of a number of variations of the Cottonwood Triangular and Desert Side-notched points. According to Crabtree (1981), there was a decrease in the importance of hunting and an increased emphasis on a relatively narrow list of plants, such as mesquite and agave.

Ethnohistoric Overview

The project area is within the home territory of the Mojave, although the Chemehuevi and the Halchidoma probably had interests in the region. Previously cited BLM regional overviews include information about the ethnography of the southern Mojave Desert. Additional ethnographic information on the region is presented in the environmental documentation for the Mead-Phoenix 500-kV Transmission Line project (U.S. Department of Energy 1983) and the Devers-Palo Verde High Voltage Transmission Line (Bean and Vane 1978). Only a brief summary is provided here.

The area occupied by the Mojave encompassed lands on both sides of the lower Colorado River from just south of Davis Dam to Topock. They traveled beyond this core area, however, and their knowledge and use of trails throughout the Mojave Desert and western Arizona was extensive. Although primarily river agriculturalists, the Mojave supplemented their diet with a variety of wild plants, game, and fish. The mesquite bean was of particular importance, with some groves harvested on a regular basis. Family groups functioned as the primary subsistence unit for farming, as well as hunting and gathering. Agricultural lands appear to have been owned by extended families, as indicated by boundary disagreements.

Available information indicates that the Mojave lived in small rancherias scattered throughout the floodplains of the Colorado River. They built a number of types of structures, the most substantial being a semi-subterranean winter house. Open-sided ramadas provided shade and protection from the summer sun.

Historic Overview

The history of the project area has been shaped by transportation routes through the region. First came the trails and roads along the river, and later the railroad. The river also served as a transportation corridor for steamboats carrying goods and passengers. Into the early part of this century the steamers hauled ore and heavy machinery for the mines in the region (Gudde 1975). Many of these vessels docked at Needles several miles north of the project.

The small community of Topock was previously known as Red Rock or Mellen. The latter appellation was taken from Jack Mellen, a nineteenth century Colorado River

steamboat captain (Coolidge 1963). According to some sources the name came from the Mojave Indian ahatopok, which means 'bridge', and was thought to refer to the railroad bridge at Topock (Gudde 1962).

Topock has been described as being located in a maze of transportation routes. Over the past 100 years it has served as a boat landing, a railroad station stop, and a transcontinental automobile route. It was an important service center until about World War II (Norris 1980). The removal of the railroad maintenance facilities and the construction of Interstate 40 heralded a decline in activity, and the town is now a small residential cluster. The area has experienced some renewed use as a transportation corridor, this time for natural gas.

Archaeological Inventory Results

Cultural resource investigations conducted for this project included a records search at the regional office of the California Archaeological Inventory and the files of the Arizona State Museum, Arizona State University, Museum of Northern Arizona, and the Arizona State Historic Preservation Office (SHPO). The project and a half mile wide area around it were included in the records search. Results from the survey for the Mojave Pipeline are included in this inventory. In all, 22 previously recorded archaeological resources were identified within this area (Table 6-1). These prehistoric resources range from isolated debris such as a single flake to complex rock alignments, one of which is on the National Register. The field visit confirmed that the alignment avoids the National Register site.

Ethnographical Inventory Results

The ethnographic data collection also involved archival research. Major sources reviewed for ethnographic and Native American concerns include Bean and Vane (1978; 1982), U.S. Department of Energy (1983), U.S. Department of Interior (1980), and Woods (1983).

Some of this information collected concerning ethnographical resources is considered confidential. A summary of this results, without detailed location information, is presented in Table 6-1.

Historical Inventory Results

The primary goal of the historical inventory was to identify historical sites that are (1) listed on official federal, state, and local registers (U.S. Department of Interior

1976; California Department of Parks and Recreation 1976; 1982; Quinn 1980), or (2) are of local importance. The major literature that was reviewed includes:

- The National Register of Historic Places (NRHP)
- California Historical Landmarks
- California Inventory of Historical Resources

Other published sources researched for historical sites include Hoover and others (1966), Gudde (1962; 1975), Norris and Carrico (1978), Warren and Roske (1981), Historical and Architectural Resources within the Lower Colorado River System (WESTEC 1980), and the Arizona Engineering Site Inventory (Texas Tech University 1981). Map data included U.S. General Land Office plats and Perris Miner's Map (Rand McNally 1896).

The results of the inventory are presented in Table 6-1. In all 14 historical resources were identified. These vary, with the community of Topock listed along with a bridge, which is on the National Register.

A field visit was made to the project area on July 24, 1991. In addition to the previously recorded sites noted above, two other potential resources were observed. In Arizona a water tank (metal with a wooden roof) was identified adjacent to the proposed project area. It is near the tracks and was likely associated with the development of the railroad. In California a wooden pole utility line with glass insulators was noted paralleling the west bank of the river. The alignment crosses under this feature. The age and any associations have yet to be determined for these structures.

TABLE 6-1
TRANSWESTERN PIPELINE PROJECT
CULTURAL RESOURCES ARCHIVAL INVENTORY RESULTS

Site Number	Class	Description	Comments
CA-SBr-219/H	A/H	Topock Maze	NRHP
CA-SBr-954	A	Petroglyphs	
CA-SBr-5523	A	Quarry	
P1462-2	A	Lithic scatter	
P1462-3	A	Lithic scatter	
P1462-4	A	Stone alignment	
P1471-2	A	Flake	
P1471-3	A	Lithic scatter	
P1471-4	A	Lithic scatter	
P1471-5	A	Lithic scatter	
P1471-6	A	Lithic scatter	
P1471-7	A	Lithic Scatter	
P1471-8	A	Lithic scatter	
P1471-9	A	Lithic scatter	
P1471-11	A	Stone alignments, lithic scatter	
P1471-14	A	Stone alignments	

TABLE 6-1 (Continued)
TRANSWESTERN PIPELINE PROJECT
CULTURAL RESOURCES ARCHIVAL INVENTORY RESULTS

Site Number	Class	Description	Comments
A1462-1	A	Core	
A1462-2	A	Core	
A1462-3	A	Core	
MP-B3	A	Chipping station	
AZ L:7:12	A	Quarry	
AZ L:7:13	A	Rock ring	
	E	Mojave Desert	Habitation, resource exploitation
	E	Colorado River	Resource exploitation
CHL 985	H	Desert Training Center, California-Arizona Maneuver Area	
CA-SBr-2910H	H	National Old Trails Road and Monument	NRHP-E-OPH-3926
CA-SBr-5524H	H	Road	
P1462-1H	H	Foundation	
	H	Utility line	Status unknown
Site of Topock	H/A	Townsite	Condition and status unknown

TABLE 6-1 (Continued)
TRANSWESTERN PIPELINE PROJECT
CULTURAL RESOURCES ARCHIVAL INVENTORY RESULTS

Site Number	Class	Description	Comments
SHPO 42	H	Topock Bridge Red Rock Bridge	Demolished 1976
SHPO 60	H	Route 66	
SHPO 71	H	Old Trails Bridge/Needles Highway Bridge	NRHP 9-30-88
SHPO 104	H	Atlantic & Pacific Railroad, later AT&SF	Portion abandoned
SHPO 105	H	Topock (Mellen)	
	H	Water tank	Status unknown

A = Archaeological
E = Ethnographical
H = Historical

NRHP = Listed on the National Register of Historic Places

Inventory Summary

Based on the results of the records search and field visit at least two apparently unrecorded and unevaluated potential resources occur near the project area. In addition to these resources, seven previously recorded sites and a townsite locale also occur within the project limits. The Mojave Pipeline survey identified three prehistoric resources: a quarry (AZ L:7:12), a rock ring (AZ L:7:13), and a chipping station (MP-B3). The proposed ROW will make use of the Needles Highway Bridge (SHPO 71). The alignment also passes through the community of Topock, site SHPO 105. The westernmost alternative crosses the location of SHPO 42, however this resource has been previously demolished. This alignment also crosses the previous site of the town of Topock on the west side of the river. The Desert Training Center Maneuver Area is crossed by the ROW and both alternatives.

