3.4 WATER QUALITY

3.4.1 Affected Environment

Coachella Canal

Water quality of the Coachella Canal reflects that of its source, the Colorado River. Water temperatures vary with seasons and air temperature. Since the canal is a continuously flowing system, dissolved oxygen concentrations normally are high. Turbidity, related to total suspended solids, varies greatly. The canal water tends to be clear in the winter when flows are low, and it tends to be murky (underwater visibility of about one foot) in the summer when the water velocity is great enough to scour silt deposits in the canal bottom and prevent fine particles from settling out. The existing water quality is considered good for fish, especially in regard to dissolved oxygen levels and temperature regimes. Table 3-2 provides a summary of recent water quality measurements conducted by CVWD. The CVWD's water quality data collections are conducted at a location near the Avenue 52 overpass in the City of Coachella. While this location is downstream from the project area and within a lined canal section, the data is indicative of overall canal water quality.

Table 3-2. Coachella Canal Water Quality Data

Parameter	Average	Maximum	Minimum
Temperature (°F)[1]	69.1	88.0	51.6
pH (standard units)	8.2	8.5	8.0
Conductivity (μmhos/cm)[2]	1,088	1,356	842
Total dissolved solids (mg/L)[3]	750	946	613
Total alkalinity (mg/L)	143	170	130
Total hardness (mg/L)	449	403	140
Nitrate as N (mg/L)	0.15	1.19	0.01

Source: CVWD (unpublished water quality data for 1995 through 2000)
[1] Degrees Fahrenheit
[2] Microsiemens per centimeter
[3] Milligrams per liter

Salton Sea

The Salton Sea is a saline body of water that currently contains about 44,000 milligrams per liter (mg/L) of dissolved solids (Reclamation/Salton Sea Authority 2000). The salinity is increasing gradually as minerals continue to enter from irrigation drainage and other inflows, but the salinity also fluctuates in response to changes in the level of the Salton Sea. A declining Salton Sea level (i.e., a declining Salton Sea volume) provides less water for dilution, causing higher salinity and vice versa. The current elevation of the Salton Sea is approximately 227 feet below sea level.

3.4.2 Significance Criteria

An alternative would have a significant water quality impact if it:

- violates any water quality standards or waste discharge requirements (regulated through applicable Water Quality Control Plans, National Pollution Discharge Elimination System permit requirements, and Total Maximum Daily Load plans), or

- substantially degrades water quality.

3.4.3 Environmental Consequences

Conventional Lining Alternative

The Conventional Lining Alternative would not cause a significant water quality impact to the canal, Salton Sea, or Colorado River, and it would not cause violations of any applicable water quality standards. Accordingly, water quality impacts would not be significant, and this alternative would not require mitigation.

Coachella Canal

This project would cause no permanent water quality changes in the canal. After lining, the quality of water in the Coachella Canal would continue to reflect that of the Colorado River, although the temperature of water in the canal may vary from that of the Colorado River, which is a normal occurrence today. The annual cycle of clear water in winter and murky water in summer would continue, although there may be a slight overall reduction in turbidity associated with the loss of soil banks as a sediment source. Construction activities could cause turbidity to increase in and adjacent

to the construction area for short periods, but this would not violate any water quality standards and would not constitute a significant impact.

Salton Sea

The proposed project would not affect the salinity or other water quality parameters of the Salton Sea.

Colorado River

Lining the Coachella Canal would not affect the temperature, pH, dissolved oxygen, or turbidity levels in the Colorado River. The proposed project would tend to slightly increase the salinity of the Colorado River downstream from Parker Dam because the reduction in flow would tend to provide less dilution for drainage inflow to the river from irrigated areas between Parker Dam and Imperial Dam. However, the increase, estimated at about one-tenth of a milligram per liter, would be insignificant. The International Boundary and Water Commission, in its comment letter on the previous Draft EIS/EIR for this project, concurred that lining the Coachella Canal would have an insignificant impact on the quality of Colorado River flows entering Mexico (see Appendix G). This finding was restated in the Commission's comment letter on the Revised and Updated Draft EIS/EIR (see comment letter A in Final EIS/EIR Volume II).

Underwater Lining Alternative

The Underwater Lining Alternative would not cause a significant water quality impact to the canal, Salton Sea, or Colorado River, and it would not cause violations of any applicable water quality standards. Accordingly, water quality impacts would not be significant. As a precaution, pH levels would be monitored during construction and hydrochloric acid would be added to the canal to reduce its pH following construction if necessary. With this exception, this alternative would not require mitigation for water quality impacts.

Long-term (post-construction) impacts to water quality would be similar to those described for the Conventional Lining Alternative. Construction-related impacts are addressed below.

Because the canal is a warm-water fishery, the temporary effects of placing fresh concrete in canal water were of concern. Therefore, the three water quality parameters were examined in the laboratory and in the canal during the prototype canal lining work performed between siphons 14 and 15.

Turbidity

The concern was whether additional turbidity in the water might potentially be generated by removal of silt from the canal, placement of concrete, and erosion of partially cured concrete. Laboratory test results indicated turbidity attributed to concrete erosion would settle rapidly (i.e., to near background levels within a half mile downstream from the lining operation). On the other hand, fine soil particles are relatively slow to settle. Observations in the Coachella Canal indicated that the turbidity generated by the alternative would be similar to that caused during routine canal maintenance operations; therefore, temporary turbidity would not have a significant impact on fish.

pH

The concern was whether the reaction between the canal water and cement paste might increase the pH in the canal over the Coachella Canal background level. This would affect the equilibrium of the existing ammonia-N (i.e., shift from the ionized form to the non-ionized form, which is considerably more toxic to aquatic life). A pH exceeding 9.0 could be a biological hazard.

Laboratory tests indicated that the pH change would be roughly proportional to the amount of cement paste lost from scour and from the equipment during placement and, under a reasonable construction scenario, would not exceed 0.2 standard pH units. Measurements during lining placement in the Coachella Canal in February 1991 showed an average pH rise from 8.21 to 8.25. This change of 0.04 pH units is well within the laboratory-based estimate of a maximum 0.2-unit variation, and it is not of concern. To ensure that the pH does not exceed 9.0 units, equipment would be obtained to add hydrochloric acid to the canal water at the construction site, in case the acid is needed to reduce pH levels to less than 9.0 units. The amount added would not affect the quality of the canal water for domestic or agricultural use. Thus, the potential impact of pH changes or control thereof is not considered significant.

Temperature

The concern was whether canal water temperature would be affected by heat generated during the chemical reactions involved in the hardening of concrete and whether such heat might affect the equilibrium of ammonia-N.

Laboratory tests indicate that the temperature increase in the canal resulting from the concrete hardening would be very slight, well below 2.0°F. Measurement in the canal indicates a maximum change of 0.2°F. Accordingly, temperature change is not expected to be significant.

Monitoring Program

A water quality monitoring program would be conducted during construction. In addition, any water quality permits required, such as a Section 401(b)(2) (Clean Water Act) permit administered by the California Regional Water Quality Control Board, Colorado River Basin, would be obtained as required.

Parallel Canal Alternative

Similar to the Conventional Lining Alternative, the Parallel Canal Alternative would not cause a significant water quality impact to the canal, Salton Sea, or Colorado River, and it would not cause violations of any applicable water quality standards. Accordingly, water quality impacts would not be significant, and this alternative would not require mitigation.

No Action Alternative

This alternative would not affect the water quality in the Coachella Canal, Salton Sea, or Colorado River.

for example, has observed that one large tamarisk tree can consume up to 200 gallons of water a day and, as a result, springs and seeps may dry up leaving no surface water for such desert animals as the bighorn sheep (*Borrego Sun* 1984). Salt cedar also changes soil quality by precipitating salt, which accumulates on the soil surface following rainfall. This increases soil salinity and displaces salt-sensitive native riparian vegetation, including cottonwoods and willows. Salt cedars also increase fire danger in riparian zones and quickly reestablish and out-compete natives after a fire. Biodiversity has been shown to decline significantly following infestation (Hughes 1993).

