From: Smith, Steven/SFO
Sent: Thursday, December 07, 2006 11:02 AM
To: James_Priest@blm.gov; John_Earle@fws.gov; Lesley_Fitzpatrick@fws.gov; Meeks, Yvonne J
Cc: Knutson, Robert; Romero, Ray/SCO
Subject: Topock - Slant Drilling & Seismic BA

Jim -

Attached is the revised final Biological Assessment (BA) applicable to the proposed slant drilling and seismic survey activities. The MS-Word file is a clean version of the document. The PDF file is a redline/strikeout version that shows all changes made to the document since the last version you provided on 11/28/06. No changes have been made to the document figures. Per your request, I will transmit one hard copy of the BA and figures to you via overnight mail.

As discussed yesterday, there may be some question about the applicability of bonytail chub critical habitat on the 100-year floodplain on the Colorado River. We look forward to feedback from you in that regard. If you would like to schedule a conference call to review this issue further, please let me know and I'll be happy to coordinate.

Thanks for you all your help on this one Jim!

Steve

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Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Groundwater Characterization Beneath the Colorado River by Slant Drilling

Prepared for

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Contents

Appendices

Acronyms and Abbreviations

BLM	United States Bureau of Land Management
BNSF	Burlington Northern-Santa Fe Railroad
USBR	United States Bureau of Reclamation
CFR	Code of Federal Regulations
DOI	United States Department of Interior
DTSC	Department of Toxic Substances Control
ESA	Endangered Species Act
HNWR	Havasu National Wildlife Refuge
PG&E	Pacific Gas and Electric Company
SWCA	Steven W. Carothers and Associates
USC	United States Code
USFWS	United States Fish and Wildlife Service

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is addressing chromium in groundwater at the Topock Compressor Station under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and U.S. Department of the Interior (DOI). The Topock Compressor Station is located in eastern San Bernardino County, California about 15 miles southeast of Needles (Figure 1). DTSC has recently directed PG&E to conduct additional investigative activities addressing groundwater below the Colorado River. This biological assessment (BA) has been prepared to analyze the effects of implementing these activities.

Section 7 of the Endangered Species Act (ESA) (16 United States Code [USC] 1531 et seq.), as amended (1978, 1982, and 1988) directs federal agencies to ensure that actions authorized, funded, or carried out by these agencies are not likely to jeopardize the continued existence of any species listed as threatened or endangered or cause destruction or adverse modification of designated critical habitats (16 USC 1536(a)(2)). This BA serves as a written request, under the provisions of Title 50 Code of Federal Regulations Part 402.14, to initiate Section 7 consultation under the ESA with United States Fish and Wildlife Service. As the action agency, the USFWS Havasu National Wildlife Refuge (HNWR) is initiating consultation with the USFWS Southwest Region 2, Ecological Services in Phoenix, Arizona.

1.1 Background, Purpose, and Need for Proposed Action

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.

A Feasibility Study/Corrective Measure Study will follow the RI/RFI Report, culminating in a proposed final remedy. To support the completion of the RI/RFI and facilitate selection of the final remedy, PG&E has been directed to implement additional groundwater characterization activities.

The proposed project involves installation of groundwater well clusters extending below the Colorado River. The wells will be installed by slant drilling from the western shoreline of the river. Prior to the well installation activities, a seismic survey of the geology below the river bottom will be conducted. This BA has been prepared to determine any potential effect

on species protected under the federal Endangered Species Act (ESA) resulting from the well installation and seismic survey activities.

Several prior ESA consultations have occurred in the project vicinity related to operation of the Topock Compressor Station and the RI/RFI process:

- A non-jeopardy biological opinion was issued to PG&E in January 2000 related to ongoing maintenance activities of a gas pipeline system, and potential effects on the desert tortoise and its critical habitat (USFWS 2000a).
- 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 measures (CH2M HILL 2004b). Based on the proposed activities, which included a proposed groundwater treatment system, a "no effect" determination was made for that project (BLM 2004).
- In December 2005, a biological assessment (CH2M HILL 2005h) and Section 7 ESA consultation were completed related to construction of the PE-1 groundwater pipeline and implementation of the floodplain *in-situ* pilot study, located on the floodplain of the Colorado River, resulting in a "may affect, not likely to adversely affect" the SWFL, and a "no effect" finding for all other listed species.
- In 2006, informal consultation was conducted for the *Access and Sampling Procedures for Groundwater Monitoring Wells Located Near 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.

1.2 Proposed, Threatened, and Endangered Species within the Range of the Proposed Action

The following wildlife species are listed as threatened or endangered under the federal ESA and potentially occur within or near the proposed action:

- Birds
  - Southwestern willow flycatcher (*Empidonax traillii extimus*), Endangered
  - Yuma clapper rail (*Rallus longirostris yumanensis*), Endangered
- Fish
  - Colorado Pike Minnow (*Ptychocheilus lucius*), Endangered
  - Razorback sucker (*Xyrauchen texanus*), Endangered
  - Bonytail Chub (*Gila elegans*), Endangered
- Reptiles
  - Desert Tortoise (*Gopherus agassizii*), Threatened

The project site is located in designated critical habitat for the Bonytail Chub, which is coincident with the 100-year floodplain of the Colorado River (USFWS 1994c). This species may occur adjacent to the proposed project in the body of the Colorado River. In addition, the project site provides potentially suitable habitat for the SWFL. No federally-listed plants

occur at the project site or vicinity. No wildlife or plant species proposed for federal listing occur within the immediate project vicinity.

1.3 Environmental Baseline

The project site 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.

Starting in the 1930s, federal actions in the project vicinity included 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.

Specific to the project vicinity, several past activities have occurred nearby the project site. A biological opinion was obtained to cover the operations and maintenance of the Topock Compressor Station and associated pipelines (USFWS, 2000a) located south of the project site. In addition, ongoing investigative and remedial activities include the installation and subsequent monitoring of various groundwater wells, and a pilot study of in-situ remediation technology on the floodplain north of the project site. The Interim Measures No. 3 groundwater treatment system was approved for construction in 2004 and has operated since July 2005. As noted above, this project was the subject of an informal consultation between BLM and the UFSWS Ventura Office (CH2M HILL 2004b; BLM 2004).

The proposed slant drilling activities are adjacent to a major gas utility and travel corridor extending east-west between the Topock Compressor Station and the Interim Measures No. 3 treatment facility. The corridor includes Interstate 40, BNSF railroad, and four natural gas transmission lines. The slant drilling site is partially within the right-of-way of Interstate 40. A substantial amount of train and vehicular traffic and associated noise and air emissions are generated along this corridor.

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).

2.0 Proposed Action

2.1 Groundwater Characterization Below the Colorado River

2.1.1 Seismic Survey

Prior to implementation of the slant drilling activities discussed below, the United States Geologic Survey will conduct a seismic survey of the Colorado River in the vicinity of the proposed slant drilling site (Figure 2). This survey will be conducted from a small motor boat, and is expected to be completed within one to three days. The boat will include specialized equipment that emits acoustic pulses to obtain data related to bedrock conditions below the Colorado River. The acoustic pulses are similar to that emitted from a recreational fish finder. This information will be utilized in refining the location and angle of the subsequent slant drilling. The seismic survey would be conducted sometime in January 2007, and prior to the fish spawning season that begins approximately February 1. A detailed description of the planned seismic survey is provided in Appendix A.

2.1.2 Slant Drilling Below the Colorado River

The proposed project involves groundwater characterization beneath the Colorado River using a slant drilling method. The slant drilling activity will have surface expression that is essentially identical to prior vertical well drilling installation activities in the vicinity of the Topock Compressor Station (CH2M HILL 2005c, 2006a, 2006c). The proposed drill site is located immediately south of Interstate 40 and west of the Colorado River (Figure 3). Prior to drilling activities, an area measuring approximately 80 feet by 50 feet (4,000 square feet [s.f.]) or about 0.10 acre) will be cleared at the drill site location. The area will be cleared by hand with a chainsaw, with the removed vegetation bundled or chipped prior to hauling off site. While the area cleared of vegetation is expected to be 0.10 acre or less, as a contingency an additional 2,000 s.f. of clearing has been considered for purposes of this biological assessment (i.e., a total of 6,000 s.f. or 0.15 acre).

The existing access route between National Trails Highway and the MW-43 well will also be cleared as needed. From MW-43 a new route will be cleared below Interstate 40 to provide access to the drill site. Removal of native vegetation will be avoided, where possible. The well site, access route, and staging area are further described and depicted in the Work Plan provided in Appendix B.

Well installation will use a track-mounted rotosonic drilling rig, which involves advancing a rotating and vibrating drill head or core barrel through the subsurface. Two slant borings are proposed that will extend approximately 150 feet and 250 feet eastward below the Colorado River. As a contingency, two additional borings may be drilled within the project site if warranted by field conditions. No additional vegetation removal would be required if additional borings are drilled. Following the drilling and testing of the boreholes, multilevel groundwater monitoring wells will be installed in the borings and surface well monuments will be constructed.

The well installation activities are anticipated to be complete within six to nine weeks. Support equipment during drilling and well installation includes a tracked forklift and support vehicle for equipment and material transfer to the drill site. Materials temporarily stored at the well site include drilling equipment and well construction materials (casing, sand, bentonite, cement grout). Cuttings generated from drilling will be temporarily transferred to lined roll-off bins at the staging area located approximately 500 feet northwest of the drill site (see Figure 3), and disposed of at a permitted facility. Water produced during well installation will be transferred for temporary storage in phase separator bins or temporary storage tanks at either the MW-20 bench or the Topock Compressor Station; the storage facilities will be provided with secondary containment, and subsequently processed at the Interim Measures No. 3 treatment plant or a permitted offsite facility.

Following well installation, site restoration through revegetation with mesquite trees will occur as outlined in the enclosed Work Plan, and as described in Section 2.2 below.

Groundwater monitoring activities following well installation will be subject to the procedures described in the *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 3* dated April 20, 2006 (CH2M HILL 2006b). These monitoring procedures were approved by the BLM and USFWS in May 2006, following completion of an ESA consultation (USFWS 2006).

2.2 Mitigation Measures for Protection of Listed Species, Native Plants, and Wildlife

As noted in the work plan, the following pre- and post-activity surveys and monitoring will be performed.

- Prior to vegetation removal, the project boundaries will be clearly marked with lath staking and flagging to minimize habitat impacts by the work crew. A preconstruction survey of the marked site will be performed by a qualified biologist to identify wetlands and any special status species in the area. Wetlands are known to occur nearby. The biologist will ensure that boundaries are adjusted, if needed, to avoid these wetlands. Additionally, the biologist will search for active bird nests prior to vegetation removal. However, the drilling is scheduled to occur outside the bird nesting season. Therefore, active nests are not expected within the slant drilling area. The biologist will also photo document and GPS the pre-construction site conditions.

- During vegetation removal, a biologist will be onsite monitoring activities to ensure work crews remain within the designated boundary and minimize impacts. The predominant plant species at the site that is expected to be removed is non-native tamarisk. However, native screwbean mesquite trees have been observed intermixed with tamarisk in the area. If avoidance or transplantation of native mesquite trees is not possible, then the biologist will document the number of trees removed and the replacement ratio will be 2:1. The biologist will ensure that the lath staking and flagging is correctly positioned to demarcate the slant drill site boundaries once the vegetation has been removed. Upon vegetation removal completion, the biologist will depart the site.

- The PG&E field contact representative will be responsible for providing site orientation training to the workers and ensuring compliance with all applicable biological measures during slant drilling activities.
- Once slant drilling and well installation activities are completed, the biologist will return to the site to photo document and GPS the post-construction conditions. The data will be included in a brief report that will be submitted to the DTSC, BLM, and USFWS within 60 days of well installation. The report will document pre- and post-activity conditions.

Following the completion of construction activities, the following restoration measures will be undertaken.

- The slant drill site will be revegetated with mesquite trees. The planting scheme will be similar to the MW-43 restoration effort, which focused on ultimate re-closure of the tree canopy. The existing irrigation infrastructure will be extended to the slant drill site.
- Some of the newly planted mesquite trees along the edge of the existing staging area and access/egress route may be crushed by the drill rig and other support equipment. Those trees that do not survive will be replaced at a 1:1 ratio.

3.0 Affected Environment

The location of the slant drilling site is immediately south of the Interstate 40 bridge crossing of the Colorado River (see Figure 3). The project is located on the California side of the Colorado River floodplain on HNWR lands administered by the USFWS. The seismic bedrock study will occur in the vicinity of the slant drilling project in the body of the Colorado River (see Figure 2). Flows within the Colorado River, located directly east of the slant drilling site, are managed by the USBR. Lands to the north and northwest are primarily managed by the BLM. PG&E owns an approximately 100-acre parcel northwest of the project site, upon which the Interim Measures No. 3 Treatment Plant is located. In addition, PG&E owns the approximately 65-acre Topock Compressor Station parcel southwest of the project site.