Cultural Resources Sensitivity

The sensitivity assessment for archaeological resources takes two major factors into account: (1) known and predicted archaeological site density/significance; and (2) generalized level of previous impacts. Major types of previous impacts include adjacent pipeline construction.

Sensitivity rankings for archaeological resources are defined as follows:

High - Areas of known high resource density/significance. This includes areas which, although not surveyed, are comparable to areas of high known sensitivity. Avoidance of impacts will be difficult, but possible. Mitigation will reduce impacts to an acceptable level.

Moderate - Archaeological resources will be scattered along the ROW. Avoidance of impacts will be possible though careful siting. Mitigation costs will be lower than in high sensitivity areas.

Low - Few sites are recorded or predicted in project vicinity. Archaeological resources will be a minor constraint.

The portion of the project in California, west of the Colorado River, is an area of generally high sensitivity for archaeological resources. This is based largely on the presence of a number of rock alignments in the vicinity. The proposed pipeline alignment and alternative west of the river pass through mostly disturbed areas, with little opportunity for intact sites. The results of the Mojave Pipeline survey demonstrate an absence of archaeological resources along their corridor in this area. Small relatively undisturbed areas, such as the boring staging area, do exist along the Transwestern project in California. Although the

overall sensitivity for the proposed route is low, such areas potentially contain undocumented resources.

In Arizona, east of the river, there are fewer documented archaeological resources, but the area is generally less disturbed. The survey for the Mojave Pipeline has recently identified previously undocumented cultural resources along the ROW. Although there are archaeological resources located along the proposed alignment, based on the recommendations for the Mojave Pipeline, they are not eligible for the National Register. When these factors are combined, the overall archaeological sensitivity for the Arizona segment of the project is low.

Ethnological Sensitivity

Sensitivity levels were assigned based primarily on heritage and scientific significance. Although final sensitivity levels were assigned on a cases by case basis, the following guidelines were used.

High - Presence of high sensitivity settlements/use areas and/or the ethnographic components which comprise them constituting significant constraints to project siting. Examples of these resources might be large villages or sacred sites.

Moderate - Moderate sensitivity settlement/use areas and/or ethnographic components which comprise them constitute some constraint to the project.

Low - The incidence of low sensitivity use areas and/or ethnographic components which comprise them constitute negligible constraints to the project. Procedures such as avoidance or data recovery will not be required.

Based on the rather general concerns identified the ethnographical sensitivity has been ranked as moderate.

Historical Resources Sensitivity

In assessing the sensitivity of historical resources the following factors were taken into account:

- Official Status - Sites listed on the National Register and state historical landmarks are accorded the highest sensitivity rating.

- Site Type - Different types of historical sites are prone to different impacts from construction projects. For example, an historic marker in the vicinity of a pipeline might not be very sensitive with respect to the effects of the project. Alternatively, a structure slated to be moved from its original setting will be much more affected by the project.

- Previous Impacts - The generalized level of previous impacts can affect sensitivity.

Only one of the five known historical resources within the project corridor has been evaluated and determined eligible for the National Register. The Needles Highway Bridge was nominated to the Register in 1988. However, its current use as a support structure for a pipeline alters its otherwise high sensitivity rating to a low. Since the Topock Bridge has been previously demolished it is also rated low for sensitivity to the project. Unless the project requires the removal of structures associated with the remaining three sites their overall sensitivity rating is also assessed as low.

7. ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT AND PROJECT OPTION

This section addresses the anticipated environmental impacts associated with the Transwestern Pipeline Project. Unless otherwise noted in the specific resource section, the impact descriptions listed below apply to the proposed project and the project option.

A. Earth

The proposed project and project option will involve no changes to the area other than the introduction of temporary construction equipment and the two acre metering station. Consequently, there will be no changes in existing topography, to unique geological features, and no displacements or disruptions of the soil. Faulting or seismic activity is unlikely in this area. The only potential environmental impact to earth resources is the possibility of wind erosion of soils. This potential impact will be rendered nonsignificant in the proposed project by the incorporation of appropriate mitigation measures (see Section 9).

B. Air

Long-term impacts on air quality were determined to be nonsignificant for the Mojave Pipeline. Emissions caused by the proposed project and project option will not result in significant long-term impacts to air quality. Construction impacts on air quality will be rendered nonsignificant in the proposed project by the incorporation of appropriate mitigation measures (see Section 9).

C. Water

No significant intensive surface runoff leading to an increase in sediment load and, nor decrease in water quality of the Colorado River is expected to result from the proposed project, nor are impacts caused by hydrostatic test water withdrawal and discharge. Groundwater contamination or adverse impacts on springs are also not likely. All of these potential impacts will not be issues of concern in the proposed project and will be rendered nonsignificant in the proposed project by the incorporation of appropriate mitigation measures (see Section 9).

D. Plant and Animal Life

Construction Impacts-Proposed Project

Construction of the proposed pipeline segment will result in temporary, but long-term disturbance to a 25-foot-wide zone of habitat not previously disturbed by pipeline construction. The remaining 50 feet of permanent ROW required for the proposed pipeline will contain habitat previously disturbed by construction of the Mojave pipeline. The portion of the route not utilizing the Mojave ROW will result in temporary, but long-term disturbance to a 25-foot-wide construction zone, and a permanent ROW width of 50 feet.

In addition to the pipeline construction, habitat disturbance will also occur along this alternate route due to: (1) construction of the proposed Transwestern/PG&E and SOCAL Meter Station adjacent to the PG&E Compressor Station (approximately 2 acres); (2) use of extra workspace (approximately 8.6 acres) for construction staging and pipe pull-through at the western end of the bore under the river; and (3) extra workspace (approximately 7 acres) for boring underneath Interstate Highway 40. The first will be permanent disturbance, while the latter two are considered to be temporary, but long-term.

Cumulative impacts will include those impacts associated with construction of both the proposed pipeline segment and Mojave pipeline.

The areas of habitats that will be disturbed by construction of the proposed pipeline segment are included in Table 7-1.

Impacts to vegetation types/wildlife habitats due to construction of the proposed pipeline segment will be relatively minor due to:

- Construction adjacent to the Mojave pipeline route. Fifty of the needed seventy-five feet of standard construction zone width will already be disturbed.