Mr. William Neill, President of the Desert Protective Council, has written numerous technical papers on his experience with this invasive species. In an article written for the Education Foundation of the Desert Protective Council, Mr. Neill described the habitat value of tamarisk as follows:

> "Compared with the native trees and shrubs of desert riparian areas, tamarisk [salt cedar] is impressively robust and competitive, yet has markedly inferior value as wildlife habitat. Consider these aspects of its botanical personality: a single large tamarisk tree produces a half million seeds a year, which disperse widely by wind and germinate wherever soil remains moist for several weeks. Seedlings mature rapidly and produce small pink flowers, often by the end of the first year. Under optimum conditions, a desert riparian area containing only a few tamarisk trees can be covered to an impenetrable thicket in less than a decade. Tamarisk grows so densely and so rapidly, up to one foot per month, that native trees are crowded and shaded from direct sunlight and cannot thrive. Tamarisk is reputed to have the highest transpiration rate of all deep-rooted trees that tap the water table. Moreover, tamarisk is more resistant to drought, once seedlings are established, than most native riparian trees, so that at time of water stress the native trees die but tamarisk survives and thereafter consumes a greater fraction of the available groundwater supply. Tamarisk can tolerate excessive salinity in water and in soil by its ability to exude salt crystals from openings in its scale-like leaves. The salt falls or is washed to the ground, where it kills emerging grasses and seedlings of other tree species. As a result, where it is well established in dense thickets, tamarisk is likely to be the only form of plant life. As noted by Van Hylckama (1980), 'One rarely finds an intruder in a saltcedar thicket.' Tamarisk is not killed by fire, cutting at ground level, or application of herbicide to the foliage, for unless the root system is killed, the root crown will resprout vigorously. Effective tamarisk removal requires 1) mechanical uprooting or 2) cutting at ground level and applying to the stump a systemic herbicide that is carried to the roots by vascular transport. The seed of tamarisk is too small to be eaten by rodents or birds, and its thin, scaly leaf is unpalatable to native browsing animals and to leaf-eating insects. By contrast, the native mesquite tree produces large, nutritious seeds, rich in protein, that are a mainstay of rodents; mesquite and willow provide high-quality forage for desert bighorn sheep; and willow and cottonwood harbor a greater abundance of insect life than does tamarisk, so are more beneficial to many bird species."

He then continues with tamarisk removal case studies and states,

> "...With the tamarisk gone, the recovery of the marsh has been rapid and impressive; the surface water has returned, to be used by migratory birds; the grasses and reeds are flourishing; and the grove of mesquite trees is again healthy." (Neill 1993)

Because of invading salt cedar, many of the desert pools at Death Valley National Monument had disappeared. After experimenting with numerous eradication techniques, the National Park Service found the best method: crews using hand or chain saws cut the plants down to ground level and then applied herbicide directly to the stumps to inhibit resprouting. Although labor-intensive, this is the only technique currently known to be suitable for use in ecologically sensitive areas. The pools in Death Valley have since returned (Johnson [TNC] 1986).

Research efforts by Reclamation, USGS, and others have documented salt cedar's propensity to lower water tables, replace native vegetation, and reduce the overall capability of a riparian ecosystem to support native wildlife. Once established, salt cedar can alter an area's water table to the point where many native plants are replaced. Forming stands considerably more dense than naturally occurring riparian vegetation, these trees are prime areas for fire outbreaks (Ohmart and Anderson 1978). Such stands reduce wildlife access to available water and constitute an effective barrier to critical wildlife habitat such as snags and herbaceous ground cover (Anderson and Ohmart 1984). Neotropical birds appear to be particularly sensitive to the latter impact (Szaro 1980). With the exception of the desert woodrat (*Neotoma lepida*) and desert cottontail (*Sylvilagus auduboni*), no native mammal species are known to feed upon salt cedar. When consumed by wildlife, only young growth is utilized. Aside from bees and cicadas, very few insects are known to use it as cover or forage. Similarly, few avian species have been recorded nesting in these trees (Hunter et al. 1988). Birds appear to utilize salt cedar only when native vegetation is absent or degraded. Anderson and Ohmart (1977), as well as others, have reported on the lower diversity and abundance of native species within salt cedar communities.

The Nature Conservancy offers the following advice regarding the challenge to eradicate tamarisk:

> "The balance of natural diversity in the West cannot be restored unless tamarisk is controlled, and you can take steps to help. Recognize and encourage the already fine efforts of the Bureaus of Reclamation and Land Management, various state agencies, and the National Park Service. Urge the U.S. Department of Agriculture to accelerate its search for a means of biological control. And, if you can, join a volunteer eradication crew." (Johnson [TNC] 1986)

The salt cedar communities along the Coachella Canal seeps are not part of a large contiguous water body like salt cedar communities along the Colorado River. In fact, the communities are not jurisdictional wetlands and are not associated with permanently saturated conditions, as are needed to support many threatened and endangered bird species. The phreatophytic communities are of little habitat value beyond shelter from the desert sun.

In Dos Palmas Springs area, the agencies/organizations responsible for land management have specifically identified salt cedar as a noxious weed whose removal is beneficial. The BLM's management plan for the Dos Palmas ACEC states that, "control of tamarisk [salt cedar] in the Dos Palmas basin will have the greatest benefit to the natural ecosystem" (BLM 1998). TNC staff have noted that salt cedar can "suck dry" desert springs (Barrows 1996). Together, the BLM and TNC worked to remove salt cedar from springs in the Dos Palmas ACEC (de Gouvenain 1996). Russell L. Kaldenberg, former Palm Springs South Coast Area Manager for the BLM, stated in his letter regarding public review of the Salt Creek/Dos Palmas Tamarisk Eradication Program EA that "Tamarisk has little value for wildlife and has reduced the habitat available for several listed rail species and the endemic desert pupfish. ...The tamarisk eradication program and planned revegetation are expected to be a major step in the restoration of this valuable wetlands and riparian area." (FWS 1992a)

Also important to the analysis of salt cedar is the current regulatory setting. Executive Order 13112, signed by President Clinton in 1999, gives special attention to the prevention and removal of invasive nonnative species, including salt cedar.

The FWS Carlsbad and Ventura Offices of the FWS have developed the following mitigation guidelines for projects in southern California (FWS 1992b):

1. The goal of any salt cedar control program shall be a positive effect on wildlife, riparian plant communities, and other natural values;

2. Revegetation with high value native trees and shrubs shall be required where salt cedar removal is not expected to result in timely natural regeneration of a native riparian community with a wildlife value greater than the salt cedar it would replace.

3. Revegetation shall occur concurrently with or immediately following salt cedar control and shall utilize proven methodologies which take into account depth to groundwater, soil characteristics, ecology of target species for revegetation, and other factors regarding site suitability.

The mitigation plan (described below) for significant impacts associated with the Coachella Canal Lining Project is consistent with the above guidelines.

In keeping with P.L. 100-675, and the FWS guidelines presented above, mitigation for impacts to salt cedar will adhere to the concept of *ecological equivalency.* A lower ratio to mitigate for the loss

of salt cedar habitat is justified because of salt cedar's low habitat value, especially in this project area. Thus, based on ecological equivalency, in conjunction with the BLM eradication plan, the evidence of salt cedar's low habitat value, and Executive Order 13112, it is appropriate that replacement of salt cedar with other more desirable native desert riparian species would occur at a ratio ranging from 1:3 for mixed salt cedar/native habitat to 1:10 for stands of pure salt cedar (see Section 3.5.4, "Mitigation").

Future Without Project Condition

Without the project, gradual decline of native phreatophyte vegetation can be expected as natural succession occurs and as the present groundwater and vegetation regime concentrates salts in surface soils. However, because of the difficulty in reliably quantifying these changes, no adjustment was made for such natural decline in the amount and vitality of the affected vegetation. Also, private landowners will continue to develop some land containing phreatophyte habitat, and the BLM and the Center for Natural Lands Management will actively remove salt cedar in the Dos Palmas ACEC. No deduction was made for future salt cedar removal or planned future land development. These potential changes are described later under the "No Action Alternative."

Between approximately 1993 and 2000, the project area experienced a 152-acre increase in salt cedar habitat, to a total of 5,223 acres; a 190-acre increase in salt cedar/honey mesquite habitat, to a total of 1,015 acres; and a 23-acre increase in honey mesquite habitat, to a total of 170 acres. Salt cedar habitat would continue to expand under the future without project condition, given the plant's tolerance for higher salt concentrations. This would displace native vegetation and increase salt cedar's presence in terms of the overall composition of the area's phreatophyte habitat.

3.5.2 Significance Criteria

An alternative would have a significant impact on the marsh/aquatic and desert riparian habitat along the Coachella Canal if it would:

- have a substantial impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies and regulation or by the FWS or DFG,
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means,
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or

- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plans or other approved local, regional, or state habitat conservation plan.