The site of the slant drilling project is located within the 100-year floodplain of the Colorado River. The vegetation is denser and the substrate consists of more alluvium soils rather than dredge spoils typical of other nearby floodplain areas. Topography in the area is abrupt, rising from around 450 feet above mean sea level at the Colorado River and project site to over 1,200 feet above mean sea level within 1 mile to the south and southwest. Slopes encountered west of the river reflect a series of ancient river terraces with desert washes. Further, the general area of the slant drilling site slopes down north to south and eventually changes from a tamarisk riparian zone to a river associated marsh habitat.

The Colorado River flows adjacent to the slant drilling site. The seismic bedrock study will occur in the River within this vicinity. 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), but is not available on the California side of the river (Panel No. 06071C5725). The interpretation of available information is that the 100-year floodplain elevation in the project vicinity is defined by the 460 feet msl contour. The 460-foot contour is generally located approximately 30 feet from the river channel. However, at the project site (and 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.

Sparse 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.). A small 3 acre wetland patch is located in proximity to the slant drilling site. The Topock Marsh, the largest of the area wetlands is located across the river and to the northeast of the seismic bedrock study and slant drilling sites. Managed by the HNWR, the Topock Marsh is an 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-h, 2006a-b; E&E, 2000).

Habitats located upland of the project site 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-h, 2006a-b; E&E, 2000).

Northwest of the project site, 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-h, 2006a-b; E&E, 2000).

Salt cedar (also referred to as tamarisk) thicket is the dominant plant community at the slant drilling site. 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 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-h, 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-h, 2006a-b; E&E, 2000).

Mammals that may occur in the project vicinity 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-h, 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-h, 2006a-b; E&E 2000).

4.0 Effects of the Proposed Action

4.1 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 adjacent to the project site. This section also analyzes the potential effects to each species and its critical habitat resulting from the slant drilling in California. A background search of available documents and databases was performed in preparation for this BA 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, 2005a-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 project vicinity (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 conducted 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). Overall the management measures identified in this BA are intended to avoid, reduce, or mitigate potential direct, indirect, and cumulative effects to these species and habitats.

4.2 Terrestrial

4.2.1 Southwestern Willow Flycatcher *Empidonax traillii extimus*)

4.2.1.1 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).

4.2.1.2 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 including the Topock Marsh (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.

4.2.1.3 Recent Findings

The project site is located between two SWFL study areas—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 individual SWFLs within Topock Marsh and Topock Gorge, respectively (Koronkiewicz et al., 2005).

Nesting and migratory habitat for the SWFL exists within and near the project vicinity. The nesting and migratory period for SWFLs occurs from May (arrival) through September (departure). Tamarisk and arrowweed are the dominant vegetation types within the project site where suitable roosting and foraging habitat exists. This thicket is concentrated below the BNSF Railway and Interstate 40 bridges and is approximately 6 acres in size. The thicket is fragmented and subject to human disturbance, two factors that may decrease the habitat value for the species (GANDA, 2005b).

The SWFL is not expected to nest within or directly adjacent to the project site 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 at the project site, the vegetation density, habitat structure, and patch-size of the thicket is

sparser, smaller, and fragmented in comparison to known breeding habitat within the Topock Marsh. Additionally, SWFLs are not known to nest in mesquite trees (Sogge et al., 1997), which are the other tree species in the project vicinity. Furthermore, there is no known breeding habitat within the project site 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 Area of Potential Effect (APE) which encompasses the project site (GANDA, 2005b; GANDA, 2006b). The survey 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 per protocol was not heard. This bird was possibly a transient since there were no subsequent detections of this species (GANDA, 2005b). Other than the single observation, no other willow flycatchers were seen or heard during the 2005 protocol survey.

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).

Biological monitors have logged several hundred hours in performing pre-activity surveys and compliance monitoring on the California floodplain for prior Topock field activities. These efforts require a qualified biologist to monitor a 200-foot circle around the project site prior to beginning operations for migratory bird nests. This effort occurs from March 15 to September 30. To date, no active nests of any migratory birds have been documented.

4.2.1.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. The seismic testing will take place within the Colorado River (Figure 2) and will conclude prior to February 1, 2007. This is well before the nesting season of the SWFL. Therefore, this action will have no effect upon this species.

The footprint of the slant drilling project site will require the clearing of 4,000 to 6,000 s.f. (0.10 to 0.15 acre) of vegetation to create a work pad for the drill equipment and crew (Figure 3). This will occur within the larger 6 acres of tamarisk thicket that is considered suitable roosting and foraging habitat for the SWFL. This equates to 2.5% of the 6 acres. Additionally, the BLM and USFWS have identified this area as sensitive avian habitat (Figure 4).

The project activities will involve a drill rig and support equipment that will be used to install groundwater monitoring wells within the floodplain. The slant drilling work plan identifies several measures to offset potential impacts including a qualified biologist performing pre- and post-activity surveys, demarcating the work area to minimize habitat disturbance and avoid potential impacts to adjacent wetlands, and assisting with the implementation of the restoration plan. Although the non-native tamarisk is expected to recover, native mesquite trees will be planted at the project site to reestablish the canopy

cover. The 0.10 to 0.15 acre of cleared vegetation will be applied to the total disturbance threshold for the floodplain, to be established through completion of a forthcoming programmatic biological assessment and ESA consultation. Exceeding the established threshold will require re-consultation with the USFWS and may require additional mitigation.

The construction related activities are planned during the winter season to avoid potential direct impacts to nesting birds that are protected under the Migratory Bird Treaty Act (MBTA). March 15 has been identified as the start of the nesting season for many migratory birds. The construction related activities are scheduled to be completed before this date. The SWFL migrates to Mexico, Central and South America in late September and is not expected to return to the Topock Marsh and Gorge until early May. Therefore, direct construction related impacts to nesting migratory birds including the SWFL are not anticipated.

Operational activities associated with the monitoring wells include personnel collecting water samples on a regular basis. 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 take place between workers. If these activities are performed within or adjacent to suitable SWFL habitat, this action may lead to the alteration of SWFL behavior. However, the lack of SWFL presence within the project vicinity suggests that the probability of altering species behavior to rise to the level of harassment during operations would be very low. Further, the magnitude of operational effects may be difficult to discern from other potentially impacting transportation (e.g., Interstate-40 and the BNSF Railroad) and recreational activities (e.g., watercraft) that regularly occur at the project site.

The Colorado River may function as a migration corridor for the SWFL during arrival (May) and departure (September). During migration periods, this species may briefly stop to roost and/or forage within or adjacent to the project site. Potential roosting and foraging habitats in the area include the tamarisk thicket at the project site. Because flycatchers may potentially utilize this habitat, it is possible that operational activities could alter the behavior of migrating individuals, but, as discussed above, the potential for impact is considered low.

In May 2006, the well access and groundwater sampling procedures were refined to further minimize any potential impacts from operational activities to this species and reduce the amount of time in the field for water sampling techniques due to human health and safety concerns, while maintaining quality control requirements (CH2M HILL, 2006b). The timing of the modified sampling procedures is from May 1 through September 30, during the flycatcher nesting season. Several conservation measures were outlined as part of the revised procedures and will be carried forward under the scope of this BA. These measures include a biologist that is assigned to the well sampling teams during the SWFL period. The biologist is responsible for awareness training, pre-activity 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).

Based on project timing, annual survey results and the application of conservation measures, direct effects to nesting or migratory SWFLs are not anticipated. Additionally, the removal of 0.10 to 0.15 acre of potentially suitable habitat would be insignificant.

4.2.1.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land and water use patterns are foreseen due to the slant drilling and seismic survey.

4.2.1.6 Cumulative Effects

Cumulative effects include future state and private activities, excluding federal activities that are reasonably certain to occur within the project vicinity. The interim and remedial actions that may occur within the project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC and the Federal agencies. It is reasonably certain that additional investigative and remedial activities very similar to the proposed action will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat may result from these activities. This loss may be sufficient enough to reduce habitat function and thus alter SWFL use and behavior. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. For the purposes of this BA, habitat loss is defined as the removal of trees/perennial shrubs. The trimming of vegetation is not considered habitat loss. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.2.1.7 Critical Habitat Effects Determination

The nearest critical habitat for the SWFL is located at Big Sandy River located approximately 50 miles east of the project site (USFWS, 2005b). The project site is located outside designated critical habitat for the SWFL. An effects determination of “no effect” to critical habitat is concluded.

4.2.1.8 Effects Determination

There has been no positive identification of SWFLs during the 2005 and 2006 protocol surveys of the APE which includes the project site (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 project vicinity. To date, no take of SWFLs (or any other migratory birds) has occurred from implementation of related activities.

Nesting of SWFLs is considered unlikely within the project vicinity. 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 floodplain 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 and to help guide in the conservation of this species, annual USFWS protocol surveys will continue to be conducted yearly for presence or absence of SWFLs and pre-construction surveys will continue to be conducted during the nesting season by biological monitors.

The identified mitigation measures will help to avoid, reduce, and mitigate operational impacts to the biological environment within the project site. It is expected that tamarisk habitat will be removed to conduct project activities that may reduce habitat function of the immediate area. Under this BA 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 at the project site.
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.
3. If greater than 0.15 acres of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible additional measures may be imposed. For the purposes of this BA, 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 (CH2M HILL 2006b; USFWS 2006) in SWFL habitat will be used under this BE and will be implemented from May 1 to September 30.

SWFL use of the project area and immediate locality can not be rejected. It is unlikely that this species nests in or adjacent to the slant drilling site based on survey information and habitat availability. However, there is potential for migrants to utilize this area as individuals move seasonally to and from nesting and wintering ranges. But given the timing of the action, the 0.10 to 0.15 acre extent of habitat removal and application of the conservation measures identified in this section, the project's effects would be insignificant and discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

4.2.2 Mojave Desert Tortoise (Gopherus agassizii)

4.2.2.1 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).

4.2.2.2 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, the 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).

4.2.2.3 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 within the APE. No live desert tortoises were detected within the survey areas. However, three disarticulated desert tortoise carcasses were observed in 2004 and 2006. 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, scat, 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 potential 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).

Based on the survey results, desert tortoises were concluded to be absent in the APE. Despite the lack of live tortoise observations, there is a possibility that desert tortoises could enter the APE. While it is possible that the desert tortoise could enter from the west, the quality of the 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).

4.2.2.4 Direct Effects

Direct effects upon this species resulting from the proposed project activities are not expected because:

- The proposed actions will take place within unsuitable habitat for this species.
- The species does not occur within or directly adjacent to the project site.

4.2.2.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land and water use patterns are foreseen due to the slant drilling and seismic survey.

4.2.2.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat, specifically tamarisk thicket, may be needed to conduct these activities. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. This loss does not affect the desert tortoise because tamarisk thicket on the floodplain is considered unsuitable habitat for this species. Additional on-site PG&E related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.2.2.7 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 project site (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.

4.2.2.8 Effects Determination

Recent evidence of desert tortoise presence was not detected during recent protocol surveys within suitable habitat. The floodplain is considered unsuitable habitat for this species. Therefore, the proposed action will have "no effect" upon this species. Habitat for this species will not be affected.

4.3 Marsh

4.3.1 Yuma Clapper Rail (Rallus longirostris yumanensis)

4.3.1.1 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).

4.3.1.2 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).

4.3.1.3 Recent Findings

There is a small 3 acre wetland associated with the Colorado River approximately 300 feet south of the slant drilling site. This wetland is within the HNWR boundary. No reports of

Yuma clapper 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. The habitat elements within this area may be suitable for nesting rails.

Several call stations have been surveyed annually for Yuma clapper rail by the USFWS along the South Dike of the Topock Marsh that is located within 1 mile of the seismic bedrock study in the Colorado River and the slant drilling site. In past years, this species has been detected south of the new South Dike and north of the Topock Marina (USFWS, 2005d). In 2005, seven Yuma clapper rails were detected along the South Dike transect (Fitzpatrick, 2006).

4.3.1.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. The seismic testing will take place within the Colorado River (Figure 2) and will conclude prior to February 1, 2007. This is well before the nesting season of the Yuma clapper rail. Therefore, this action will have no effect upon this species.

The slant drilling site requires clearing of 0.10 to 0.15 acre within 300 feet of a Colorado River associated wetland/marsh on the southern end of the floodplain. The USFWS has identified this general area as habitat for avian species (see Figure 4). Within this area, a small wetland/marsh may potentially be suitable nesting habitat for the Yuma clapper rail. There will be no entry into the wetland/marsh habitat, but the slant drilling project will remove 0.10 to 0.15 acre of tamarisk buffer. However, slant drilling operations are scheduled to be completed prior to March 15 that has been established for the migratory bird arrival and the clapper rail is not expected to use tamarisk habitat directly. Also, groundwater monitoring procedures created to reduce effects to SWFLs will occur in the tamarisk thicket starting on May 1. Therefore, any direct affects to nesting Yuma clapper rails are not expected to occur. See Section 4.2.1.4 within the SWFL section for additional information on activities that will occur within this area.