- Construction in areas of existing disturbance. Of the approximately 12,000 feet of pipeline route, only about 3,000 traverses Mojavean creosote bush scrub with low to moderate existing disturbance.

- Method of crossing the Colorado River. Aquatic and riparian habitats will be avoided by boring under the river.

Construction of the proposed route will result in disturbance to 13.62 acres of Mojavean creosote bush scrub including 10.3 acres with light to moderate levels of disturbance and 3.32 acres of high levels of disturbance (Table 7-1). This acreage includes 8.6 acres of extra workspace, pipe laydown and pull-through area associated with the boring operation. The high level disturbance areas include the railroad ROW and areas already disturbed by Mojave pipeline construction activities.

As described in Section 6, the Mojavean creosote bush scrub traversed by the proposed Transwestern pipeline route does not represent high-quality wildlife habitat due to several factors, including existing and ongoing (such as Interstate Highway 40 and the railroad) human-caused disturbance, as well as the fragmentation and isolation of this area. As such, construction-related disturbance to vegetation types/wildlife habitat along the proposed route will not be significant.

Because the Mojave Pipeline Project Final EIR/EIS addresses a 100-foot construction ROW, cumulative impacts due to pipeline construction (construction of the Mojave and proposed Transwestern pipelines) will be similar to those described for the Mojave pipeline. The total width of the construction ROW for both the proposed Transwestern and Mojave pipelines will be 100 feet. Cumulative impacts in the area due to construction of the proposed Transwestern pipeline route and the Mojave Pipeline will include 15.5 acres of lightly to moderately disturbed Mojavean creosote bush scrub, 10.22 acres of high disturbed Mojavean creosote bush scrub, and 36.0 acres of disturbed/ruderal habitat. Because both pipelines will follow the same route in this area, factors affecting wildlife habitat quality that are described above also apply to cumulative impact analysis. As such, cumulative impacts associated with construction of these pipelines will not be significant (refer to Table 7.2 for cumulative acreages).

General Wildlife Species

Potential impacts to wildlife species due to construction of the proposed pipeline will include direct loss of animals due to crushing by equipment; displacement of animals into adjacent areas; disturbance due to increases in dust, noise, human activity, and nighttime lighting; and loss of habitat and habitat features. Species most likely to be impacted will be those associated with Mojavean creosote bush scrub and disturbed/ruderal areas.

As described in Section 6, wildlife species common to Mojavean creosote bush scrub include desert iguana, zebra-tailed lizard, horned lark, white-tailed antelope squirrel and desert kit fox. Based on observation of the 24 July 1991 survey, the level of existing human-caused disturbance, and the degree of fragmentation and isolation due to Interstate Highway 40, the railroad, and the Colorado River, it appears that the desert tortoise is not utilizing areas traversed by the proposed pipeline route.

Overall, the habitats that will be disturbed by the proposed Transwestern pipeline route are not of high quality to wildlife species. As such, a relatively low number of individuals of general wildlife species will be lost or displaced by construction. These impacts will not be significant.

Impacts associated with both the proposed Transwestern and Mojave pipelines will comprise cumulative impacts. In this area, both traverse generally low-quality wildlife habitats. Thus, cumulative impacts to general wildlife species due to construction of these pipelines will not be significant.

Riparian/Aquatic Habitats

The proposed pipeline route crosses under approximately 1,500 feet of riparian and aquatic habitats (Table 7-1). Potential indirect impacts to aquatic and riparian habitats due to construction of the proposed project will include introductions of soil sediments, and vehicle fuels (accidental fuel spills), as well as increases in noise levels due to equipment. As described in Section 6, a variety of fish occupy this portion of the Colorado River. These species will not be significantly affected by soil sediments because potential amounts of either entering the river will be minute. Fuel spills into the river will alter water quality and might impact species of fish. However, safety controls have been developed to lessen the likelihood of a spill occurring (refer to Section 4 and Section 9). Increased noise levels will not affect wildlife species using these habitats because: (1) wildlife occur in tamarisk scrub in low densities; and (2) these habitats are already subject to high levels of noise due to Interstate Highway 40, the railroad, and boats on the river.

Sensitive Species

Sensitive species of plants and wildlife known from the vicinity of the proposed Transwestern pipeline route are described in Section 6. Generally, those include:

- Barrel cactus
- Sensitive fish species (bonytail chub, razorback sucker)
- Desert tortoise
- Yuma clapper rail
- Federal and California state-listed birds (bald eagle, peregrine falcon)

- Other sensitive bird species

Based on observations of the 24 July 1991 survey, barrel cactus along the pipeline route are absent or in low densities. None was observed. As such, impacts to this species due to construction of the proposed pipeline segment will not be significant.

The occurrence of the bonytail chub and/or razorback sucker in the vicinity of the pipeline route is possible, but very unlikely. Along the lower Colorado River, both species distributions have been reduced to a few remnant populations. Fish species in general might be impacted by introduction of soil sediments and vehicle fuels into the Colorado River. If soil sediments are introduced into the river, they will likely be in minute amounts. Fuel spills might impact fish species (including these two sensitive fish, if present), however the likelihood of a spill into the river is low. Safety controls and mitigation have been developed to reduce the likelihood of occurrence of these impacts (see Section 3). Overall, impacts to these two sensitive species due to construction of the proposed pipeline segment will not be significant.

As described in Section 6, desert tortoises do not appear to be using habitats traversed by the proposed pipeline segment. No individuals or sign were observed during the 24 July 1991 survey. Based on information developed by BioSystems Analysis, Inc., and on discussions with R. Branfield (USFWS), F. Hoover (CDFG), and J. Ellison (overall project manager for the Mojave Pipeline), the area traversed by the Enron pipeline route does not contain suitable tortoise habitat. The Mojavean creosote bush scrub occurring along the pipeline route contains various levels of human-caused disturbance and has been fragmented and isolated by existing facilities, roads (including Interstate Highway 40), the railroad, and the Colorado River. Construction of the proposed pipeline segment will not impact this species. Based on information submitted to them, R. Bransfield, USFWS, and F. Hoover, CDFG, agree with this conclusion.

Because the proposed pipeline segment route does not traverse marsh habitat, the Yuma clapper rail is unlikely to occur along the pipeline route, except possibly while travelling to and from areas of suitable habitat. Marsh habitat downstream of the pipeline route will potentially be impacted by soil sediments and fuel spills. As described above, they will be introduced into the river in minute amounts. Safety controls and mitigations have been developed to lessen the likelihood of occurrence (see Sections 4 and 9). Nearby populations of this species are not likely to be affected by indirect impacts, such as increases in noise. Noise levels in the vicinity of the pipeline route are currently quite high due to Interstate Highway 40, the railroad, and boats on the river. Potential impacts to this species, which are unlikely, will not be significant.

Due to the lack of suitable habitat, other bird species with various levels of sensitive and protected status do not occur in the vicinity of the proposed pipeline route other

than on an infrequent basis during migration or other movements. As such, if impacts to these species occur, they will not be significant. These species include: bald eagle, peregrine falcon, California black rail, California yellow-billed cuckoo, Arizona Bell's vireo, elf owl, Gila woodpecker, and bank swallow.