3.5.3 Environmental Consequences

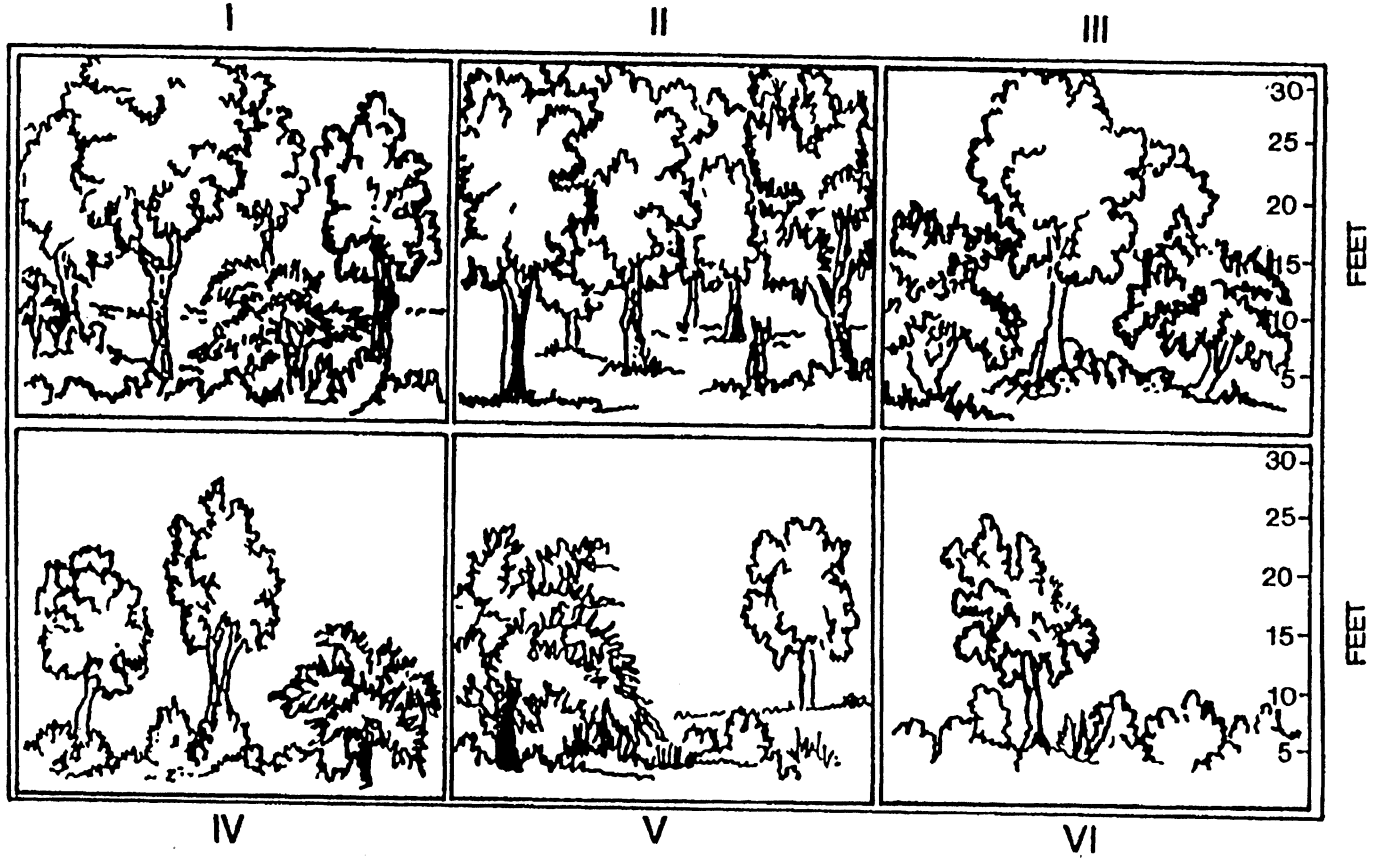
Conventional Lining Alternative

Methodology

During preparation of the previous Draft EIS/EIR, Reclamation assessed project impacts to marsh/aquatic and desert riparian habitat along the Coachella Canal. The estimates of vegetation loss were based on an analysis of the growth of the vegetation types after the canal was first put into operation in 1948, with the assumption that these growth areas would be lost following seepage reductions from lining of the canal. Photographs from 1936 to the present provided an informational data base. The most useful comparisons were made using 1949 aerial photos from the Fairchild Collection, Whittier College, California, and 1988 aerial photos contracted by Reclamation. The information in the photographs was enhanced using remote sensing techniques to identify vegetation types and was correlated with geohydrologic information, as well as visual observation, in the potentially affected areas to produce a site-specific estimate of the loss or decrease in hardiness of the present vegetation. Vegetation structure types were also assessed, as indicated in Figure 3-5. During the preparation of the Revised and Updated Draft EIS/EIR in 2000, the initial vegetation assessments were changed to reflect current conditions. The 1988 photo interpretation data was updated using 1998 infra-red satellite images, supplemented by 1998 true color satellite images. Field assessment of changes in vegetation communities and structural type was conducted in August 2000, and additional field verification was conducted in October and November 2000. Additionally, input from resource agencies and the Center for National Lands Management was provided during a meeting at the Dos Palmas ACEC in November 2000. As a result of the additional field work and resource agency and Center for National Lands Management input, the marsh/aquatic and desert riparian acreage totals have been further revised. The new acreages, which do not affect the significance of project impacts, are reflected in this Final EIS/EIR.

General Effects on Seepage-Induced Marsh/Aquatic and Desert Riparian Vegetation

Without mitigation, effects of this alternative on marsh/aquatic and desert riparian habitat would be significant. Lining the Coachella Canal would reduce the amount of seepage from the canal that flows underground and downslope and supports seepage-induced marsh/aquatic and desert riparian vegetation. This would result in a range of impacts that include the following: loss of marsh/aquatic and some desert riparian types in areas that go dry; transition of more mesic to more xerically-adapted desert riparian types in some areas that go dry or in areas where the groundwater level drops



Vegetation Structural types based on foliage density at various heights
(adapted from Anderson and Ohmart, 1984)

NORTH

Figure 3-5
Vegetation Structural Types

due to seepage reduction but is still supplied by natural groundwater sources; and transition of desert riparian types to upland desert types in areas with no groundwater supplies from either source. The rate of loss of vegetation types would vary. The response of marsh/aquatic and desert riparian vegetation to lining of the first 49 miles of the Coachella Canal suggests the following succession of losses. Marsh/aquatic vegetation sustained by canal seepage would die within the first year or two following the lining. Most of the arrowweed would die within the first 10 years, and most of the screwbean mesquite would gradually decline during the first 10 post-lining years. Much of the salt cedar would eventually die out as the groundwater level declined beyond the range of the root systems. However, mitigation measures (described in Section 3.5.3) would avoid or offset these impacts at ecologically equivalent levels.

In addition to the losses and transitions described above, these would also result in the degradation of some vegetation areas because of the decreased availability of groundwater. Although non-canal seepage water sources would continue to be available, the total amount of available groundwater would be less. Without mitigation, where these impacts would occur, wildlife value per acre would decline. Some of the existing desert riparian vegetation would remain after canal lining because some of this vegetation is supported by a combination of water sources including precipitation run-off, canal seepage, and artesian groundwater discharges not associated with the Coachella Canal. Based on observations elsewhere, the root systems of some vegetation would be able to follow the declining groundwater table and survive; however, the surviving plants would be less vigorous. This would generally be manifested in a 75-percent reduction in foliage density. Only honey mesquite would be able to survive at reduced size because of the capability of its root system to follow the groundwater table.

Marsh/Aquatic Vegetation

Of a total of 456 acres of potentially affected marsh/aquatic vegetation in the study area, without mitigation, 122 acres would be expected to be lost between siphon 7 and siphon 32 due to a reduction in groundwater levels and subsequent desiccation. This loss would be considered significant in the absence of mitigation. As mitigated, this impact would be reduced to less than significant levels.

Desert Riparian Vegetation

Of a total of 7,421 acres of potentially affected desert riparian vegetation in the study area (siphon 7 to siphon 32), 4,576 acres would be expected to be lost due to a reduction in groundwater levels. In this same area, another 1,339 acres of salt cedar, salt cedar/honey mesquite, salt cedar/screwbean mesquite, and cottonwood/willow would be degraded. A total of 3,549 acres (78 percent) of the lost acreage are associated with pure stands of salt cedar. Tables 3-4 and 3-5 summarize the effects of the project on the vegetation in each hydrologic unit. These losses would be considered significant in the absence of mitigation. As mitigated, these impacts would be reduced to less than significant levels.