4.3.1.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land and water use patterns are foreseen due to the slant drilling and seismic survey.

4.3.1.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat, specifically tamarisk thicket, may be needed to conduct these activities. This loss of tamarisk thickets may reduce the function of this habitat to buffer the wetland/marsh from project activities. Subsequent effects of future projects will consider past

effects of actions as new proposals come forward. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.3.1.7 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.

4.3.1.8 Effects Determination

Suitable habitat and known presence of Yuma clapper rails occurs on the Arizona-side of the Colorado River within the Topock Marsh. The 3 acre Colorado River associated wetland/marsh located 300 feet south of the slant drilling site may be suitable habitat for nesting rails. Although no presence of Yuma clapper rails have been documented in this location and no work will be conducted in the 3 acre wetland area, the tamarisk thicket provides a buffer from the project activities should rails select this area for nesting.

The identified protection measures will help to avoid, reduce, and mitigate operational impacts to the biological environment within the project site. It is expected that tamarisk habitat will be removed to conduct project activities that may reduce habitat value of the immediate area. Under this BA 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 at the project site.

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 Yuma clapper rail habitat after March 15 will be required to be reassessed and additional conservation measures considered.

3. If greater than 0.15 acre of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible additional measures may be imposed. For the purposes of this BA, habitat loss is defined as the removal of trees/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 (CH2M HILL 2006b; USFWS 2006) in SWFL habitat will be used under this BA and will be implemented from May 1 to September 30.

Suitable habitat conditions and the documented presence of Yuma clapper rails exist in the Topock Marsh within 1 mile of project activities. The 3 acre wetland/marsh 300 feet south of the slant drilling site may be suitable for nesting rails. However, given the timing of the project, the 0.10 to 0.15 acre extent of tamarisk habitat loss, distance from the project site to

wetland habitat, and conservation measures discussed in this section, a "no effect" determination is concluded for this species.

4.4 Aquatic

4.4.1 Colorado Pikeminnow (Ptychocheilus lucius)

4.4.1.1 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).

4.4.1.2 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 has been designated for the Lower Colorado River.

4.4.1.3 Direct Effects

No direct effects will occur as this species does not occur in the project area.

4.4.1.4 Indirect Effects

No indirect effects will occur as this species does not occur in the project area.

4.4.1.5 Cumulative Effects

No cumulative effects will occur as this species does not occur in the project area.

4.4.1.6 Critical Habitat Effects Determination

Critical habitat does not occur within or near the project area for the Colorado pikeminnow. An effect determination of "no effect" for critical habitat is concluded for this species.

4.4.1.7 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.

4.4.2 Razorback Sucker (Xyrauchen texanus)

4.4.2.1 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).

4.4.2.2 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, 2002). 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. Reproduction in the lower basin has been studied in Lakes Mead and Mohave. Spawning in Lake Mohave typically begins in January or February, while in Lake Mead it begins slightly later. Spawning typically runs 30-90 days, at water temperatures ranging from 55˚ to 70˚ F. Spawning areas tend to be wave-washed,

gravelly shorelines and shoals. Fish spawn in water from 3 to 20 feet in depth with the majority of fish in the 5-10 foot range. Razorback suckers apparently spawn continuously throughout the spawning season. There is considerable fidelity based on recapture data, and fish often show up on the same spawning site year after year (Minckley et al. 1991).

4.4.2.3 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.

4.4.2.4 Direct Effects

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

A small boat will be used to submerge the seismic equipment within a small portion of the Colorado River (Figure 2). 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 testing will be performed during the winter season and completed before February 1. 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, the seismic testing will have no affect upon this species (Adams, 2006).

The footprint of the slant drilling project site will require that 4,000 to 6,000 s.f. (0.10 to 0.15 acre) be cleared of vegetation to create a work pad for the drill equipment and crew. This will occur within the larger 6 acres of tamarisk thicket that is located within the 100-year floodplain of the Colorado River. This may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the extent of this impact on the function of the riparian zone from the proposed action is very limited and therefore is not expected to impact the razorback sucker.

4.4.2.5 Indirect effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land or water use patterns are foreseen from the seismic survey and slant drilling activities.

4.4.2.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat will degrade riparian function in contributing nutrients to the river. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.4.2.7 Critical Habitat Effects Determination

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

4.4.2.8 Effects Determination

The seismic bedrock study will occur within the Colorado River and will be completed prior to February 1 and the spawning season for the razorback sucker. The acoustical pulses will not alter any behavioral patterns. The slant drilling will occur within the 100-year floodplain and requires the clearing of 4,000 to 6,000 s.f. of riparian habitat. This clearing equates to 0.10 to 0.15 acre of the total 6 acres of riparian habitat. However, this will not negatively impact this species and a "no effect" determination is concluded for this aquatic species.

4.4.3 Bonytail Chub (Gila elegans)

4.4.3.1 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 project site, critical habitat includes the Colorado River and the 100-year floodplain (see Figure 4) 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).

4.4.3.2 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 taken. 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).

As a result of the rarity of this species, the reproduction of the bonytail is not well understood. Based on the appearance of ripe fish in the upper basin, spawning appears to occur during late June and early July. Spawning in the lower basin occurs from late spring to early summer. 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).

4.4.3.3 Recent Findings

The project site is located within the 100-year floodplain of the Colorado River that delineates critical habitat for the bonytail chub (Figure 4). From south to north, this area extends from a river-associated wetland 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. 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 project vicinity.

4.4.3.4 Direct Effects

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

A small boat will be used to submerge the seismic equipment within a small portion of the Colorado River (Figure 2). 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 testing will be performed during the winter season and completed before February 1. 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, the seismic testing will have no affect upon this species (Adams, 2006).

The footprint of the slant drilling project site will require that 4,000 to 6,000 s.f. (0.10 to 0.15 acre) be cleared of vegetation to create a work pad for the drill equipment and crew. This will occur within the larger 6 acres of tamarisk thicket that is located within the 100-year floodplain of the Colorado River. This may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the extent of this impact on the function of the riparian zone from the proposed action is very limited and therefore is not expected to impact the bonytail chub.

4.4.3.5 Indirect effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land or water use patterns are foreseen from the slant drilling and seismic survey activities.

4.4.3.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat will degrade riparian function in contributing nutrients to the River. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.4.3.7 Critical Habitat Effects Determination

Critical habitat for the bonytail chub is delineated by the 100-year floodplain of the Colorado River (Figure 4). The slant drilling project will require clearing 4,000 to 6,000 s.f. (0.10 to 0.15 acre) of riparian habitat in the 100-year floodplain and may reduce riparian function in contributing nutrients to the river.

The identified mitigation measures will help to avoid, reduce, and mitigate operational impacts to the biological environment within the project site. It is expected that tamarisk habitat will be removed to conduct project activities that may reduce habitat function of the immediate area. Under this BA 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 at the project site.

2. If greater than 0.15 acre of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible additional measures may be imposed. For the purposes of this BA, habitat loss is defined as the removal of trees/perennial shrubs. The trimming of vegetation is not considered habitat loss.

However, given the removal of 0.10 to 0.15 acre of vegetation within the total 6 acres that occurs within the 100-year floodplain and the application of conservation measures, no appreciable diminishment to critical habitat function is expected. An effects determination of "may affect, but not likely to adversely affect" is concluded for critical habitat of this species.

4.4.3.8 Effects Determination

The seismic bedrock study will occur in the Colorado River and will be completed prior to February 1 and the spawning season for the bonytail chub. There are no anticipated negative effects to the species from slant drilling operations. Therefore, a "no effect" determination is concluded for this species.

5.0 Effects Determination Summary

5.1 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.

5.2 Mojave Desert Tortoise

An effects determination of "no effect" is concluded for the Mojave desert tortoise.

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

5.3 Yuma Clapper Rail

An effects determination of "no effect" is concluded for the Yuma clapper rail.

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

5.4 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.

5.5 Razorback Sucker

An effects determination of "no effect" is concluded for the razorback sucker.

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

5.6 Bonytail Chub

An effects determination of "no effect" 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.

6.0 Works Cited

Adams, Doug. 2006. BLM Lake Havasu Field Office, personal communication.

Applied Earthworks, Inc. 2004. *Cultural Resources Management Plan for the Topock Compressor Station Expanded Groundwater Extraction and treatment System San Bernardino, California.* September.

Arizona Game and Fish Department (AGFD). 2001. Gila elegans. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.

Arizona Game and Fish Department (AGFD). 2002. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.

Arizona Game and Fish Department (AGFD). 2004. Arizona Game and Fish Natural Heritage Program. http://www.gf.state.az.us/pdfs/w_c/hdms/COUNTY%20SPEC%20STAT%20LIST.pdf.

Bagley, B.E. 1989. Nongame field note: Bonytail Chub. Arizona Game and Fish Department, Phoenix. pp. 1-3.

Bestgen, K.R. 1990. *Status review of the razorback sucker, Xyrauchen texanus.* Final report to USBR, Colorado State University. Larval Fish lab, Fort Collins, CO. 92 pp.

California Department of Fish and Game (CDFG). 2003. California Wildlife Habitat Relationships System. http://www.dfg.ca.gov/whdab/whdabold/cwhr/R005.html.

California Natural Diversity Database (CNDDB). 2003. California Department of Fish and Game. Commercial version. Information dated July 1. Information accessed November 4.

CH2M HILL. 2004a. *Cultural Resources Investigations for Interim Measures No 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System San Bernardino, California.* August.

CH2M HILL. 2004b. *Final Biological Resources Investigations for Interim Measures No. 3:* Topock *Compressor Station Expanded Groundwater Extraction and Treatment System San Bernardino County, California.* September.

CH2M HILL. 2005a. *Work Plan for Special Status Species Survey within the Area of Potential Effect (APE), Topock Compressor Station, Needles, California.* March.

CH2M HILL. 2005b. *Biological Resources Survey Report for the Area of Potential Effect (APE) Topock Compressor Station Expanded Groundwater Extraction and Treatment System Needles, California.* October.

CH2M HILL. 2005c. *Land Area Subject to Groundwater Well Installation Biological Resources Monitoring – Completion Report Topock Project Site, Needles, California.* April.

CH2M HILL. 2005d. *Interim Measures No. 3, Land Use Area – Technical Memorandum*. July.

CH2M HILL. 2005e. *Draft MW-20 Bench Decommissioning Work Plan, Topock Compressor Station, Needles, California*. August.

CH2M HILL. 2005f. *Biological Resources Completion Report for Interim Measures No. 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System Needles, California.* September.

CH2M HILL. 2005g. *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 2*. September.

CH2M HILL. 2005h. *Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions*. November.

CH2M HILL. 2006a. *Biological Resources Completion Report for the PE-1 Pipeline and In-Situ Pilot Study: Topock Compressor Station Expanded Groundwater Extraction and Treatment System Needles, California.* March.

CH2M HILL.2006b. *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 3*. April.

CH2M HILL. 2006c. *Biological Resources Completion Report for the Interim Measures Performance Monitoring (IMPM) Program, Pacific Gas and Electric Topock Compressor Station Expanded Groundwater Extraction and Treatment System*. June.

Conway, C.J., W.R. Eddleman, S.H. Anderson, and L.R. Hanebury. 1993. Seasonal changes in Yuma clapper rail vocalization rate and habitat use. Journal of Wildlife management 57(2): 282-290.

Ecology and Environment, Inc. (E&E). 2000. *Draft RCRA Facility Investigation Report. Bat Cave Wash Area, Pacific Gas and Electric Company's Topock Compressor Station Needles, California.* April 17.

Eddleman, W.R. 1989. *Biology of the Yuma clapper rail in the southwestern U.S. and northwestern Mexico.* USBR, IA No. 4-AA-30-020060. 127 pp.

Fitzpatrick, Lesley. 2006. USFWS Phoenix Field Office, personal communication.

Garcia and Associates (GANDA). 2005a. *Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System, Topock, California.* July.

Garcia and Associates (GANDA). 2005b. *Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System, Topock, California*. August.

Garcia and Associates (GANDA). 2006a. *Desert Tortoise Presence/Absence Surveys for the PG&E Topock Compressor Station Expanded Groundwater Extraction and Treatment System*. July.

Garcia and Associates (GANDA). 2006b. *Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Topock Compressor Station Expanded Groundwater Extraction and Treatment System. September.*

Gilbert, C.H. and N.B. Scofield. 1898. *Notes on collection of fishes from the Colorado Basin in Arizona.* Proceedings of the U.S. National Museum. 20:487-499.

