanol (and for the first month, a dye tracer) will be kept in double-contained reagent tanks temporarily located at each well head. The reagent tanks (sized 3,000 gallons or less) will be refilled approximately once a month.

Concurrent with the pilot test injection, a tracer test will also be initiated to better understand the flow conditions in the pilot test area. The tracer study will be conducted with each injection well receiving its own tracer (e.g., fluorescein and rhodamine). These dyes will be introduced at a target concentration of 1 milligram per liter in the injection water and will be continuously injected for the first month of circulation. Approximately 12 pounds of each dye will be injected in the respective wells during the 1-month dye injection period.

Monitoring of reagent flow (rate and volume) into the injection well and water levels in nearby monitoring wells will be conducted as proposed in the work plan or in accordance with other requirements, if more stringent. The work plan proposes daily monitoring throughout the first week of injection until the injection system is operating routinely. Thereafter, weekly monitoring visits will record volumes of reagent injected. Groundwater chemistry monitoring will be conducted to evaluate the effectiveness of the reagent introduction to the aquifer. Monitoring wells will be sampled twice prior to the initial injection event and on a phased schedule post-injection (weekly for the first month, bi-weekly for next 3 months, and monthly for the next 5 months). Monitoring will continue for a minimum of 9 months. Depending on the results obtained, post-test monitoring may continue beyond the 9-month time frame.

These facilities and activities fall within Category Nos. 1 and 3, as described in Section 3.3.1.

### 3.3.6 Maintenance and Other Activities

Ongoing and future activities include maintenance and operation of the IM No. 3 system, and groundwater monitoring well network. This includes routine maintenance and any required repairs to the treatment system, injection, extraction, pipelines, and monitoring wells. Maintenance activities may also involve enhancement of existing facilities to optimize IM No. 3 operations (e.g., upgrading or replacing equipment). Such maintenance/optimization activities would occur primarily in areas where existing facilities are located. In addition, road repairs will be periodically required to ensure adequate access to investigative and remedial facilities throughout the APE. This may include paving of an existing roadway on PG&E property extending from the west side of the Topock Compressor Station into Bat Cave Wash. Paving this roadway would reduce or eliminate the need for other maintenance activities such as grading, which is regularly required to ensure adequate access to facilities near the Topock Compressor Station.

Periodic maintenance of the IM No. 3 injection wells involves backwashing approximately every 8 weeks. Associated equipment includes a pickup truck mounted with an air compressor to remove water and accumulated sediments from the well casing. Water is collected in tanks and transported back to the IM No. 3 treatment plant. Maintenance of the IM No. 3 extraction wells involves periodically replacing the pumps, using an approximately 1-ton truck with a hoist to lift and replace the well pump. Such maintenance is typically completed within 1 day.

Potential structural IM No. 3 enhancements outside of the existing project footprint include enhanced spill control structures such as containment berms and truck loading pads. At the MW-20 bench, spill containment berms may be installed around the IM No. 3 water/brine

tanks. In addition, the truck-loading area at the MW-20 bench would be improved with a concrete spill pad and surrounding moat to minimize potential impacts in case of a spill. Additional improvements at the MW-20 bench may include the replacement of the existing water/brine tanks (six blue tanks and three brown tanks). Up to four new concrete tanks would replace these tanks. Each concrete tank would have a capacity of approximately 100,000 gallons, and measure about 35 feet in diameter and 20 feet in height. Alternatively, the three existing brown tanks may remain in place, and could be augmented by relocation of several of the existing blue tanks. Any remaining blue tanks not required for IM No. 3 operations would be removed. In addition, connective pipe and pumps may be installed at the MW-20 bench to provide for water transfer among the tanks, and between the tanks and tanker trucks.

A concrete spill containment pad structure may also be installed at the existing loading facility on the eastern side of the IM No. 3 Treatment Plant. The loading area is currently a permeable gravel surface; installation of a concrete pad and moat would serve to contain any potential spills and avoid or limit release to the environment. In addition, a second clarifier may be added to the IM No. 3 treatment system. Installation of a second clarifier would involve the construction of a concrete pad measuring about 20 feet by 15 feet. The new clarifier would be mounted on the concrete pad directly adjacent to the existing clarifier and outside of the existing sun shade structure. The new clarifier would be similar in height as the existing clarifier (about 20 feet).

Other activities include possible actions that require immediate corrective action. This includes repairs to existing facilities or emergency cleanup operations following a potential spills or releases. The *Emergency Notification Binder* (CH2M HILL, 2005f) covers investigative and interim remedial activities in the APE and provides site personnel contact information in the event of an emergency that requires immediate reporting. Reporting covers internal and external entities and may include site management personnel, PG&E management, emergency response personnel, regulatory agencies, other agencies, and/or landowners.

IM No. 3 activities are specifically subject to defined emergency response procedures described in the *Hazardous Materials Management Business Plan* (HMMP) (PG&E, 2006), which addresses hazardous substances handled at the IM No. 3 Treatment Plant. Emergency situations covered in the HMMP include spills, leaks, fire, explosion, equipment failure, vehicle accident, a chemical reaction, natural disaster and employee exposure, accident, injury, or incident. Procedures presented in the HMMP give, in order, the basic steps to be followed for the emergency actions. For example, the procedure for a non-transportation-related spill, with no water contact, gives direction on how to:

- Assess and evaluate the (potential) hazard.
- Isolate and stop the flow the material.
- Apply proper absorbent or other material and contain waste generated during cleanup.
- Complete a scene-management checklist.
- Decontaminate and cleanup equipment used.
- Properly dispose any waste generated.

The HMMP also states that site personnel assessing and responding to emergency situations should make every effort to minimize impact to the surrounding environment.

These activities fall within Category Nos. 2, 3, 5, and 7 described in Section 3.3.1.

### 3.3.7 Unspecified Actions and Interim Measures

Additional studies and/or responses or corrective actions not identified in the actions specified above may occur prior to implementation of the final remedy. It is anticipated that these actions would be very similar to activities that have already occurred for investigative and response activities and would generally fall into any one or a combination of Category Nos. 1 through 7, as described in Section 3.3.1.

Preferably, construction and operation of these unidentified or unspecified activities would occur within areas that provide existing access, are already disturbed (e.g., those sites already impacted by investigative and response actions), and are limited to topographically flat sites to avoid or minimize additional landscape disturbances. Such activities may include, but are not necessarily limited to, new pipeline alignments, soil sampling and/or new extraction or injection wells. In addition, contingency activities may involve re-starting the IM No. 2 plant including associated batch treatment facilities and operations (e.g., storage tanks, trucking) focused on the MW-20 bench. These activities are described above in Section 3.2.5 and detailed further in Appendices B3 and B4.

To the maximum extent possible, such facilities and their associated activities would be designed, constructed, and implemented within previously-used areas. The project intent will be to avoid or minimize additional effects to listed species and all biological resources. It is estimated that an additional 4 acres (2 acres on the floodplain and 2 acres on the uplands) may be required to construct or implement unspecified/unidentified facilities and activities. Habitat loss is defined as the removal of trees and perennial shrubs. Therefore, of the estimated 4 acre total, the acreage of habitat lost would be substantially less due to the siting of activities within previously used areas and/or areas with little or no vegetation.

As with all future activities subject to this PBA and related Section 7 consultation, to avoid and/or minimize effects to listed species and their habitats, aggregate habitat loss thresholds of 2.5 acres for the floodplain and 3 acres for the uplands are hereby established to preclude any adverse effects to listed species. As noted above, habitat loss is defined as the removal of trees and perennial shrubs, and does not include trimming of vegetation. If the respective acreages are exceeded, consultation with the USFWS will be reinitiated to reassess the potential effects to listed species and consider possible mitigation. The above acreages do not imply project coverage or approval at the risk of other resources (e.g., cultural resources).

Unanticipated or currently unspecified activities not adequately described and assessed in this PBA may require additional Section 7 ESA consultation as determined by BLM and USFWS. The expected format of the required information would be similar to the technical memorandum provided previously that addressed the 2006 floodplain sampling procedures during the SWFL nesting season (CH2M HILL, 2006b). Specifically, subject field activities will be designed to minimize biological impacts, particularly those involving sensitive species listed under the Federal ESA.

ESA consultation will occur by applying the concept and practice of adaptive management, which accounts for uncertainties through a process of information feedback and subsequent

adjustments to management practices. Future activities not adequately specified in this PBA will integrate any new or updated information related to APE biology. All approvals by BLM and/or USFWS, including ESA clearance, will account for any new information and provide for additional management or mitigation measures as needed.

### 3.3.8 Restoration / Mitigation Activities

In accordance with agency conditions and direction, various restoration activities are planned throughout the APE. As investigative and response activities continue, additional restoration/mitigation measures may be required by the BLM or USFWS, should new information require the addition of these measures.

Restoration involves return of a project site or sites to prior topographic conditions and/or reestablishment of native vegetation in areas which were cleared for remedial or investigative activities. The cultural landscape is also considered. Restoration is anticipated to occur in four major areas, in addition to other offsite restoration activities and general debris removal throughout the APE. The approximate locations of these major restoration areas within the APE are shown on Figure 5. Restoration areas associated with the IM No. 3 project are considered priorities for implementation.

- IM No. 2 Batch Treatment Plant Decommissioning: Planned decommissioning of batch treatment facilities associated with IM No. 2. Limited earthwork is anticipated. Activities primarily involve the removal of existing facilities. The affected area is about 1.3 acres.
- IM No. 3 Staging Area: Restoration of topographic features and revegetation to replicate conditions prior to IM No. 3 implementation at the construction staging area and other areas used during construction. Restoration at the IM No. 3 construction staging area specifically will include fill removal and soil contouring to restore preconstruction topographic contours and drainage patterns. The affected area is about 0.9 acre.
- East Mesa and West Mesa: These two IM No. 3 injection wellfield areas will be restored to conditions occurring prior to injection well drilling. Primary restoration activities involve revegetation with limited earthwork required. The acreage of the East and West Mesa is about 1.4 and 0.6 acres, respectively.
- City of Needles Electric Areas: Restoration of areas affected by offroad access in March 2005 (not shown on Figure 5). Little or no earthmoving activities are involved in these efforts.
- Potential cleanup of debris located within the APE (e.g., removal of scrap metal, wood, brick, plastic, or similar materials) in accordance with the RFI/RI (these areas are not shown on Figure 5).

If the amount of habitat disturbance for project implementation or restoration exceeds a total of 2.5 acres on the floodplain and 3 acres on the uplands, consultation with the USFWS will be reinitiated to reassess the potential effects to listed species.

These activities fall within Category No. 6, as described in Section 3.3.1.

## 3.4 General Project Management Measures

Similar to the approval of past activities within the APE, approval of planned future activities are expected to be consistent with the substantive intent of current mitigation measures applied by BLM and USFWS to investigative and interim measures/removal actions as stipulated in BLM Action Memorandum dated Sept. 17, 2004. In addition to the measures noted below, project activities could also be subject to other regulatory requirements including, but not necessarily limited to, California Fish and Game Code Section 1600 et seq. and the requirements of the California Endangered Species Act. Further, prior to the approval of field activities, the BLM and/or USFWS will engage in consultation with the Native American community. The consultation typically includes nine local tribes.

To clarify existing BLM mitigation measures, March 15 through September 30 was established to delineate the migratory bird nesting season and May 1 through September 30 was established to signify the nesting period for the SWFL. During these periods, a biological monitor would be in the field to conduct preconstruction surveys for nesting birds and USFWS-approved surveys would be conducted annually for the presence of SWFLs. In addition, February 1 through May 31 is established as conservation dates to identify the up/down river migration and spawning period for razorback suckers and bonytail chubs.

General management measures, also referred to as "Mitigation Measures, Lake Havasu Field Office" will apply to future field activities are listed below:

1. All project activities will be conducted in a manner that avoids take of a federally listed species. Take is defined to include any harm or harassment , including significant habitat modification or degradation potentially kill or injure listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Should a listed species enter the project site or become harmed or killed by project activities, the project shall be shut down and the USFWS, BLM, and CDFG shall be consulted. Impacts to habitat will also be minimized to the maximum possible extent.

2. PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with the mitigation measures. The FCR must be onsite during all construction activities. The FCR shall have authority to halt activities that are in violation of the mitigation measures and/or pose a danger to listed species. The FCR will have a copy of the mitigation measures when work is being conducted on the site. The FCR may be a project manager, PG&E representative, or a biologist.

3. PG&E shall have a qualified biologist responsible for assisting crews in compliance with the mitigation measures, performing surveys in front of the crew as needed to locate and avoid listed species, and monitoring compliance. Preconstruction surveys by a biologist shall be implemented for special-status wildlife species in impact areas immediately prior to initiation of ground-disturbing activities. The inspection shall provide 100 percent coverage of the area within the project limits. Any desert tortoise burrows and pallets outside of, but near, the project footprint shall be flagged at that time so that they may be avoided during work activities. At conclusion of work activities, all flagging shall be removed.

4. Listed species, including the desert tortoise, shall not be handled or harassed. Encounters with a listed species shall be reported to the project biologist and BLM Lake Havasu biologists. These biologists will maintain records of all listed species encountered during project activities. This information will include for each individual: the locations (narrative, vegetation type, and maps) and dates of observations; general conditions and health; any apparent injuries and state of healing; and diagnostic markings.

5. All PG&E employees and the contractors involved with the proposed project shall be required to attend PG&E's threatened and endangered species education program prior to initiation of activities. New employees shall receive training prior to working onsite.

6. To the maximum extent possible, facilities (treatment facility, pipelines, injection wells, and access routes) shall be sited within an existing right–of-way (ROW) and previously disturbed or barren areas to limit new surface disturbance.

7. Existing routes of travel to and from the proposed project site shall be used. Cross-country vehicle and equipment use shall be prohibited.

8. Trash and food items shall be contained in closed containers and removed daily to reduce attractiveness to opportunistic predators such as common ravens (*Corvus corax*), coyotes (*Canis latrans*), and feral dogs.

9. To minimize effects, lights shall be angled toward the ground, reduced in intensity to levels compatible with safety concerns, and limited in duration of usage. The hue of lighting shall be that which is most compatible with and least disturbing to wildlife.

10. Employees shall not bring pets to the project site.

11. Firearms shall be prohibited from the project site, except as required for security employees.

12. Employees shall be required to check under their equipment or vehicle before it ismoved. If a desert tortoise or other wildlife is encountered under vehicles or equipment, the vehicle shall not be moved until the animal has voluntarily moved to another location, or to a safe distance from the parked vehicle.13. Upon project completion, all unused material and equipment shall be removed from the site. This condition does not apply to fenced sites.

13. Upon completion, all unused material and equipment shall be removed from the site. This condition does not apply to fenced areas.

14. Palo verde, ocotillo, mesquite, cat-claw, smoke tree, and cacti species are considered sensitive by the BLM. To the extent practicable, these species shall be avoided. If avoidance is not possible, these species shall be transplanted when practical. Should any of the aforementioned plants be destroyed, they shall be replaced.

15. The area of disturbance shall be confined to the smallest practical area, considering topography, placement of facilities, location of burrows, nesting sites or dens, public health and safety, and other limiting factors. As needed, work area boundaries shall be

delineated with flagging or other marking to minimize surface disturbance associated with vehicle straying.

16. Activities shall be restricted to a pre-determined corridor. If unforeseen circumstances require project expansion, the potential expanded work areas shall be surveyed for listed species prior to use of the area. All appropriate mitigation measures shall be implemented within the expanded work areas based on the judgment of the agencies and the project biologist. Work outside of the original ROW shall proceed only after receiving written approval from the BLM, Fish and Wildlife Service (Service) and CDFG describing the exact location of the expansion.

17. PG&E has the option of erecting desert tortoise fencing in lieu of inspection open trenches If the trench is short, personnel may monitor the trench. All open holes and trenches shall be inspected for trapped desert tortoises at the beginning, middle, and end of the work day, at a minimum. During excavation of trenches or holes, earthen ramps shall be provided to facilitate the escape of any wildlife species that may inadvertently become entrapped. If desert tortoises are trapped, the project biologist shall be notified immediately. The desert tortoise shall be allowed to escape before work continues in that location. A final inspection of the open trench segment shall also be made immediately before back filling. All open pipe segments shall be covered when work activity is not occurring at the site.

18. All construction vehicles and equipment shall be periodically checked to ensure proper working condition and to ensure that there is no potential for fugitive emissions of oil, hydraulic fluid, or other hazardous products. The BLM shall be informed of any hazardous spills.

19. Workers shall exercise caution when traveling to and from the APE. To minimize the likelihood for vehicle strikes of listed species, speed limits when commuting to project areas on ROW roads shall not exceed 20 miles per hour.

20. Intentional killing or collection of either plant or wildlife at construction sites and surrounding areas shall be prohibited. The BLM shall be notified of any such occurrences.

21. For emergency situations involving a pipeline leak or spill or any other immediate safety hazard, PG&E shall notify the BLM within 48 hours. As a part of this emergency response, the BLM may require specific measures to protect listed species. During cleanup and repair, the agencies may also require measures to recover damaged habitats.