Because the Mojave pipeline route is adjacent to the proposed Transwestern pipeline route, cumulative impacts to sensitive species will be similar to the impacts described above for construction of the proposed pipeline reroute.

Construction Impacts - Project Option

Construction impacts to plant and animal life resulting from the project option, i.e., crossing the Colorado River via the suspension bridge, will be similar to those resulting from the proposed project, except for the following:

Acreages of disturbance to habitats resulting from construction of the project option will include 5.16 acres of Mojavean creosote bush scrub, including 3.46 acres that contain a relatively high level of existing human-caused disturbance. The remainder of disturbance (3.7) acres will occur in areas that are already highly disturbed and/or contain ruderal habitat. These include the railroad ROW and areas already disturbed by Mojave pipeline construction activities. See Table 7-1 for a summary of differences in acreage disturbed between the proposed project and the project option.

TABLE 7-1

APPROXIMATE ACRES OF CONSTRUCTION DISTURBANCE,
BY HABITAT, ALONG THE PROPOSED
TRANSWESTERN PIPELINE ROUTE

Habitat Type	Length of Occurrence Along Pipeline Route (feet)	Disturbance Acreage Due to Construction	
		Transwestern Route	Mojave and Transwestern Routes
PROPOSED PROJECT			
Mojavean creosote bush scrub-low to moderate disturbance	3000	10.3[a]	15.5[a]
Mojavean creosote bush scrub-high disturbance	5200[b]	3.32[b]	10.22[b]
Disturbed/ruderal	5000[c]	10.0[d]	36.0[e]
Total	**13,200**	**23.62**	**61.72**
PROJECT OPTION			
Mojavean creosote bush scrub-low to moderate disturbance	3000	1.7	6.9
Mojavean creosote bush scrub-high disturbance	5000[f]	3.46[f]	11.16[f]
Disturbed/ruderal	4500	3.7[g]	28.9[h]
Total	**12,500**	**8.86**	**48.96**

[a] Includes 8.6 acres for a pull-through area associated with boring under the Colorado River.

[b] Includes .86 acres for the 500 feet of 20-inch pipeline to the SOCAL meter station and .16 acres for the 700 feet of 10-foot access road.

[c] Includes 1200 feet of route that parallel the Mojave pipeline, 2300 feet of new pipeline construction, and 1500 feet of extra workspace associated with boring under Interstate Highway 40.

[d] Includes approximately 2 acres of disturbance due to construction of the proposed Transwestern meter station and 6 acres due to boring under the Interstate Highway 40.

[e] Includes approximately 2 acres of disturbance due to construction of the proposed Transwestern meter station, 6 acres due to boring under Interstate Highway 40 and 2 acres due to construction of the Mojave Compressor Station.

[f] Includes approximately .86 acres for the 500 feet of 20-inch pipeline to the SOCAL meter station.

[g] Includes approximately 2 acres of disturbance due to construction of the proposed Transwestern meter station.

[h] Includes approximately 2 acres of disturbance due to construction of the proposed Transwestern meter station and 20 acres due to construction of the Mojave Compressor Station.

Operational Impacts - Proposed Project

Impacts to biological resources due to operation of the proposed pipeline segment will generally include the following types of disturbance:

- A 50-foot-wide permanent ROW, including 25 feet in areas previously disturbed by the Mojave pipeline and 25 feet of new disturbance. The ROW is considered to be long-term disturbance and is located within the construction zone disturbance.
- Two acres of long-term disturbance associated with the meter station.
- Loss of individuals of general and sensitive species of plants and wildlife due to crushing by or collisions with equipment.
- Periodic added disturbance, such as noise, dust, and human presence.
- Possible, but unlikely accidents, such as pipeline leaks resulting in fires or vehicle fuel spills.

Acreages shown in Table 7-2 and described below will not represent new disturbance beyond that shown in Table 7-1. That is, acreages for construction disturbance include acreages of disturbance associated with pipeline operation and maintenance described below.

Disturbance to vegetation due to operation of the proposed pipeline segment will occur within a total of 5.02 acres of Mojavean creosote bush scrub in the permanent ROW and within 4.0 acres of disturbed/ruderal habitat in the ROW and at the meter station (Table 7-2). Because the vegetation types traversed by the proposed pipeline route are not high-quality wildlife habitats, these impacts will not be significant.

Vegetation along the proposed Transwestern and Mojave pipeline routes will be allowed to reestablish naturally. The same permanent ROW will be used for periodic inspections of both pipelines. As such, operation of the Transwestern pipeline will not represent a substantial additive impact.

General Wildlife

Because the wildlife habitats that will be disturbed due to operation and maintenance of the proposed pipeline route are of low quality, relatively few individuals of wildlife species will be lost, displaced, or disturbed by indirect impacts (such as noise or dust). As such, impacts to general wildlife species will not be significant.

Operation and maintenance of the Mojave and the proposed Transwestern pipeline segment will impact generally low-quality wildlife habitats. As such, cumulative impacts to wildlife species will not be significant.

Riparian/Aquatic Habitats

The proposed pipeline route will avoid riparian and aquatic habitats by boring under the Colorado River; therefore, direct impacts will not occur. Potential indirect impacts to habitats and wildlife species utilizing them will include accidental fuel spills from equipment. This is considered an unlikely event. Safety controls have been developed to minimize the likelihood of these indirect impacts (see Section 4).

Sensitive Species

Sensitive species in the region of the pipeline route are described in Section 6. Due to lack of disturbance to suitable habitat along the pipeline route, operation and maintenance impacts will not occur to Yuma clapper rail, bald eagle, peregrine falcon, and other sensitive bird species. Based on observations of the 24 July, 1991 survey, barrel cactus and desert tortoise do not appear to occur along the pipeline route. As such, impacts to those species due to operation and maintenance of the pipeline will not occur. Because the proposed pipeline will cross under the Colorado River, operation and maintenance impacts to bonytail chub and razorback sucker will not occur.

Because the Mojave pipeline will be adjacent to the proposed pipeline route, disturbances will be similar. As such, cumulative impacts due to pipeline operation and maintenance will not be significant.

Operational Impacts - Project Option

Operational impacts to plant and animal life resulting from the project option, i.e., crossing the Colorado River via the suspension bridge, will be similar to those resulting from the proposed project, except for the following:

Acreages of disturbance to habitats resulting from the operation of the project option will be the same as those resulting from its construction, namely a total of 5.16 acres of Mojavean creosote bush scrub, including 3.46 acres that contain a relatively high level of existing human-caused disturbance. The remainder of disturbance (3.7 acres) will occur in areas that are already highly disturbed and/or contain ruderal habitat. These include the railroad ROW and areas already disturbed by Mojave pipeline construction activities. See Table 7.2 for a summary of differences in acreage disturbed between the proposed project and the project option.