Koronkiewicz, T.J., M.A. McLeod, B.T. Brown, and S.W. Carothers. 2004. *Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the Lower Colorado River and Tributaries, 2003.* Annual report submitted to U.S. Bureau of Reclamation, Boulder City, NV by SWCA Environmental Consultants, Flagstaff, AZ. 125 pp.

Luckenbach, R. A. 1982. *Ecology and management of the Desert Tortoise (Gopherus agassizii) in California.* Pages 1-37 in R.B. Bury, ed., North American Tortoise and Conservation Ecology. U.S. Department of Interior, Fish and Wildlife Service, Wildlife Research Report 12.

Minckley, W.L. 1973. *The fishes of Arizona.* Arizona Game and Fish Department. Phoenix, Arizona.

Minckley, W.L., P.C. Marsh, J.E. Brooks, J.E. Johnson, and B.L. Jensen. 1991. *Management towards recovery of the razorback sucker.* Pages 303-357 in W.L. Minckley and J.E. Deacon, eds. *Battle against extinction: native fish management in the American West.* Univ. of Arizona Press, Tucson, Arizona.

O'Conner, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. *Home range size and movements by desert tortoise, Gopherus agassizii, in eastern Mojave Desert.* Herpetology Monographs. Volume 8. 60-71 pp.

Ohmart, R.D., and R.E. Tomlinson. 1977. *Foods of western clapper rails.* Wilson Bulletin 89: 332-336.

Rosenberg, K.V., R.D. Ohmart, W.C. Hunter, and B.W. Anderson. 1991. *Birds of the lower Colorado River valley.* University of Arizona Press, Tucson, Arizona. 416 pp.

Rostral, D.C., V.A. Lance, J.S. Grimbles, and A.C. Alberts. 1994. *Seasonal reproductive cycle of the desert tortoise (Gopherus agassizii) in eastern Mojave Desert.* Herpetology Monographs. Volume 8. 72-102 pp.

Sogge, M.K., T.J. Tibbitts, and S.J. Sferra. 1993. *Status of the Southwestern Willow Flycatcher along the Colorado River between the Grand Canyon and Lake Mead, 1993 summary report.* National Park Service, CPSU/NAU Report. 69 pp.

Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbitts. 1997. *A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol.* Technical report NPS/NAUCPRS/NRTR-97/12. National Park Service Colorado Plateau Research Station at Northern Arizona University, Flagstaff, Arizona. 40 pp.

Sogge, M.K., P. Dockens, S.O. Williams, B.E. Kus, and S.J. Sferra. 2003. *Southwestern Willow Flycatcher Breeding Site and Territory Summary – 2002.* United States Geological Survey, Southwest Biological Science Center, Colorado Plateau Field Station, Flagstaff, Arizona. 17 pp.

Stebbins, R.C. 1985. *Peterson Field Guides: Western Reptiles and Amphibians.* Houghton Mifflin Company, Boston, Massachusetts.

Steven W. Carothers and Associates. 2001. *Recovery Goals for the Bonytail (Gila elegans) of the Colorado River Basin.* A supplement to the *Bonytail Chub Recovery Plan.* Draft Final Report dated March 12, 2001.

Tibbitts. T.J., M.K. Sogge and S.J. Sferra. 1994. *A survey protocol for the southwestern willow flycatcher (Empidonax traillii extimus).* Technical Report NPS/NAUCPRS/NRTR-94/04, 15 pp.

Todd, R.L. 1986. *A saltwater marsh hen in Arizona: a history of the Yuma clapper rail (Rallus longirostris yumanensis).* Arizona Game and Fish Dept., Fed. Aid Project. W-95-R. Competition Report. 290 pp.

United States Bureau of Land Management (BLM). 2004. Email regarding informal consultation with the USFWS Ventura Office for IM3 project activities. September.

United States Bureau of Reclamation (USBR). 1996. Description and Assessment of Operations, Maintenance, and Sensitive Species of the Lower Colorado River. *Final Biological Assessment for United States Fish and Wildlife Service and Lower Colorado River Multi-Species Conservation Program.* Lower Colorado Region, Boulder City, NV. 207 pp. plus appendices.

United States Bureau of Reclamation (USBR). 1999. *Long Term Restoration Program for the Historical Southwestern Willow Flycatcher (*Empidonax traillii extimus*) Habitat along the Lower Colorado River. Lower Colorado Region.* Boulder City, NV. 70 pp.

United States Bureau of Reclamation (USBR). 2000. *Final Biological Assessment for Proposed Surplus Water Criteria, Secretarial Implementation Agreements for California Water Plan Components and Conservation Measures on the Lower Colorado River (Lake Mead to Southerly International Boundary).* Final Dated August 30. Lower Colorado Region, Boulder City, NV. 80 pp. plus appendices.

United States Bureau of Reclamation (USBR). 2002. *Biological Assessment for Continued Discretionary Operations, Maintenance and Sensitive Species of the Lower Colorado River for the period of April 30, 2002 - April 30, 2005.* Lower Colorado Region, Boulder City, NV. 37 pp. plus appendices. March.

United States Bureau of Reclamation (USBR). 2004. *Lower Colorado River Multi-Species Conservation Program Final Habitat Conservation Plan.* Lower Colorado Region, Boulder City, NV. December

United States Fish and Wildlife Service (USFWS). 1983. *Yuma Clapper Rail Recovery Plan.* Albuquerque, NM. 51 pp.

United States Fish and Wildlife Service (USFWS). 1990a. *Bonytail Chub Recovery Plan*. Denver, CO. 35 pp.

United States Fish and Wildlife Service (USFWS). 1990b. Federal Register, Department of the Interior, Fish and Wildlife Services. Final Listing. ETWP: "Determination of Threatened Status for the Mojave Population of the Desert Tortoise." 50 CFR Part 17. 55 FR 12178-12191. April 2.

United States Fish and Wildlife Service (USFWS).1990c. *Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise.*

United States Fish and Wildlife Service (USFWS). 1991. *Colorado Pikeminnow Recovery Plan*. Denver, CO. 32 pp.

United States Fish and Wildlife Service (USFWS). 1994a. *Desert Tortoise (Mojave population) Recovery Plan*. Portland, Oregon.

United States Fish and Wildlife Service (USFWS). 1994b. *Federal Register, Department of the Interior, Fish and Wildlife Services. Rules and Regulations. Determination of Critical Habitat for the Mojave Population of the Desert Tortoise; Final Rule.* 50 CFR Part 17. 59 FR 5820-5866. February 8.

United States Fish and Wildlife Service (USFWS). 1994c. *Federal Register, Department of the Interior, Fish and Wildlife Services. Rules and Regulations. Determination of Critical Habitat for the Razorback Sucker and Bonytail Chub; Final Rule.* 50 CFR Part 17. March 21.

United States Fish and Wildlife Service (USFWS). 1995. Final Rule determining Endangered Status for the Southwestern Willow Flycatcher. Federal Register. Vol. 60, No. 38. February 27.

United States Fish and Wildlife Service (USFWS). 1997a. *Final Biological Opinion and Conference Opinion on Lower Colorado River Operations and Maintenance – Lake Mead to Southerly International Boundary*. Prepared by USFWS, Region 2, Albuquerque, NM, for USBR, Lower Colorado Region, Boulder City, NV. Consultation number 2-21-95-F-216. 195 pp.

United States Fish and Wildlife Service (USFWS). 1997b. *Biological and Conference Opinion on Lower Colorado River Operations and Maintenance – Lake Mead to Southerly International Boundary*. April 30.

United States Fish and Wildlife Service (USFWS). 1998. *Razorback Sucker Recovery Plan*. Denver, CO. 81 pp.

United States Fish and Wildlife Service (USFWS). 2000a. *Biological Opinion for Maintenance Activities on the Pacific Gas and Electric Company Gas Pipeline System in the California Desert* (6840, CA-063.50) (1-8-99-F-71). January 7.

United States Fish and Wildlife Service (USFWS). 2000b. *Southwestern Willow Flycatcher Protocol Revision 2000*. Sacramento, California. 3 pp.

United States Fish and Wildlife Service (USFWS). 2001a. *Upper Colorado River Endangered Fish Recovery Program, Denver, CO.* 72 pp. plus appendices.

United States Fish and Wildlife Service (USFWS). 2001b. *Recovery Goals for the Razorback Sucker (*Xyrauchen texanus*) of the Colorado River Basin*. A supplement to the *Razorback Sucker Recovery Plan*. Draft Final Report dated March 12, 2001, for Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, Region 6, Denver, CO. 75 pp. plus appendices.

United States Fish and Wildlife Service (USFWS). 2002. *Reinitiation of Formal Section 7 Consultation on Lower Colorado River Operations and Maintenance – Lake Mead to Southerly International Boundary, Arizona, California and Nevada.* April 30.

United States Fish and Wildlife Service (USFWS). 2003. *Notice of Availability of the Final Southwestern Willow Flycatcher Recovery Plan.* Albuquerque, New Mexico, i-ix. 210pp. Appendices A-O. March 5.

United States Fish and Wildlife Service (USFWS). 2004. Threatened and Endangered Species Database. http://ecos.fws.gov/tess_public/TESSWebpageUsaLists? state=AZ.

United States Fish and Wildlife Service (USFWS). 2005a. *Biological and Conference Opinion on the Lower Colorado River Multi-Species Conservation Program, Arizona, California, and Nevada.* March 4

United States Fish and Wildlife Service (USFWS). 2005b. *Federal Register, Department of the Interior, Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwestern Willow Flycatcher; Final Rule.* 50 CFR Part 17. RIN 1018-AT88. October 19.

United States Fish and Wildlife Service (USFWS). 2005c. Letter from John Earle (HNWR Manager) requesting that additional surveys for Yuma Clapper Rail not be conducted on refuge lands. January.

United States Fish and Wildlife Service (USFWS). 2005d. 2004 Yuma clapper rail protocol survey data from the HNWR. Fax sent July 27.

United States Fish and Wildlife Service (USFWS). 2005e. Informal consultation between USGS and USFWS regarding the Pore Water Study.

United States Fish and Wildlife Service (USFWS). 2006. *Concurrence Letter on the Site Access and Sampling Procedures for Groundwater Monitoring Wells Located near Potential Southwestern Willow Flycatcher Habitat Technical Memorandum.* April 28.

Vanicek, C.D. 1967. *Ecological studies of native Green River fishes below Flaming Gorge Dam, 1964-66.* Ph.D. dissertation. Utah State University, Logan ,Utah.

Woodbury, A.M. and R. Hardy. 1940. *The dens and behavior of the desert tortoise.* Science. December 6. 529 pp.

Woodbury, A.M. and R. Hardy. 1948. *Studies of the desert tortoise, Gopherus agassizii.* Ecology Monographs. Volume 18, Number 2. 145-200 pp.

Figures

Appendix A
Seismic Survey

Appendix B
Slant Drilling Work Plan

Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Groundwater Characterization Beneath the Colorado River by Slant Drilling

~~Draft~~

Prepared for

Pacific Gas and Electric Company

~~November~~December 2006

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Contents

Appendices

Acronyms and Abbreviations

BLM	United States Bureau of Land Management
BNSF	Burlington Northern-Santa Fe Railroad
USBR	United States Bureau of Reclamation
CFR	Code of Federal Regulations
DOI	United States Department of Interior
DTSC	Department of Toxic Substances Control
ESA	Endangered Species Act
HNWR	Havasu National Wildlife Refuge
PG&E	Pacific Gas and Electric Company
SWCA	Steven W. Carothers and Associates
USC	United States Code
USFWS	United States Fish and Wildlife Service

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is addressing chromium in groundwater at the Topock Compressor Station under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and U.S. Department of the Interior (DOI). The Topock Compressor Station is located in eastern San Bernardino County, California about 15 miles southeast of Needles (Figure 1). DTSC has recently directed PG&E to conduct additional investigative activities addressing groundwater below the Colorado River. This biological ~~evaluation (BE~~assessment (BA) has been prepared to analyze the effects of implementing these activities.

Section 7 of the Endangered Species Act (ESA) (16 United States Code [USC] 1531 et seq.), as amended (1978, 1982, and 1988) directs federal agencies to ensure that actions authorized, funded, or carried out by these agencies are not likely to jeopardize the continued existence of any species listed as threatened or endangered or cause destruction or adverse modification of designated critical habitats (16 USC 1536(a)(2)). This BA serves as a written request, under the provisions of Title 50 Code of Federal Regulations Part 402.14, to initiate Section 7 consultation under the ESA with United States Fish and Wildlife Service. As the action agency, the USFWS Havasu National Wildlife Refuge (HNWR) is initiating consultation with the USFWS Southwest Region 2, Ecological Services in Phoenix, Arizona.

1.1 Background, Purpose, and Need for Proposed Action

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.