Effects on Hydrologic Units

Hydrologic Unit A - Siphons 7 to 14. Marsh/aquatic vegetation does not currently exist in hydrologic unit A. Impacts in this unit would be limited to desert riparian vegetation, primarily through the degradation of existing vegetation. Some vegetation associations that are located near artesian wells and the siphons or that are agriculturally dependent would remain. An estimated 126 acres of vegetation would be lost, 66 percent of which would be salt cedar and 22 percent of which would be salt cedar/honey mesquite. Approximately 274 acres of vegetation, 79 percent of which is salt cedar, would be reduced in vitality. Mitigation measures are provided to reduce these impacts to a less than significant level.

Table 3-4. Project Impacts to Desert Riparian Vegetation Without Mitigation

Vegetation type	Present acres	Estimated acres degraded	Estimated acres lost	Estimated acres remaining
Hydrologic Unit A				
Salt cedar	490	217	83	190
Salt cedar/arrowweed	1	0	0	1
Salt cedar/honey mesquite	69	13	28	28
Honey mesquite	12	2	1	9
Screwbean mesquite	49	42	6	1
Cottonwood/willow	4	0	4	0
Sueda	28	0	4	24
Subtotal	653	274	126	253

Table 3-4. Project Impacts to Desert Riparian Vegetation Without Mitigation (continued)

Vegetation type		Present acres	Estimated acres degraded	Estimated acres lost	Estimated acres remaining
Hydrologic Unit B					
Salt cedar		327	282	38	7
Salt cedar/honey mesquite		242	140	98	4
	Subtotal	569	422	136	11
Hydrologic Unit C					
Salt cedar		2,182	105	1,672	405
Salt cedar/palm		11	0	0	11
Salt cedar/honey mesquite		488	273	152	63
Salt cedar/honey mesquite/palm		41	0	41	0
Cottonwood/willow		1	0	1	0
Pampas grass		71	0	71	0
Pampas grass/palm		71	0	71	0
	Subtotal	2,865	378	2,008	479
Hydrologic Unit D					
Salt cedar		2,179	208	1,755	216
Salt cedar/palm		147	0	112	35
Salt cedar/honey mesquite		235	0	90	145
Honey mesquite		119	0	117	2
Screwbean mesquite		171	0	0	171
Screwbean mesquite/palm		83	0	66	17
Screwbean mesquite/salt cedar		122	0	34	88
Cottonwood/willow		1	0	0	1
Arrow weed scrub		40	0	0	40
Sueda		86	0	84	2
Palm		30	0	0	30
Sawgrass		13	0	0	13
	Subtotal	3,226	208	2,258	760
Hydrologic Unit E					
Salt cedar		45	18	24	3
Salt cedar/honey mesquite		10	10	0	0
Honey mesquite		39	16	23	0
Cottonwood/willow		13	13	0	0
	Subtotal	116	57	47	3

Table 3-4. Project Impacts to Desert Riparian Vegetation Without Mitigation (continued)

Vegetation type	Present acres	Estimated acres degraded	Estimated acres lost	Estimated acres remaining
Total for All Hydrologic Units				
Salt cedar	5,223	830	3,572	821
Salt cedar/palm	158	0	112	46
Salt cedar/arrowweed	1	0	0	1
Salt cedar/honey mesquite	1,045	436	369	240
Salt cedar/honey mesquite/palm	41	0	41	0
Honey mesquite	170	18	141	11
Screwbean mesquite	220	42	6	172
Screwbean mesquite/palm	83	0	66	17
Screwbean mesquite/salt cedar	122	0	34	88
Cottonwood/willow	19	13	5	1
Sueda	114	0	88	26
Arrow weed scrub	40	0	0	40
Palm	30	0	0	30
Sawgrass	13	0	0	13
Pampas grass	71	0	71	0
Pampas grass/palm	71	0	71	0
Total	7,421	1,339	4,576	1,506

Table 3-5. Project Impacts to Marsh/Aquatic Vegetation Without Mitigation (acres)

Hydrologic Unit	Present acres	Acres with project	Acres lost
A	0	0	0
B	17	15	2
C	49	47	2
D	390	272	118[1]
E	0	0	0
Total	456	334	122

[1] 105 acres would be maintained with water supplies, whereas 13 acres would be lost permanently.

Hydrologic Unit B - Siphons 14 to 18. Approximately 17 acres of marsh vegetation exist in hydrologic unit B. However, because of the existence of Frink Springs and other pre-canal groundwater upwellings, only 2 acres of marsh/aquatic vegetation in this unit would be lost. An estimated 136 acres of salt cedar and salt cedar/honey mesquite would be lost. Another 422 acres of salt cedar and salt cedar/honey mesquite would be reduced in vitality. Mitigation measures are provided to reduce these impacts to a less than significant level.

Hydrologic Unit C - Siphons 18 to 23. Approximately 49 acres of marsh/aquatic vegetation exist in hydrologic unit C. Because of artesian flows in the Hot Mineral Spa and adjacent areas, only 2 acres of marsh/aquatic would be lost. An estimated 2,008 acres of desert riparian vegetation would be lost, 91 percent of which would consist of salt cedar or salt cedar/honey mesquite, and approximately 378 acres of salt cedar and salt cedar/honey mesquite would be degraded. Mitigation measures are provided to reduce these impacts to a less than significant level.

Hydrologic Unit D - Siphons 23 to 29. Approximately 390 acres of marsh/aquatic vegetation exist in hydrologic unit D. Vegetation associated with the mainstream of the creek of the Dos Palmas Spring would remain. No change would occur in the vegetation complex associated with, and downstream from, the artesian flows from the San Andreas Palms area and in the vicinity of Oasis Springs. A total of 122 acres of marsh/aquatic vegetation between the canal and Salton Sea would be lost. This includes a thin strip of marsh/aquatic vegetation that has emerged along the edge of the Eagle Mountain Railroad. A borrow area created during construction of the elevated railroad's berms has captured some surface seeps and created a narrow strip of marsh/aquatic vegetation encompassing approximately 10 acres. Approximately 2,258 acres of desert riparian vegetation would be lost in hydrologic Unit D, of which 81 percent consists of salt cedar stands, and of which an additional 10 percent consists of native habitat infested with salt cedar. Approximately 208 additional acres of salt cedar in the area would be degraded. Mitigation measures are provided to reduce these impacts to a less than significant level.

Hydrologic Unit E - Siphons 29 to 32. This unit contains no marsh/aquatic habitat. Twenty-four acres of salt cedar and 23 acres of honey mesquite would be lost, and 57 acres of desert riparian habitat would be degraded. Mitigation measures are provided to reduce these impacts to a less than significant level.

3.5.4 Mitigation

Mitigation ratios for loss of desert riparian habitat vary by native species composition. Marsh/ aquatic vegetation communities as well as desert riparian communities such as cottonwood-willow, screwbean mesquite, screwbean mesquite with California fan palms, honey mesquite, sueda, and California fan palms would be replaced acre-for-acre. However, habitat types with a nonnative salt cedar component would be mitigated at lower ratios. Purely salt cedar communities would be mitigated at one acre for every ten acres impacted (a 1;10 ratio). The proposed mitigation ratios for the mixed salt cedar communities are in Table 3-6. The lower mitigation ratios for salt cedar reflect that this nonnative, invasive species has a low habitat value and displaces native plants, as described under the heading "Value of Salt Cedar (Tamarisk)." The salt cedar habitat would be replaced in adjacent areas including the Dos Palmas ACEC with native desert riparian shrub communities such as screwbean mesquite, honey mesquite, and cottonwood-willow habitat. Similarly, pampas grass communities would be replaced with native species.

Table 3-6. Mitigation Ratios for Desert Riparian Vegetation Communities

Community	Mitigation Ratio (mitigation : impact)
Cottonwood/willow	1:1
Screwbean mesquite	1:1
Screwbean mesquite with California fan palms	1:1
Screwbean mesquite/salt cedar	1:1
Honey mesquite	1:1
Salt cedar	1:10
Salt cedar/honey mesquite	1:3
Salt cedar/honey mesquite with California fan palms	1:3
Salt cedar/California fan palms	1:3
Salt cedar/arrowweed	1:5
Sueda*	1:1
Pampas grass	1:10
Pampas grass/palm	1:3
California fan palms	1:1

* Sueda is an alkali scrub community type but for the purposes of this mitigation assessment is included as a desert riparian community type.