TABLE 7-2

APPROXIMATE ACRES OF PIPELINE OPERATION AND MAINTENANCE BY HABITAT, ALONG THE PROPOSED TRANSWESTERN PIPELINE ROUTE[a]

Habitat Type	Length of Occurrence Along Transwestern Route (feet)	Acreage in Permanent ROW	
		Transwestern Route	Mojave and Transwestern Routes Combined
PROPOSED ROUTE			
Mojavean creosote bush scrub-low to moderate disturbance	3000	1.7	3.4
Mojavean creosote bush scrub-high disturbance	5200[b]	3.32[b]	5.62[b]
Disturbed/ruderal	5000[d]	4.0[d]	26.0[e]
Total	**13,200**	**9.02**	**35.02**
PROJECT OPTION			
Mojavean creosote bush scrub-low to moderate disturbance	3000	1.7	3.4
Mojavean creosote bush scrub-high disturbance	5000[f]	3.46[f]	6.06[f]
Disturbed/ruderal	4500	3.7[g]	25.4[h]
Total	**12,500**	**8.86**	**34.86**

a Acreages shown in this table represent areas within which permanent or long-term disturbance associated with maintenance of the pipeline will occur. There areas are located within areas of construction disturbance shown in Table 5.1.

b Includes .86 acres for the 500 feet of 20-inch pipeline to the SOCAL meter station and .16 acres for the 700 feet of 10-foot access road.

c Includes 1200 feet of route that parallel the Mojave pipeline route, 2300 feet of new pipeline construction, and 1500 feet of extra workspace associated with boring under Interstate Highway 40.

d Includes approximately two acres of disturbance due to the proposed Transwestern/PG&E and SOCAL Meter Station.

e Includes approximately two acres due to the proposed Transwestern/PG&E and SOCAL Meter Station and 20 acres due to the Mojave Compressor Station.

f Includes approximately .86 acres for the 500 feet of 20-inch pipeline to the SOCAL meter station.

[*] Includes approximately two acres of disturbance due to the proposed Transwestern/PG&E and SOCAL Meter Station.

[^] Includes approximately two acres due to the proposed Transwestern/PG&E and SOCAL Meter Station and 20 acres due to the Mojave Compressor Station.

Impacts of construction and operation of the proposed project and project option on plant and animal life would be rendered nonsignificant by the incorporation of appropriate mitigation measures (see Section 9).

E. Noise

The potential for increase in noise levels resulting from construction and operation of the proposed project and project options will be nonsignificant, especially in comparison with the potential for increase in noise levels resulting from the Mojave Pipeline, which was determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

F. Light and Glare

The potential for increase in light and glare resulting from construction and operation of the proposed project and project options will be nonsignificant, especially in comparison with the potential for increase in light and glare resulting from the Mojave Pipeline, which was determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

G. Land Use

Construction Impacts - Proposed Project

The construction-related movement of equipment, supplies, and commuting workers on the local roads and highways will temporarily add to normal traffic density, but will not result in significant long-term impacts on roads and highways.

Pipeline crossings of Interstate Highway 40 will be accomplished by boring beneath the roadbeds, thereby not interfering with traffic and service along these major transportation corridors. At more lightly traveled county, local, and unpaved roads, open-cut excavation will be used for pipeline construction and will require that temporary detours be arranged. However, such construction-related delays and/or detours are not considered significant because of the low traffic volumes and the short period of interference.

The proposed project will not increase pipeline congestion on the existing pipeline suspension bridge and therefore results in a beneficial land use impact since future pipeline use of the bridge is not precluded. It will also demonstrate the flexibility of directional boring technology as a Colorado River crossing technique, which can then be used by other future pipelines without direct disturbance of the river bottom. No cumulative land use impacts will result if the proposed pipeline is installed by boring beneath the Colorado River, since overall land use will not be affected.

Construction Impacts - Project Option

Construction impacts to land use resulting from the project option, i.e., crossing the Colorado River via the suspension bridge, will be similar to those resulting from the proposed project, except for the following:

The proposed project will result in the addition of one new pipeline to the existing pipeline suspension bridge. This bridge has a limited capacity to accept additional pipelines, therefore this project will reduce future flexibility because less room will exist for future pipelines to cross the river at this point. This impact will be less than significant if BLM determines that additional natural gas transportation represents an appropriate use of this increment of bridge capacity or if an additional method of river crossing is employed. This bridge can only accommodate two additional pipelines before the construction of additional supports is necessary. This construction can result in disturbance to the river bottom.

Operational Impacts - Proposed Project

Following construction, the surface of the pipeline ROW will be restored, and allowed to naturally revegetate to its previous use and appearance. The meter station site will preclude other land uses on the two-acre site for the life of the project. These impacts are not considered significant.

The project will limit the allowable land uses along the ROW for the life of the project. The amount of land that will be disturbed over the long term, including the meter station totals approximately 9.02 acres. This does not include approximately 1,500 feet of the pipeline that crosses under the Colorado River. The proposed activity is consistent with BLM's planned use as a utility corridor.

Operational Impacts - Project Option

Operational impacts to land use resulting from the project option, i.e., crossing the Colorado River via the suspension bridge, will be similar to those resulting from the proposed project, with a total of 8.86 acres of land disturbed over the long term.

Effects of the proposed project and project option on land use will be nonsignificant, especially in comparison with the effects on land use resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

H. Natural Resources.

Effects of the proposed project and project option on natural resources will be nonsignificant, especially in comparison with the effects on natural resources resulting

from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

I. Risk of Upset

Effects of the proposed project and project option on risk of upset will be nonsignificant, especially in comparison with the effects on risk of upset resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

J. Population

Effects of the proposed project and project option on population will be nonsignificant, especially in comparison with the effects on population resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

K. Housing

Effects of the proposed project and project option on housing will be nonsignificant, especially in comparison with the effects on housing resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

L. Transportation / Circulation

Effects of the proposed project and project option on transportation and circulation will be nonsignificant, especially in comparison with the effects on transportation and circulation resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

M. Public Services

Effects of the proposed project and project option on public services will be nonsignificant, especially in comparison with the effects on public services resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

N. Energy

Effects of the proposed project and project option on energy will be nonsignificant, especially in comparison with the effects on energy resulting from the Mojave

Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

O. Utilities

Effects of the proposed project and project option on utilities will be nonsignificant, especially in comparison with the effects on utilities resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

P. Human Health

Effects of the proposed project and project option on human health will be nonsignificant, especially in comparison with the effects on human health resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

Q. Aesthetics

Potential impacts to visual resources will be nonsignificant, as they were in the Final FEIR/EIS for the Mojave Pipeline by implementing environmental and safety controls involving recontouring. Therefore, no mitigation measures will be required.

R. Recreation

Effects of the proposed project and project option on recreation will be nonsignificant, especially in comparison with the effects on recreation resulting from the Mojave Pipeline, which were determined to be nonsignificant without the incorporation of mitigation measures. No mitigation measures will be required.

S. Cultural Resources

Construction Impacts to Cultural Resources - Proposed Project

Table 7-3 summarizes the results of the current cultural resource inventory within the project alignment. The temporary construction ROW for the pipeline will generally be 75 feet wide with a permanent ROW width of 50 feet. Work spaces, access roads, and other project-related ground disturbing activities will be kept within the 200-foot corridor surveyed for the Mojave Pipeline to avoid impacts to cultural resources. Within the unsurveyed portions of the project, all undisturbed areas outside the 200-foot Mojave survey corridor are to be avoided. Specific areas to be avoided are discussed below.