A Feasibility Study/Corrective Measure Study will follow the RI/RFI Report, culminating in a proposed final remedy. To support the completion of the RI/RFI and facilitate selection of the final remedy, PG&E has been directed to implement additional groundwater characterization activities.

The proposed project involves installation of groundwater well clusters extending below the Colorado River. The wells will be installed by slant drilling from the western shoreline of the river. Prior to the well installation activities, a seismic survey of the geology below the river bottom will be conducted. This BA has been prepared to determine any potential effect

on species protected under the federal Endangered Species Act (ESA) resulting from the well installation and seismic survey activities.

Several prior ESA consultations have occurred in the project vicinity related to operation of the Topock Compressor Station and the RI/RFI process:

- A non-jeopardy biological opinion was issued to PG&E in January 2000 related to ongoing maintenance activities of a gas pipeline system, and potential effects on the desert tortoise and its critical habitat (USFWS 2000a).
- 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 measures (CH2M HILL 2004b). Based on the proposed activities, which included a proposed groundwater treatment system, a "no effect" determination was made for that project (BLM 2004).
- In December 2005, a biological assessment (CH2M HILL 2005h) and Section 7 ESA consultation were completed related to construction of the PE-1 groundwater pipeline and implementation of the floodplain *in-situ* pilot study, located on the floodplain of the Colorado River, resulting in a "may affect, not likely to adversely affect" the SWFL, and a "no effect" finding for all other listed species.
- In 2006, informal consultation was conducted for the *Access and Sampling Procedures for Groundwater Monitoring Wells Located Near 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.

1.2 Proposed, Threatened, and Endangered Species within the Range of the Proposed Action

The following wildlife species are listed as threatened or endangered under the federal ESA and potentially occur within or near the proposed action:

- Birds
  - Southwestern willow flycatcher (*Empidonax traillii extimus*), Endangered
  - Yuma clapper rail (*Rallus longirostris yumanensis*), Endangered
- Fish
  - Colorado Pike Minnow (*Ptychocheilus lucius*), Endangered
  - Razorback sucker (*Xyrauchen texanus*), Endangered
  - Bonytail Chub (*Gila elegans*), Endangered
- Reptiles
  - Desert Tortoise (*Gopherus agassizii*), Threatened

The project site is located in designated critical habitat for the Bonytail Chub, which is coincident with the 100-year floodplain of the Colorado River (USFWS 1994c). This species may occur adjacent to the proposed project in the body of the Colorado River. In addition, the project site provides potentially suitable habitat for the SWFL. No federally-listed plants

occur at the project site or vicinity. No wildlife or plant species proposed for federal listing occur within the immediate project vicinity.

1.3 Environmental Baseline

The project site 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.

Starting in the 1930s, federal actions in the project vicinity included 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.

Specific to the project vicinity, several past activities have occurred nearby the project site. A biological opinion was obtained to cover the operations and maintenance of the Topock Compressor Station and associated pipelines (USFWS, 2000a) located south of the project site. In addition, ongoing investigative and remedial activities include the installation and subsequent monitoring of various groundwater wells, and a pilot study of in-situ remediation technology on the floodplain north of the project site. The Interim Measures No. 3 groundwater treatment system was approved for construction in 2004 and has operated since July 2005. As noted above, this project was the subject of an informal consultation between BLM and the UFSWS Ventura Office (CH2M HILL 2004b; BLM 2004).

The proposed slant drilling activities are adjacent to a major gas utility and travel corridor extending east-west between the Topock Compressor Station and the Interim Measures No. 3 treatment facility. The corridor includes Interstate 40, BNSF railroad, and four natural gas transmission lines. The slant drilling site is partially within the right-of-way of Interstate 40. A substantial amount of train and vehicular traffic and associated noise and air emissions are generated along this corridor.

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).

2.0 Proposed Action

2.1 Groundwater Characterization Below the Colorado River

2.1.1 Seismic Survey

Prior to implementation of the slant drilling activities discussed below, the United States Geologic Survey will conduct a seismic survey of the Colorado River in the vicinity of the proposed slant drilling site (Figure 2). This survey will be conducted from a small motor boat, and is expected to be completed within one to three days. The boat will include specialized equipment that emits acoustic pulses to obtain data related to bedrock conditions below the Colorado River. The acoustic pulses are similar to that emitted from a recreational fish finder. This information will be utilized in refining the location and angle of the subsequent slant drilling. The seismic survey would be conducted sometime in January 2007, and prior to the fish spawning season that begins approximately February 1. A detailed description of the planned seismic survey is provided in Appendix A.

2.1.2 Slant Drilling Below the Colorado River

The proposed project involves groundwater characterization beneath the Colorado River using a slant drilling method. The slant drilling activity will have surface expression that is essentially identical to prior vertical well drilling installation activities in the vicinity of the Topock Compressor Station (CH2M HILL 2005c, 2006a, 2006c). The proposed drill site is located immediately south of Interstate 40 and west of the Colorado River (Figure 3). Prior to drilling activities, an area measuring approximately 80 feet by 50 feet (4,000 sq~~. ft./~~uare feet [s.f.]) or about 0.10 acre) will be cleared at the drill site location.~~ How and what with will this area be cleared? The~~ The area will be cleared by hand with a chainsaw, with the removed vegetation bundled or chipped prior to hauling off site. While the area cleared of vegetation is expected to be 0.10 acre or less, as a contingency an additional 2,000 s.f. of clearing has been considered for purposes of this biological assessment (i.e., a total of 6,000 s.f. or 0.15 acre).

The existing access route between National Trails Highway and the MW-43 well will also be cleared as needed. From MW-43 a new route will be cleared below Interstate 40 to provide access to the drill site. Removal of native vegetation will be avoided, where possible. The well site, access route, and staging area are further described and depicted in the Work Plan provided in Appendix B.

Well installation will use a track-mounted rotosonic drilling rig, which involves advancing a rotating and vibrating drill head or core barrel through the subsurface. Two slant borings are proposed that will extend approximately 150 feet and 250 feet eastward below the Colorado River. As a contingency, two additional borings may be drilled within the project site if warranted by field conditions. No additional vegetation removal would be required if additional borings are drilled. Following the drilling and testing of the boreholes, multilevel

groundwater monitoring wells will be installed in the borings and surface well monuments will be constructed.

The well installation activities are anticipated to be complete within six to nine weeks. Support equipment during drilling and well installation includes a tracked forklift and support vehicle for equipment and material transfer to the drill site. Materials temporarily stored at the well site include drilling equipment and well construction materials (casing, sand, bentonite, cement grout). Cuttings generated from drilling will be temporarily transferred to lined roll-off bins at the staging area located approximately 500 feet northwest of the drill site (see Figure 3), and disposed of at a permitted facility. Water produced during well installation will be transferred for temporary storage in phase separator bins or temporary storage tanks at either the MW-20 bench or the Topock Compressor Station; the storage facilities will be provided with secondary containment, and subsequently processed at the Interim Measures No. 3 treatment plant or a permitted offsite facility.

Following well installation, site restoration through revegetation with mesquite trees will occur as outlined in the enclosed Work Plan, and as described in Section 2.2 below.

Groundwater monitoring activities following well installation will be subject to the procedures described in the *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 3* dated April 20, 2006 (CH2M HILL 2006b). These monitoring procedures were approved by the BLM and USFWS in May 2006, following completion of an ESA consultation (USFWS 2006).

2.2 Mitigation Measures for Protection of Listed Species, Native Plants, and Wildlife

As noted in the work plan, the following pre- and post-activity surveys and monitoring will be performed.

- Prior to vegetation removal, the project boundaries will be clearly marked with lath staking and flagging to minimize habitat impacts by the work crew. A preconstruction survey of the marked site will be performed by a qualified biologist to identify wetlands and any special status species in the area. Wetlands are known to occur nearby. The biologist will ensure that boundaries are adjusted, if needed, to avoid these wetlands. Additionally, the biologist will search for active bird nests prior to vegetation removal. However, the drilling is scheduled to occur outside the bird nesting season. Therefore, active nests are not expected within the slant drilling area. The biologist will also photo document and GPS the pre-construction site conditions.
- During vegetation removal, a biologist will be onsite monitoring activities to ensure work crews remain within the designated boundary and minimize impacts. The predominant plant species at the site that is expected to be removed is non-native tamarisk. However, native screwbean mesquite trees have been observed intermixed with tamarisk in the area. If avoidance or transplantation of native mesquite trees is not possible, then the biologist will document the number of trees removed and the replacement ratio will be 2:1. The biologist will ensure that the lath staking and flagging is correctly positioned to demarcate the slant drill site boundaries once the vegetation

has been removed. Upon vegetation removal completion, the biologist will depart the site.

- The PG&E field contact representative will be responsible for providing site orientation training to the workers and ensuring compliance with all applicable biological measures during slant drilling activities.
- Once slant drilling and well installation activities are completed, the biologist will return to the site to photo document and GPS the post-construction conditions. The data will be included in a brief report that will be submitted to the DTSC, BLM, and USFWS within 60 days of well installation. The report will document pre- and post-activity conditions.

Following the completion of construction activities, the following restoration measures will be undertaken.

- The slant drill site will be revegetated with mesquite trees. The planting scheme will be similar to the MW-43 restoration effort, which focused on ultimate re-closure of the tree canopy. The existing irrigation infrastructure will be extended to the slant drill site.
- Some of the newly planted mesquite trees along the edge of the existing staging area and access/egress route may be crushed by the drill rig and other support equipment. Those trees that do not survive will be replaced at a 1:1 ratio.

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3.0 Affected Environment

The location of the slant drilling site is immediately south ~~and under~~of the Interstate 40 bridge ~~that crosses the~~ crossing of the Colorado River (see Figure 3). The project is located on the California ~~floodplain~~ side of the Colorado River floodplain on HNWR lands ~~administer~~administered by the ~~HNWR of the~~ USFWS. The seismic bedrock study will occur in the vicinity of the slant drilling project ~~with~~in the body of the Colorado River~~.~~ (see Figure ~~3~~2). Flows within the Colorado River, located directly east of the slant drilling site, are managed by the USBR. Lands to the north and northwest are primarily managed by the BLM. PG&E owns an approximately 100-acre parcel northwest of the project site, upon which the Interim Measures No. 3 Treatment Plant is located. In addition, PG&E owns the approximately 65-acre Topock Compressor Station parcel southwest of the project site.

The site of the slant drilling project is located within the 100~~-~~-year~~-~~ floodplain of the Colorado River. The vegetation is denser and the substrate consists of more alluvium soils rather than dredge spoils typical of ~~the remainder of the~~other nearby floodplain areas. Topography in the area is abrupt, rising from around 450 feet above mean sea level at the Colorado River and project site to over 1,200 feet above mean sea level within 1 mile to the south and southwest. Slopes encountered west of the river reflect a series of ancient river terraces with desert washes. Further, the general area of the slant drilling site slopes down north to south and eventually changes from a tamarisk riparian zone to a river associated marsh habitat.

The Colorado River flows adjacent to the slant drilling site. The seismic bedrock study will occur in the River within this vicinity. 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), but is not available on the California side of the river (Panel No. 06071C5725). The interpretation of available information is that the 100-year floodplain elevation in the project vicinity is defined by the 460 feet msl contour. The 460-foot contour is generally located approximately 30 feet from the river channel. However, at the project site (and 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.

Sparse 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.). A small 3 acre wetland patch~~e~~ is located ~~just south of the~~ in proximity to the slant drilling site. The Topock Marsh, the largest of the area wetlands is located across the river and to the northeast of the seismic bedrock study and slant drilling sites. Managed by the HNWR, the Topock Marsh is an 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-h, 2006a-b; E&E, 2000).

Habitats located upland of the project site 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-h, 2006a-b; E&E, 2000).

Northwest of the project site, 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-h, 2006a-b; E&E, 2000).

Salt cedar (also referred to as tamarisk) thicket is the dominant plant community at the slant drilling site. 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 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-h, 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-h, 2006a-b; E&E, 2000).

Mammals that may occur in the project vicinity 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-h, 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-h, 2006a-b; E&E 2000).

4.0 Effects of the Proposed Action

4.1 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 adjacent to the project site. This section also analyzes the potential effects to each species and its critical habitat resulting from the slant drilling in California. A background search of available documents and databases was performed in preparation for this BA 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, 2005a-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 project vicinity (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 conducted 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). Overall the management measures identified in this BA are intended to avoid, reduce, or mitigate potential direct, indirect, and cumulative effects to these species and habitats.

4.2 Terrestrial

4.2.1 Southwestern Willow Flycatcher *Empidonax traillii extimus*)

4.2.1.1 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

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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).

4.2.1.2 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 including the Topock Marsh (Koronkiewicz et al., 2005~~) including the Topock Marsh~~).