The 1:10 ratio for salt cedar also recognizes that salt cedar provides limited lower quality habitat value resulting in a decrease in biodiversity. Of concern related to continued salt cedar

encroachment, as cited by the National Park Service, is the disruption of "the structure and stability of native plant communities and (degradation of) native wildlife habitat by out competing and replacing native plant species, monopolizing limited sources or moisture..." (Muzika and Swearingen 1997). Any benefits to salt cedar's limited habitat value are offset by this species' impacts to the desert community's ability to sustain biological diversity. Large, vast stands or individual clusters of monotypic vegetation clearly do not have the ability to support the diversity of the native species associated with the Sonoran Desert community. According to The Nature Conservancy, "in some cases tamarisk [salt cedar] probably replaces rather than displaces native riparian vegetation that has been destroyed by human activities" (Carpenter 1998). Through the reduction in the extent of salt cedar and replacement of it with an appropriate distribution and native vegetation association that is more representative of the desert ecosystem, the establishment potential of a more biologically diverse community increases.

The majority vegetation type in the Colorado Desert (subdivision of the Sonoran Desert) is the sparse desert shrub community, consisting primarily of different densities of creosote bush intermixed with bursage, jointfir, or saltbush, or with various combinations of the three. Desert annuals are abundant during the periods of favorable moisture. It is not expected that all salt cedar would be impacted immediately, but rather it would slowly decline in its abundance, taking many years before it is gone. Furthermore, according to The Nature Conservancy, "tamarisk is a facultative phreatophyte, meaning that it can draw water from underground sources; but, once established, it can survive without access to groundwater" (Carpenter 1998). This being the case, any wildlife that utilizes salt cedar could continue to do so as the native habitat planted as mitigation for the Coachella Canal Lining Project develops.

The implementation of the following mitigation plan would reduce the environmental consequence below the level of significance.

Mitigation Guidelines

Mitigation guidelines for the proposed project are established by Section 203(a)(2) of P.L. 100-675, and California State Water Code Section 12565(c), which state that mitigation measures for the replacement of incidental fish and wildlife values shall be on an acre-for-acre basis, based on ecological equivalency. In addition, wetlands habitat maintenance is a national priority that has been set in response to nationwide concern for dwindling habitat for waterfowl, other wildlife, and values relating to a healthy ecosystem. Executive Order 11990, Protection of Wetlands, was issued to assist in avoiding adverse impacts to wetlands. The order provides for a process to improve and coordinate

federal plans, functions, programs, and resources so as to attain beneficial use without impacting wetlands. Federal agencies are required to find that there are no practicable alternatives to such construction and that proposed actions include all practicable measures to minimize impacts to wetlands. Additionally, guidance is also provided by Executive Order 13112 (64 *Federal Register* 6183, February 8, 1999) which specifies prevention and removal of invasive nonnative species such as salt cedar. This project conforms to the above standards, and the mitigation plan follows the guidelines listed below:

- Avoidance of impacts is preferred.
- When impacts cannot be avoided, in-place, in-kind mitigation is the next goal.
- Impacts to marsh/aquatic habitat will be compensated in-kind and acre-for-acre.
- Desert riparian vegetation types with little to no salt cedar component will be compensated in-kind and acre-for-acre.
- No in-kind replacement of salt cedar- or pampas grass-dominated acreage is proposed per Executive Order 13112. Salt cedar- or pampas grass-dominated areas will be mitigated at a ratio of 1:10 with native desert riparian habitat types.
- Purchase of desirable parcels of land and transfer of title to a resource management agency are acceptable, with mitigation ratios being based upon relative value of the parcel habitat.
- Establish a trust fund for the Dos Palmas Preserve in the Dos Palmas ACEC to fund the preserve's management plan, and explore other similar mitigation opportunities.
- Provide supplemental water, as necessary, to support mitigation.

In the Dos Palmas ACEC, particularly in the Dos Palmas Preserve, located in hydrologic unit D between siphon 23 and siphon 29, much of the impacts to marsh/aquatic and some of the impacts to desert riparian habitat would be avoided. To accomplish this, water would be supplied upslope from the existing marsh/aquatic habitat areas and allowed to flow downstream through the marshes and ponds, where it would be collected into the mainstream of the north branch of Salt Creek. The water would then continue downstream to maintain desert pupfish habitat and flow to the Salton Sea. This plan avoids impacts to 105 acres of marsh/aquatic habitat and 142 acres of desert riparian habitat. This assumes that there would be regular exotic species management along Salt Creek consistent with the *Dos Palmas Area of Critical Environmental Concern Management Plan.*

Mitigation Requirements

To mitigate for unavoidable impacts to the 17 acres of marsh/aquatic (2 acres, 2 acres, and 13 acres in hydrologic units B, C, and D, respectively), an equal amount of marsh/aquatic would be created adjacent to the existing Dos Palmas marsh and pond complex prior to lining the canal. Unavoidable loss of desert riparian habitat adjacent to the Coachella Canal would be replaced elsewhere following the mitigation ratios listed in Table 3-3. The requirement for mitigation of unavoidable impacts to desert riparian habitat could be met by a combination of (1) purchasing and preserving 575 acres, and (2) restoring/creating a 327acres of honey mesquite, screwbean mesquite, cottonwood/willow and/or California fan palm in the ACEC. Alternatively, mitigation guidelines would permit a broader mix of replacement species in conformance with specific replacement criteria.

Mitigation Plan Performance Standards

The mitigation plan for this project complies with the requirements of CEQA in terms of the level of detail provided. As stated in § 15126.4(a)(1)(B) of the State CEQA Guidelines:

> [Mitigation] measures may specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way.

The mitigation plan establishes performance standards by quantifying land purchase and habitat creation/restoration requirements, specifying standards that must be met for land purchase and habitat creation/restoration efforts, and identifying areas where it would be feasible to implement these measures based on land ownership, mapped habitat types, and the suitability of sites for desert riparian restoration/creation efforts. Accordingly, while the mitigation plan does not indicate the particular parcels that would be purchased or the specific areas where desert riparian habitat would be created, it provides sufficient detail to ensure that the identified mitigation requirements will be met and that the impacts to marsh/aquatic and desert riparian habitat will be reduced to less than significant levels.

Any California fan palm, honey mesquite, screwbean mesquite, or cottonwood/willow community would be replaced, on an acre-for-acre basis, with like species or other suitable desert riparian/desert wash species such as smoke tree, palo verde, desert willow, and desert ironwood. Quailbush, sueda, or wolfberry may be used to mitigate impacts to salt cedar, pampas grass, and sawgrass areas. Plantings of desert riparian shrubs (e.g., mesquite, indigo bush, desert senna, cat's claw acacia, cheese bush) would be interspersed with riparian tree species, whenever possible.

Specific planting sites would be selected based on physical and biological suitability criteria (e.g. soil electroconductivity and texture, depth to groundwater, topography, presence or absence of other vegetation) and avoidance of disruption of existing desert riparian and marsh/aquatic vegetation. Exact acreage, species composition, and location of the plantings would depend on the results of this site suitability analysis, but habitat created by the planted riparian vegetation would provide ecological equivalency of habitat lost or degraded due to the project. Where habitat restoration/ creation occurs, plantings would be made to achieve a density of about 100 mature trees per acre.

In order of descending preference, the locations where marsh/aquatic and desert riparian mitigation measures would be implemented is as follows:

1. Dos Palmas ACEC.

    a. BLM's Dos Palmas Preserve.
    b. Areas adjacent to the Preserve.
    c. Areas adjacent to other lands managed for wildlife.

2. Areas downslope from the canal on federal or state land with favorable soil electroconductivity and texture and other conditions (e.g., Frink Springs area).

3. Salton Sea shoreline areas including the marsh/aquatic habitat at the mouth of the Coachella Valley Stormwater Channel and within the Sonny Bono Salton Sea National Wildlife Refuge.

Mitigation at the Dos Palmas ACEC (preference 1) would follow the guidelines contained in the *Dos Palmas Area of Critical Environmental Concern Management Plan* (BLM 1998). Habitat restoration objectives contained in the management plan in Subsections B(2)(a) and (b) would be supported. Mitigation efforts on BLM property would be conducted under the direction of the BLM. It is probable that once specific mitigation actions for BLM property are identified, a trust fund would be established to allow the BLM to implement those measures directly, provided that the mitigation activities meet the performance standards described in this mitigation plan.