22. Once the treatment facility is no longer needed, PG&E shall restore disturbed areas in a manner that will assist in the reestablishment of biological values within the disturbed ROW. Methods of such restoration shall include the reduction of erosion, re-spreading of top two inches of soil, planting with appropriate native shrubs, and scattering of bladed vegetation and rocks across the ROW, depending upon the appropriateness or effectiveness in a given area.

23. Within 60 days of completion of construction activities, the FCR and biologist shall prepare a brief report for the BLM documenting the effectiveness and practicality of the mitigation measure and making recommendations for modifying the measures to enhance species protection. The report will also provide information on survey and monitoring activities, observed listed species, and the actual acreage disturbed by the project.

24. Any future construction during August for most birds, will require preconstruction surveys for nesting pairs, nests and eggs. These preconstruction surveys shall occur in areas proposed for any vegetation removal and active nesting areas flagged. If nesting birds are detected, vegetation removal be avoided during the nesting season. All construction activity within 200 feet of active nesting areas will be prohibited until the nesting pair/young have vacated the nests.

25. All areas within the proposed action areas, subject to operations and maintenance activities, and within the potential impact of the action, shall be monitored annually during the active period for tortoise by a biologist knowledgeable of desert tortoise ecology. Surveys shall be completed throughout the duration of the action to verify the presence or absence of desert tortoise and reports shall be provided to the biologists in the BLM Lake Havasu Field Office on an annual basis.

26. Riparian areas surrounding the proposed action site and subject to influence of operations and maintenance activities shall be surveyed for southwestern willow flycatcher according to the protocol established by the USFWS. These surveys shall be completed each year by a biologist permitted by the USFWS to carry out flycatcher surveys until the action has been completed and all facilities have been removed. Reports shall be provided to the biologists in the BLM Lake Havasu Field Office on an annual basis.

27. Upon locating an individual of a dead or injured listed species, PG&E shall make initial notification to the BLM and US Fish and Wildlife (Service) within three working days of its finding. The notification must be made by telephone and writing to the Lake Havasu BLM Office (2610 Sweetwater Avenue, Lake Havasu City, Arizona 86406, 928-505-1200) and the Phoenix Fish and Wildlife Office (2321 West Royal Palm Road, Suite 103, Phoenix, AZ 85021, 602-242-0210). The report will include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death (if known), and other pertinent information. Animals injured through PG&E activities shall be transported to a qualified veterinarian for treatment at the expense of PG&E. If an injured animal recovers, the CDFG and the BLM shall be contacted for final disposition of the animal.

28. PG&E will immediately notify the BLM Lake Havasu Field Manager (or his designated representative) of any cultural resources (prehistoric/historic sites or objects) and/or paleontological resources (fossils) encountered during permitted operations and will maintain the integrity of such resources pending subsequent investigation. All operations in the immediate area of the discovery must be suspended until written authorization from BLM to proceed is issued. An evaluation of the discovery shall be

made by a qualified archaeologist or paleontologist to determine appropriate actions to prevent the loss of significant cultural or scientifically important paleontological values.

29. No permanent improvements that affect the integrity of the bridge/culvert over Bat Cave Wash on historic Route 66 shall be implemented.

30. Actions that result in impacts to archaeological or historical resources are subject to the provisions of the Archaeological Resources Protection Act of 1979, as amended, and the Federal Land Policy and Management Act of 1976.

# 4.0 Biological Setting and Environmental Baseline

This section describes the biological setting and environmental baseline in the APE. The information in this section was obtained from several sources that may be found in Section 7.0.

## 4.1 Biological Setting

The APE is located approximately 15 miles to the southeast of the City of Needles along Interstate 40 in the easternmost portion of San Bernardino County, California (see Figure 1). Agriculture and public lands dominate the surrounding area. The APE includes areas within both California and Arizona (see Figure 2). The state boundary is located within the Colorado River, as shown on Figure 2. West of the Colorado River, the topography is abrupt, rising from around 450 feet msl at the river to over 1,200 feet above msl within 1 mile to the south and southwest. Slopes encountered west of the Colorado River reflect a series of ancient river terraces. East of the Colorado River within the HNWR (see Figure 2), dredge spoils rise approximately rise 30 feet above the river surface forming a mound of sand and tamarisk that gradually slopes back to water level and emergent vegetation at the Topock Marsh further east.

The Colorado River is the primary aquatic habitat located approximately 1,300 feet east of the Topock Compressor Station. The river is approximately 700 to 900 feet wide and 8 to 15 feet deep at this location (E&E 2000). Flood Insurance Rate Mapping is available on the Arizona-side of river (Panel No. 040058215C). However, mapping on the California side of the river (Panel No. 06071C5725) is not available. The interpretation of this limited information is that the 100-year floodplain elevation in the vicinity of the APE is approximately 460 feet msl based on information from the Flood Insurance Rate Mapping map that indicates a Zone A 100-year flood elevation in the Topock Marsh of 460 feet (Matt Johns, CH2M HILL, personal communication, 2006). Within the APE, the 460-foot contour is generally located on the Colorado River floodplain within approximately 30 feet of the river channel. However, in the vicinity of the BNSF Railway and Interstate 40 bridge crossings, the 460-foot contour extends approximately 300 feet from the river channel as evidenced by the dense vegetation in this area. East of the River, the 100-year floodplain encompasses the majority of the Topock Marsh.

Little to no submergent vegetation exists within the Colorado River. Small patches of emergent vegetation along the banks consist of common reed (*Phragmites communis*), cattails (*Typha* sp.), sedges (*Carex* sp.), and bulrush (*Scirpus* sp.). Several of these wetland patches are located at the confluence of Bat Cave Wash, near Moabi Regional Park, and the mouth to Topock Marsh. Larger wetlands and marshes exist along the eastern bank of the peninsula north of the Topock Marina. The Topock Marsh, extending northeast of the APE within the HNWR, provides important aquatic marsh and riparian habitat in the local vicinity. The

Colorado River functions as an important corridor for fish and migratory birds (CH2M HILL, 2004b, 2005a-d, g, i, 2006a-b; E&E, 2000).

Terrestrial habitats, typical of Mojave Desert uplands, in the APE consist of creosote bush scrub, Mojave wash, desert riparian, and tamarisk thicket. The dominant upland plant community is creosote bush scrub. The area is sparsely vegetated with widely distributed creosote bushes (*Larrea tridentata*). Other plant species that occur within this plant community include burrobush (*Ambrosia dumosa*), allscale (*Atriplex polycarpa*), split grass (*Schismus* sp.), spineflower (*Chorizanthe* sp.), desert trumpet (*Eriogonum inflatum*), beavertail cactus (*Opuntia basilaris*), golden cholla (*Opuntia echinocarpa*), brittlebush (*Encelia farinosa*), cheesebush (*Hymenoclea salsola*), dalea (*Dalea mollisma*), red barrel cactus (*Ferocactus pilosus*), sweetbush (*Bebbia juncea*), and ratany (*Krameria erecta*) (CH2M HILL, 2004b, 2005a-d, g, i, 2006a-b; E&E, 2000). The creosote bush and salt bush scrub plant communities comprise approximately 974 acres within the APE (Figure 6).

West of the Colorado River, the Mojave Wash habitat type is comprised of Bat Cave Wash and the other unnamed washes in the area. Bat Cave Wash is an ephemeral drainage that extends from the Chemehuevi Mountains to the Colorado River approximately 3,500 feet north of the Topock Compressor Station. Although this wash may periodically flood during stormwater runoff events, it remains dry throughout most of the year due to arid desert conditions. The wash floor is relatively barren of vegetation and consists of sand, gravel, and cobblestone substrate. Although the drainages occur within the creosote bush scrub plant community, several native tree species are associated with the washes including palo verde (*Cercidium* sp.), acacia (*Acacia greggii*), mesquite (*Prosopis* sp.), and smoke tree (*Dalea spinosa*). Desert riparian vegetation is predominately present at the confluence of Bat Cave Wash and the Colorado River. This plant community consists of scattered mesquite, palo verde, and salt cedar (*Tamarix* sp.) (CH2M HILL, 2004b, 2005a-d, g, i, 2006a-b; E&E, 2000). The salt cedar and mesquite combination plant community comprises approximately 3 acres within the APE on the California side of the River (Figure 6).

East of the Colorado River, the APE is a sand and salt cedar environment very similar to that found of the floodplain on the California side. North of the Topock Marina is an approximately 120-acre peninsula bordered by water to the west, south, and east. This area is within the HNWR and is also the southern portion of the Topock Marsh. The Topock Marsh is an extensive wetland community that extends from approximately the BNSF Rail northward for about 10 miles beyond the APE to the Fort Mojave Indian Reservation.

South of the Topock Marsh and the HNWR is the Topock Marina and other private property totaling approximately 30 acres. Development on the property includes the marina, multiple trailer sites, a restaurant, and residential dwellings. Also crossing this property is the BNSF railroad tracks, the Interstate 40, and natural gas transmission lines. The marina, restaurant and trailer sites are located near the mouth to the Topock Marsh. The residential dwellings and gas transmission lines are located just south of the Interstate 40. The habitat ranges from riverine to dry uplands and is highly altered to facilitate human occupation, transportation and energy transmission needs. Land use in the area is discussed in more detail in Section 3.1.

Salt cedar (also referred to as tamarisk) thicket is the dominant plant community along the Colorado River floodplain. This invasive, exotic plant species has displaced native plant

species. This plant community consists of dense monotypic stands of salt cedar with an understory of arrowweed (*Pluchea sericea*). The salt cedar and arrowweed plant communities comprise approximately 349 acres within the APE (Figure 6).

The aquatic habitat of the Colorado River supports several game fish species including striped bass (*Morone saxatillis*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), flathead catfish (*Pylodictis olivaris*), and channel catfish (*Ictalurus punctatus*) (CH2M HILL, 2004b, 2005a-d, g, i, 2006a-b; E&E, 2000).

Avian species commonly associated with the river include American coot (*Fulica americana*), mallard (*Anas platyrhynchos*), pied-billed grebe (*Podilymbus podiceps*), great egret (*Casmerodius albus*), great blue heron (*Ardea herodias*), northern rough-winged swallow (*Stegidopteryx serripennis*), and belted kingfisher (*Ceryle alcyon*). Other avian species found in the upland areas include red-tailed hawk (*Buteo jamencensis*), Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), common raven (*Corvus corax*), song sparrow (*Melospiza melodia*), Canyon wren (*Catherpes mexicanus*), brewer's blackbird (*Euphagus cyanocephalus*), great-tailed grackle (*Quiscalus mexicanus*), turkey vulture (*Cathartes aura*), greater roadrunner (*Geococcyx californianus*), lesser nighthawk (*Chordeiles acutipennis*), and rock dove (*Columba livia*) (CH2M HILL, 2004b, 2005a-d, g, i, 2006a-b; E&E, 2000).

Mammals that may occur in the APE include deer mouse (*Peromyscus maniculatus*), Merriam kangaroo rat (*Dipodomys merriami*), whitetail antelope squirrel (*Ammospermophilus leucurus*), desert woodrat (*Neotoma lepida*), California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*), and black-tailed hare (*Lepus californicus*), coyote (*Canis latrans*), desert kit fox (*Vulpes macrotis*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), stripped skunk (*Mephitis mephitis*), beaver (*Castor canadensis*), and raccoon (*Procyon lotor*) (CH2M HILL, 2004b, 2005a-d, g, i, 2006a-b; E&E, 2000).

Reptiles that may occur in the area include chuckwalla (*Sauromalus obesus*), side-blotched lizard (*Uta stansburiana*), western whiptail lizard (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), and western diamondback rattlesnake (*Crotalus atrox*) (CH2M HILL 2004b, 2005a-d, g, i, 2006a-b; E&E 2000).

## 4.2 Environmental Baseline

The APE lies within a larger area of significant cultural and sacred tribal resources. In addition, the Colorado River itself is of spiritual and cultural importance to local tribes (Applied Earthworks, 2004; CH2M HILL, 2004a). Over time, the Colorado River corridor has undergone many changes influenced by past and present federal, state, or private actions, which comprise the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process (50 CFR 402.02). However, for purposes of this PBA, ongoing activities discussed under Section 3.2 (Past and Present Activities) are assessed for potential impacts to listed species and are included in the related ESA consultation.

By 1852, the first steamboat traveled up the Colorado River to resupply Fort Yuma. This marked the beginning of the steamboat trade that would have profound effects on the mature riparian areas along the river (Lingenfelter, 1978). The Colorado River Gold Rush began in 1862 (Lingenfelter, 1978). The gold rush fueled steamboat trade along the lower Colorado River. Initially, downed, dried cottonwood, willow, and mesquite trees were used as fuel for the steamboats (Ives, 1861). Increased river traffic soon used all of the available wood debris, and crews began cutting down large quantities of cottonwoods, willows, and mesquites. By 1890, most of the large cottonwood-willow stands and mesquite bosques had been cut down (Ohmart et al., 1988; Grinnell, 1914). The railroad crossing at Needles by the Atlantic and Pacific Railroad in 1883 resulted in the end of steamboat trade along the lower Colorado River (LaRue, 1916).

By the late 1800s, salt cedar was introduced into the United States as an ornamental tree and soon it escaped cultivation. Expansion of its range was rapid by the early 1900s (DeLoach, 1989). By 1920, salt cedar appeared along the mainstem of the Colorado River (Ohmart et al., 1988). This species adapted to the altered riverine ecosystem and displaced native riparian species throughout the lower Colorado River. Important wildlife habitats, including the cottonwood-willow gallery forests, have all but disappeared from the Colorado River and have been replaced by the less desirable salt cedar (Anderson and Ohmart, 1984).

In 1910, Joseph Grinnell led a 3-month expedition from Needles to Yuma to collect data on mammals, birds, and associated habitats. The expedition provided one of first detailed accounts of the flora and fauna of the lower Colorado River. Grinnell documented the loss of riparian habitat to agriculture during his expedition (Grinnell, 1914).

Starting in the 1930s, federal actions consisted of the channelization of the Colorado River and the construction of several dams, including the Hoover Dam, Parker Dam, and Davis Dam. The changes to the natural river flows significantly altered available fish habitats and reduced the river's ability to meander and create or destroy backwaters and marshes. Alleviating the threat of floods also allowed for conversion of riparian areas to agricultural uses. In addition, USBR implemented intermittent riverbank stabilization and dredging programs from 1951 to today. As part of the mitigation for the various river control projects, USBR has undertaken to improve and enhance backwater and marsh areas (USBR, 1996, 2000, 2002, 2004).

Specific to the APE, several past activities have occurred within or adjacent to the site. In the southern section of the APE, PG&E owns and operates a compressor station and gas transmission line (Figure 2). A biological opinion was obtained to cover the operations and maintenance of this facility and associated pipelines (USFWS, 2000a). Ongoing and planned investigative and remedial activities are related to an existing chromium plume in groundwater (Figure 2). As described in Section 3.2.6, a groundwater treatment facility was recently constructed on land owned by PG&E (Figure 3), along with associated groundwater wells within the upland and floodplain (see IM No. 3 discussion in Section 3.2.6 and Appendix C for additional details). Near the treatment facility, there is evidence of an old abandoned quarry pit and World War II-era military training exercises. A major gas utility and travel corridor are located between the compressor station and treatment facility. The corridor includes Interstate 40, BNSF railroad, and four natural gas transmission lines (Figure 2). A substantial amount of train and vehicular traffic and associated noise and air emissions are generated along this corridor. Also intersecting the APE are several

alignments of Historic Route 66, which attracts tourists to the APE and vicinity. Moabi Regional Park, managed by San Bernardino County, is located in the far northern section of the APE. This regional park contains facilities for mobile homes, campers, and boaters. A marina leads into the park from the Colorado River. The small town of Topock, with several mobile homes, a restaurant, and marina, is located along the southeastern section of the APE in Arizona (Figure 2).

The proposed project is within the HNWR. Recreational activities within the HNWR include sightseeing, boating, bird watching, fishing, hunting, and camping. Prior damming and channelization of the Colorado River have significantly altered the aquatic, marsh, and riparian habitats associated with the river. These water control and diversion actions have also contributed to increased housing development along the river and facilitated an increase in the intensity of river-related recreation (including watercraft, fishing, and hunting) (USBR, 1996, 2000, 2002, 2004).

The Colorado River has been stocked with various game fish that have been linked to predation of native listed fish species (USBR, 2004). The invasion of salt cedar along the Colorado River has significantly altered riparian habitat. This exotic tree dominates and displaces native plant communities. The USBR is responsible for managing the river and has consulted with USFWS on its actions (USBR, 1996, 2000, 2002, 2004). Several biological opinions have been issued to the USBR (USFWS, 1997a-b, 2002, 2005a). A Multi-Species Conservation Plan (MSCP) and Multi-Species Habitat Conservation Plan (MSHCP) recently have been developed for the Colorado River (USBR, 2004).