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, ~~most~~several

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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~~) (Sogge et al., 2003~~). The Hoover to Parker Management Unit that includes the Topock Marsh ~~near the project site has documented xx~~contains approximately 21 territories (~~citation)~~Sogge et al., 2003).

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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.

4.2.1.3 Recent Findings

The project site is located between two SWFL study areas—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 individual ~~(?)~~SWFLs within Topock Marsh and Topock Gorge, respectively (Koronkiewicz et al., 2005).

Nesting and migratory habitat for the SWFL exists within and near the project vicinity. The nesting and migratory period for SWFLs occurs from May (arrival) through September (departure). Tamarisk and arrowweed are the dominant vegetation types within the project site where suitable roosting and foraging habitat exists. This thicket is concentrated below the BNSF Railway and Interstate 40 bridges and is approximately 6 acres in size. The thicket is fragmented and subject to human disturbance, two factors that may decrease the habitat value for the species (GANDA, 2005b).

The SWFL is not expected to nest within or directly adjacent to the project site based on past USBR annual surveys that indicate flycatchers are selecting the higher-quality habitat at the

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Topock Marsh and Gorge (Koronkiewicz et al., 2005). Although tamarisk habitat exists at the project site, the vegetation density, habitat structure, and patch-size of the thicket is sparser, smaller, and fragmented in comparison to known breeding habitat within the Topock Marsh. Additionally, SWFLs are not known to nest in mesquite trees (Sogge et al., 1997), which are the other tree species in the project vicinity. Furthermore, there is no known breeding habitat within the project site 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 Area of Potential Effect (APE) which encompasses the project site (GANDA, 2005b; GANDA, 2006b). The survey 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 per protocol was not heard. This bird was possibly a transient since there were no subsequent detections of this species (GANDA, 2005b). Other than the single observation, no other willow flycatchers were seen or heard during the 2005 protocol survey.

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).

Biological monitors have logged several hundred hours in performing pre-activity surveys and compliance monitoring on the California floodplain for prior Topock field activities. These efforts require a qualified biologist to monitor a 200-foot circle around the project site prior to beginning operations for migratory bird nests. This effort occurs from March 15 to September 30. To date, no active nests of any migratory birds have been documented.

4.2.1.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. The seismic testing will take place within the Colorado River (Figure 2) and will conclude prior to February 1, 2007. This is well before the nesting season of the SWFL. Therefore, this action will have no effect upon this species.

The footprint of the slant drilling project site will require ~~that a~~ the clearing of 4,000 ~~sq. ft. (~~to 6,000 s.f. (0.~~10~~10 to 0.15 acre) ~~area be cleared~~ of vegetation to create a work pad for the drill equipment and crew (Figure 3). This will occur within the larger 6 acres of tamarisk thicket that is considered suitable roosting and foraging habitat for the SWFL ~~(Figure 3). The~~. This equates ~~out~~ to ~~1~~2.5% of the 6 acres. Additionally, the BLM and USFWS have identified this area as sensitive avian habitat (Figure 4).

The project activities will involve a drill rig and support equipment that will be used to install groundwater monitoring wells within the floodplain. The slant drilling work plan identifies several measures to offset potential impacts including a qualified biologist performing pre- and post-activity surveys, demarcating the work area to minimize habitat disturbance and avoid potential impacts to adjacent wetlands, and assisting with the

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implementation of the restoration plan. Although the non-native tamarisk is expected to recover, native mesquite trees will be planted at the project site to reestablish the canopy cover. The ~~approximately~~ 0.10 to 0.15 acre of cleared vegetation will be applied to the total disturbance threshold for the floodplain, to be established through completion of a forthcoming programmatic biological assessment and ESA consultation. Exceeding the established threshold will require re-consultation with the USFWS and may require additional mitigation.

The construction related activities are planned during the winter season to avoid potential direct impacts to nesting birds that are protected under the Migratory Bird Treaty Act (MBTA). March 15 has been identified as the start of the nesting season for many migratory birds. The construction related activities are scheduled to be completed before this date. The SWFL migrates to Mexico, Central and South America in late September and is not expected to return to the Topock Marsh and Gorge until early May. Therefore, direct construction related impacts to nesting migratory birds including the SWFL are not anticipated.

Operational activities associated with the monitoring wells include personnel collecting water samples on a regular basis. 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 take place between workers. If these activities are performed within or adjacent to suitable SWFL habitat, this action may lead to the alteration of SWFL behavior. However, the lack of SWFL presence within the project vicinity suggests that the probability of ~~harassing this~~altering species behavior to rise to the level of harassment during operations would be very low. Further, the magnitude of operational effects may be difficult to discern from other potentially impacting transportation (e.g., Interstate-40 and the BNSF Railroad) and recreational activities (e.g., watercraft) that regularly occur at the project site.

The Colorado River may function as a migration corridor for the SWFL during arrival (May) and departure (September). During migration periods, this species may briefly stop to roost and/or forage within or adjacent to the project site. Potential roosting and foraging habitats in the area include the tamarisk thicket at the project site. Because flycatchers may potentially utilize this habitat, it is possible that operational activities could alter the behavior of migrating individuals, but, as discussed above, the potential for impact is considered low.

In May 2006, the well access and groundwater sampling procedures were refined to further minimize any potential impacts from operational activities to this species and reduce the amount of time in the field for water sampling techniques due to human health and safety concerns, while maintaining quality control requirements (CH2M HILL, 2006b). The timing of the modified sampling procedures is from May 1 through September 30, during the flycatcher nesting season. Several conservation measures were outlined as part of the revised procedures and will be carried forward under the scope of this BA. These measures include a biologist that is assigned to the well sampling teams during the SWFL period. The biologist is responsible for awareness training, pre-activity surveys, compliance monitoring, and reporting. In response to informal consultation regarding the revised procedures, a

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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).

Based on project timing, annual survey results and the application of conservation measures, direct effects to nesting or migratory SWFLs are not anticipated. Additionally, the removal of 0.10 to 0.15 acre of potentially suitable habitat would be ~~inconsequential~~insignificant.

4.2.1.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land and water use patterns are foreseen due to the slant drilling and seismic survey.

4.2.1.6 Cumulative Effects

Cumulative effects include future state and private activities, excluding federal activities that are reasonably certain to occur within the project vicinity. The interim and remedial actions that may occur within the project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC and the Federal agencies. It is reasonably certain that additional investigative and remedial activities very similar to the proposed action will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat may result from these activities. This loss may be sufficient enough to reduce habitat function and thus alter SWFL use and behavior. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. For the purposes of this BA, habitat loss is defined as the removal of trees~~,~~ / perennial shrubs. The trimming of vegetation is not considered habitat loss. ~~-~~Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.2.1.7 Critical Habitat Effects Determination

The nearest critical habitat for the SWFL is located at Big Sandy River located approximately 50 miles east of the project site (USFWS, 2005b). The project site is located outside designated critical habitat for the SWFL. An effects determination of "no effect" to critical habitat is concluded.

4.2.1.8 Effects Determination

There has been no positive identification of ~~a~~ SWFLs during the 2005 and 2006 protocol surveys of the APE which includes the project site (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 project vicinity. To date,

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no take of SWFLs (or any other migratory birds) has occurred from implementation of related activities.

Nesting of SWFLs is considered unlikely within the project vicinity. 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 floodplain 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 and to help guide in the conservation of this species, annual USFWS protocol surveys will continue to be conducted yearly for presence or absence of SWFLs and pre-construction surveys will continue to be conducted during the nesting season by biological monitors.

The identified mitigation measures will help to avoid, reduce, and mitigate operational impacts to the biological environment within the project site. It is expected that tamarisk habitat will be removed to conduct project ~~activities~~activities that may reduce habitat ~~value~~function of the immediate area. Under this BA 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 at the project site.
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.
3. If greater than ~~10~~ 0.15 acres of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible ~~mitigation~~additional measures may be imposed. For the purposes of this BA, 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 (CH2M HILL 2006b; USFWS 2006) in SWFL habitat will be used under this BE and will be implemented from May 1 to September 30. ~~Reread the determination for these procedures so as to make sure that we are not contradicting any of those measures.~~

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SWFL use of the project area and immediate locality can not be rejected. It is unlikely that this species nests in or adjacent to the slant drilling site based on survey information and habitat availability. However, there is potential for migrants to utilize this area as individuals move seasonally to~~/~~ and from nesting and wintering ranges. But given the timing of the action, the 0.~~10~~10 to 0.15 acre extent of habitat removal and application of the conservation measures identified in this section, the project's effects would be insignificant and discountable. An effects determination of "may affect, but not likely to adversely affect" is concluded for this species.

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4.2.2 Mojave Desert Tortoise (Gopherus agassizii)

4.2.2.1 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).

4.2.2.2 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

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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, the 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).

4.2.2.3 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 within the APE. No live desert tortoises were detected within the survey areas. However, three disarticulated desert tortoise carcasses were observed in 2004 and 2006. 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, scat, 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 potential 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).

Based on the survey results, desert tortoises were concluded to be absent in the APE. Despite the lack of live tortoise observations, there is a possibility that desert tortoises could enter the APE. While it is possible that the desert tortoise could enter from the west, the quality of the 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).

4.2.2.4 Direct Effects

Direct effects upon this species resulting from the proposed project activities are not expected because:

- The proposed actions will take place within unsuitable habitat for this species.

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- The species does not occur within or directly adjacent to the project site.

4.2.2.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land and water use patterns are foreseen due to the slant drilling and seismic ~~activities~~survey.

4.2.2.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat, specifically tamarisk thicket, may be needed to conduct these activities. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. This loss does not affect the desert tortoise because tamarisk thicket on the floodplain is considered unsuitable habitat for this species. Additional on-site PG&E related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.2.2.7 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 project site (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.

4.2.2.8 Effects Determination

Recent evidence of desert tortoise presence was not detected during recent protocol surveys within suitable habitat. The floodplain is considered unsuitable habitat for this species. Therefore, the proposed action will have "no effect" upon this species. Habitat for this species will not be affected.

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4.3 Marsh

4.3.1 Yuma Clapper Rail (Rallus longirostris yumanensis)

4.3.1.1 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).

4.3.1.2 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).

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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).

4.3.1.3 Recent Findings

There is a small 3 acre wetland associated with the Colorado River approximately 300 feet south of the slant drilling site. This wetland is within the HNWR boundary. No reports of Yuma clapper 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. The habitat elements within this area may be suitable for nesting rails.

Several call stations have been surveyed annually for Yuma clapper rail by the USFWS along the South Dike of the Topock Marsh that is located within 1 mile of the seismic bedrock study in the Colorado River and the slant drilling site. In past years, this species has been detected south of the new South Dike and north of the Topock Marina (USFWS, 2005d). In 2005, seven Yuma clapper rails were detected along the South Dike transect (Fitzpatrick, 2006).

4.3.1.4 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. The seismic testing will take place within the Colorado River (Figure 2) and will conclude prior to February 1, 2007. This is well before the nesting season of the Yuma clapper rail~~s~~. Therefore, this action will have no effect upon this species.

The slant drilling site ~~and the~~ requires clearing of ~~a 50x80 ft (4,000 sq. ft./~~0.10 to 0.15 acre~~) area will occur~~ within 300 feet of ~~an~~ a Colorado River associated wetland/marsh on the southern end of the floodplain. The USFWS has identified this general area as ~~sensitive~~ habitat for ~~avain~~avian species (see Figure 4). ~~This~~ Within this area, a small wetland/marsh may potentially be suitable nesting habitat for the Yuma clapper rail ~~(Figure 3). This area should be identified on a figure~~. There will be no entry into the wetland/marsh habitat, but the slant drilling project will remove 0.10 to 0.15 acre of tamarisk buffer. However, slant drilling operations are scheduled to be completed prior to March 15 that has been established for the migratory bird arrival and the clapper rail is not expected to use tamarisk habitat directly. Also, groundwater monitoring procedures created to reduce effects to SWFLs will occur in the tamarisk thicket ~~after March 15.~~starting on May 1. Therefore, any direct ~~effects~~affects to nesting Yuma clapper rails ~~is~~are not expected to occur. See Section 4.2.1.4 within the SWFL section for additional information on activities that will occur within this area.

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4.3.1.5 Indirect Effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur.~~—~~ No indirect effects of the proposed action are anticipated. No changes in land and water use patterns are foreseen due to the slant drilling and seismic survey.

4.3.1.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat, specifically tamarisk thicket, may be needed to conduct these activities. This loss of tamarisk thickets may reduce the function of this habitat to buffer the wetland/marsh from project activities. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.3.1.7 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.

4.3.1.8 Effects Determination

Suitable habitat and known presence of Yuma clapper rails occurs on the Arizona-side of the Colorado River within the Topock Marsh. The 3 acre Colorado River associated wetland/marsh located 300 feet south of the slant drilling site may be suitable habitat for nesting rails. Although no presence of Yuma clapper rails have been documented in this location~~. In such,~~ and no work will be conducted in the ~~function of~~3 acre wetland area, the tamarisk thicket ~~would be to provide~~provides a ~~valuable~~ buffer from the project activities ~~if~~should rails select~~ed~~ this area for nesting.