Purchase of private land to be transferred to a resource agency (such as the BLM or State agency) for habitat management may also be included in the mitigation plan. This ratio of purchased land to revegetation was established by a biological work group during the initial project evaluation in the previous Draft EIS/EIR (1994). Based on revised habitat boundaries and new figures, the basic

mitigation plan currently envisions approximately 575 acres of land purchase and 327 acres of desert riparian revegetation on federal land. Land purchase would be consistent with Section III.A(1) of the *Dos Palmas Area of Critical Environmental Concern Management Plan*, which calls for the BLM to continue acquisition efforts within the ACEC.

Consideration would be given to a pilot revegetation program to test planting techniques in the sites selected for replacement vegetation. The initiation and scope of a pilot program would depend on the nature of the horticultural issues that would need to be resolved before the replacement vegetation is planted. This pilot revegetation program is considered to be consistent with Section 203(a)(2) of P.L. 100-675 which states that mitigation shall be implemented concurrent with construction of the works.

Operation and maintenance (O&M) activities for the replacement vegetation and the marsh/aquatic habitat to be preserved would be provided by one or more federal and State resource entities under an O&M plan to be developed during the design phase of the project. CVWD would manage water supplies provided from the canal for mitigation purposes. The O&M plan would be combined with existing resource management programs in the Dos Palmas ACEC, for efficiency and consistency. Land acquired for mitigation purposes may be transferred to a federal or State resource management entity.

Feasibility of Accomplishing the Necessary Mitigation

An assessment of the existing vegetation, land ownership, and other related factors indicates that it would be feasible to accomplish the necessary mitigation for the Coachella Canal Lining Project at the Dos Palmas ACEC (preference 1 listed under "Performance Standards for Mitigation").

- **Land Ownership**. The Dos Palmas ACEC encompasses 14,880 acres. As part of the mitigation planning effort for this project, land ownership information for the Dos Palmas ACEC and nearby areas was reviewed at the Assessors' offices of Riverside and Imperial counties. This review of land ownership information shows that approximately 5,700 acres of property within the ACEC is privately owned. This 5,700-acre total excludes property owned by the Center for Natural Lands Management which, although it is a private organization, manages its property at Dos Palmas in cooperation with the BLM to maintain and enhance the ACEC's natural resource values. Accordingly, there would be little mitigation benefit accomplished by purchasing land owned by the Center for Natural Lands Management. The level of development within the ACEC is relatively low, with much of the land being vacant. Based on the identified mitigation

goal of 575 acres of land purchase, there is more than enough privately owned land within the Dos Palmas ACEC that could be purchased and turned over to a resource agency such as the BLM.

- **Vegetation**. The recently updated assessment of phreatophyte vegetation along the Coachella Canal was compared with the Dos Palmas ACEC boundaries to determine if there is suitable habitat within the ACEC to either be purchased and preserved or to serve as the basis for habitat restoration/creation. This mitigation plan calls for the creation/restoration of 327 acres. In addition, the 575 acres of land to be purchased must either include desert riparian habitat ecologically equivalent to the habitat being lost or degraded or ecologically equivalent habitat must be created or restored on the purchased property.

  Where habitat creation is required, it could be accomplished by either eradicating stands of salt cedar and replacing them with native desert riparian habitat or by creating native desert riparian habitat in areas that currently do not support it because of lack of water. This latter approach would require that water be delivered, probably in perpetuity, to the created habitat. See the following discussion on sources of water. Desert riparian habitat that can be established without requiring an artificial source of water would be favored because it would represent a more natural habitat for the desert environment and because using canal water for desert riparian habitat restoration incrementally reduces the amount of conserved water that is available for other uses.

  The majority of desert riparian vegetation within hydrologic unit D is located within the boundaries of the Dos Palmas ACEC, although there are stands of salt cedar to the east of (outside) the ACEC that are within this hydrologic unit. As indicated in Table 3-4, hydrologic unit D contains 3,226 acres of desert riparian vegetation, of which approximately 760 acres would be expected to remain following implementation of the project (without mitigation).

  Based on the habitat types present in the Dos Palmas ACEC and adjacent lands, there would be sufficient opportunities for habitat restoration or creation to meet the mitigation requirements. The restoration could include a combination of the following:

  - eradication of the 216 acres of unaffected salt cedar and replacement with native desert riparian vegetation (provided that salinity levels in the soil would be conducive to native desert riparian plants, as discussed below);

- eradication of the 208 acres of degraded salt cedar habitat and replacement with native desert riparian vegetation (contingent on soil conditions, and with supplemental water from the canal or another source if necessary);

- eradication of the salt cedar component of the unaffected 35 acres of salt cedar/palm or 145 acres of salt cedar/mesquite habitat with an increase in the native vegetation components of those habitat types; and/or

- the provision of canal water or water from another source to maintain existing seepage-dependent native riparian habitat that would otherwise be forgone as a result of the lining project, including 117 acres of honey mesquite and 66 acres of screwbean mesquite/palm.

In addition, some of the 1,963 acres of land currently dominated by salt cedar that would be lost or degraded could be restored with native habitat, provided that suitable soil conditions are present and that water could be made available. Consideration would be given to active removal of these salt cedar plants because even desiccated salt cedar could act as a seed source until dessication is complete. Such a commitment would offset land purchase or revegetation requirements. Desert riparian habitat could also be established in areas that are currently vegetated with less sensitive, non-riparian habitat, provided that there are suitable soils and other site conditions.

- **Site Suitability**. Factors affecting the suitability of a site for habitat restoration or creation include soil salinity compared to salt tolerance levels for native riparian species, depth to water table, location of a source of irrigation water, proximity of other suitable parcels, and the value of extant vegetation. As stated in a preliminary mitigation site suitability study for the Coachella Canal Lining Project (Anderson and Miller 1992), no formula exists that can be used for unequivocally selecting sites for revegetation, but objective decisions can be made by considering factors such as those listed above. The preliminary mitigation site suitability study for this project was focused on land near the former Salt Creek ACEC, which forms a key component of what is now called the Dos Palmas ACEC. Accordingly, that preliminary study provides insight into the issues associated with establishing native riparian habitat at or near the current Dos Palmas ACEC.

  The Dos Palmas area is encompassed by an ancient lakebed, and much of the area is poorly drained. These factors have helped contribute to high soil salinity levels in many locations, and

high salinity levels can affect the viability of native desert riparian restoration and creation efforts. As discussed previously, one reason that salt cedar out-competes native plants is its ability to tolerate (and create) higher soil salinity levels. There are, however, well drained uplands within the Dos Palmas ACEC that have relatively lower salinity levels. In these areas, the depth to groundwater is often greater, but in many locations, this constraint could be overcome with irrigation.

The 1992 study identified approximately 1,250 acres of land that could be revegetated with riparian habitat with a significant gain in wildlife value, including property currently in BLM ownership as well as privately owned lands. As described in this mitigation plan, any mitigation conducted on BLM property would be done under the direction of the BLM (probably through a funding arrangement) and in a manner consistent with the *Dos Palmas Area of Critical Environmental Concern Management Plan* (BLM 1998).

Although these factors show that it would be feasible to mitigate project impacts in the Dos Palmas ACEC (mitigation preference 1), additional mitigation opportunities (preferences 2 and 3) have been identified to ensure that it would be feasible to meet all mitigation requirements. These second and third preference areas are not further described in this plan, however, due to the likelihood that mitigation would be accomplished completely within the Dos Palmas ACEC and adjacent lands.

Water Supply for Mitigation Plan

The marsh/aquatic and desert riparian habitat mitigation plan would require additional sources of water; the specific quantity of water required would depend on the locations selected for development of new marsh/aquatic habitat and underlying soil types. Water requirements include water needed to maintain desert riparian and live stream conditions in certain reaches of Salt Creek and its north tributary for the benefit of the desert pupfish. Generally, the mitigation water operations would be arranged so that runoff from the marsh/aquatic habitat would supply the water requirements for pupfish habitat, which is currently the case. Water for mitigation would come from one or more of the following sources:

- Salt Cedar Removal. An acre of salt cedar in the project area consumes approximately 4.0 to 4.8 acre-feet of water per year depending on the density of the habitat (based on a Reclamation study of salt cedar and other desert riparian habitat water use from 1995 through 1998). To put this in context with regard to the project area, the salt cedar present in hydrologic unit D (which encompasses the Dos Palmas ACEC) consumes roughly 8,716 to 10,460 acre-feet of water per

year. This is more than 13 times as much water as flows from Salt Creek into the Salton Sea (based on mean annual flows measured over the last four years). The *Dos Palmas Area of Critical Environmental Concern Management Plan* identifies salt cedar as, "One of the most prodigious water users in the Dos Palmas basin" (BLM 1998). The management plan further states that, "Control of tamarisk [salt cedar] may also offset the loss of water to native vegetation once the [Coachella] canal is cement-lined." Accordingly, by removing salt cedar from the ACEC, the amount of water that needs to be supplied to this area to support mitigation could be reduced.