# 5.0 Species and Habitat Description, Effects of the Action, and Relevant Reports

## 5.1 Introduction

This section describes the status, natural history, distribution, and abundance of federally listed species that may occur or are known to occur within or near the APE. This section also analyzes the potential effects to each species and its critical habitat resulting from on-going and future investigative and interim remedial activities that may occur prior to the implementation of the final remedy. Table 1 provides a list of planned activities and a summary of the area estimated to be used during implementation. A background search of available documents and databases was performed in preparation for this PBA and the information in this section was obtained from several sources (AGFD, 2004; USBR, 1996, 1999, 2000, 2002, 2004; CNDDB, 2003; CDFG, 2003; CH2M HILL, 2004b, 2005 a-h, 2006a-c; E&E, 2000; USFWS, 2004; USFWS, 2005a).

In March 2005, a work plan was produced and submitted to USFWS, BLM, and California Department of Fish and Game representatives describing proposed surveys within suitable habitat for the SWFL, Mojave desert tortoise, and Yuma clapper rail within the APE (Figure 7) (CH2M HILL, 2005a). Surveys were proposed according to USFWS-approved protocols (Sogge et al., 1997; USFWS 1990c; USFWS 2000b). The 2005 and 2006 flycatcher and tortoise surveys were conducted in accordance with these protocols (GANDA, 2005a-b and 2006a-b), and a brief summary of the survey results are included in this section. Based on prior discussions, PG&E received a letter from USFWS HNWR staff in January 2005 requesting that protocol surveys for clapper rail not be performed because HNWR staff were interested in avoiding duplication of prior USFWS survey efforts and were concerned with potential added stress to the clapper rail (USFWS, 2005c). Accordingly, PG&E did not perform surveys for this species. The USFWS stated that it would share data collected from the 2004 and 2005 surveys with PG&E. The USFWS data results are briefly summarized in this section (USFWS, 2005d; Fitzpatrick, 2006). The 2005 work plan and survey reports are attached to this PBA as Appendix E. Overall the management measures identified in Section 3.4 are intended to avoid, reduce, or mitigate potential direct, indirect, and cumulative effects to these species and habitats.

## 5.2 Terrestrial

### 5.2.1 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

#### 5.2.1.1 Status

The SWFL (*Empidonax traillii extimus*) was listed as federally endangered on February 27, 1995 (USFWS, 1995). Critical habitat was designated on October 19, 2005 (USFWS, 2005b). The SWFL Recovery Plan was released on March 5, 2003 (USFWS, 2003). The SWFL was listed as endangered by the state of California in 1991.

Several factors have caused the decline in SWFL populations. Extensive areas of suitable riparian habitat have been lost due to river regulation and channelization, agricultural and urban development, mining, road construction, and overgrazing (Tibbitts et al., 1994). As a result of habitat fragmentation, cowbird (*Molothrus ater*) nest parasitism has increased. The invasion of the exotic tamarisk has also altered the riparian ecosystem in the Southwest. Willow flycatcher nesting has been documented in tamarisk stands along the Colorado River. Many of the observations of SWFL since 1993 have occurred in habitat dominated by tamarisk (Koronkiewicz et al., 2005). This provides strong evidence that successful breeding is occurring in tamarisk on the Lower Colorado River. Because of low population numbers rangewide, identifying and conserving SWFL breeding sites is thought to be crucial to the recovery of the species (USFWS, 2003).

#### 5.2.1.2 Natural History, Distribution, Abundance and Habitat

The SWFL is one of four subspecies of willow flycatcher. *Empidonax* flycatchers are noted for their physical similarities and the difficulty in identifying individuals in the field. This species is a small bird, approximately 14.6 centimeters (5.75 inches) long, with a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish body. Two white wing bars are visible. The upper mandible is dark, the lower is light. The most distinguishable taxonomic characteristic of the SWFL is the absent or faintly visible eye ring. This willow flycatcher can be differentiated from other species by its distinctive "fitz-bew" song. As an insectivore, it forages within and above dense riparian vegetation taking insects on the wing and gleaning them from the foliage. It also forages along water edges, backwaters, and sandbars adjacent to nest sites (Tibbitts et al, 1994). The current estimate of the rangewide SWFL population is between 1,100 and 1,200 pairs/territories (Koronkiewicz et al., 2005). From 1997 to 2004, breeding populations of SWFL were documented at seven study areas along the Virgin and Lower Colorado Rivers and tributaries (Koronkiewicz et al., 2005).

The SWFL breeds in dense riparian habitats in all or part of seven southwestern states, from sea level in California to over 2,600 meters (8,550 feet) in Arizona and southwestern Colorado (Sogge et al., 1997). This particular species breeds only in dense riparian vegetation near surface water or saturated soil. Along the Colorado River , they may typically nest in riparian habitat characterized by a dense stand of intermediate-sized shrubs or trees, such as willows (especially *Salix gooddingii*), *Baccharis*, or arrowweed (*Pluchea sericea*), usually with an overstory of scattered larger trees, such as cottonwoods (*Populus fremontii*). Occupied habitat always has dense vegetation in the patch interior regardless of the plant composition and height. These dense patches are often interspersed with small openings, open water, or sparser vegetation, creating a mosaic that is not uniformly dense (Sogge et al., 1997).

Riparian patches used by breeding flycatchers vary in size and may be a relatively dense, linear, contiguous stand or an irregularly shaped mosaic of dense vegetation with open areas. SWFLs are known to nest in patches as small as 0.8 hectare (2 acres) to as large as several hundred hectares (Sogge et al, 1997). The mean size of flycatcher breeding habitat patches is 8.5 hectares (21.2 acres) (Sogge et al, 1997; USFWS, 2003). Habitat patches as small as 0.5 hectare (1.23 acres) may support one or two nesting pairs (USFWS, 1995). Sogge et al. (1993) found territorial flycatchers in habitat patches ranging from 0.5 to 1.2 hectares (1.23 to

2.96 acres). However, this species has not been observed nesting in narrow, linear riparian habitats that are less than 10 meters (30 feet) wide, although they may use such linear habitats during migration (Sogge et al., 1997; USFWS, 2003). In the southwest, several willow flycatcher breeding territories are found within small breeding sites containing five or fewer territories; only two sites are known to have 50 or more territories (Gila and Rio Grande). The Hoover to Parker Management Unit that includes the Topock Marsh contains approximately 21 territories (Sogge et al., 2003).

Nesting habitat almost always contains or is adjacent to water or saturated soil. With the loss of preferred habitat throughout the southwest, SWFL have been observed using tamarisk thickets for nesting. Nearly 50 percent of willow flycatcher territories occur in mixed native/exotic habitat, and 25 percent are at sites where tamarisk is dominant (Sogge et al., 1997). Flycatchers nest in tamarisk at many river sites and, in many cases, use tamarisk even if native willows are present. Tamarisk eradication can be detrimental to willow flycatchers in mixed and exotic habitats, especially in or near occupied habitat or where restoration is unlikely to be successful. Risks to the flycatcher increase if the tamarisk control projects are implemented in the absence of a plan to restore suitable native riparian plant species or if site conditions preclude the reestablishment of native plant species of equal or higher functional value. Threats also increase if the eradication projects are large-scale, thus possibly setting the stage for large-scale habitat loss (USFWS, 2005a).

Migrant SWFLs may occur in nonriparian habitats and riparian habitats unsuitable for breeding. These migration stopover areas, even though not used for breeding, may be critically important sites affecting local and regional flycatcher productivity and survival (Sogge et al., 1997). One of the last long-distance, neo-tropical migrants to arrive in North America during spring migration, willow flycatchers have a short (approximately 100-day) breeding season, with individuals typically arriving in May or June and departing in late August. All four subspecies of willow flycatchers spend the non-breeding season in portions of southern Mexico, Central America, and northwestern South America. Willow flycatchers have been recorded on the wintering grounds from central Mexico to southern Central America as early as mid-August, and wintering resident individuals have been recorded in southern Central America as late as the end of May.

#### 5.2.1.3 Recent Findings

The APE is located between two SWFL study areas—the Topock Marsh and Topock Gorge. In 2004, USBR contracted Steven W. Carothers and Associates (SWCA) to perform surveys for SWFL at these study areas. During this survey, SWCA recorded 65 and three SWFL individuals within Topock Marsh and Topock Gorge, respectively (Koronkiewicz et al., 2005).

Nesting and migratory habitat for the SWFL exists within and near the APE. The nesting and migratory period for SWFLs occurs May (arrival) through September (departure). Tamarisk and arrowweed are the dominant vegetation types within the portion of the APE that is associated with the Colorado River floodplain. The dense tamarisk thickets are considered suitable nesting, roosting and foraging habitat for willow flycatchers.

East of the river, suitable nesting habitat exists in the Topock Marsh where nesting pairs of SWFLs have been documented within 4 miles of the APE. Along the northeastern edge of

the APE exists a contiguous band of suitable habitat (approximately 42 acres) that could support a nesting pair of SWFLs (Figure 7). However, the annual protocol surveys conducted in 2005 and 2006 have not documented SWFLs nesting in this area. The topography along this peninsula from west to east consists of rolling sand dunes increasing in elevation from the levee road to an additional 20 feet and decreasing to tamarisk thicket and eventually to marsh habitat.

Within the APE and west of the Colorado River, less suitable SWFL nesting habitat exists that may be used for roosting and foraging during migration. These thickets are concentrated below the BNSF Railway and Interstate 40 bridge (approximately 6 acres), near the Bat Cave Wash and Colorado River confluence (approximately 5 acres), near the unnamed wash and Colorado River confluence directly northwest of Bat Cave Wash (approximately 3 acres), and near Park Moabi Marina (approximately 7 acres) as shown on Figure 7. Each of these tamarisk thickets constitute a very small portion of the total APE, ranging from about 0.5 percent to 2.0 percent of the APE as shown in Table 2. These patches tend to be fragmented and subject to human disturbance, two factors that may decrease the habitat value for the species (GANDA, 2005b).

While tamarisk thicket habitat exists in the APE, this species is not expected to nest within or directly adjacent to the APE based on past USBR annual surveys that indicate flycatchers are selecting the higher-quality habitat at the Topock Marsh and Gorge (Koronkiewicz et al., 2005). Although tamarisk habitat exists within the APE, the vegetation density, habitat structure, and patch-size of thickets are sparser, smaller, and more fragmented in comparison to observed/known breeding habitat within the Topock Marsh. Additionally, SWFLs are not known to nest in mesquite, palo verde, and acacia trees (Sogge et al., 1997), which are the other tree species in the APE. Furthermore, there is no known breeding habitat within the APE where flycatcher reproductive success and survivorship has resulted in a stable or growing population.

To assess SWFL presence or absence, PG&E contracted GANDA in 2005 and 2006 to perform USFWS protocol surveys of potential suitable habitat within the APE. (Figure 7; CH2M HILL, 2005b; GANDA, 2005b). The methodology followed the protocol for project related surveys that recommends five surveys be conducted during three survey periods, with three surveys occurring during the last survey period. These periods are from May 15 to 31, June 1 to 21, and June 22 to July 17 (Sogge et al., 1997; USFWS, 2000b). On June 7, 2005, one possible willow flycatcher was detected near Moabi Regional Park. Although the bird was visually identified as a willow flycatcher, the distinctive "fitz-bew" call required for positive identification was not heard. This bird was possibly a transient since there were no subsequent detections of this species (GANDA, 2005b). Other than this single observation, no other willow flycatchers were seen or heard during the 2005 protocol survey of the APE. (Appendix E).

In 2006, the protocol surveys for the SWFL were repeated within the APE. The methodology was identical to the survey conducted in 2005. Results of the survey reported no detection of SWFLs within the APE during this period (GANDA, 2006b).

Additionally, biological monitors have logged several hundred hours in performing preactivity surveys on the California floodplain in compliance with the mitigation measures

detailed in Section 3.4 and the revised well sampling procedures. These surveys required that a qualified biologist monitor a 200-foot circle for migratory bird nests around the work area prior to construction related activities. This monitoring occurs from March 15 – September 30. To date, no active nests of any migratory birds have been documented.

#### 5.2.1.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. Specific actions occurring within or adjacent to suitable habitat in the floodplain have the potential to affect the species. This includes the floodplain groundwater monitoring programs, IM No. 3 floodplain operations, floodplain soil sampling, floodplain well installations, floodplain in-situ pilot study, seismic bedrock studies, slant drilling, activities similar to the pore water study, and floodplain restoration.

The following activities are not expected to have an effect to this species due to unsuitable habitat at the specific project location: IM No. 2 decommissioning, IM No. 3 upland operations, upland soil sampling, *in-situ* upland pilot study, and upland restoration including the MW-20 bench and IM No. 3 staging area. These sites are located within the upland that does not support the riparian vegetation and other characteristics commonly associated with flycatcher habitat.

The project activities proposed by PG&E will occasionally involve the use of heavy equipment including, but not limited to, backhoes and drill rigs that may be used to remove vegetation, grade the ground surface, and drill groundwater monitoring wells within the floodplain. This equipment can create substantial ground disturbance and noise.

Operational activities associated with monitoring the wells include personnel collecting water samples weekly, biweekly, or monthly. A small hand-held generator may be used for power to activate the submersible pumps during water collection. The generators' noise output is minimal enough that a conversation can occur. If these activities are performed within or adjacent to suitable flycatcher habitat, this action may lead to alterations of SWFL behavior. However, the lack of SWFL presence within the APE suggests that the probability of negatively altering SWFL behavior during operations and any future construction-related activities would be low. Further, the magnitude of project effects may be difficult to discern from other potentially impacting transportation activities (i.e., the Interstate-40 and the BNSF Railroad) and recreational activities (e.g., watercraft) that occur with regularity within the APE.

The Colorado River may function as a migration corridor for the SWFL. During migration periods, this species may briefly stop to roost and/or forage within or adjacent to the APE. Potential roosting and foraging habitats include the tamarisk patches located at Bat Cave Wash and an adjacent unnamed wash, under the BNSF railroad and Interstate 40 overpasses, near Park Moabi Regional Park, and the eastern edge of the APE (Figure 6) (CH2M HILL, 2005a-b). Because flycatchers may potentially use the habitat in the APE for roosting and foraging during the spring and fall migration seasons, it is possible that operational activities could alter the behavior of migrating individuals, but as discussed, the potential for impact is considered low. The greatest potential for direct effects to SWFL would be within the short migratory period during arrival (May – June) and departure (July

– September) when individuals could be passing through the APE to/from more suitable nesting locations.

Potentially suitable habitat for SWFL nesting exists within the 42 acres along the eastern edge of the APE located on the HNWR in Arizona. Habitat elements such as patch size, shrub density and the presence and/or location of water provide the appropriate habitat structure and features to allow for this behavior. However, annual surveys conducted in 2005 and 2006 have not documented any nesting or presence of SWFLs utilizing this habitat patch within the APE. Potential sites for additional monitoring wells include the levee road near the eastern shore of the Colorado River, approximately 230 feet from the edge of this suitable habitat. The 10- to 20-foot elevation increase of the topography between the wells and this habitat eliminates any direct line-of-sight and provides a buffer from project activities. Based on the combination of annual survey results, distances of wells to habitat, topography between wells to habitat and the application of conservation measures, any direct effects to nesting or migratory SWFLs would be low to none.

In May 2006, the well access and monitoring procedures were refined to further minimize any potential impacts to this species and reduce the amount of time in the field for sampling techniques due to human health and safety concerns, while maintaining quality control requirements for sample collection (CH2M HILL, 2006b). The duration of the modified sampling procedures is from May 1 through September 30, 2006, during the flycatcher breeding season. Several conservation measures were outlined as part of the revised procedures and will be carried forward under the scope of this PBA. A biologist is assigned to the well sampling teams during the SWFL period. The biologist is responsible for awareness training, preactivity surveys, compliance monitoring, and reporting. In response to informal consultation regarding the revised procedures, a USFWS letter dated 28 April 2006 concurred with a "may affect, not likely to adversely affect" determination made by the BLM for the SWFL (USFWS, 2006).

Project-related construction and operational activities will not occur within cottonwood-willow stands and therefore will have no effect upon the Colorado River's overall balance of remaining cottonwood-willow stands that historically were the native habitat for this species. Over time, tamarisk acreage resulting from human population growth in the Colorado River corridor has significantly increased along the Colorado River and the larger thickets are known to serve as SWFL breeding habitat. Several individual and small stands of tamarisk are expected to be affected as a result of the proposed actions (Table 2). To avoid and minimize habitat disturbance, sparsely vegetated areas within the floodplain have typically been selected in the past and the intent is to continue this practice for implementing future actions. In addition, every effort will be made to avoid dense contiguous stands of tamarisk greater than 1.0 acre and any associated vegetation. Limited riparian vegetation, primarily smaller patches or individual plants of tamarisk and arrowweed, may be crushed or trimmed as a result of the proposed actions. A 2.5-acre disturbance threshold will be followed in an attempt to lessen the potential effects to the species and habitat. Exceeding the 2.5-acre threshold will require consultation with the USFWS and may require possible mitigation.

#### 5.2.1.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. The possible actions that may occur will more than likely be extensions of current projects such as the installation and burying of groundwater conveyance pipeline; creation of additional access roads; and construction of additional well sites. These activities would require heavy equipment, trucks, materials, and crews to implement. Any indirect effects are considered to be low.