The identified ~~mitigation~~protection measures will help to avoid, reduce, and mitigate operational impacts to the biological environment within the project site. It is expected that tamarisk habitat will be removed to conduct project activities that may reduce habitat value of the immediate area. Under this BA the following conservation measures, not replacing those already identified, will be imposed.

~~5.~~1. The intent of PG&E will be to minimize the net increase of disturbed habitat at the project site.

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~~6.~~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 Yuma clapper rail habitat after March 15 will be required to be reassessed and additional conservation measures considered.

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~~7.~~3. If greater than ~~10 acres~~ 0.15 acre of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible ~~mitigation~~additional measures may be imposed. For the purposes of this BA, habitat loss is defined as the removal of trees ~~/~~ /perennial shrubs. The trimming of vegetation is not considered habitat loss.

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4. The previously consulted-upon modified well access and sampling procedures implemented in 2006 (CH2M HILL 2006b; USFWS 2006) in SWFL habitat will be used under this BA and will be implemented from May 1 to September 30. ~~Reread the determination for these procedures so as to make sure that we are not contradicting any of those measures.~~

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Suitable habitat conditions and the documented presence of Yuma clapper rails exist in the Topock Marsh within 1 mile of project activities. The 3 acre wetland/marsh 300 ~~ft.~~feet south of the slant drilling site may be suitable for nesting rails. However, given the timing of the project, the 0.10 to 0.15 acre ~~extend~~extent ~~of~~of tamarisk habitat loss, ~~the~~ distance from the project site to wetland habitat, and ~~the~~ conservation measures discussed in this section, a "no effect" determination is concluded for this species.

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4.4 Aquatic

4.4.1 Colorado Pikeminnow (Ptychocheilus lucius)

4.4.1.1 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).

4.4.1.2 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

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basin effective April 20, 1994. No critical habitat has been designated for the Lower Colorado River.

4.4.1.3 Direct Effects

No direct effects will occur as this species does not occur in the project area.

4.4.1.4 Indirect Effects

No indirect effects will occur as this species does not occur in the project area.

4.4.1.5 Cumulative Effects

No cumulative effects will occur as this species does not occur in the project area.

4.4.1.6 Critical Habitat Effects Determination

Critical habitat does not occur within or near the project area for the Colorado pikeminnow. An effect determination of "no effect" for critical habitat is concluded for this species.

4.4.1.7 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.

4.4.2 Razorback Sucker (Xyrauchen texanus)

4.4.2.1 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).

4.4.2.2 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

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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, 2002). 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. Reproduction in the lower basin has been studied in Lakes Mead and Mohave. Spawning in Lake Mohave typically begins in January or February, while in Lake Mead it begins slightly later. Spawning typically runs 30-90 days, at water temperatures ranging from 55˚ to 70˚ F. Spawning areas tend to be wave-washed, gravelly shorelines and shoals. Fish spawn in water from 3 to 20 feet in depth with the majority of fish in the 5-10 foot range. Razorback suckers apparently spawn continuously throughout the spawning season. There is considerable fidelity based on recapture data, and fish often show up on the same spawning site year after year (Minckley et al. 1991).

4.4.2.3 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.

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4.4.2.4 Direct Effects

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

A small boat will be used to submerge the seismic equipment within a small portion of the Colorado River (Figure 2). 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 testing will be performed during the winter season and completed before February 1. Up river migration, spawning, and down river migration of adult and fry razorback suckers are expected to occur ~~after~~between February 1 ~~to~~ and May 31~~. Therefore~~; therefore, the seismic testing will have no affect upon this species (Adams, 2006).

The footprint of the slant drilling project site will require that ~~a~~ 4,000 ~~sq. ft. (~~to 6,000 s.f. (0.10 to 0.15 acre) ~~area~~ be cleared of vegetation to create a work pad for the drill equipment and crew. This will occur within the larger 6 acres of tamarisk thicket that is located within the 100-~~-~~year floodplain of the Colorado River. This may reduce the function of the riparian zone to contribute nutritional attributes to the ~~River~~river. However, the extent of this impact on the function of the riparian zone from the proposed action is very limited and therefore is not expected to impact the razorback sucker.

4.4.2.5 Indirect effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land or water use patterns are foreseen from the seismic survey and slant drilling activities.

4.4.2.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitat will degrade riparian function in contributing nutrients to the ~~River~~river. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

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4.4.2.7 Critical Habitat Effects Determination

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

4.4.2.8 Effects Determination

The ~~Seismic~~seismic bedrock study will occur with in the Colorado River and will be completed prior to February 1 and the spawning season for the razorback sucker. The acoustical ~~implulses reguired~~pulses will not alter any behavioral patterns. The slant drilling ~~will~~will occur within the 100–year floodplain and ~~require~~requires the clearing of 4,000 ~~sq. ft.~~to 6,000 s.f. of riparian habitat. This clearing equates to 0.10 to 0.15 acre of the total 6 acres of riparian habitat. However, this will not negatively impact this species and a "no effect" determination is concluded~~.~~ for this aquatic species.

4.4.3 Bonytail Chub (Gila elegans)

4.4.3.1 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 project site, critical habitat includes the Colorado River and the 100-year floodplain (see Figure 4) 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).

4.4.3.2 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 taken. 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).

As a result of the rarity of this species, the reproduction of the bonytail is not well understood. Based on the appearance of ripe fish in the upper basin, spawning appears to occur during late June and early July. Spawning in the lower basin occurs from late spring to early summer. 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

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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 USBRderborder, 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 USBRnborn 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).

4.4.3.3 Recent Findings

The project site is located within the 100-year floodplain of the Colorado River that delineates critical habitat for the bonytail chub (Figure 4). From south to north, this area extends from a river-associated wetland 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. 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 project vicinity.

4.4.3.4 Direct Effects

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

A small boat will be used to submerge the seismic equipment within a small portion of the Colorado River (Figure 2). The equipment that will be used for the study creates an acoustical

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pulse that is similar to that used by a recreational fish finder. The seismic testing will be performed during the winter season and completed before February 1. Up river migration, spawning, and down river migration of adult and fry bonytail chubchubs are expected to occur afterbetween February 1 to and May 31. Therefore; therefore, the seismic testing will have no affect upon this species (Adams, 2006).

The slant drilling activities will involve the use of a drill rig on terrestrial land within the Colorado River floodplain. This action will not directly affect this species.

The footprint of the slant drilling project site will require that 4,000 to 6,000 s.f. (0.10 to 0.15 acre) be cleared of vegetation to create a work pad for the drill equipment and crew. This will occur within the larger 6 acres of tamarisk thicket that is located within the 100-year floodplain of the Colorado River. This may reduce the function of the riparian zone to contribute nutritional attributes to the river. However, the extent of this impact on the function of the riparian zone from the proposed action is very limited and therefore is not expected to impact the bonytail chub.

4.4.3.5 Indirect effects

Indirect effects are those that are caused by the proposed action and are later in time, but reasonably certain to occur. No indirect effects of the proposed action are anticipated. No changes in land or water use patterns are foreseen from the slant drilling and seismic survey activities.

4.4.3.6 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 project vicinity focus on the cleanup of soil and groundwater as directed by the DTSC. It is reasonably certain that additional investigative and remedial activities very similar to the proposed actions will occur. The anticipated level and use of equipment, materials and personnel will be similar as well. The loss or manipulation of floodplain habitathabitat will degrade riparian function in contributing nutrients to the River. Subsequent effects of future projects will consider past effects of actions as new proposals come forward. Additional on-site PG&E-related activities will be addressed in the forthcoming PBA, prior to implementation of such activities.

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.

4.4.3.7 Critical Habitat Effects Determination

Critical habitat for the bonytail chub is delineated by the 100- -year floodplain of the Colorado River (Figure 4). The slant drilling project will require clearing 4,000 sg. ft (to 6,000 s.f. (0.10 to 0.15 acre) of riparian habitat in the 100-year floodplain (Figure 4) and may reduce riparian function in contributing nutrients to the River.river.

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The identified mitigation measures will help to avoid, reduce, and mitigate operational impacts to the biological environment within the project site. It is expected that tamarisk habitat will be removed to conduct project activities that may reduce habitat valuefunction of the immediate area. Under this BA the following conservation measures, not replacing those already identified, will be imposed.

9.1. The intent of PG&E will be to minimize the net increase of disturbed habitat at the project site.

10.2. If greater than 10 acres0.15 acre of floodplain habitat is lost or manipulated, specific project consultation with the USFWS will be required and possible mitigation additional measures may be imposed. For the purposes of this BA, habitat loss is defined as the removal of trees / / perennial shrubs. The trimming of vegetation is not considered habitat loss.

However, given the removal of 0.10 acresto 0.15 acre of vegetation within the total 6 acres that occurs within the 100--year floodplain and the application of conservation measures discussed, no appreciable diminishment to critical habitat function is expected. An effects determination of "may affect, but not likely to adversely affect" is concluded for critical habitat of this species.

4.4.3.8 Effects Determination

Seismic testing will be completed prior to the spawning season and the slant drilling will take place on the floodplain. Therefore, the proposed actions will have no effect upon this species.

The Seismicseismic bedrock study will occur in the Colorado River and will be completed prior to February 1 and the spawning season for the bonytail chub. There also is not are no anticipated to be any negative effects to the species from slant drilling operations. Therefore, a "no effect" determination is concluded for this species.

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5.0 Effects Determination Summary

5.1 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.

5.2 Mojave Desert Tortoise

An effects determination of "no effect" is concluded for the Mojave desert tortoise.

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

5.3 Yuma Clapper Rail

An effects determination of "no effect" is concluded for the Yuma clapper rail.

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

5.4 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.

5.5 Razorback Sucker

An effects determination of "no effect" is concluded for the razorback sucker.

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

5.6 Bonytail Chub

An effects determination of "no effect" 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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6.0 Works Cited

Adams, Doug. 2006. BLM Lake Havasu Field Office, personal communication.

Applied Earthworks, Inc. 2004. *Cultural Resources Management Plan for the Topock Compressor Station Expanded Groundwater Extraction and treatment System San Bernardino, California.* September.

Arizona Game and Fish Department (AGFD). 2001. Gila elegans. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.

Arizona Game and Fish Department (AGFD). 2002. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.

Arizona Game and Fish Department (AGFD). 2004. Arizona Game and Fish Natural Heritage Program. http://www.gf.state.az.us/pdfs/w_c/hdms/COUNTY%20SPEC%20STAT%20LIST.pdf.

Bagley, B.E. 1989. Nongame field note: Bonytail Chub. Arizona Game and Fish Department, Phoenix. pp. 1-3.

Bestgen, K.R. 1990. *Status review of the razorback sucker, Xyrauchen texanus.* Final report to USBR, Colorado State University. Larval Fish lab, Fort Collins, CO. 92 pp.

California Department of Fish and Game (CDFG). 2003. California Wildlife Habitat Relationships System. http://www.dfg.ca.gov/whdab/whdabold/cwhr/R005.html.

California Natural Diversity Database (CNDDB). 2003. California Department of Fish and Game. Commercial version. Information dated July 1. Information accessed November 4.

CH2M HILL. 2004a. *Cultural Resources Investigations for Interim Measures No 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System San Bernardino, California.* August.

CH2M HILL. 2004b. *Final Biological Resources Investigations for Interim Measures No. 3:* Topock *Compressor Station Expanded Groundwater Extraction and Treatment System San Bernardino County, California.* September.

CH2M HILL. 2005a. *Work Plan for Special Status Species Survey within the Area of Potential Effect (APE), Topock Compressor Station, Needles, California.* March.

CH2M HILL. 2005b. *Biological Resources Survey Report for the Area of Potential Effect (APE) Topock Compressor Station Expanded Groundwater Extraction and Treatment System Needles, California.* October.

CH2M HILL. 2005c. *Land Area Subject to Groundwater Well Installation Biological Resources Monitoring – Completion Report Topock Project Site, Needles, California.* April.

CH2M HILL. 2005d. *Interim Measures No. 3, Land Use Area – Technical Memorandum*. July.

CH2M HILL. 2005e. *Draft MW-20 Bench Decommissioning Work Plan, Topock Compressor Station, Needles, California.* August.

CH2M HILL. 2005f. *Biological Resources Completion Report for Interim Measures No. 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System Needles, California.* September.

CH2M HILL. 2005g. *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 2*. September.

CH2M HILL. 2005h. *Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions*. November.

CH2M HILL. 2006a. *Biological Resources Completion Report for the PE-1 Pipeline and In-Situ Pilot Study: Topock Compressor Station Expanded Groundwater Extraction and Treatment System Needles, California.* March.