- Existing Discharges. For marsh/aquatic habitat and desert riparian habitat mitigation in the Dos Palmas Spring area, the discharge of existing wells and springs on BLM and the Center for Natural Lands Management land that remains after the canal is lined would be available for this purpose, to the extent that there is water available over existing uses that are to continue. The use of this water would be arranged under a cooperative agreement with Center for Natural Lands Management and BLM, who currently use water from these sources to supply ponds and marsh habitat in the Dos Palmas Spring area.

- New Wells. Additional water for mitigation could be obtained by drilling additional wells to develop non-potable artesian aquifer water in the vicinity of the canal. Based on available geohydrologic information, it is estimated that up to 2,000 acre-feet of water would be available from this source annually. Testing and monitoring of new wells would be conducted to ensure that water quality is suitable for (1) threatened and endangered species in the area and (2) marsh/aquatic and desert riparian vegetation. Congress authorized the development of groundwater from federal land for mitigation use in P.L. 100-675, which stipulated that priority be given to non-potable sources.

- Canal Diversion. Water diverted from the Coachella Canal would also be used for mitigation. For the purposes of this analysis, it is assumed that approximately 4,850 acre-feet of canal water conserved by the lining project would be managed by CVWD for mitigation. Use of water from the canal for mitigation would reduce the net amount of conserved water available for conservation uses allowable under P.L. 100-675. Accordingly, although lining the canal would annually reduce seepage by approximately 30,850 acre-feet, because it is anticipated that up to 4,850 acre-feet per year of canal water would be managed by CVWD to support mitigation, the annual net (post-mitigation) yield of the proposed project is projected to be 26,000 acre-feet of conserved water per year.

Monitoring Plan

A monitoring plan would be implemented by the project proponents to ensure the success of the mitigation effort. For mitigation in the Dos Palmas ACEC, monitoring would be consistent with management objectives stated in the *Dos Palmas Area of Critical Environmental Concern Management Plan*. A monitoring budget would be allocated from a trust fund established as part of this mitigation effort. For mitigation sites located outside the Dos Palmas ACEC, monitoring would be conducted monthly during the first and second year growing season, twice annually during years 3 through 5, and annually for years 6 through 10. The sites would then be monitored in post-planting years 15, 20 and 25. The mitigation plan would be reviewed after each survey year to determine if modifications to the plan or corrective actions would be required.

Criteria for survival of planted desert riparian trees or shrubs would be related to the natural survival rate of adjacent and similar stands of native desert riparian vegetation to account for natural soil conditions, including the gradual buildup of salt in the soil. Specific criteria would be developed during the design phase of the project.

Conclusions

The following mitigation measures are proposed to be implemented:

Maintain existing marsh/aquatic habitat	105	acres
Create additional marsh/aquatic habitat	17	acres
Restore/create additional desert riparian habitat	327	acres
Acquire private land and transfer title to federal and/or state resource management agencies.	575	acres

The proposed acreages for restoration/creation of additional desert riparian habitat and the acquisition of private land and potential subsequent transfer to resource management agencies may be changed in consultation with resource agencies, provided that these actions still provide mitigation on an acre-for-acre basis, based on ecological equivalency. As described above, implementing this mitigation plan at or near the Dos Palmas ACEC is considered feasible based on land ownership, existing vegetation, and preliminary site suitability analyses. With these actions, the project's significant impact on marsh/aquatic and desert riparian habitat values would be mitigated to less than significant levels.

Underwater Lining Alternative

The impacts and mitigation for this alternative would be the same as for the Conventional Lining Alternative.

Parallel Canal Alternative

The impacts and mitigation for this alternative would be essentially the same as for the Conventional Lining Alternative.

No Action Alternative

The canal would not be lined; seepage would continue at its present rate and would support current vegetation communities. Canal operation and maintenance would not change from the present condition.

Succession of phreatophyte vegetation would continue to occur in the vicinity of the canal. The present canal seepage, groundwater, and vegetation regime is concentrating salts in the surface soil. This trend would gradually cause native vegetation to decline and salt cedar to increase because of its salt tolerance. While such changes appear to be self-evident, the rate of habitat value loss is not known.

Changes in the use of private lands within the study area may result in non-project-related losses of vegetation from private lands. In addition, BLM and the Center for Natural Lands Management would be expected to continue to remove salt cedar in an effort to convert certain areas back to the native vegetation that existed prior to the introduction of salt cedar into the United States. While such removal would require replacement of other vegetation through natural regrowth or by planting, it is not known what form future replacements would take.

3.6 MARSH/AQUATIC AND DESERT RIPARIAN HABITAT ALONG THE COLORADO RIVER

3.6.1 Affected Environment

Beginning about halfway between Blythe, California, and Imperial Dam, the Colorado River changes from a flow regime that is extensively channelized to one that has an irregular channel with numerous backwaters on the flood plain. Cattails and reeds are the dominant marsh/aquatic vegetation type along the river and around the backwaters. Proceeding away from the river, the flood plain contains substantial areas of salt cedar with screwbean and honey mesquite. Scattered stands of cottonwood and willow riparian habitat are also present.

The marsh/aquatic and riparian habitat along the river are host to a variety of wildlife, including the federally endangered Yuma clapper rail, southwestern willow flycatcher, and razorback sucker.

3.6.2 Significance Criteria

An alternative would have a significant impact on marsh/aquatic and desert riparian habitat along the Colorado River if it would:

- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (i.e., those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adopted for life in saturated soil conditions) through direct removal, filling, hydrological interruption, or other means,

- have a substantial impact on any riparian habitat or other sensitive natural community along the Colorado River identified in local or regional plans, policies and regulation or by the DFG or FWS, or

- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or State habitat conservation plan.

3.6.3 Environmental Consequences

Conventional Lining Alternative

The Conventional Lining Alternative would not have an individually significant impact to marsh/aquatic and desert riparian habitat along the Colorado River. This alternative's incremental contribution to cumulative marsh/aquatic habitat would be mitigated, as described in Chapter 4.0 and consistent with the conservation measures identified in the "Biological Opinion for Interim Surplus Criteria, Secretarial Implementation Agreements, and Conservation Measures on the Lower Colorado River, Lake Mead to the Southerly International Boundary Arizona, California and Nevada."

The reduction of average flow in the Colorado River would reduce the amount of open water of the river itself and in the backwaters along the river from April to September. As noted previously under "Surface Water," the proposed project would lower the level of the river by up to 0.19 inch. As a worst case, the water area of the backwaters would be reduced by approximately 2.9 acres, less than one tenth of one percent of the current backwaters area.

The changes predicted along the river would occur against a background of continually changing flows and channel conditions where maximum and minimum flows would continue at recent historic levels. Consequently, there is no clear indication of impact on marsh/aquatic and riparian habitat along the river, and it is concluded that the project would not have a significant impact on these habitat types. Accordingly, no mitigation is required for project specific impacts. As described in Chapter 4.0, Cumulative Impacts, the incremental contribution of the project to cumulative marsh/aquatic and desert riparian impacts along the Colorado River would be mitigated by creation of 24 to73 acres of vegetation in saturated soils that support the southwestern willow flycatcher.

Refer to Chapter 4.0 for more detailed discussion of this project's incremental impact to the Colorado River and its associated backwaters and wetlands.

Underwater Lining Alternative

The potential impacts to marsh/aquatic and desert riparian habitat along the Colorado River would be less than significant for the same reasons described for the Conventional Lining Alternative.

Parallel Canal Alternative

The potential impacts to marsh/aquatic and desert riparian habitat along the Colorado River would be less than significant for the same reasons described for the Conventional Lining Alternative.

No Action Alternative

This alternative would not affect the marsh/aquatic and desert riparian habitat along the Colorado River.

(*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), and ladder-backed woodpecker (*Picoides scalaris*). Some species, such as the white-crowned sparrow (*Zonotrichia leucophrys*), are found in these communities during winter. Many bird species stay briefly during migration. Typical reptiles inhabiting the area include zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), and sidewinder rattlesnake (*Crotalus cerastes*). Common mammals inhabiting the area include coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and antelope ground squirrel (*Ammospermophilus leucurus*). Numerous rodent species, such as pocket mice (*Perognathus* spp.) and kangaroo rats (*Dipodomys* spp.), are the most abundant mammals.