The decommissioning of the IM No. 3 facilities may begin within the time frame of this PBA (i.e., before the end of 2012). This action will require the use of heavy equipment, trucks and personnel to teardown and remove building material. This is primarily an upland activity and any indirect effect would be low to none.

No changes in land use patterns are foreseen.

#### 5.2.1.6 Cumulative Effects

Cumulative effects include future state and private activities, excluding federal activities, that are reasonably certain to occur within the action area. The interim and remedial actions that may occur within the APE focus on the cleanup of soil and groundwater. It is reasonably certain that additional investigative and remedial activities very similar to the actions that have been implemented to date will occur. The level and use of equipment, materials and personnel will be similar as well. However, the loss or manipulation of floodplain habitat is expected to be required to conduct these and future unspecified activities. This loss may be sufficient enough to reduce the habitat value and thus alter SWFL use and behavior. Habitat loss is defined as the removal of trees and perennial shrubs. The trimming of vegetation is not considered habitat loss.

Future state and private actions separate from PG&E that are reasonably certain to occur within the project vicinity include continued recreational activities associated with the Colorado River such as boating, camping, and fishing. Additionally, operations and maintenance of existing infrastructure such as the gas pipelines, railroad, Interstate 40 and other nearby roads and utilities are anticipated.

#### 5.2.1.7 Critical Habitat Effects Determination

The nearest critical habitat for the SWFL is located at Big Sandy River located approximately 50 miles east of the APE (USFWS, 2005b). PG&E's activities are located outside designated critical habitat for the SWFL. An effects determination of "no effect" to critical habitat is concluded.

#### 5.2.1.8 Effects Determination

There has been no positive identification of a SWFL during the 2005 and 2006 protocol surveys of the APE (GANDA, 2005b and 2006b). Although the results from two protocol surveys may be limited to determining presence/absence, it does provide the best available science specific to SWFLs within the APE. To date, no take of SWFLs (or any other migratory birds) has occurred within the APE from project activities.

The best opportunity for nesting SWFLs in the APE would occur in the tamarisk thickets along the eastern edge of the APE in Arizona. However, the distance from potential well

locations near the levee road along the eastern shore of the Colorado River in conjunction with the 20 foot increase in the topography would provide a buffer from activities if SWFLs were inclined to attempt to nest in this location. These buffer features would allow for migratory activity to occur unimpeded. Additionally, annual and pre-project surveys will be conducted to identify the presence of SWFLs and adapt operations to minimize any potential for effects. Further, if project activities (primarily those utilizing heavy equipment for the construction and development of wells) occurred before the March 15 migratory bird dates, any potential effects would be a non-issue.

Nesting of SWFLs is considered unlikely west of the Colorado River within the California portion of the APE. This can be attributed to the lack of appropriate vegetation composition, habitat structure, microclimate, and presence of water or moist soils. Negative effects to nesting SWFLs are not anticipated to occur.

Seasonal migratory use of habitat on the floodplains of California and Arizona can be anticipated to occur along the Colorado River as SWFLs move to and from other known breeding locations. Project activities therefore could influence activity during this period. To further the knowledge of SWFLs within the APE and to help guide in the conservation of this species, annual USFWS protocol surveys will be conducted to determine presence or absence of SWFLs and pre-construction surveys will be conducted during the migratory/nesting season by biological monitors.

Future project activities, under guidance of the identified mitigation measures presented in Section 3.21 will help to avoid, reduce, and mitigate operational impacts to the biological environment within the APE. It is estimated that additional Tamarisk habitat may be lost, removed, or manipulated to conduct activities. This may be sufficient to reduce habitat value and alter SWFL behavior. Under this PBA the following conservation measures, not replacing those already identified, will be imposed.

1. The intent of PG&E will be to minimize the net increase of disturbed habitat in the APE.

2. Construction and development activities that use heavy equipment should be completed prior to March 15. The use of any heavy equipment in or near SWFL habitat after March 15 will be required to be reassessed and additional conservation measures considered. Preferably such activities would occur from Oct 1 to March 15.

3. To the extent feasible, future project activities within the sensitive areas identified on Figure 8 (i.e., potential SWFL habitat, wetlands, 100-year floodplain, and a 60-foot buffer from the Colorado River) should be avoided. Further, if greater than 2.5 acres of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible mitigation may be required. Habitat loss is defined as the removal of trees and perennial shrubs. The trimming of vegetation is not considered habitat loss.

4. The previously consulted upon modified well access and sampling procedures implemented in 2006 in SWFL habitat will be used under this PBA and will be implemented from May 1 – September 30.

Southwestern willow flycatcher use of the APE cannot be rejected and future project activities are anticipated to occur on the Arizona and California floodplains in or near suitable nesting/migratory habitat along the Colorado River and within the Topock Marsh on the HNWR. However, based on the location of project activities and distance from recorded SWFL nesting habitat; the non-conducive distribution, composition and structure of habitat conditions in or adjacent to the APE; the non-documentation of nesting and/or migratory SWFLs obtained from annual surveys in potentially suitable habitat; and accompanied with the application of the above conservation measures identified in this section, the effects of project activities to the SWFL could not be meaningfully measured, detected or evaluated and are not expected to occur. Therefore, any potential direct or indirect effects from project activities are either insignificant or discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

## 5.2.2 Mojave Desert Tortoise (*Gopherus agassizii*)

### 5.2.2.1 Status

The desert tortoise was listed as federally threatened on April 2, 1990 (USFWS, 1990b). Critical habitat was designated on February 8, 1994 (USFWS, 1994b). The Desert Tortoise Recovery Plan was released on June 28, 1994 (USFWS, 1994a). The desert tortoise was listed as threatened by the state of California in 1989.

The decline in the desert tortoise population is primarily due to habitat loss, degradation, and fragmentation resulting from increased human population and urbanization in the desert and arid regions of the southwestern United States. The increase in urbanization, collection of tortoises for pets, overgrazing, landfills, subsidized predation, highway mortality, vandalism, agriculture, fire, drought, and offroad vehicle use have all contributed to the decline of the tortoise in the wild. Another important reason for the tortoise decline in the western Mojave Desert is the introduction of an upper respiratory tract disease into many of the wild populations (USFWS, 1990b, 1994a).

### 5.2.2.2 Natural History, Distribution, Abundance, and Habitat

The desert tortoise is a large herbivorous terrestrial reptile. It has a high-domed shell that can reach a length of 36 centimeters (14 inches). The animal has stocky, elephant-like limbs and a short tail. The carapace (upper shell) is brown, and the plastron (lower shell) is yellow—both exhibiting prominent growth lines. Adult males can be distinguished from females by the concavity toward the rear of their plastron. Adult males also have larger chin glands and a longer tail and gular horn than females (Stebbins, 1985).

The adult desert tortoise is active from mid-March or April to November and, during the winter months, is dormant in underground burrows (Luckenbach, 1982). Desert tortoises will congregate in winter dens during colder weather, and then spread out to nearby areas during moderate weather in the spring and fall and retreat into short individual burrows or under shrubs during more extreme heat in summer (Woodbury and Hardy, 1940). During the summer active period, desert tortoises have home ranges from 12.7 to 72.1 hectares (5-29 acres) (O'Conner et al., 1994). During active periods, tortoises feed on a wide variety of herbaceous plants, including cactus, grasses, and annual flowering plants (USFWS, 1994a).

Desert tortoises may live beyond 80 years and have a relatively slow rate of reproduction. Sexual maturity is reached at 15 to 20 years of age. Mating generally occurs in the spring (mid-March to late-May), with nesting and egg-laying occurring from May to July (Rostral et al., 1994). The female tortoise lays her eggs in a hole approximately 7 to 10 centimeters (2.7 to 3.9 inches) deep dug near the mouth of a burrow (Woodbury and Hardy, 1948). Following egg-laying, the female covers the eggs with soil. Clutch size ranges from 2 to 14 eggs, with an average of 5 to 6 eggs (Luckenbach, 1982). Desert tortoise eggs typically hatch from August through October. These hatchlings are provided a food source in the form of an egg yolk that is assimilated into the underside of the shell. This yolk sac will sustain the animal for up to 6 months. The hatchling desert tortoise will go into hibernation in the late fall but can be active on warm sunny or rainy days (Luckenbach, 1982).

The desert tortoise can be found in desert and arid regions from southern Nevada and extreme southwestern Utah to northern Sinaloa, Mexico, southwestern Arizona west to the Mojave Desert, and eastern side of the Salton Basin, California (Stebbins, 1985). The desert tortoise can be divided into two distinct races, the Mojave and Sonoran, based on morphological and genetic characteristics.

The Mojave race is associated with the Mojave Desert in California, Nevada, and Utah, as well as a portion of Arizona. This race is primarily associated with flats and bajadas (shallow slopes that lie at the base of rocky hills), with soils ranging from sand to sandy-gravel but firm enough for the tortoise to construct burrows. In California, this desert tortoise is most commonly found in association with creosote bush scrub, with inter-shrub space for growth of herbaceous plants (USFWS, 1994a).

The Sonoran race is associated with the Sonoran Desert in Arizona. This race is found predominantly on steep rocky slopes of mountain ranges or sloping foothills primarily in Arizona upland vegetation dominated by palo verde and saguaro cactus (USFWS, 1990b).

#### 5.2.2.3 Recent Findings

In 2004, 2005, and 2006 PG&E contracted CH2M HILL and GANDA to perform USFWS protocol presence/absence surveys for the desert tortoise. No live desert tortoises were detected within the survey area. However, three disarticulated desert tortoise carcasses were observed. Two carcasses were associated with ephemeral drainages. The third carcass was observed on a mesa top. Each carcass was estimated to be more than 4 years old. The carcasses observed in the drainages may have washed in from outside the survey area during a rainstorm. This interpretation is based on the location of the finds, surrounding topography, and the lack of any other desert tortoise sign within the survey area. The desert tortoise carcasses may indicate historical use of the area, however, no live desert tortoises, scats, tracks, or other evidence of recent use was observed. Burrows with entrances large enough to accommodate a desert tortoise were also observed during the surveys. The possible desert tortoise burrows had no scat, tracks, or other signs within or surrounding the burrows and were likely created by a black-tailed jackrabbit or other burrowing mammal species (CH2M HILL, 2005b; GANDA, 2005a, 2006a). The annual reports documenting the desert tortoise survey results may be referenced within Appendix E.

Based on the survey results, desert tortoises were concluded to be absent in the APE. Despite the absence of live tortoise observations, there is a possibility that desert tortoises

could enter the survey area. While it is possible that the desert tortoise could enter the APE from the west, the quality of the present creosote bush scrub habitat is poor, typically lacking of annual vegetation for forage and burrows for shelter. Combined with the presence of steep rocky slopes of the Chemehuevi Mountains and associated deep drainages, these conditions make permanent occupation of the survey area unlikely. Additionally, past disturbances and fragmentation by pipeline corridors, roads, Interstate 40, the BNSF railroad, Topock Compressor Station, evaporation ponds, and other manmade facilities further degrade the habitat (CH2M HILL, 2005b; GANDA, 2005a, 2006a).

#### 5.2.2.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. Specific actions occurring within suitable habitat in upland areas have the potential to affect this species. These include upland groundwater monitoring programs, IM No. 3 upland operations, upland soil sampling, upland well installations, *in-situ* upland pilot study, and upland restoration activities.

The following activities, associated with the floodplain, are not expected to have an effect to this species due to unsuitable habitat at the specific project location: IM No. 2 decommissioning, pore water study, seismic bedrock studies, slant drilling, floodplain soil sampling, floodplain well installations, and floodplain restoration.

A large portion of the APE (approximately 988 acres) is located on the uplands within desert habitat that is referred to as creosote bush scrub (Figure 6). Although the area is considered poor desert tortoise habitat, a transient could enter the site. It is intended that project-related construction and operational activities will be designed to have a minimal effect on the creosote bush scrub plant community. No more than 3 acres of creosote bush scrub are expected to be affected by the proposed actions. Under additional protection measures of tribal cultural resources in the uplands, any direct effects to the habitat or landscape will be closely evaluated and minimized.

The project activities proposed by PG&E on the uplands will occasionally involve the use of heavy equipment including but not limited to graders, backhoes, drill rigs, and water trucks that may be used to remove vegetation, grade the ground surface including dirt roads, extract soil samples, drill monitoring wells, and install other facilities. This equipment can create substantial ground disturbance and noise. The project also includes the continued operations of IM No. 1 and IM No. 3 involving vehicles traveling on dirt roads to access sites and associated human activity. Existing routes will be utilized wherever possible. Any direct effects to the creosote bush scrub habitat would be low.

Operational activities associated with monitoring the wells include personnel collecting water samples biweekly, weekly, or monthly. A small hand-held generator typically is used for power to activate the submersible pumps during water collection. The generator's noise output is minimal but may distract this species. These activities will be performed within suitable but poor habitat. The potential for direct effects to the desert tortoise involves the possibility of a transient entering the APE. However, based on past survey findings and a full-time biological monitor onsite conducting preactivity surveys, the probability of potential impact is considered low. Additionally, negative affects to tortoises may be further complicated by nearby natural and manmade barriers such as the Chemehuevi

Mountains, Colorado River, BNSF railroad, and I-40 Interstate fragmenting the landscape. Any direct effects associated resulting from operational activities would be insignificant and discountable.

As with construction and maintenance actions, there is a risk of altering individual tortoise behavior from the restoration of degraded sites (Figure 5). This will involve recontouring, removing structures, driving trucks, using bobcats, and replanting native vegetation, for example. Once established, the restoration will improve the quality of the creosote bush scrub habitat for this species and other wildlife species. Any direct effects associated with restoration will be beneficial to this species and habitat.

#### 5.2.2.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. The possible actions that may occur will more than likely be the extension of projects such as the installation and burying of groundwater conveyance pipeline; creation of additional access roads; and construction of additional well sites. These activities would require heavy equipment, trucks, materials and crews to implement. The decommissioning of the IM No. 3 facilities may begin within the time frame of this PBA (i.e., before the end of 2012). This action will require the use of heavy equipment, trucks and personnel to teardown and remove building material.

No changes in land use patterns are foreseen.

#### 5.2.2.6 Cumulative Effects

Cumulative effects are of those future state and private activities, excluding federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation. Any future investigative and remedial actions that may occur within the APE are focused at the cleanup of hexavalent chromium within the groundwater. It is reasonably certain that future investigative and remedial activities beyond, but similar to, those actions that have been implemented to date will occur. The level and use of equipment, materials and personnel will be similar as well. The loss of up to 3.0 acres of creosote bush scrub upland habitat is estimated to be required to conduct these activities. Habitat loss is defined as the removal of trees and perennial shrubs. The trimming of vegetation is not considered habitat loss.

Future state and private actions separate from PG&E that are reasonably certain to occur within the project vicinity include continued recreational activities associated with the Colorado River such as boating, camping, and fishing. Additionally, operations and maintenance of existing infrastructure such as the gas pipelines, railroad, Interstate 40 and other nearby roads and utilities are anticipated.

#### 5.2.2.7 Critical Habitat Effects Determination

The nearest critical habitat for the Mojave desert tortoise is located within the Chemehuevi Valley located approximately 9 miles west of the APE (USFWS, 1994b). PG&E's activities are located outside designated critical habitat for the Mojave Desert tortoise. An effects determination of "no effect" to critical habitat is concluded.

#### 5.2.2.8 Effects Determination

Recent evidence of desert tortoise presence was not detected during the 2004, 2005, and 2006 protocol surveys of the APE (CH2M HILL, 2005b; GANDA, 2005a, 2006a). However, remains of desert tortoises have been documented in the APE. These remains are highly aged and are not understood to be from those of recent occupation by the desert tortoise. There has been no reported take of this species resulting from investigative and remedial activities to date.

The upland landscape is considered poor habitat for the desert tortoise. It is estimated that no more than 3 acres of creosote bush scrub upland habitat would be affected by future proposed actions. The intent of PG&E will be to use those areas already disturbed by project activities so as to minimize the net increase of affected habitat. It should also be noted that this PBA does not imply the approval of actions and/or the degradation of the landscape at the expense or risk to other resources (e.g., cultural resources).

Under this PBA the following conservation measures, not replacing those already identified, will be imposed.

1. The intent of PG&E will be to minimize the net increase of disturbed habitat in the APE.
2. If future activities require the loss or manipulation of greater than 3.0 acres of upland creosote bush scrub habitat, specific project consultation with the USFWS will need to occur and possible mitigation may be required. Habitat loss is defined as the removal of trees and perennial shrubs. The trimming of vegetation is not considered habitat loss.
3. PG&E is to have a USFWS-certified desert tortoise handler available if and when a tortoise visits the APE and requires relocation.