Although the Needles Highway Bridge is listed on the National Register it appears unlikely that the Transwestern project will adversely affect this resource based on its present function. Impacts to the other resources listed in Table 7-3 will be similar to those from the Mojave Pipeline. Only if the removal of the structures is requi will the potential impacts be greater.

An intensive survey of the proposed project corridor has not been conducted as part of this study, however, the proposed project is located mostly within the survey corridor for the Mojave Pipeline. The cultural resources survey for the Mojave Pipeline addressed a 200-foot-wide corridor, 100 feet on either side of their centerline. Therefore, where the Transwestern alignment is within 100 feet of the Mojave pipeline an intensive cultural resources survey has been completed (McGuire 1990). The cultural resources survey for the Mojave Pipeline did not identify any significant cultural resources along the main Transwestern alignment. During the Transwestern field visit, however, an undocumented potential resource was noted. A wooden pole utility line is crossed by the alignment. This unevaluated resource will be avoided.

The proposed alignment is located north of the Mojave alignment between the Interstate Highway 40 crossing and the river boring location on the east side of the river. A water tank adjacent the boring location will be avoided to prevent impacts to this structure. The undisturbed portion of the proposed bore location on the west side of the river will be avoided to prevent potential impacts to any undocumented resources.

Construction Impacts to Cultural Resources - Project Option

Construction impacts to cultural resources resulting from the project option, i.e., crossing the Colorado River via the suspension bridge, will be similar to those resulting from the proposed project, except that the entire proposed ROW for this option does lie within the Mojave ROW, which has been previously surveyed for cultural resources.

Operational Impacts to Cultural Resources - Proposed Project

Based on the avoidance of areas indicated under construction impacts, no additional impacts are anticipated to cultural resources due to the operation of the Transwestern pipeline.

The proposed project is generally situated within the survey corridor for the Mojave Pipeline (McGuire 1990). Based on the results of this survey and archival research, no significant resources are located within this survey corridor, and consequently the proposed project area. Several unevaluated areas outside of the Mojave Pipeline Corridor that are within the proposed project corridor will be avoided, however,

including an undisturbed utility line crossing, a water tank near the east end and all other undisturbed areas. Based on the restrictions and areas avoidance indicated above, there will be no impacts to significant resources.

Operational Impacts to Cultural Resources - Project Option

Operational impacts to cultural resources resulting from the project option, i.e., crossing the Colorado River via the suspension bridge, will be similar to those resulting from the proposed project.

Impacts of construction and operation of the proposed project and project option on cultural resources would be rendered nonsignificant by the incorporation appropriate mitigation measures (see Section 9).

TABLE 7-3
TRANSWESTERN PIPELINE PROJECT
CULTURAL RESOURCES

Site Number	Description	Comments
CHL-985	Desert Training Center, California-Arizona Maneuver Area	
SHPO 71	Needles Highway Bridge	NRHP 9-30-88
SHPO 105	Topock (Mellen)	
	Water tank	Status unknown
MP-B3	Chipping station	Recommended not eligible (McGuire 1990)
AZ L:7:12	Quarry	Recommended not eligible (McGuire 1990)
AZ L:7:13	Rock ring	Recommended not eligible (McGuire 1990)
	Utility line	Status unknown
	Mojave Desert	Native American concerns
	Colorado River	Native American concerns

8. ANY ADVERSE EFFECTS THAT CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

The potential environmental impacts of the proposed projects are discussed in the previous section. No significant adverse environmental impact will result from implementation of the proposed project or project option, with implementation of mitigation measures included in Section 9.

9. MITIGATION MEASURES WHICH HAVE BEEN INCORPORATED IN THE PROJECT

Mitigation measures that follow have been summarized. For additional details, refer to the project description and resource discussions.

Where appropriate, mitigation measures have been proposed to further reduce environmental impacts to a level of nonsignificance. The following section describes the measures suggested for each of the impacted environmental resources described in Section 7. Unless otherwise noted, the measures are applicable to the Proposed Project and the Project Option.

A. Earth

The following mitigation measures will be implemented during clearing, construction, and restoration to control the potential loss of soils through wind erosion:

1. Topsoil Banking

- "Topsoil from nondisturbed areas will be "separated and stock piled along the pipeline alignment. Once backfilling and recontouring have been completed, this soil shall be replaced."

2. Mojave Desert

- "All areas of the ROW containing native vegetation shall be restored by the replacement of the segregated topsoil onto the disturbed ROW. After return of the topsoil and the windrowed vegetation, the disturbed areas shall be imprinted."

- "No mulching, fertilization or reseeding shall take place within the Mojave Desert beyond the replacement of the windrowed vegetation."

- "Areas with a high potential for either wind or water erosion shall be stabilized by the use of a tackifier such as J-tac (40-80 lbs/acre)."

3. Grading and Erosion

- "In addition to the replacement of topsoil, rock and natural plant debris shall also be replaced to reduce erosion potential."

- "Erosion control devices shall be placed where the pipeline alignments or new access roads are constructed on slopes or in other locations such as stream crossings where erosion may occur."

These mitigation measures will reduce impacts to earth resources to a level of nonsignificance.

B. Air

Several mitigation measures reduce impacts to air quality to nonsignificance during construction of the proposed project and project option are as follows:

4. "The ROW shall be watered to reduce dust."

5. "Construction related vehicle emission shall be reduced by using proper equipment."

6. "Construction related vehicle emissions shall be reduced by using proper air-to-fuel ratios."

These mitigation measures will reduce impacts to air quality to a level of nonsignificance.

C. Water

Several mitigation measures to reduce impacts to water quality to nonsignificance during construction of the proposed project and project option are as follows:

7. Hydrostatic test water will be purchased from the municipal water supply at the Golden Shores Resort on the Arizona side of the river, less than one mile north of the Interstate Highway 40. The total volume of water to be purchased for the hydrostatic tests is approximately 795,000 gallons. The hydrostatic test water for the following sections of the pipeline will be transported and discharged at the proposed scrubber station site in Section 10, T16N, R21W, Mohave County, Arizona:

- Transwestern to Topock 24" Pipeline (Proposed Project and Project Option)
- Transwestern 24" Pipe for Colorado River Bore (Proposed Project)
- Transwestern to SOCAL 20" Pipeline (Proposed Project and Project Option)

The hydrostatic test water for the following section of the pipeline will be discharged into a 38-foot × 38-foot × 3-foot deep discharge pit on the west side of the PG&E Compressor Station. The water will be discharged at a rate of 2500 gallons per minute with a splash barrel to control the flow rate and hay bales to trap solids.

- Transwestern to PG&E 20" Pipeline (Proposed Project and Project Option)

The hydrostatic test water for the following meter stations will be discharged inside the meter station fence at a rate controlled by the meter station piping valves. Hay bales will also be used to trap solids. The topography of the area will eliminate the possibility for discharge water to run off into the Colorado River.

- Transwestern at PG&E and SOCAL Meter Stations

8. "If required by state or federal permit, hydrostatic water [will] be tested and treated before release."

9. "Hydrostatic test water [will] be released properly to reduce the potential for scour."

10. "Water discharged in hydrostatic testing [will] be done in accordance with local, state and federal permits."