Desert riparian vegetation types attract many bird species not often found in the desert communities. Desert riparian and marsh/aquatic bird species, such as common yellowthroat (*Geothlypis trichas*), red-winged blackbird (*Agelaius phoeniceus*), marsh wren (*Cistothorus palustris*), song sparrow (*Melospiza melodia*), black phoebe (*Sayornis nigricans*), and Abert's towhee (*Pipilo alberti*), are common inhabitants. Sparrows, warblers, and other migrating birds occasionally occur in these vegetation types during spring and fall. Common reptiles include many of those found in the desert scrub and desert wash communities. Amphibians, such as the bullfrog (*Rana catesbeiana*), occur in the canal and ponds in the Dos Palmas ACEC. Mammals include many of those occurring in the adjacent desert communities, as well as water-associated species, such as muskrats (*Ondatra zibethica*), and raccoons (*Procyon lotor*).

3.7.2 Significance Criteria

An alternative would have a significant impact on terrestrial habitat if it would:

- have a substantial impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies and regulation or by the DFG or FWS,

- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or

- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or State habitat conservation plan.

3.7.3 Environmental Consequences

Conventional Lining Alternative

Without mitigation, this alternative would cause significant impacts to terrestrial habitat; as mitigated, impacts would be less than significant. Previously disturbed areas would be used to the extent possible for the batch plants and staging areas.

Under this alternative, canal lining activities would be restricted to a corridor along the existing canal and spoil banks and to a ten-acre concrete batch plant area and a five-acre contractor equipment staging area. During construction, the positioning of the five bypass pipelines would require temporary use of a 65-foot-wide corridor of land along the canal, to be located on either side of the canal and maintenance road, as discussed in Chapter 2.0. The maximum potential amount and types of land to be used for the bypass are shown on Table 3-7. The bypasses corridor generally would not require clearing of vegetation. When vegetation cannot be avoided, plants would be crushed rather than uprooted where possible. However, soil compaction would occur in the corridor. Only the vegetation at the pipe supports and at abrupt changes in grade would be affected. The alignments of the corridor and the individual pipes would be selected to minimize disturbance of vegetation. Including the batch plants, staging areas, pipe supports, and contour grading, an estimated 40 acres would be cleared. An additional 250 acres would be affected by activities such as laying bypass pipelines and stockpiling soil, as well as through compaction by construction equipment.

The locations of the bypass pipelines would be flexible and would avoid valuable habitat, particularly established trees and areas with relatively healthy stands of desert shrubs.

The alignment of the temporary bypass pipelines is based on the following criteria:

- Use terrain with the least amount of surface irregularity to minimize surface disturbance and topsoil disturbance.
- Minimize risk of flash flood disturbance to bypass facilities.
- Use existing roads or trails to the extent practicable.
- Minimize disturbance of vegetation that would not otherwise be adversely affected by the project. Limit disturbance to crushing rather than clearing, where possible.

Table 3-7. Land and Habitat Types Affected by Canal Lining
Units: Acres

Type of land	Conventional Lining Alternative[1]	Underwater Alternative	Parallel Canal Alternative
Desert riparian	[2] 12	[2] 12	[2] 41
Desert wash	56	57	186
Desert scrub/ironwood	[3] 121	38	[3] 302
Badlands/salt flats	35	54	182
Disturbed land	[4] 44	[5] 53	[4] 105
Developed land	7	0	16
Desert pavement	15	13	41
Marsh/Aquatic	0	[6] 3	0
Total	123	230	434

[1] Maximum amount of land that would be affected by bypass pipelines.
[2] Approximately 81 percent of this acreage would eventually be lost when the canal is lined.
[3] Includes 5 acres of contractor staging area.
[4] Includes 10 acres for concrete batching operations.
[5] Includes 10 acres for concrete batching operations and 13 acres for equipment deployment.
[6] This marsh/aquatic acreage would eventually be lost when canal is lined and is addressed under "Marsh/Aquatic and Desert Riparian Habitat Along the Coachella Canal."

- Minimize disturbance to private and public improvements along the canal, including flood control dikes.

- Upslope from the canal, keep bypass pipes as close to the canal as possible but avoid the band of desert wash vegetation that tends to lie close to the upstream edge of the spoil bank from original construction.

- Downslope from the canal, where a choice must be made, disturb seepage-dependent vegetation rather than more xerically adapted desert wash vegetation. The seepage-dependent vegetation lost would be compensated as described in the mitigation plan for desert riparian habitat. Non-seepage-dependent vegetation that is crushed by construction activities would regenerate naturally.

Pipe placement would also take into consideration the presence of any sensitive archaeological resources encountered during pre-construction surveys.

The bypass pipe corridor would be cleared and graded only as much as needed to lay the pipe. Topsoil would be removed only where abrupt changes in the ground will require cutting a more gradual slope with a bulldozer. Elsewhere, construction would simply bend or crush vegetation above ground, which would allow regrowth. During periods of low water demand in the Coachella Canal service area, the width of the corridor required for the bypass pipelines would be reduced from the maximum of 65 feet, when less than five pipelines can bypass the flow.

The loss of mature trees of ironwood, palo verde, and mesquite that cannot be avoided would be mitigated by replanting two trees for every one tree destroyed. Tree survival would be monitored for five years, and those which do not survive planting would be replaced to ensure that the 2:1 ratio is achieved. Similarly, replacement trees would be planted for trees that, after five years, do not meet standard species-specific mitigation success criteria (e.g., tree height, diameter at breast height). Where desert washes are disturbed, the ground surface would be recontoured to approximate pre-construction conditions. With the implementation of these measures, potential impacts to terrestrial habitat would be mitigated to below levels of significance.

Underwater Lining Alternative

This alterative would involve construction as discussed in Chapter 2.0 under "Construction Activities." Land disturbances would occur mainly in the berm area on both sides of the canal. The berm tops would be graded to facilitate the movement of heavy equipment. Spoils from the canal trimming would include dry earth from canal excavation above the water line and a thin slurry of earth and water from inside the canal prism. Dry soil would add only a minor amount to the existing berms. The slurry from the canal bottom would spread as far as 50 feet from the outside of the berm. Essentially all vegetation in this area would be subject to some degree of disturbance from the slurry, as would burrows and nests of animals.

Other land disturbances associated with construction would include a ten-acre batch plant and five-acre staging area. Previously disturbed areas would be used to the extent possible. For this estimate, it is assumed that ten acres of disturbed land and five acres of desert scrub/ironwood habitat would be used. It is anticipated that no additional access roads would be needed. In addition, the movement of construction machinery is expected to disturb an average of one-half acre of previously disturbed land at each siphon, for a total of 12.5 acres. A total of 230 acres would be disturbed, as shown in Table 3-7.

Mitigation for unavoidable loss of valuable terrestrial habitat would be the same as for the Conventional Lining Alternative and would bring the impact to below a level of significance.

Parallel Canal Alternative

Construction of the canal would involve clearing a swath of land 221 feet wide between siphons 7 and 29, and 311 feet wide between siphons 29 and 32. These widths include the width of canal excavation and the width of spoil piles on each side of the canal and equipment operation space.

The construction of this alternative would require 873 acres of land for situating the new canal and the spoil piles resulting from canal excavation. The new canal would be constructed on alternating sides of the existing canal, depending on terrain, to minimize disturbance to private development and wildlife habitat. The proposed sides of the canal, and distances from the canal, proposed for the new sections of canal are presented in Chapter 2.0. The types of land to be used for the parallel canal are shown on Table 3-7. The criteria used to route the parallel canal are discussed under "Land Ownership and Use."

Significant impacts from this alternative would be offset through the following mitigation measures. The loss of mature trees of ironwood, palo verde, and mesquite that cannot be avoided would be mitigated by replanting two trees for every one tree destroyed. Where desert washes are disturbed, the ground surface would be recontoured to approximate pre-construction conditions. With the implementation of these measures, potential impacts to terrestrial habitat would be mitigated to below levels of significance.

The existing canal would be partially filled with soil excavated from the new canal but otherwise left as is. The abandoned canal would gradually become vegetated with desert vegetation, which would ultimately provide partial replacement for vegetation lost to the new canal.

No Action Alternative

Without the project, no change would occur in terrestrial habitat.