The documentation of aged desert tortoise remains and the presence of two possible burrows within the APE, although difficult to interpret, do suggest that an individual may have and could potentially visit the APE in the future. However, based on the non-presence of tortoises documented by 3 years of protocol surveys within the APE; the low suitability of tortoise habitat within the APE; the location of project activities and distance from known suitable habitat and tortoise presence; and accompanied by mitigation measures presented in Section 3.4 and in addition to the landscape level protection afforded to Tribal cultural resources, the effects of project activities to the Mohave Desert tortoise could not be meaningfully measured, detected, or evaluated and are not expected to occur. Therefore any potential direct or indirect effects from project activities are either insignificant or discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

## 5.3 Marsh

### 5.3.1 Yuma Clapper Rail (*Rallus longirostris yumanensis*)

#### 5.3.1.1 Status

The Yuma clapper rail was listed as a federally endangered species on March 11, 1967, under endangered species legislation enacted in 1966. Critical habitat has not been designated for this species. The Yuma Clapper Rail Recovery Plan was released on

February 4, 1983 (USFWS, 1983). The Yuma clapper rail is a fully protected species in California and was listed as threatened by the state in 1978.

Much of the decline of the Yuma clapper rail can be attributed to altered seasonal flow regimes and lost marsh habitat due to the construction of hydro facilities and dredging on the Lower Colorado River. Population changes on a local level have been documented, but these changes may be based on changes in habitat quality. In turn, a decline in habitat quality may be the result of the aging of existing cattail stands to a less suitable condition for rail occupancy. Historically, the marshes seldom accumulated large amounts of dead vegetative material because of floods and changes to the river channel, which washed away cattail stands on a repeating cycle (USBR, 2004).

#### 5.3.1.2 Natural History, Distribution, and Abundance and Habitat

The Yuma clapper rail is a chicken-shaped marsh bird with a long down-curved beak. Both sexes are slate brown above, with light cinnamon underparts and barred flanks. This subspecies is slightly lighter in color and slightly thinner than other clapper rails. The bird measures 14 to 16 inches long once it is fully grown (Eddleman,1989).

Yuma clapper rails are found in emergent wetland vegetation such as dense or moderately dense stands of cattails (*Typha latifolia* and *T. domingensis*) and bulrush (*Scirpus californicus*) (Eddleman, 1989; Todd, 1986). They can also occur, in lesser numbers, in sparse cattail-bulrush stands or in dense reed (*Phragmites australis*) stands (Rosenberg et al., 1991). The most productive clapper rail areas consist of a mosaic of uneven-aged marsh vegetation interspersed with open water of variable depths (Conway et al., 1993). Annual fluctuation in water depth and residual marsh vegetation are important factors in determining habitat use by Yuma clapper rails (Eddleman, 1989).

Yuma clapper rails may begin exhibiting courtship and pairing behavior as early as February. Nest building and incubation can begin by mid-March, with the majority of nests being initiated between late April and late May (Eddleman, 1989). The rails build their nests on dry hummocks, on or under dead emergent vegetation and at the bases of cattail or bulrush. Sometimes they weave nests in the forks of small shrubs that lie just above moist soil or above water that is up to about 2 feet deep. The incubation period is approximately 28 days so the majority of clapper rail chicks should be fledged by August (Eddleman, 1989). Yuma clapper rails nest in a variety of different micro habitats within the emergent wetland vegetation type, with the only common denominator being a stable substrate. Nests can be found in shallow water near shore or in the interior of marshes over deep water. Nests usually do not have a canopy overhead as surrounding marsh vegetation provides protective cover (Eddleman, 1989).

Crayfish (*Procambarus clarki*) are the preferred prey of Yuma clapper rails. Crayfish comprise as much as 95 percent of the diet of some Yuma clapper rail populations (Ohmart and Tomlinson 1977). Availability of crayfish may be a limiting factor in clapper rail populations and is believed to be a factor in the migratory habits of the rail (Rosenberg et al., 1991). However, Eddleman (1989) found that crayfish populations in some areas remain high enough to support clapper rails all year and that seasonal movement of clapper rails cannot be correlated to crayfish availability. New information suggests that selenium levels in crayfish may be high enough to cause reproductive effects. However, due to the species'

secretive nature, nests are difficult to find and reproductive effects are difficult to assess. No adverse effects have been documented (USFWS, 2005a).

#### 5.3.1.3 Recent Findings

The eastern edge of the APE is located within a USFWS study site near the Topock Marina. Several call stations have been surveyed annually for Yuma clapper rail by the USFWS along the South Dike that is located within the HNWR. In past years, this species has been detected south of the new South Dike and north of the Topock Marina (Figure 7) (USFWS, 2005d). A 2004 survey map and data are included in Appendix E. In 2005, seven Yuma clapper rails were detected along the South Dike transect (Fitzpatrick, 2006). Suitable emergent habitat is located approximately 400 feet from potential well locations near the eastern shoreline of the Colorado River, and extends the full length of the northeastern edge of the APE. The emergent habitat type is buffered from the nearest well by a 400-foot distance of tamarisk and a 10- to 20-foot elevation increase of the floodplain to the west and suitable habitat to the east.

On the California-side, there is a small wetland associated with the Colorado River within the APE that is approximately 3 acres in size, located in the vicinity of the Interstate-40 bridge. This wetland is within the HNWR boundary. No reports of rails have been documented at this location and at the request of the USFWS, PG&E has not conducted any rail surveys of this area.

#### 5.3.1.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. Specific actions occurring within or adjacent to marsh habitat within the APE located south of the Interstate 40 bridge and along the eastern boundary of the APE have the potential to affect the species. This includes floodplain groundwater monitoring programs, IM No. 3 floodplain operations, floodplain soil sampling, floodplain well installations, slant drilling, seismic bedrock studies, activities similar to the pore water study, and floodplain restoration.

The following activities are expected not to affect this species due to unsuitable upland habitat at the specific project location: upland groundwater monitoring programs, IM No. 2 decommissioning, IM No. 3 upland operations, *in-situ* upland pilot study, upland soil sampling, and upland restoration activities.

Marsh habitat conditions and the associated riparian communities are essential habitat elements for the Yuma clapper rail. PG&E's activities are designed to avoid marshes and wetlands if at all possible. Dense salt cedar adjacent to marshes functions as a cover and buffer element to protect nests from predators (Fitzpatrick, 2006). Approximately 200 feet of dense salt cedar (and an additional 200 feet of open floodplain) would buffer the marsh habitat on the eastern edge of the APE from well construction, development and monitoring on the Arizona floodplain. The salt cedar habitat near the marsh on the California floodplain is also under the modified access and sampling procedures applied for the SWFL from May 1 to September 30.

Operational activities associated with monitoring the wells within the salt cedar habitat include personnel collecting water samples biweekly, weekly, or monthly. A small hand-

held generator typically is used for power to activate the submersible pumps during water collection. The generator's noise output is minimal; however, it may distract this species.

#### 5.3.1.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. The possible actions that may occur will more than likely be the extension of projects such as the installation and burying of groundwater conveyance pipeline; creation of additional access roads; and construction of additional well sites. These activities would require heavy equipment, trucks, materials and crews to implement.

It is not anticipated that any additional facilities or buildings will be required to be built. But the decommissioning of the IM No. 3 facilities in time may begin within the time frame of this PBA (i.e., before 2012). This action will require the use of heavy equipment, trucks and personnel to teardown and remove building material. This activity may increase vehicle traffic to the main compressor station on the road overlooking the wetland.

No changes in land use patterns are foreseen.

#### 5.3.1.6 Cumulative Effects

Cumulative effects are those of future state and private activities, excluding federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation. The actions that may occur within the APE are focused at the cleanup of hexavalent chromium within the groundwater. It is reasonably certain that additional investigative and response activities beyond, yet similar to, the actions that have been implemented to date will occur. The level and use of equipment, materials and personnel will be similar as well.

Future state and private actions separate from PG&E that are reasonably certain to occur within the project vicinity include continued recreational activities associated with the Colorado River such as boating, camping, and fishing. Additionally, operations and maintenance of existing infrastructure such as the gas pipelines, railroad, Interstate 40 and other nearby roads and utilities are anticipated.

#### 5.3.1.7 Critical Habitat Effects Determination

Critical habitat has not been designated for the Yuma clapper rail. An effects determination of "no effect" for critical habitat is concluded for this species.

#### 5.3.1.8 Effects Determination

Yuma clapper rails have been documented in suitable nesting habitat along the northeastern boundary of the APE on the HNWR in Arizona. Potential monitoring well locations include the floodplain of the Colorado River in Arizona near the existing levee road. This area is approximately 60 feet from the Colorado River and 400 feet from known occupied habitat (Figure 7). Project activities in this area would be buffered from suitable nesting habitat by approximately 200 feet of tamarisk (about 42 acres total) vegetation and 200 feet of open floodplain, as well as a 10 to 20 foot increase in topography.

There is also 3 acres of potentially suitable habitat under (below/near) the Interstate 40 bridge. However, no Yuma clapper rails have been documented at this location. Past

investigative and response activities have occurred in the tamarisk dominated zone near this wetland. Currently, a slant drilling project to directionally test for potential contaminants under the Colorado River is being proposed. This slant drilling activity will be addressed under a separate biological assessment (CH2M HILL 2006e) prior to the finalization of the PBA. The slant drilling activity is scheduled to be completed before March 15. As well, project activities occurring in this location are limited to well monitoring on a monthly schedule and subject to the 2006 modified well access and sampling procedures consulted upon for the SWFL (USFWS 2006).

Under this PBA the following conservation measures, not replacing those already identified, will be imposed.

1. The intent of PG&E will be to avoid investigative or response actions in or near marshes or wetlands, if at all possible.
2. If future actions are proposed to occur within 300 feet of wetlands or marshes (specifically the eastern boundary of the APE on the Arizona floodplain), project specific review will occur to ensure compliance with this PBA and associated USFWS consultation.
3. Specific to the Arizona portion of the APE, all construction and development activities should be completed prior to March 15. Preferably, such activities would occur from October 1 to March 15.
4. Where feasible, actions should not be proposed within the tamarisk habitat under the Interstate 40 and the BNSF railway bridges that occur on the HNWR unless otherwise agreed to by the USFWS.
5. No more than 2.5 acres of floodplain habitat can be impacted without triggering additional ESA consultation requirements.

Suitable habitat conditions and documented presence of nesting individuals do increase the level of awareness of project activities negatively effecting Yuma clapper rails primarily along the eastern boundary of the APE. However, the distances and locations of potential well sites from occupied habitat; as well as the topographical features and tamarisk densities between potential wells and suitable habitat will provide sufficient cover to buffer this species from any effects caused by project activities. In addition with the application of the above conservation measures, the effects of project activities to the Yuma clapper rail could not be meaningfully measured, detected or evaluated and are not expected to occur. Therefore, any potential direct or indirect effects of project activities are either insignificant or discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

# 5.4 Aquatic

## 5.4.1 Colorado Pikeminnow (*Ptychocheilus lucius*)

### 5.4.1.1 Status

The Colorado pikeminnow was listed as a federally endangered species in 1967 and came under protection of the ESA in 1973. The Colorado Pikeminnow Recovery Plan was released in 1991 (USFWS, 1991) and was supplemented with the Colorado Pikeminnow Recovery Goals in 2001 (USFWS, 2001a). The Colorado pikeminnow is a fully protected species in California and was listed as endangered by the state in 1971. It is considered to be extirpated from the lower Colorado River (Minckley, 1973).

### 5.4.1.2 Natural History, Distribution, Abundance and Habitat

The Colorado pikeminnow is considered the world's largest minnow, reaching lengths up to 5 feet. It has a large long head, somewhat pike-like, with a terminal mouth. It was, historically, the top predator fish in the Colorado River. This species is the only member of the genus *Ptychocheilus* endemic to the Colorado River Basin.

This species was formerly widespread in the Colorado River basin from Wyoming to Arizona and California. Now, native populations are restricted to the upper basin in Wyoming, Colorado, Utah, and New Mexico in the Green, Yampa, White, Gunnison, and Colorado Rivers. Critical habitat was designated for Colorado pikeminnow in the upper basin effective April 20, 1994. No critical habitat was designated in Arizona.

### 5.4.1.3 Direct Effects

No direct effects will occur.

### 5.4.1.4 Indirect Effects

No indirect effects will occur.

### 5.4.1.5 Cumulative Effects

No cumulative effects will occur.

### 5.4.1.6 Critical Habitat Effects Determination

Critical habitat has not been designated for the Colorado pikeminnow. An effect determination of "no effect" for critical habitat is concluded for this species.

### 5.4.1.7 Effects Determination

Due to the extirpation of the Colorado pikeminnow in the Lower Colorado River, an effect determination of "no effect" is concluded for this species.

## 5.4.2 Razorback Sucker (*Xyrauchen texanus*)

### 5.4.2.1 Status

The razorback sucker was listed as a federally endangered species on October 23, 1991, with an effective date of November 22, 1991. The Razorback Sucker Recovery Plan was released in 1998 (USFWS, 1998). The recovery plan was supplemented with the Upper Colorado River Endangered Fish Recovery Program (USFWS, 2001a) and the Razorback Sucker Recovery Goals (USFWS, 2001b). The razorback sucker is a fully protected species in California and was listed as endangered by the state in 1974.

Critical habitat was designated in 15 river reaches in the historic range of the razorback sucker on March 21, 1994, with an effective date of April 20, 1994 (USFWS, 1994c). This includes Lake Mead to its full pool elevation, the Colorado River and its 100-year floodplain between Hoover Dam and Davis Dam including Lake Mohave to its full pool elevation, and the Colorado River and its 100-year floodplain from Parker Dam to Imperial Dam (USFWS, 1994c).

The trend for the razorback sucker is for a continued rangewide decrease in wild populations due to lack of sufficient recruitment of young adults, with the loss of old adults due to natural mortality. The primary limiting factor for the razorback sucker appears to be non-native fish predation of the early life stages (USFWS, 2005a).

### 5.4.2.2 Natural History, Distribution, Abundance and Habitat

The razorback sucker is a large fish, measuring over 2 feet long and weighing 8 pounds. Sexual dimorphism is present, with males being smaller, slimmer, and having larger fins than females. During the breeding season males have nuptial tubercles covering posterior fins and portions of the body. Females tend to be larger, heavier-bodied, and have fins that are somewhat smaller in proportion to their body size (Minckley, 1973).

The razorback sucker is endemic to large rivers of the Colorado River Basin from Wyoming to Mexico. Present distribution of natural populations is limited to Lake Mohave, Green River Basin, and the Upper Colorado River Basin. Historically razorback suckers inhabited the Colorado, Gila, Salt, Verde, and San Pedro rivers.

Presently, natural adult populations exist only in Lake Mohave, Lake Mead, and Lake Havasu. This species uses a variety of habitat types from mainstem channels to slow backwaters of medium and large streams and rivers, sometimes around cover. In impoundments they prefer depths of 1 meter or more over sand, mud, or gravel substrates. (AGFD, 2002b). Early explorers report the fish as extremely abundant (Gilbert and Scofield, 1898). In central Arizona it was abundant enough to be commercially harvested for human and animal food and for fertilizer in the late 1800s. Similar abundances have been noted for the upper basin (Bestgen, 1990). Today the species occupies only a small portion of its historical range, and most occupied areas have very low numbers of fish. Between Davis Dam and Lake Havasu, observations of razorback suckers are extremely rare (USBR, 2004).

Spawning occurs from late winter through spring along gravelly shorelines or bays. Evidence suggests that suckers migrate from larger rivers to smaller tributaries prior to spawning. A single female is attended by 2 to 12 males, and the group moves in tight circles

over the bottom. The eggs are adhesive and attach to the interstitial spaces within the gravel substrate. The young hatch in a few days and live along the shoreline for a time. Females will spawn repeatedly with several males. Hatching success is highly dependant on water temperature with complete mortality in temperatures less than 10 degrees Celsius (50 degrees Fahrenheit) (AGFD, 2002b).

#### 5.4.2.3 Recent Findings

The Lower Colorado River supports the largest remaining populations of razorback sucker. The population consists primarily of subadults. In 2005, razorback suckers were documented near Needles, California. In 2006, 236 suckers were captured and released at that spawning site. The likelihood of this species being in the area around Park Moabi and Topock Marina is very high (Fitzpatrick, 2006).

Extinction of the species in the wild throughout the historic range is being forestalled by stocking of subadult fish into the remaining wild populations (USBR, 2002). Where natural recruitment is occurring (i.e., spawning and survival of young), it is not known whether the current level of recruitment will sustain the existing population levels. Where natural recruitment is not occurring, loss of the remaining wild populations is expected.

Stocking efforts in the Upper Colorado River Basin and in Lakes Mohave and Havasu and the Lower Colorado River below Parker Dam are ongoing, with the 30,000-fish requirement for Lake Havasu completed in 2001. The most critical of these efforts is the replacement of the Lake Mohave population using wild-caught larvae from the lake. By the end of 2001, the initial goal to stock 50,000 subadult fish into Lake Mohave was achieved. The Lake Mohave efforts will continue to meet the second goal, which is to establish a population of 50,000 adults.

#### 5.4.2.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. Activities that may occur in the Colorado River include seismic bedrock studies and pore water studies. The 2005 pore water study was issued a no effect determination (USFWS, 2005e).