CH2M HILL.2006b. *Site Access and Sampling Procedures for Groundwater Monitoring Wells Located Near Potential Southwestern Willow Flycatcher Habitat, Rev. 3*. April.

CH2M HILL. 2006c. *Biological Resources Completion Report for the Interim Measures Performance Monitoring (IMPM) Program, Pacific Gas and Electric Topock Compressor Station Expanded Groundwater Extraction and Treatment System.* June.

Conway, C.J., W.R. Eddleman, S.H. Anderson, and L.R. Hanebury. 1993. Seasonal changes in Yuma clapper rail vocalization rate and habitat use. Journal of Wildlife management 57(2): 282-290.

Ecology and Environment, Inc. (E&E). 2000. *Draft RCRA Facility Investigation Report. Bat Cave Wash Area, Pacific Gas and Electric Company's Topock Compressor Station Needles, California.* April 17.

Eddleman, W.R. 1989. *Biology of the Yuma clapper rail in the southwestern U.S. and northwestern Mexico.* USBR, IA No. 4-AA-30-020060. 127 pp.

Fitzpatrick, Lesley. 2006. USFWS Phoenix Field Office, personal communication.

Garcia and Associates (GANDA). 2005a. *Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System, Topock, California.* July.

Garcia and Associates (GANDA). 2005b. *Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System, Topock, California.* August.

Garcia and Associates (GANDA). 2006a. *Desert Tortoise Presence/Absence Surveys for the PG&E Topock Compressor Station Expanded Groundwater Extraction and Treatment System.* July.

Garcia and Associates (GANDA). 2006b. *Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Topock Compressor Station Expanded Groundwater Extraction and Treatment System. September.*

Gilbert, C.H. and N.B. Scofield. 1898. *Notes on collection of fishes from the Colorado Basin in Arizona.* Proceedings of the U.S. National Museum. 20:487-499.

Koronkiewicz, T.J., M.A. McLeod, B.T. Brown, and S.W. Carothers. 2004. *Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the Lower Colorado River and Tributaries, 2003.* Annual report submitted to U.S. Bureau of Reclamation, Boulder City, NV by SWCA Environmental Consultants, Flagstaff, AZ. 125 pp.

Luckenbach, R. A. 1982. *Ecology and management of the Desert Tortoise (Gopherus agassizii) in California.* Pages 1-37 in R.B. Bury, ed., North American Tortoise and Conservation Ecology. U.S. Department of Interior, Fish and Wildlife Service, Wildlife Research Report 12.

Minckley, W.L. 1973. *The fishes of Arizona.* Arizona Game and Fish Department. Phoenix, Arizona.

Minckley, W.L., P.C. Marsh, J.E. Brooks, J.E. Johnson, and B.L. Jensen. 1991. *Management towards recovery of the razorback sucker.* Pages 303-357 in W.L. Minckley and J.E. Deacon, eds. *Battle against extinction: native fish management in the American West.* Univ. of Arizona Press, Tucson, Arizona.

O'Conner, M.P., L.C. Zimmerman, D.E. Ruby, S.J. Bulova, and J.R. Spotila. 1994. *Home range size and movements by desert tortoise, Gopherus agassizii, in eastern Mojave Desert.* Herpetology Monographs. Volume 8. 60-71 pp.

Ohmart, R.D., and R.E. Tomlinson. 1977. *Foods of western clapper rails.* Wilson Bulletin 89: 332-336.

Rosenberg, K.V., R.D. Ohmart, W.C. Hunter, and B.W. Anderson. 1991. *Birds of the lower Colorado River valley.* University of Arizona Press, Tucson, Arizona. 416 pp.

Rostral, D.C., V.A. Lance, J.S. Grimbles, and A.C. Alberts. 1994. *Seasonal reproductive cycle of the desert tortoise (Gopherus agassizii) in eastern Mojave Desert.* Herpetology Monographs. Volume 8. 72-102 pp.

Sogge, M.K., T.J. Tibbitts, and S.J. Sferra. 1993. *Status of the Southwestern Willow Flycatcher along the Colorado River between the Grand Canyon and Lake Mead, 1993 summary report.* National Park Service, CPSU/NAU Report. 69 pp.

Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbitts. 1997. *A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol.* Technical report NPS/NAUCPRS/NRTR-97/12. National Park Service Colorado Plateau Research Station at Northern Arizona University, Flagstaff, Arizona. 40 pp.

Sogge, M.K., P. Dockens, S.O. Williams, B.E. Kus, and S.J. Sferra. 2003. *Southwestern Willow Flycatcher Breeding Site and Territory Summary – 2002.* United States Geological Survey, Southwest Biological Science Center, Colorado Plateau Field Station, Flagstaff, Arizona. 17 pp.

Stebbins, R.C. 1985. *Peterson Field Guides: Western Reptiles and Amphibians.* Houghton Mifflin Company, Boston, Massachusetts.

Steven W. Carothers and Associates. 2001. *Recovery Goals for the Bonytail (Gila elegans) of the Colorado River Basin.* A supplement to the *Bonytail Chub Recovery Plan.* Draft Final Report dated March 12, 2001.

Tibbitts. T.J., M.K. Sogge and S.J. Sferra. 1994. *A survey protocol for the southwestern willow flycatcher (Empidonax traillii extimus).* Technical Report NPS/NAUCPRS/NRTR-94/04, 15 pp.

Todd, R.L. 1986. *A saltwater marsh hen in Arizona: a history of the Yuma clapper rail (Rallus longirostris yumanensis).* Arizona Game and Fish Dept., Fed. Aid Project. W-95-R. Competition Report. 290 pp.

United States Bureau of Land Management (BLM). 2004. Email regarding informal consultation with the USFWS Ventura Office for IM3 project activities. September.

United States Bureau of Reclamation (USBR). 1996. Description and Assessment of Operations, Maintenance, and Sensitive Species of the Lower Colorado River. *Final Biological Assessment for United States Fish and Wildlife Service and Lower Colorado River Multi-Species Conservation Program.* Lower Colorado Region, Boulder City, NV. 207 pp. plus appendices.

United States Bureau of Reclamation (USBR). 1999. *Long Term Restoration Program for the Historical Southwestern Willow Flycatcher (*Empidonax traillii extimus*) Habitat along the Lower Colorado River. Lower Colorado Region.* Boulder City, NV. 70 pp.

United States Bureau of Reclamation (USBR). 2000. *Final Biological Assessment for Proposed Surplus Water Criteria, Secretarial Implementation Agreements for California Water Plan Components and Conservation Measures on the Lower Colorado River (Lake Mead to Southerly International Boundary).* Final Dated August 30. Lower Colorado Region, Boulder City, NV. 80 pp. plus appendices.

United States Bureau of Reclamation (USBR). 2002. *Biological Assessment for Continued Discretionary Operations, Maintenance and Sensitive Species of the Lower Colorado River for the period of April 30, 2002 - April 30, 2005.* Lower Colorado Region, Boulder City, NV. 37 pp. plus appendices. March.

United States Bureau of Reclamation (USBR). 2004. *Lower Colorado River Multi-Species Conservation Program Final Habitat Conservation Plan.* Lower Colorado Region, Boulder City, NV. December

United States Fish and Wildlife Service (USFWS). 1983. *Yuma Clapper Rail Recovery Plan.* Albuquerque, NM. 51 pp.

United States Fish and Wildlife Service (USFWS). 1990a. *Bonytail Chub Recovery Plan*. Denver, CO. 35 pp.

United States Fish and Wildlife Service (USFWS). 1990b. Federal Register, Department of the Interior, Fish and Wildlife Services. Final Listing. ETWP: "Determination of Threatened Status for the Mojave Population of the Desert Tortoise." 50 CFR Part 17. 55 FR 12178-12191. April 2.

United States Fish and Wildlife Service (USFWS).1990c. *Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise.*

United States Fish and Wildlife Service (USFWS). 1991. *Colorado Pikeminnow Recovery Plan*. Denver, CO. 32 pp.

United States Fish and Wildlife Service (USFWS). 1994a. *Desert Tortoise (Mojave population) Recovery Plan*. Portland, Oregon.

United States Fish and Wildlife Service (USFWS). 1994b. *Federal Register, Department of the Interior, Fish and Wildlife Services. Rules and Regulations. Determination of Critical Habitat for the Mojave Population of the Desert Tortoise; Final Rule.* 50 CFR Part 17. 59 FR 5820-5866. February 8.

United States Fish and Wildlife Service (USFWS). 1994c. *Federal Register, Department of the Interior, Fish and Wildlife Services. Rules and Regulations. Determination of Critical Habitat for the Razorback Sucker and Bonytail Chub; Final Rule.* 50 CFR Part 17. March 21.

United States Fish and Wildlife Service (USFWS). 1995. Final Rule determining Endangered Status for the Southwestern Willow Flycatcher. Federal Register. Vol. 60, No. 38. February 27.

United States Fish and Wildlife Service (USFWS). 1997a. *Final Biological Opinion and Conference Opinion on Lower Colorado River Operations and Maintenance – Lake Mead to Southerly International Boundary*. Prepared by USFWS, Region 2, Albuquerque, NM, for USBR, Lower Colorado Region, Boulder City, NV. Consultation number 2-21-95-F-216. 195 pp.

United States Fish and Wildlife Service (USFWS). 1997b. *Biological and Conference Opinion on Lower Colorado River Operations and Maintenance – Lake Mead to Southerly International Boundary*. April 30.

United States Fish and Wildlife Service (USFWS). 1998. *Razorback Sucker Recovery Plan*. Denver, CO. 81 pp.

United States Fish and Wildlife Service (USFWS). 2000a. *Biological Opinion for Maintenance Activities on the Pacific Gas and Electric Company Gas Pipeline System in the California Desert* (6840, CA-063.50) (1-8-99-F-71). January 7.

United States Fish and Wildlife Service (USFWS). 2000b. *Southwestern Willow Flycatcher Protocol Revision 2000*. Sacramento, California. 3 pp.

United States Fish and Wildlife Service (USFWS). 2001a. *Upper Colorado River Endangered Fish Recovery Program, Denver, CO*. 72 pp. plus appendices.

United States Fish and Wildlife Service (USFWS). 2001b. *Recovery Goals for the Razorback Sucker (*Xyrauchen texanus*) of the Colorado River Basin*. A supplement to the *Razorback Sucker Recovery Plan*. Draft Final Report dated March 12, 2001, for Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, Region 6, Denver, CO. 75 pp. plus appendices.

United States Fish and Wildlife Service (USFWS). 2002. *Reinitiation of Formal Section 7 Consultation on Lower Colorado River Operations and Maintenance – Lake Mead to Southerly International Boundary, Arizona, California and Nevada.* April 30.

United States Fish and Wildlife Service (USFWS). 2003. *Notice of Availability of the Final Southwestern Willow Flycatcher Recovery Plan.* Albuquerque, New Mexico, i-ix. 210pp. Appendices A-O. March 5.

United States Fish and Wildlife Service (USFWS). 2004. Threatened and Endangered Species Database. http://ecos.fws.gov/tess_public/TESSWebpageUsaLists? state=AZ.

United States Fish and Wildlife Service (USFWS). 2005a. *Biological and Conference Opinion on the Lower Colorado River Multi-Species Conservation Program, Arizona, California, and Nevada*. March 4

United States Fish and Wildlife Service (USFWS). 2005b. *Federal Register, Department of the Interior, Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwestern Willow Flycatcher; Final Rule.* 50 CFR Part 17. RIN 1018-AT88. October 19.

United States Fish and Wildlife Service (USFWS). 2005c. Letter from John Earle (HNWR Manager) requesting that additional surveys for Yuma Clapper Rail not be conducted on refuge lands. January.

United States Fish and Wildlife Service (USFWS). 2005d. 2004 Yuma clapper rail protocol survey data from the HNWR. Fax sent July 27.

United States Fish and Wildlife Service (USFWS). 2005e. Informal consultation between USGS and USFWS regarding the Pore Water Study.

United States Fish and Wildlife Service (USFWS). 2006. *Concurrence Letter on the Site Access and Sampling Procedures for Groundwater Monitoring Wells Located near Potential Southwestern Willow Flycatcher Habitat Technical Memorandum*. April 28.

Vanicek, C.D. 1967. *Ecological studies of native Green River fishes below Flaming Gorge Dam, 1964-66.* Ph.D. dissertation. Utah State University, Logan ,Utah.

Woodbury, A.M. and R. Hardy. 1940. *The dens and behavior of the desert tortoise.* Science. December 6. 529 pp.

Woodbury, A.M. and R. Hardy. 1948. *Studies of the desert tortoise, Gopherus agassizii.* Ecology Monographs. Volume 18, Number 2. 145-200 pp.

Figures

Appendix A
Seismic Survey

Appendix B
Slant Drilling Work Plan

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