11. "Chemicals, fuels, and lubricating oil [will] not be stored near stream channels. Any accidental spills shall be promptly cleaned up."

D. Plant and Animal Life

Mitigation measures to reduce impacts to plant and animal life to nonsignificance during construction and operation of the proposed project and project option are as follows:

12. "Controls on Traffic, Access, and Construction Disturbance Area:"

"Project-related activities shall be restricted to established roads, designated access roads, the construction ROW, and other designated project areas and shall be examined during preconstruction surveys. Access roads shall be clearly flagged for use. The construction ROW shall also be clearly marked at the centerline and outside boundaries."

13. "Clearing, Grading, and Dust Control:"

"Trees and large shrubs shall be avoided or removed prior to clearing. The upper two to six inches of topsoil from the construction ROW requiring grading shall be removed and windrowed with the vegetation and kept separate from the remaining spoils."

"Grading shall be limited to that area necessary to permit movement and operation of equipment.'

Run-off from project activities into the Colorado River will be avoided.

14. "Topsoil Salvage and Handling:"

"Surface material [from undisturbed areas] ("topsoil") [will] be salvaged from trenching and any grading activities for preservation of topsoil and existing seedbanks in natural vegetation.

15. "Trenching, Blasting, and Inspection:"

"The trench must be backfilled as quickly as possible following lowering of the pipe. The maximum length of open trench at any one time shall not exceed [one] mile. For trenches not filled at the end of the day, escape ramps for wildlife shall be installed at distances no greater than 0.25 mile apart.

16. "Pets, Camping Firearms, and Use of Area:"

"No camping shall be permitted on the construction ROW. Only authorized camping areas may be utilized.

"To prevent harassment, mortality, or destruction of dens/burrows of wildlife species, pets shall not be allowed on the ROW, staging areas, access roads or any other sites required for construction activities. Firearms shall also be prohibited in the same areas. Unauthorized workers shall not be permitted at construction areas during non-scheduled hours."

17. "Trash Control:"

"To avoid attracting species of concern and potential predators, all food-related trash and litter (wrappers, cans, bottles, food scraps) shall be placed in closed containers and disposed of daily. The working ROW of each spread shall be [checked] daily to remove any trash or litter which may not have been disposed of properly."

18. "Handling and Disposal of Hazardous Materials:"

"Refueling and storage of hazardous materials shall occur in previously disturbed areas. Areas where refueling or storage of hazardous materials is prohibited shall be marked by the environmental monitors. The storage of these materials near streams shall be consistent with CDFG code 5650."

19. "Fire Control Procedures:"

"No trash-burning fires shall be permitted in the construction area. Vehicles used in the ROW with catalytic converters shall be equipped with shielding or other acceptable fire prevention features. Construction spreads must be equipped with fire extinguishers, with workers trained in their use. Fire resistant mats and/or wind screens shall be placed on the ground below welding and grinding operations whenever dry vegetation is present.

"Supervisors shall have the names of local fire fighting agencies. A detailed fire plan shall be prepared as a standard part of a BLM Construction, Operation and Maintenance Plan."

20. "Collection and Harassment of Species:

"No intentional killing or collection of either plants or wildlife shall be permitted. No intentional damage to trees or other vegetation shall be permitted outside of the construction ROW; this shall include the collection of plants including cacti without prior authorization."

21. "Clean-Up:"

"After construction is completed, a final ROW clean-up shall include removal of all stakes, lathes, flagging, barrels, cans, drums, accidental spills and any other refuse generated by construction. No shrub material or other plant cover shall be disturbed during this process."

22. "Surface Restoration:"

"Recontouring to natural lines and grade must be accomplished without disruption to adjacent undisturbed habitat. Sediment collected behind temporary hay bales shall be removed. Permanent water breakers and/or terraces shall be constructed across the ROW on sloping ground to prevent erosion. On steep grades, earth-filled sacks or stone riprap shall be used as determined necessary to stabilize the ground surface."

23. "Post-Construction Access Control:"

"The permanent ROW may be used to access the pipeline in emergency situations as defined under conditions stipulated by the Agencies. Damage to vegetation on the ROW shall be fixed and the ROW restored as soon as possible following the emergency. The appropriate agencies shall be notified. Signs shall be posted indicating the ROW is closed to vehicles."

24. "Post-Construction Environmental Monitoring and Reporting:"

If habitat compensation or specific reclamation measures are required, which can be measured, post-construction monitoring and reporting will take place.

"Post-construction monitoring shall meet two basic objectives: 1) to assess actual impacts that occur during construction, and 2) to monitor other mitigations. Post-construction inspection of the project area shall be conducted by the environmental monitoring team after completion of clean-up and surface restoration.

"A final construction monitoring report shall be prepared. Post-construction monitoring shall be undertaken at the end of the fifth year of operation."

25. "Equipment Operation Inspection and Maintenance:"

"Since most operation of facilities is by remote control, site visits are mainly related to inspection and pipeline maintenance. Access to sites shall be limited to access roads, or newly constructed roads approved as part of the project. All personnel shall attend regular meetings to be reminded about safety and environmental concerns."

26. "Rodenticides and Herbicides:"

"If rodenticide and/or herbicide use is required, the pipeline company shall contact the USFWS and CDFG for review and concurrence with the proposed activity."

27. "Contingency Plans:"

"Each pipeline company shall prepare appropriate contingency plans and procedures prior to initiation of operations and present them to the Agencies for review. These plans shall outline procedures for contacting the Agencies under a variety of situations which may occur. The plans shall provide procedures for notification concerning emergencies related to pipeline leaks or ruptures and what will constitute an emergency; plans for protecting the biological resources during emergency operations; procedures for accomplishing routine pipeline maintenance; and plans for consultation with the Agencies for unforeseen circumstances."

28. "Desert Tortoise:"

The area in California traversed by the pipeline route mentioned no sign of desert tortoise during earlier preconstruction surveys for the Mojave Pipeline project. Although the area was classified as non-habitat for tortoises (BioSystems Analysis, Inc. files), a desert tortoise survey will be conducted prior to construction of this pipeline.

All areas within the projected construction ROW not previously disturbed will be surveyed for sign of tortoises, including individuals, burrows, scat, carcasses, eggshell fragments, and other signs. The survey will be conducted by experienced tortoise biologists following USFWS survey guidelines.

If tortoises are observed above-ground, they will not be moved, but their location will be noted and made available to the biological monitor. Tortoise burrows found will be examined to assess occupancy status. Tortoises will be removed from active burrows and relocated at least 150 feet away from the ROW to an existing, unoccupied burrow. If an existing burrow cannot be located, an artificial burrow will be constructed. Handling of tortoises will follow protocol developed by agency biologists for the Kern River-Mojave pipeline project.

A biological monitor will be present during construction activities in the California portion of the pipeline route. The monitor will be a biologist with prior experience in tortoise handling protocol, and will be familiar with construction monitoring. The monitor will be responsible for moving tortoises in the unlikely event that any are observed in the ROW during construction. Tortoise handling procedures will follow those developed by agency biologists for the Kern River-Mojave pipeline project.

Procedures will be developed for tortoise monitoring and handling in the unlikely event that tortoises are encountered.

E. Noise

No mitigation measures are required.