Activities that may occur within the 100-year floodplain include floodplain groundwater monitoring programs, IM No. 3 floodplain operations, flood plain soil sampling, slant drilling, floodplain well installations, activities similar to the pore water study, and floodplain restoration.

Seismic studies will be similar to the 2005 pore water study that was issued a no effect determination by the USFWS (USFWS, 2005e). The seismic studies involve a small boat that will be used to submerge the seismic equipment within a portion of the Colorado River. The equipment that will be used for the study creates an acoustical pulse that is similar to that used by a recreational fish finder. The seismic studies will be performed during the winter season and completed before February 1, when feasible. Up river migration, spawning, and down river migration of adult and fry razorback suckers are expected to occur between February 1 and May 31; therefore, seismic studies between June 1 and January 31 will have no affect upon this species (Adams, 2006). Conversely, activities within the Colorado River that are conducted during the spawning and migration period may affect this species.

The project activities proposed by PG&E will occasionally involve the use of heavy equipment including but not limited to backhoes and drill rigs that may be used to remove vegetation, grade the ground surface, and drill groundwater monitoring wells within the floodplain. Smaller equipment such as bobcats and quad-runners are also used to transport personnel and well sampling tools. This equipment can create disturbance to the ground and vegetation that may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the magnitude of riparian function that may be reduced by the proposed action is not expected to impact the razorback sucker due to limited project-related activities and associated minor footprints directly adjacent to the Colorado River. Additionally, a 2.5 acre floodplain vegetation removal threshold has been established to minimize any reduced function of the riparian zone.

#### 5.4.2.5 Indirect effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. All proposed activities will take place outside the Colorado River with the exception of activities similar to the prior pore water study, which in 2005 received a no effect determination (USFWS, 2005e). No changes in land use patterns are foreseen. No indirect effects are anticipated.

#### 5.4.2.6 Cumulative Effects

Cumulative effects are of those future state and private activities, excluding federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation. The interim and remedial actions that may occur within the APE are focused at the cleanup of hexavalent chromium within the groundwater. It is reasonably certain that additional investigative and remedial activities beyond, but similar to, those actions that have been implemented to date will occur.

These actions will occur within the 100-year floodplain and involve heavy equipment including but not limited to backhoes and drill rigs that may be used to remove vegetation, grade the ground surface, and drill groundwater monitoring wells on the California and Arizona floodplains within the APE. Smaller equipment such as bobcats and quad-runners are also used to transport personnel and well sampling tools. This equipment can create disturbance to the ground and vegetation that may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the magnitude of riparian function that may be reduced by the proposed action is not expected to impact the razorback sucker due to limited project-related activities and associated minor footprints directly adjacent to the Colorado River. Additionally, a 2.5 acre floodplain vegetation removal threshold has been established to minimize any reduced function of the riparian zone.

Future state and private actions separate from PG&E that are reasonably certain to occur within the project vicinity include continued recreational activities associated with the Colorado River such as boating, camping, and fishing. Additionally, operations and maintenance of existing infrastructure such as the gas pipelines, railroad, Interstate 40 and other nearby roads and utilities are anticipated.

No changes in land use or water use are foreseen.

#### 5.4.2.7 Critical Habitat Effects Determination

Critical habitat for the razorback sucker does not occur within the APE. An effect determination of "no effect" for critical habitat is concluded for this species.

#### 5.4.2.8 Effects Determination

Under this PBA the following conservation measures, not replacing those already identified, will be imposed.

1. The intent of PG&E will be to minimize the net increase of disturbed habitat in the APE.
2. If greater than 2.5 acres of habitat within the general and 100-year floodplain is destroyed or manipulated, specific project consultation with the USFWS will be required and possible mitigation may be required.
3. If additional actions are proposed within the Colorado River beyond those described for the pore water study, consultation will be required to be reinitiated at that time.
4. Proposed project activities within the Colorado River should preferably occur between June 1 and January 31. Project activities that differ from the pore water study and which are proposed to occur between February 1 and May 31 will require further consultation.
5. In the event an emergency situation (e.g., a spill into the Colorado River), where actions to abate the problem are to occur along the shoreline/river interface or in the water, a negative impact to this species may occur. Those actions which may adversely affect this species and constitute a taking, are not covered within this scope of this determination in this PBA. If an emergency situation occurs, immediate consultation with the USFWS will be required.

Razorback suckers have been documented north of the APE near Needles, California. There is a high likelihood for this species to utilize the mainstem Colorado River as will as the backwater areas of Park Moabi and the Topock Marina. Future project activities are anticipated to occur in the Colorado River and within the 100-year floodplain. However, the light magnitude of small scale projects in the River; the minimal amount of riparian habitat altered in the 100-year floodplain; and accompanied by the conservation measures described above, the effects of project activities to the razorback sucker could not be meaningfully measured, detected or evaluated and are not expected to occur. Therefore, any potential direct or indirect effects from project activities are either insignificant or discountable. An effects determination of "may effect, but not likely to adversely affect" is concluded for this species.

### 5.4.3 Bonytail Chub (*Gila elegans*)

#### 5.4.3.1 Status

The bonytail chub was listed as a federally endangered species on April 24, 1980, with an effective date of May 23, 1980. The Bonytail Chub Recovery Plan was updated in 1990 (USFWS, 1990a). The recovery plan was supplemented with the Upper Colorado River Endangered Fish Recovery Program (USFWS, 2001a) and the Bonytail Chub Recovery goals (SWCA, 2001). The bonytail chub was listed as endangered by the state of California in 1974.

Critical habitat was designated in six river reaches in the historic range of the bonytail chub on March 21, 1994, with an effective date of April 20, 1994, in designated portions of the Colorado, Green, and Yampa Rivers in the Upper Basin and the Colorado River in the Lower Basin (USFWS, 1994c). In relation to the APE, critical habitat includes the Colorado River and the 100-year floodplain (see Figure 8) from Parker Dam to the northern boundary of the HNWR just south of Needles, CA.

The trend for the bonytail chub is for a continued rangewide decrease in wild populations due to lack of sufficient recruitment of young adults with the loss of old adults due to natural mortality. Like the razorback sucker, the primary limiting factor for bonytail appears to be nonnative fish predation of the early life stages (USFWS, 2005a).

#### 5.4.3.2 Natural History, Distribution, Abundance and Habitat

In appearance, bonytail are gray to gray-green on the dorsal, with silvery sides fading to a white ventral surface. The fish is elongated and somewhat laterally compressed with a narrow caudal peduncle. Adults are from 11 to 13 inches in length, although larger individuals (up to 24 inches) are occasionally identified. A smooth predorsal hump is present in the adult form. Breeding males can be distinguished by reddish marks on the paired fins and the presence of tubercles anterior on the body (Vanicek, 1967).

In Lake Mohave, spawning has been observed during the month of May, while in the upper Green River, spawning occurs in June and July at water temperatures of about 18 degrees Celsius (64 degrees Fahrenheit) (Minckley, 1973). Eggs are scattered over the bottom; no parental care occurs. Cold water released below dams precludes successful hatching of eggs (Bagley, 1989).

The bonytail was once widely distributed throughout the Colorado River and its main tributaries, to include the Green River in Utah and Wyoming, and the Colorado, Gila, Salt, and Verde rivers in Arizona. Currently, this species is found only in isolated populations in the Yampa River, Green River, Colorado River at the Colorado/Utah border, and at the confluence of the Green and Colorado Rivers. In the lower basin, the bony tail is found only in Lake Mohave with possible individuals between Parker Dam and Davis Dam (AGFD, 2001). They were still abundant in Lake Mead after the completion of Hoover Dam; however, by 1950 they were considered rare. By the time concern was raised for this fish, it had disappeared from much of its range. Loss of the extant wild populations is expected.

Extinction of this fish in the wild throughout its historic range is being forestalled by the stocking of subadult fish into the Upper Colorado River Basin and Lakes Mohave and Havasu in the Lower Colorado River (USFWS, 2005a). These stockings are intended to create populations of young adults that may be expected to persist for 40 to 50 years. While it is expected that these young adults will reproduce, the successful recruitment of wild born young fish to the population may not occur without additional management of habitat and biological factors. Management and research on these populations will be critical to provide for the survival and recovery of the species. Of vital importance to the stocking program is maintenance and enhancement of the existing bonytail broodstock (USFWS, 2005a).

#### 5.4.3.3 Recent Findings

A portion of APE is within the 100-year floodplain of the Colorado River that delineates critical habitat for the bonytail chub (Figure 8). From south to north, this area extends from a river-associated wetland (described in the Yuma clapper rail section 5.3.1) to a deep sand and drier environment of dredge spoils deposited by the Army Corps of Engineers from excavating the river channel. The gradient ranges from river level to possibly 20 feet created by the dredge spoils. The dredge spoils environment can be described as sand, tamarisk and arrowweed. This is detailed in greater depth within the SWFL section 5.2.1. The mouths of the washes have channels and bridges that would allow water to flood these areas if a larger event was to occur. The lower ends of the washes are composed of tamarisk and water. Normally, except for isolated rain events, there is no overland flow connectivity to the river.

The Lower Colorado River supports the largest remaining populations of bonytail chub. The populations consist primarily of sub-adults. In 2005, eight individuals were captured and released near Park Moabi (Fitzpatrick, 2006), increasing the likelihood of individuals being present in the APE.

#### 5.4.3.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. Activities that may occur in the Colorado River include seismic bedrock studies and pore water studies. The 2005 pore water study was issued a no effect determination (USFWS, 2005e).

Activities that may occur within the 100-year floodplain and critical habitat include floodplain groundwater monitoring programs, IM No. 3 floodplain operations, floodplain soil sampling, slant drilling, floodplain well installations, activities similar to the pore water study, and floodplain restoration.

Seismic studies will be similar to the 2005 pore water study that was issued a no effect determination by the USFWS (USFWS, 2005e). The seismic studies involve a small boat that will be used to submerge the seismic equipment within a portion of the Colorado River. The equipment that will be used for the study creates an acoustical pulse that is similar to that used by a recreational fish finder. The seismic studies will be performed during the winter season and completed before February 1 when feasible. Up river migration, spawning, and down river migration of adult and fry bonytail chubs are expected to occur between February 1 and May 31; therefore, seismic studies between June 1 and January 31 will have no affect upon this species (Adams, 2006). Conversely, activities within the Colorado River that are conducted during the spawning and migration period may affect this species.

The project activities proposed by PG&E will occasionally involve the use of heavy equipment including but not limited to backhoes and drill rigs that may be used to remove vegetation, grade the ground surface, and drill groundwater monitoring wells within the general and 100-year floodplain. Smaller equipment such as bobcats and quad-runners are also used to transport personnel and well sampling tools. This equipment can create disturbance to the ground and vegetation that may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the magnitude of riparian function that may be reduced by the proposed action is not expected to impact the bonytail chub due

to limited project-related activities and associated minor footprints directly adjacent to the Colorado River. Additionally, a 2.5 acre floodplain vegetation removal threshold has been established to minimize any reduced function of the riparian zone.

#### 5.4.3.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. All proposed activities will take place outside the Colorado River with the exception of activities similar to the prior pore water study, which in 2005 received a no effect determination (USFWS, 2005e). No changes in land use patterns are foreseen. No indirect effects are anticipated.

#### 5.4.3.6 Cumulative Effects

Cumulative effects are of those future state and private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation. It is expected that all the activities will take place outside the Colorado River with the exception of those similar to the prior pore water study, which in 2005 received a no effect determination (USFWS, 2005e).

The project actions that may occur within the APE are focused at the cleanup of hexavalent chromium within the groundwater. It is reasonably certain that additional investigative and remedial activities beyond, yet similar to, those actions that have been implemented to date will occur. These actions will occur within the 100-year floodplain, designated as critical habitat, and involve heavy equipment including but not limited to backhoes and drill rigs that may be used to remove vegetation, grade the ground surface, and drill groundwater monitoring wells on the California and Arizona floodplains. Smaller equipment such as bobcats and quad-runners are also used to transport personnel and well sampling tools. This equipment can create disturbance to the ground and vegetation that may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the magnitude of riparian function that may be reduced by the proposed action is not expected to impact the bonytail chub due to limited project-related activities and associated minor footprints directly adjacent to the Colorado River. Additionally, a 2.5 acre floodplain vegetation removal threshold has been established to minimize any reduced function of the riparian zone.

Future state and private actions separate from PG&E that are reasonably certain to occur within the project vicinity include continued recreational activities associated with the Colorado River such as boating, camping, and fishing. Additionally, operations and maintenance of existing infrastructure such as the gas pipelines, railroad, Interstate 40 and other nearby roads and utilities are anticipated.

No changes in land use or water use patterns are foreseen.

#### 5.4.3.7 Critical Habitat Effects Determination

Critical habitat in relationship to the APE includes the 100-year floodplain of the Colorado River (see Figure 8) from Parker Dam to the northern boundary of the HNWR south of Needles, CA. Project activities will be occurring within this designation. However, based on the small footprint of project activities; the limited amount of vegetation removal within the

100-year floodplain; and accompanied by the below conservation measures, no appreciable diminishment to critical habitat function is expected nor could be meaningfully measured, detected or evaluated. Therefore, any potential direct or indirect effects of project activities to critical habitat for the bonytail chub are either insignificant or discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for critical habitat of this species.

#### 5.4.3.8 Effects Determination

Under this PBA the following conservation measures, not replacing those already identified, will be imposed.

1. The intent of PG&E will be to minimize the net increase of disturbed habitat in the APE.
2. If greater than 2.5 acres of habitat within the general and 100-year floodplain is destroyed or manipulated, specific project consultation with the USFWS will be required and possible mitigation may be required.
3. If additional actions are proposed within the Colorado River beyond those described for the pore water study, consultation will be required to be reinitiated at that time.
4. Proposed project activities within the Colorado River should preferably occur between June 1 and January 31. Project activities that differ from the pore water study and which are proposed to occur between February 1 and May 31 will require further consultation.
5. In the event an emergency situation (such as a spill into the Colorado River), where actions to abate the problem are to occur along the shoreline/river interface or in the water, a negative impact to this species may very well occur. Those actions that may adversely affect this species and constitute a taking, are not covered within this scope of this determination in this PBA. If an emergency situation occurs, immediate consultation with the USFWS will be required.

Bonytail chubs have been captured and released near Park Moabi making the likelihood for this species to utilize the mainstem Colorado River and backwater areas (near Park Moabi and Topock Marina) within and near the APE a possibility. Future project activities are anticipated to occur in the Colorado River and within the 100-year floodplain. However, the light magnitude of the small scale projects in the River; the minimal amount of riparian habitat altered in the 100-year floodplain; and accompanied by the conservation measures described above, the effects of project activities to the bonytail chub could not be meaningfully measured, detected, or evaluated and are not expected to occur. Therefore, any potential direct or indirect effects from project activities are either insignificant or discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

# 6.0 Effects Determination Summary

## 6.1 Southwestern Willow Flycatcher

An effects determination of "may affect, but not likely to adversely affect" is concluded for the southwestern willow flycatcher.

A critical habitat effects determination of "no effect" is concluded for this species.

## 6.2 Mojave Desert Tortoise

An effects determination of "may affect, but not likely to adversely affect" is concluded for the Mojave desert tortoise.

A critical habitat effects determination of "no effect" is concluded for this species.

## 6.3 Yuma Clapper Rail

An effects determination of "may affect, but not likely to adversely affect" is concluded for the Yuma clapper rail.

A critical habitat effects determination of "no effect" is concluded for this species.

## 6.4 Colorado Pikeminnow

An effects determination of "no effect" is concluded for the Colorado pikeminnow.

A critical habitat effects determination of "no effect" is concluded for this species.

## 6.5 Razorback Sucker

An effects determination of "may affect, but not likely to adversely affect" is concluded for the razorback sucker.

A critical habitat effects determination of "no effect" is concluded for this species.

## 6.6 Bonytail Chub

An effects determination of "may affect, but not likely to adversely affect" is concluded for the bonytail chub.

A critical habitat effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

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# Tables

TABLE 1
Planned Remedial and Investigative Actions in the APE

| Planned Actions [a] | Estimated Short-Term Area Affected (Acres) [b] | Estimated Long-Term Area Affected (Acres) [b] |
|---|---|---|
| Soil Sampling [c] | 0.5 | 0.00 |
| Groundwater Wells [d] | 4.5 | <0.1 |
| In Situ Pilot Study (Upland) | 0.25 | <0.1 |
| Maintenance and Other | <1.0 | <1.0 |
| Unspecified | 6.0 | 4.0 |
| Pipelines | 2.0 | <1.0 |
| Restoration Activities [e] | 10.0 | 0.0 |

Notes:

[a] Access to planned activity areas will occur mainly along existing access routes and/or preapproved travel corridors.
[b] Because planned activities will be sited in previously used areas to the extent possible, total impacts to vegetation communities would be less than the affected acreage noted above; no more than 2.5 acres of salt cedar (on the floodplain) and 3 acres of creosote bush scrub (in uplands) are anticipated to be impacted by planned activities.
[c] Up to 200 samples, each within a 10-foot-diameter area.
[d] Up to 30 groundwater well clusters installed, each requiring a 0.15-acre area during construction and occupying 100 square feet thereafter (CH2M HILL, 2005c, 2005d, 2005h).
[e] Restoration activities will restore designated areas to preconstruction conditions.

TABLE 2
Salt Cedar Thickets

| Location | Contiguous Acreage | Percent of APE [a] |
|---|---|---|
| BNSF Railway and I-40 | 5.8 | 0.4 |
| Bat Cave Wash | 5.1 | 0.4 |
| Unnamed Wash | 2.7 | 0.2 |
| Park Moabi Marina | 6.9 | 0.5 |
| Arizona Portion of HNWR | 30.7 | 2.2 |

[a] Percent of APE does not include aquatic habitats (e.g., Colorado River) in total area.

# Figures

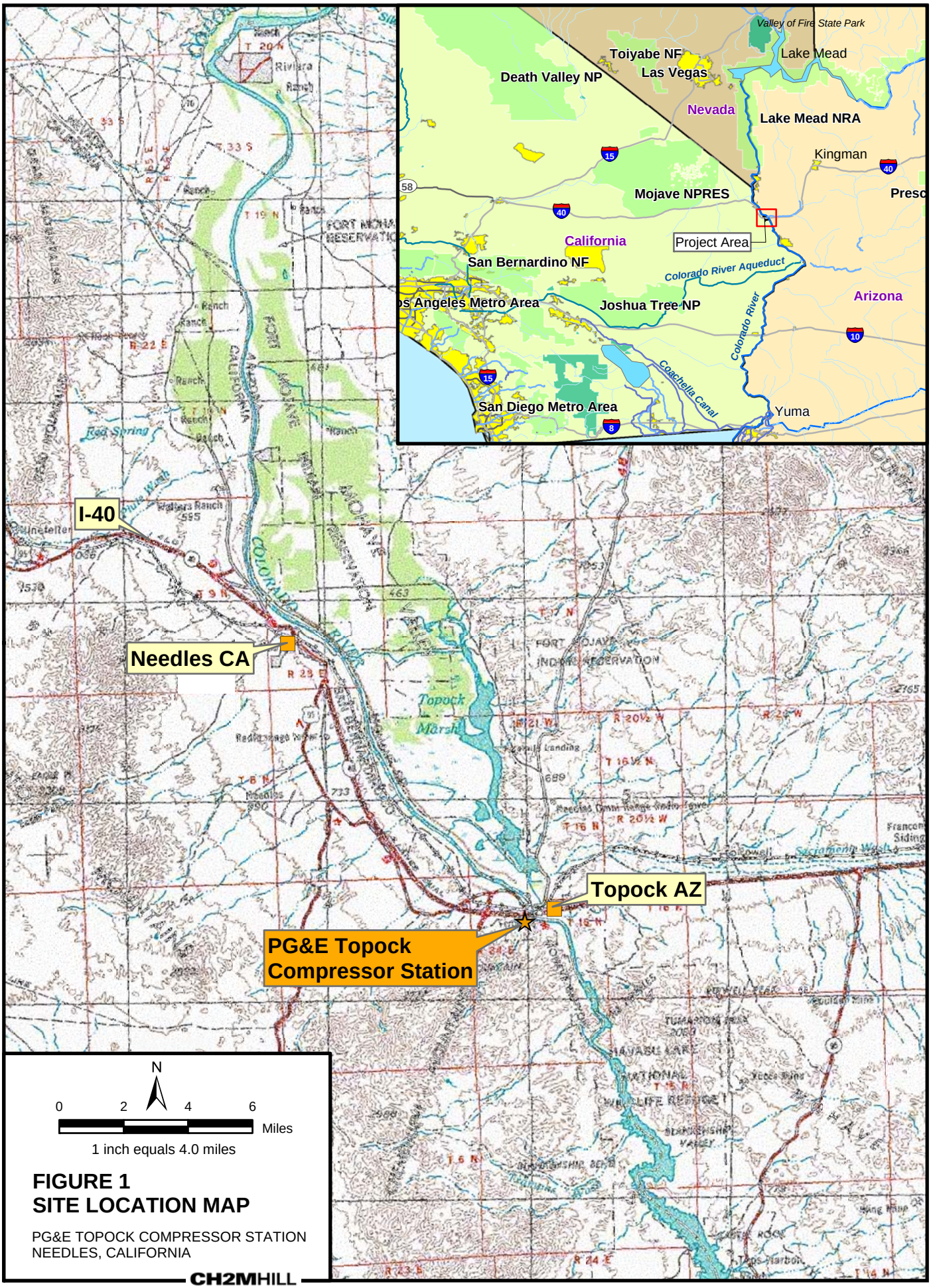


**FIGURE 1**
**SITE LOCATION MAP**

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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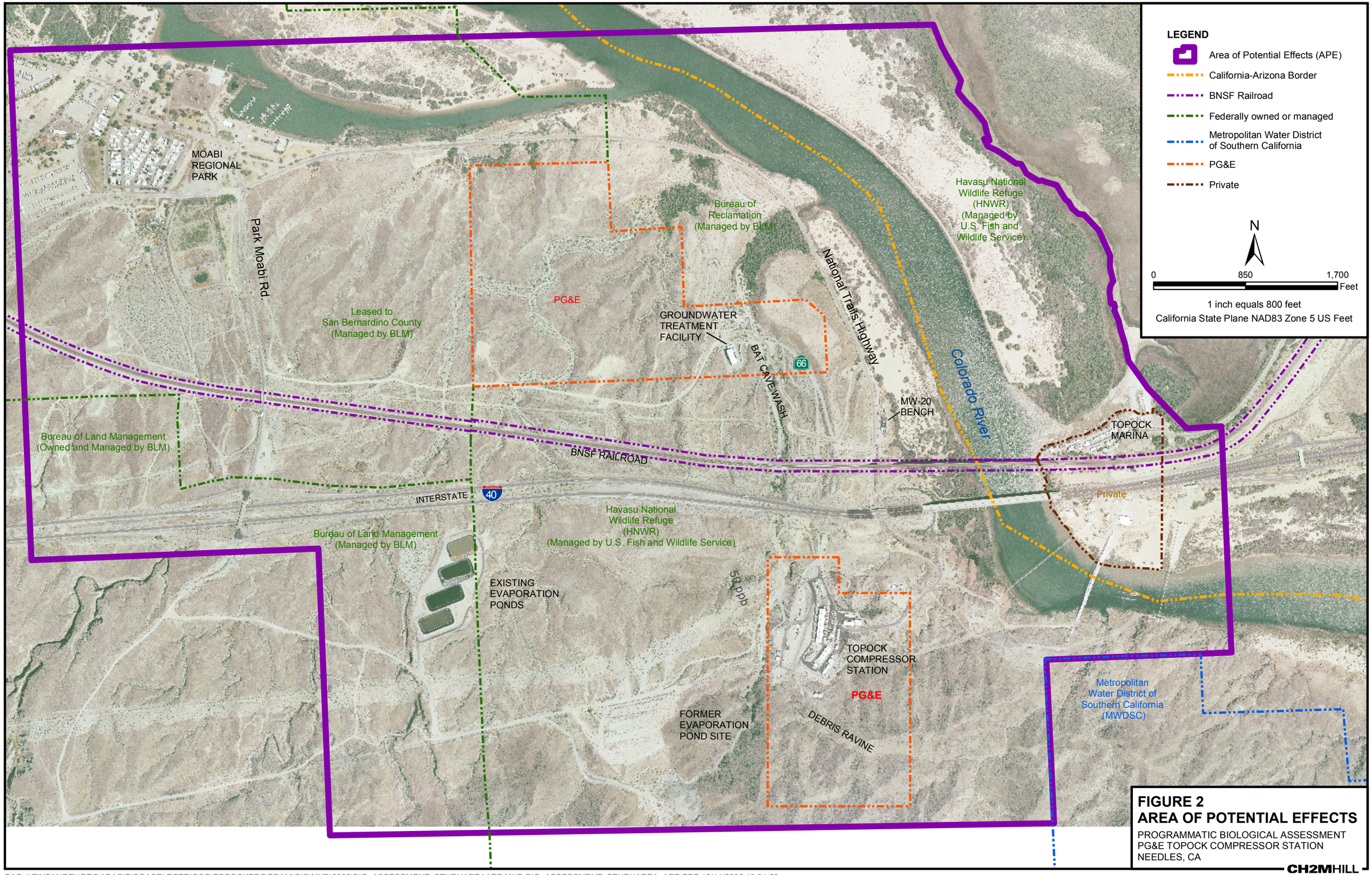
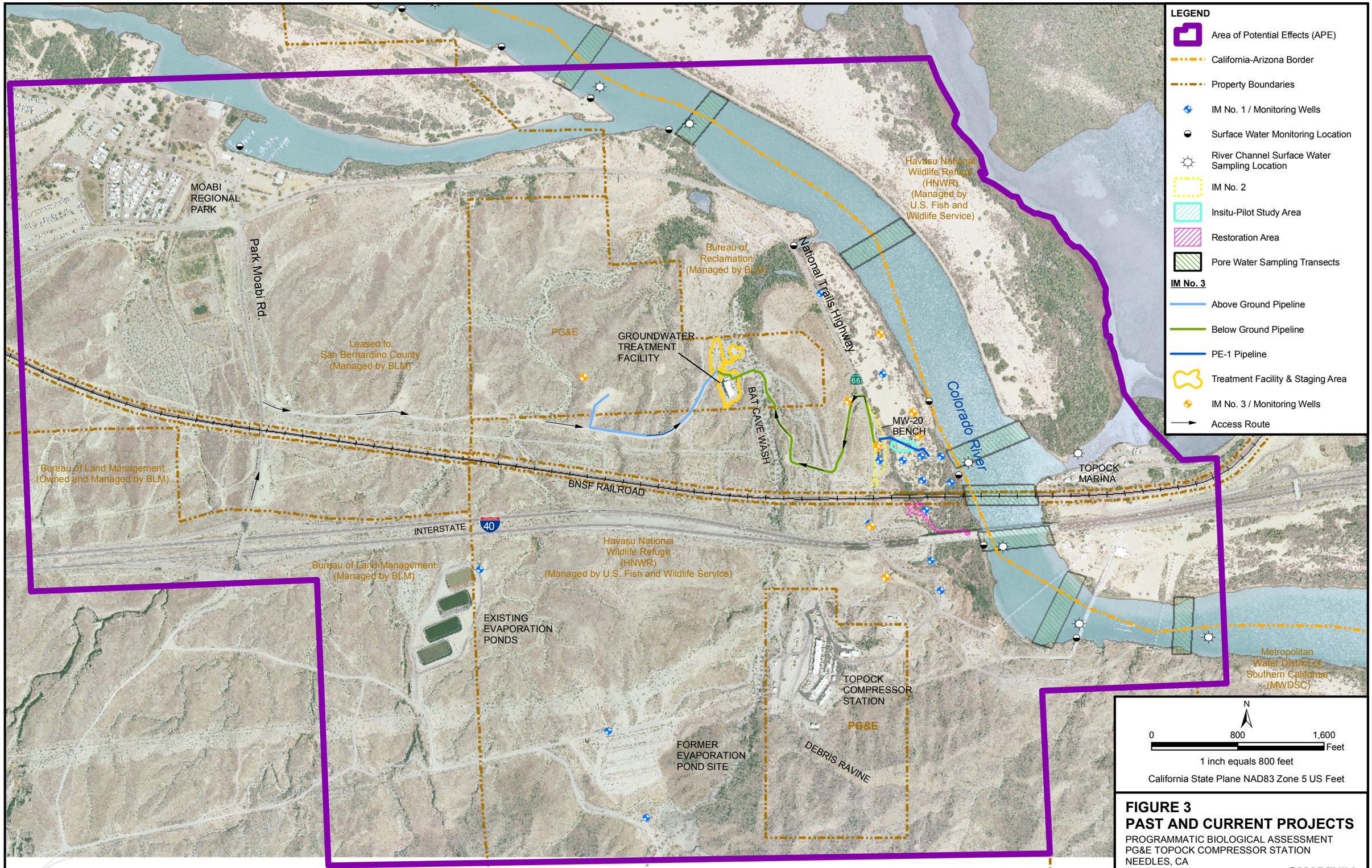



**FIGURE 2**
**AREA OF POTENTIAL EFFECTS**
PROGRAMMATIC BIOLOGICAL ASSESSMENT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CA

CH2MHILL




# FIGURE 3
# PAST AND CURRENT PROJECTS

PROGRAMMATIC BIOLOGICAL ASSESSMENT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CA