F. Light and Glare

No mitigation measures are required.

G. Land Use

No mitigation measures are required.

H. Natural Resources

No mitigation measures are required.

I. Risk of Upset

No mitigation measures are required.

J. Population

No mitigation measures are required.

K. Housing

No mitigation measures are required.

L. Transportation / Circulation

No mitigation measures are required.

M. Public Services

No mitigation measures are required.

N. Energy

No mitigation measures are required.

O. Utilities

No mitigation measures are required.

P. Human Health

No mitigation measures are required.

Q. Aesthetics

The mitigation measures described in Section 9-A (Earth) will be implemented to control the potential loss of visual quality to a level of nonsignificance. No additional mitigation measures are required.

R. Recreation

No mitigation measures are required.

S. Cultural Resources

Mitigation measures proposed specifically for the proposed project and project option include the following:

29. Avoidance of the water tower adjacent to the AT&SF line and the historic transmission line, which parallels the Colorado River on the California side.

30. Additional communication with the local Native American community, including communication regarding archaeological resources potentially affected by the project, as well as ethnographic resources.

These mitigation measures will reduce the level of impacts to cultural resources to a level of nonsignificance.

10. ORGANIZATIONS CONTACTED

Bureau of Land Management (BLM), S. Johnson
U.S. Fish and Wildlife Service (USFWS), R. Bransfield
California Department of Fish and Game (CFG), F. Hoover
Fluor-Daniel, J. Ellison

11. REFERENCES

Bean, Lowell J. and Sylvia Brakke Vane. 1978. Persistence and Power: A Study of Native American Peoples in the Sonoran Desert and the Devers-Palo Verde High Voltage Transmission Line. Report submitted by Cultural Systems Research, Inc. to Southern California Edison Company.

Bean, Lowell J. and Sylvia Brakke Vane. 1982. The Ivanpah Generating Station Project Ethnographic (Native American) Resources. Submitted by Cultural Systems Research, Inc. to Southern California Edison Company.

Bettinger, Robert L. and R.E. Taylor. 1974. Suggested Revisions in Archaeological Sequences of the Great Basin and Interior Southern California. Nevada Archaeological Survey Research Papers 5:1-26. Reno.

California Department of Parks and Recreation. 1976. California Inventory of Historic Resources. Sacramento, California.

California Department of Parks and Recreation. 1982. California Historical Landmarks. Sacramento, California.

California State Lands Commission and Federal Energy Regulatory Commission. 1987. Mojave-Kern River-El Dorado Natural Gas Pipeline Projects Final Environmental Impact Report/Statement, Volume I and II.

California State Lands Commission. 1991. Mojave-Kern River Pipeline Projects Environmental Impact Report Final Amendment.

Coolidge, Richard N. 1963. History of the Colorado River During the Steamboat Era. M.A. Thesis. San Diego State College.

Crabtree, Robert H. 1981. Archaeology. In A Cultural Resource Overview of the Colorado Desert Planning Units, by Elizabeth von Till Warren, Robert H. Crabtree, Claude Warren, Martha Knack, and Richard McCarthy. Pp. 25-54. California Bureau of Land Management, Cultural Resources Publications, Anthropology-History, Riverside.

Fryman, Jr. Frank B. 1976. An Archaeological Survey of the Proposed Park Moabi Motorcycle Race Course Project Area, San Bernardino County, California. Manuscript on file San Bernardino County Museum.

Gudde, Erwin C. 1962. California Place Names. Second edition. University of California Press, Berkeley and Los Angeles.

Gudde, Erwin C. 1975. California Gold Camps. University of California Press, Berkeley and Los Angeles.

Hair, Charles W., 1991. Geotechnical Investigation, Phase II, Colorado River Pipeline Crossing, San Bernardino County, California – Mohave County, Aarizona. Submitted by Louis J. Capozzoli and Assoc., Inc., to Enron Gas Pipeline Group.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Grace Rensch. 1966. Historic Spots in California. Third edition. Sanford Press, Sanford, California.

King, Chester and Dennis G. Casebeir. 1981. Background to Historic and Prehistoric Resources of the East Mojave Desert Region. Second Printing. Bureau of Land Management, Riverside California.

Leonard III, Nelson. 1978. The Archaeological Assessment of the proposed Pipeline Route in the Vicinity of Needles, California. Manuscript on file San Bernardino County Museum, Redlands.

McGuire, Kelly. 1990. A Cultural Resources Inventory and Limited Evaluation of the Proposed Mojave Pipeline Corridor in California and Arizona. Far Western Anthropological Research Group, Inc. Davis, California.

Mojave Pipeline BLM Right-of-Way Grant, CA 17204.

Mojave Pipeline Company. 1991. Alignment Sheet MP0.0 to MP4.0 Mojave Mainline.

Norris, Frank. 1980. Arizona State Historic Property Inventory Form. On file at Dames & Moore, San Diego.

Norris, Frank and Richard L. Carrico. 1978A. History of Land Use in the California Desert. Prepared by WESTEC Services for the Bureau of Land Management, Riverside, California.

Payton, Paige M. 1987. Ground Drawings of the Lower Colorado River: An Analysis of Technique, Context, and Design. Senior Honors Thesis, Department of Anthropology, California State University, San Bernardino. Manuscript on file at San Bernardino County Museum.

Quinn, Ann. 1980. Historical Landmarks of San Bernardino County, San Bernardino County Museum Association Quarterly, Volume XVIII, No. 1 and 2.

Rand McNally & Co. 1896. Perris' Miners Map of the Desert Region of Southern California. Chicago.

Rogers, Malcolm J. 1958. San Dieguito Implements from the Terraces of the Rincon-Patano and Rillito Drainage System. The Kiva 24(1):1-23.

Skellet, J. Personal Communication 6 August 1991.

Steenberg, J. Personal Communication 8 August 1991.

Texas Tech University. 1981. Arizona Historic Engineering Site Inventory. History of Engineering Program. Lubbock, Texas.

U.S. Department of Energy. 1983. Mead-Phoenix 500 kV Transmission Line Project Environmental Impact Statement. Volume 4, Cultural Environment. Washington, D.C.

U.S. Department of Interior. 1976. National Register and Supplements through May 1988.

U.S. Department of Interior. 1987. The Yuma Resource Area Management Plan. Bureau of Land Management, Yuma, Arizona.

U.S. Department of Interior. 1980. The California Desert Conservation Area Plan. Bureau of Land Management, Riverside, California.

Warren, Claude N. 1980. The Archaeology and Archaeological Resources of the Amargosa-Mojave Basin Planning Units. Pp. 1-134 in A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units. California Bureau of Land Management, Cultural Resources Publications, Anthropology-History, Riverside.

Warren, Claude N. 1984. The Desert Region. In California Archaeology, by Michael Moratto. Academic Press, New York.

Warren, Claude N. and Robert Crabtree. 1986. Prehistory of the Southwestern Area. In Great Basin, edited by Warren D'Azevedo, pp. 183-193. Handbook of North American Indians, Vol. 11. William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Warren, Claude, N. Martha Knack, and Elizabeth von Till Warren. 1980A. Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units. California Bureau of Land Management, Cultural Resources Publications, Anthropology-History, Riverside.