CH2MHILL

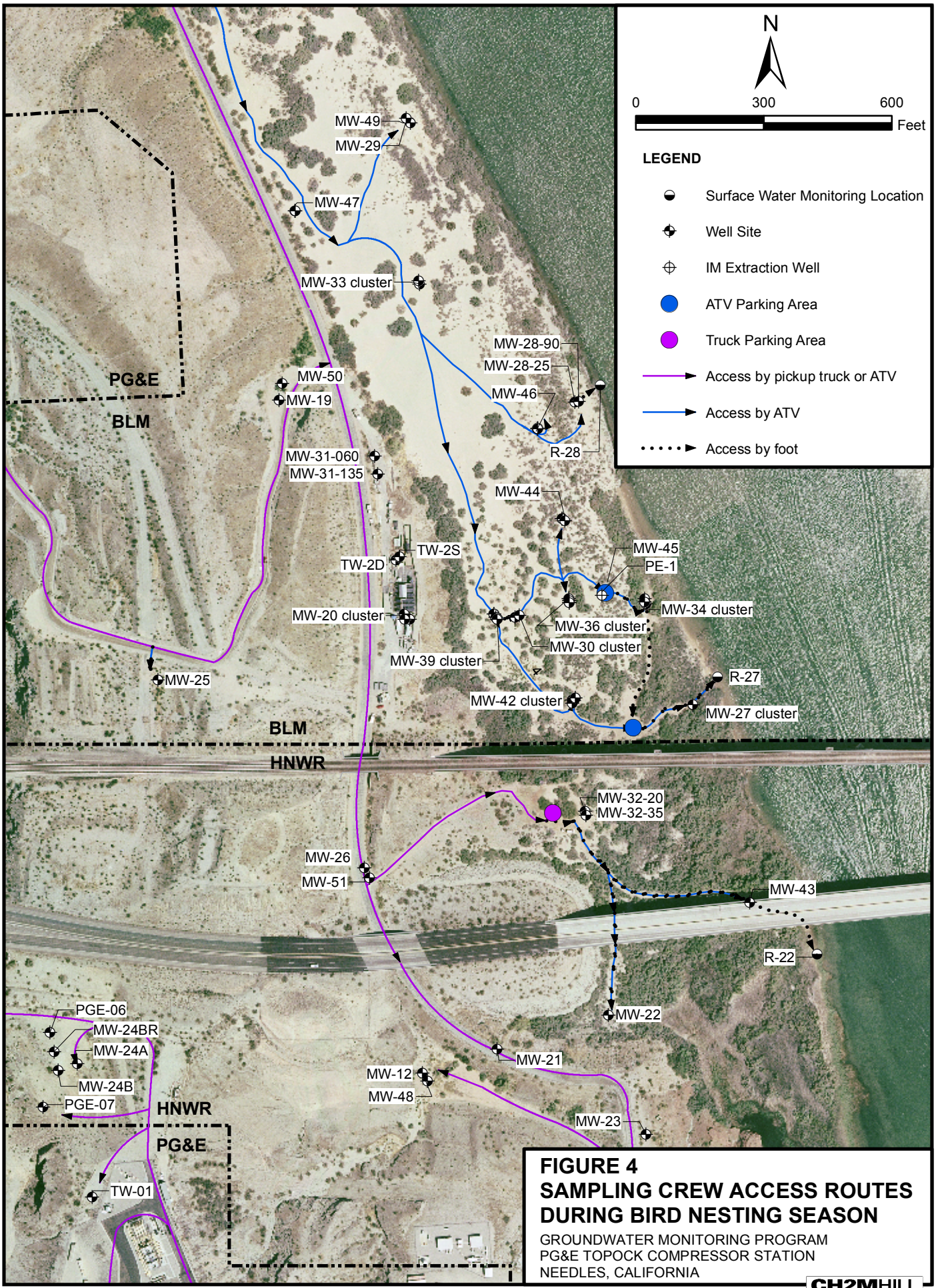



**FIGURE 4**
**SAMPLING CREW ACCESS ROUTES DURING BIRD NESTING SEASON**

GROUNDWATER MONITORING PROGRAM
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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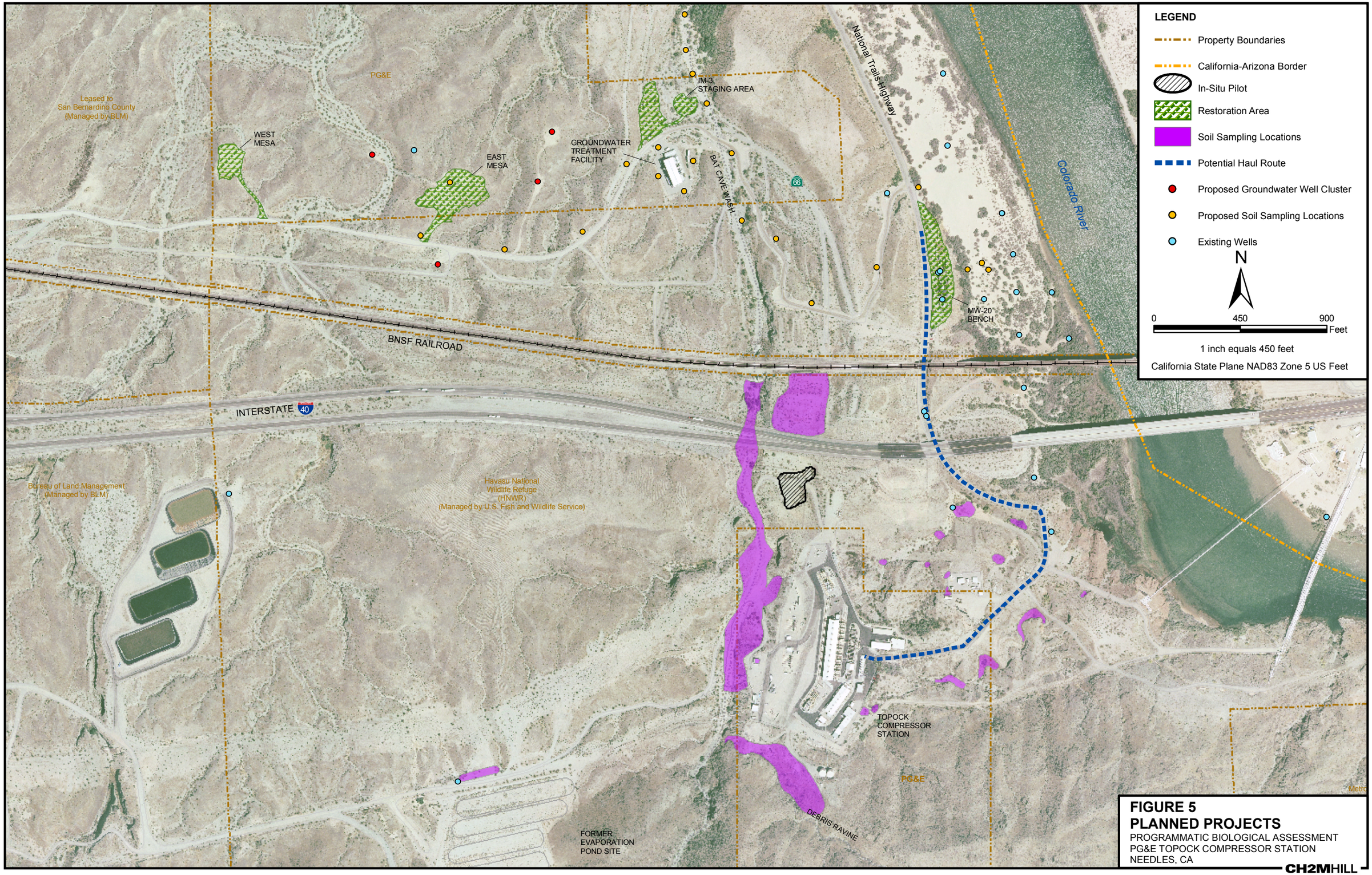
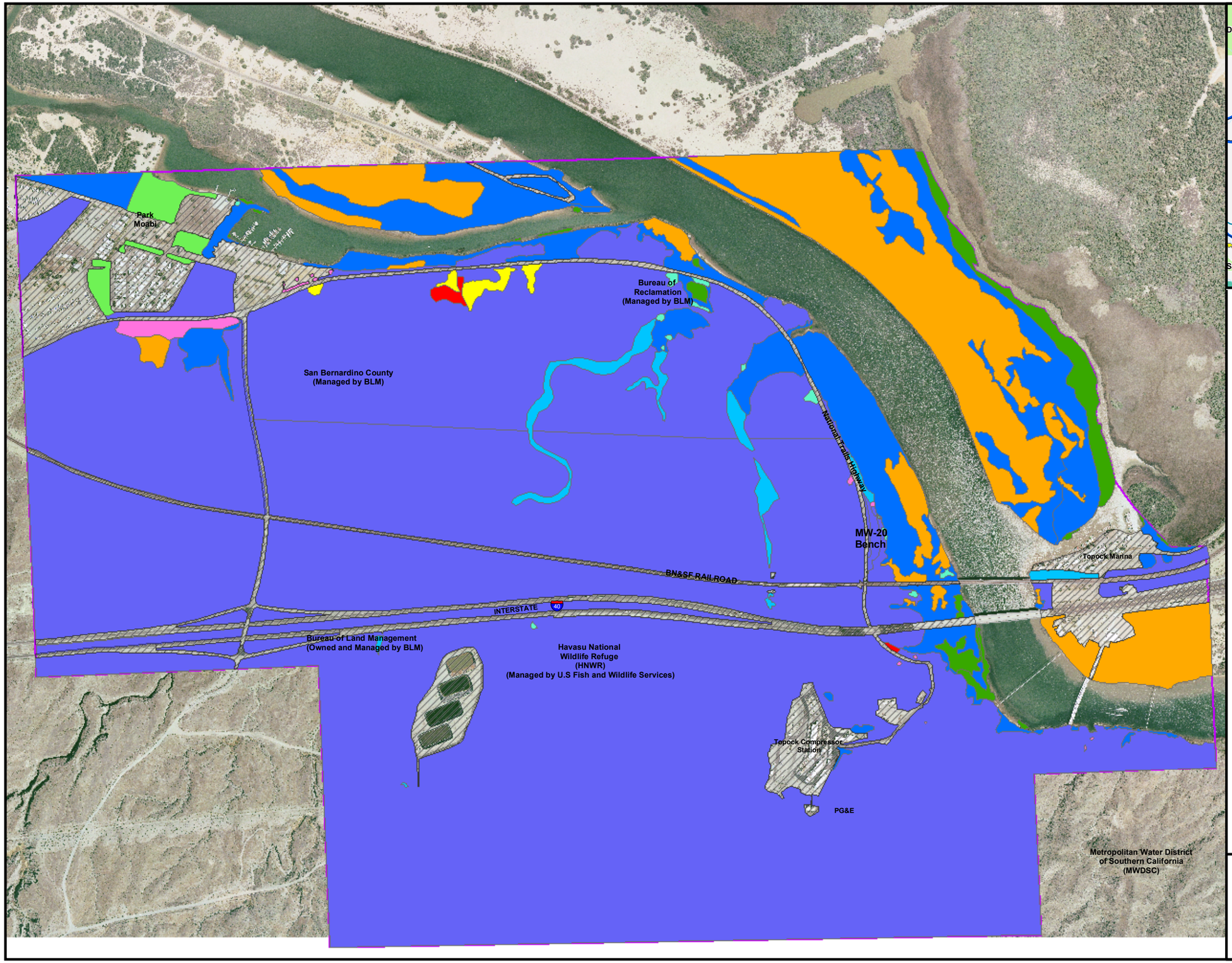
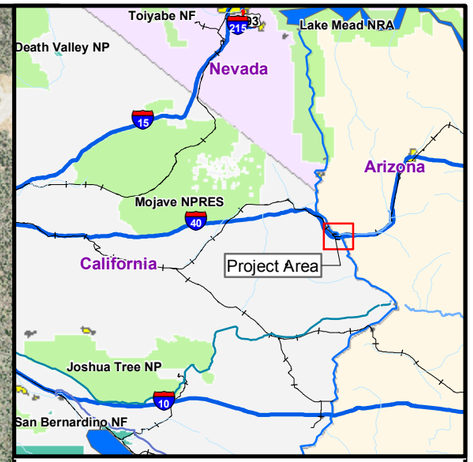



**FIGURE 5**
**PLANNED PROJECTS**
PROGRAMMATIC BIOLOGICAL ASSESSMENT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CA

CH2MHILL




N

0 450 900 1,800 Feet

1 inch equals 900 feet

**LEGEND**

Area of Potential Effects

| | Approximate Acreage | Approximate % Composition |
|---|---|---|
| Developed | 130 | 9.5 |
| **Vegetation Communities** | | |
| Arrow Weed | 114 | 8.3 |
| Creosote Bush Scrub | 973 | 70.9 |
| Landscaped | 8 | 0.6 |
| Mesquite | 2 | 0.1 |
| Mesquite/Palo Verde | 12 | 0.9 |
| Palo Verde | 4 | 0.3 |
| Salt Bush | 1 | 0.1 |
| Salt Cedar | 111 | 8.1 |
| Salt Cedar/Mesquite | 3 | 0.2 |
| Wetland/Marsh | 15 | 1.1 |

**FIGURE 6**
**TOPOCK VEGETATION COMMUNITIES, MAY 2006**
PROGRAMMATIC BIOLOGICAL ASSESSMENT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

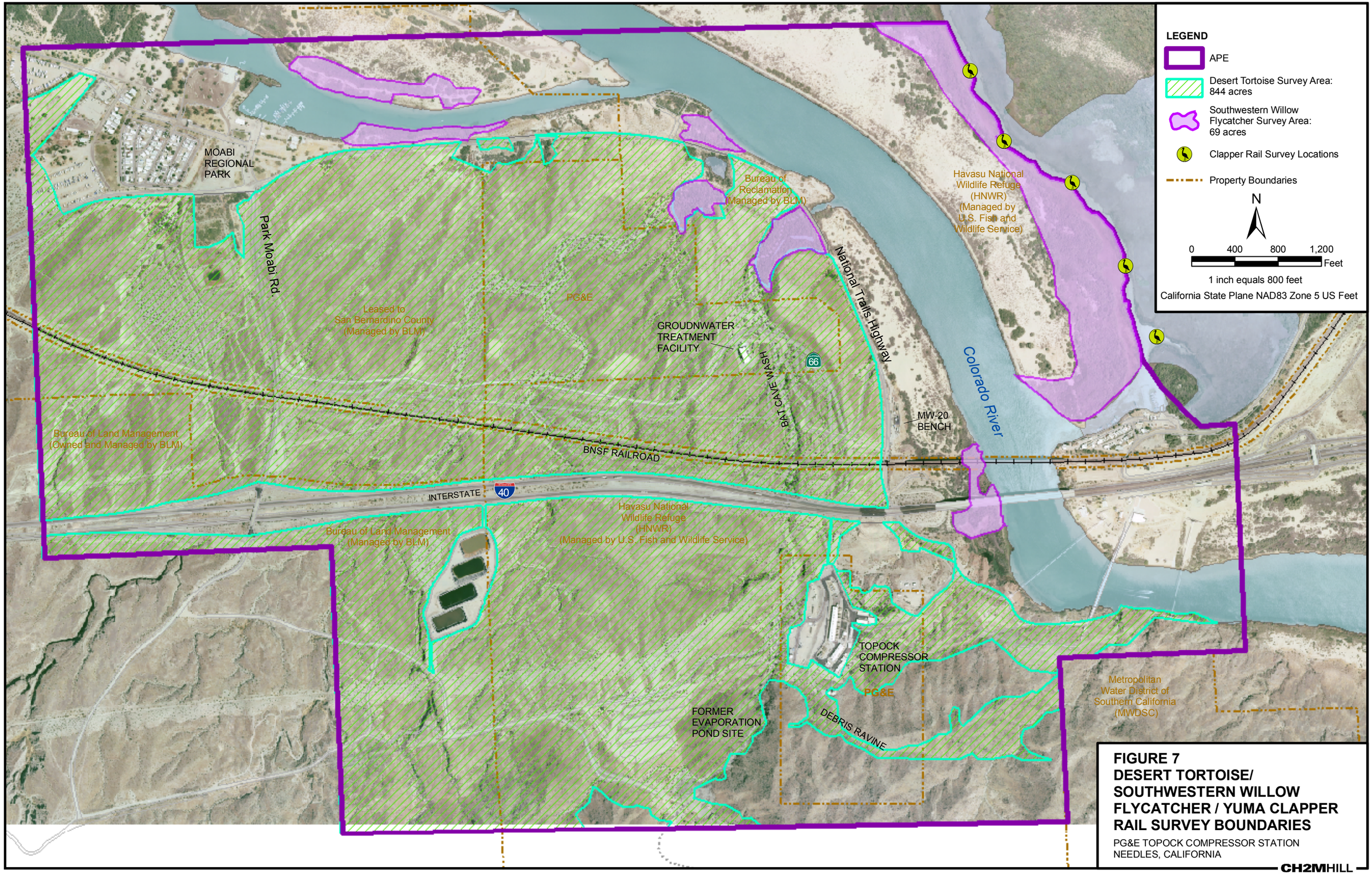



**FIGURE 7**
**DESERT TORTOISE/ SOUTHWESTERN WILLOW FLYCATCHER / YUMA CLAPPER RAIL SURVEY BOUNDARIES**

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

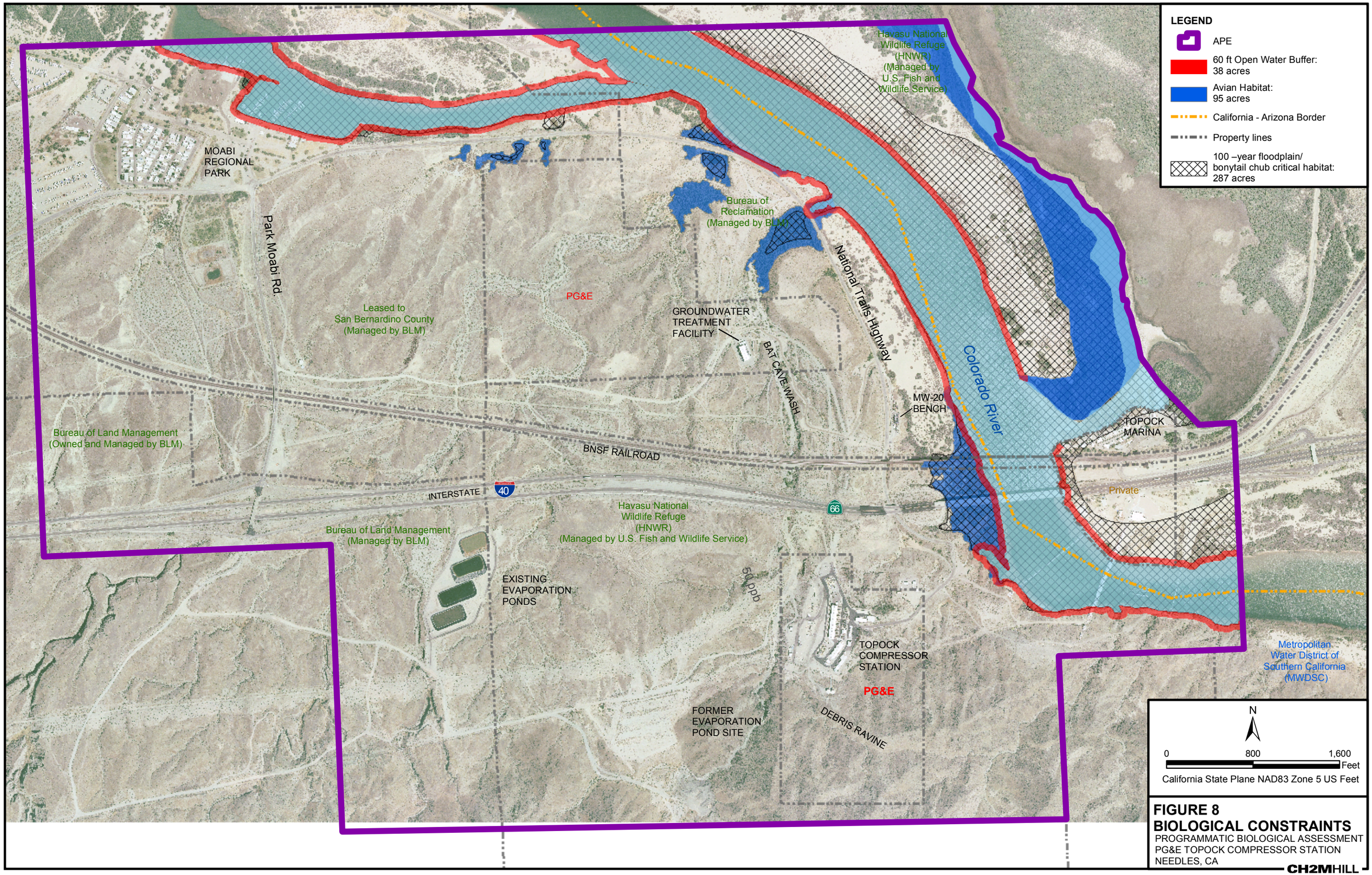



**FIGURE 8**
**BIOLOGICAL CONSTRAINTS**
PROGRAMMATIC BIOLOGICAL ASSESSMENT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CA

CH2MHILL

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