

Coachella Canal Lining Project

Riverside and Imperial Counties
California

Final Environmental Impact Statement/
Final Environmental Impact Report

Volume I

State Clearinghouse No. 1990020408

April 2001

United States Department of the Interior Coachella Valley Water District

Bureau of Reclamation
Lower Colorado Region

**Final Environmental Impact Statement/
Final Environmental Impact Report
Coachella Canal Lining Project
Riverside and Imperial Counties, California**

Prepared by: United States Department of the Interior, Bureau of Reclamation (Reclamation), and Coachella Valley Water District (CVWD)

Abstract

This Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, and the California Environmental Quality Act (CEQA). Reclamation is responsible for project compliance with NEPA. CVWD is responsible for project compliance with CEQA. This Final EIS/EIR incorporates revisions and responses to public comments received on the Revised and Updated Draft EIS/EIR, which was circulated for a 60-day public review period extending from September 22, 2000 through November 21, 2000. That Draft EIS/EIR revised and updated a 1994 Draft EIS/EIR which was previously prepared and circulated for public review for this proposed action.

The purpose of this federal action is to conserve 30,850 acre-feet annually of water presently being lost as seepage from the earthen reaches of the Coachella Canal. A specific quantity of conserved water would be assigned to the Department of the Interior to facilitate implementation of the San Luis Rey Indian Water Rights Settlement Act (Public Law 100-675, November 17, 1988). Remaining quantities of conserved water would be distributed to southern California to meet present water demand and to assist the State in attaining the goals of California's Colorado River Water Use Plan. The State of California is providing funding for the Coachella Canal Lining Project under California Water Code §12560 et seq.

This Final EIS/EIR describes the project area environment, addresses the significant environmental issues, and presents evaluations of the environmental consequences of the proposed action and its alternatives. The four alternatives evaluated are Conventional Lining, Underwater Lining, Parallel Canal, and No Action. Under the Conventional Lining Alternative, the canal would be lined in place after draining the water from each section of the canal and diverting the water flow around the construction area. The Underwater Lining Alternative would utilize a special process to line the canal while water continues to flow in the canal. The Parallel Canal Alternative would involve construction of a new canal parallel to the existing canal.

This Final EIS/EIR also complies with the Endangered Species Act of 1973, as amended, the Fish and Wildlife Coordination Act, the Clean Water Act (Section 404), the Clean Air Act, Executive Order 11988 (Floodplain Management), and Executive Order 11990 (Wetlands Protection), and partially fulfills the requirements of the National Historic Preservation Act of 1966, as amended, and the Archaeological and Historic Preservation Act of 1974.

For further information regarding the processing or content of this document, please contact Mr. Don Young, Bureau of Reclamation, Yuma Office, P.O. Box D, Yuma, Arizona, 85366, telephone (520) 343-8159; or, Mr. Don Mitchell, Coachella Valley Water District, P.O. Box 1058, Coachella, California, 92236, telephone (760) 398-2651. Parties interested in providing comments prior to the adoption of a Record of Decision for the proposed action must provide their comments to Reclamation within 30 days of the publication of the Final EIS Notice of Availability in the *Federal Register*.

COACHELLA CANAL LINING PROJECT

FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

April 2001

Preface

This Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) consists of two volumes, each of which is bound separately. This is Volume I.

Volume I contains the main body of the Final EIS/EIR, which has been revised in response to comments received on the Revised and Updated Draft EIS/EIR. This volume also contains all of the Attachments (A through J) which were circulated with the Revised and Updated Draft EIS/EIR. These revisions and additions provide no significant new information; they merely provide additional background information, clarify, or expand the original conclusions of the Revised and Updated Draft EIS/EIR.

Volume II contains copies of the Draft EIS Notice of Availability and the Draft EIR Notice of Completion, public hearing announcements, comments received on the Revised and Updated Draft EIS/EIR and responses to those comments, and a transcript of the October 25, 2000 Revised and Updated Draft EIS/EIR public hearing.

Appendices to this Final EIS/EIR consist of the same four appendices that accompanied the Revised and Updated Draft EIS/EIR: geohydrology, engineering, environmental, and social. Each appendix is bound separately.

ACRONYMS AND ABBREVIATIONS

AAC	All-American Canal
ACEC	Area of Critical Environmental Concern
AQMP	Air Quality Management Plan
BA	Biological Assessment
Basin	Salton Sea Air Basin
BCO	Biological and Conference Opinion
BLM	Bureau of Land Management
Border Patrol	Immigration and Naturalization Service, Border Patrol
canal	Coachella Canal
CARB	California Air Resources Board
CDPR	California Department of Parks and Recreation
CEDD	California Employment Development Department
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CO	carbon monoxide
Court	U.S. Supreme Court
CRSS	Colorado River Simulation System
CVWD	Coachella Valley Water District
DFG	(California) Department of Fish and Game
DWR	(California) Department of Water Resources
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ET	Evapotranspiration
FESA	Federal Endangered Species Act
FSC	federal Species of Concern
ft/s	feet per second
ft ³ /s	cubic feet per second
FWS	(U.S.) Fish and Wildlife Service
gpm	gallons per minute
ICAPCD	Imperial County Air Pollution Control District
IID	Imperial Irrigation District
kWh	kilowatthours
LCRMSCP	Lower Colorado River Multi-Species Conservation Program

Lower Basin States	Arizona, California, and Nevada
MkWh	million kilowatthours
mg/L	milligrams per liter
MSHCP	multiple-species habitat conservation plan
MWD	Metropolitan Water District of Southern California
NAAQS	national ambient air quality standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
NPS	National Park Service
NRCS	Natural Resources Conservation Service
O ₃	ozone
O&M	operation and maintenance
Pb	lead
P.L.	Public Law
Plan	California's Colorado River Water Use Plan
PM ₁₀	particulate matter 10 microns or smaller in diameter
PM _{2.5}	fine particulate matter equal to or less than 2.5 microns in diameter
PVC	polyvinylchloride
PVID	Palo Verde Irrigation District
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
ROC	reactive organic compounds
RV	recreational vehicle
SCAQMD	South Coast Air Quality Management District
SDCWA	San Diego County Water Authority
Secretary	Secretary of the Interior
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SRA	State Recreation Area
TNC	The Nature Conservancy
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USMC	U.S. Marine Corps
WAPA	Western Area Power Administration

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SUMMARY

This Final Environmental Impact Statement/Final Environmental Impact Report (EIS/EIR) evaluates the environmental effects of a proposed project to line 33.2 miles¹ of the Coachella Canal (canal) in the southern California desert, east of the Salton Sea. This Final EIS/EIR incorporates revisions and responses to public and agency comments received during the 60-day review period for the Revised and Updated Draft EIS/EIR. That review period extended from September 22, 2000 through November 21, 2000, and the comments and responses to those comments are contained in Volume II of this Final EIS/EIR. A public hearing on the Revised and Updated Draft EIS/EIR was held on Wednesday, October 25, 2000, at the Coachella Valley Water District. Transcripts from that public hearing are also provided in Final EIS/EIR Volume II.

The previous (original) Draft EIS/EIR for this project was circulated for public review in the spring of 1994, and 20 comment letters were received. The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and Coachella Valley Water District (CVWD) were the federal and State lead agencies, respectively, for the previous Draft EIS/EIR, and they are also the lead agencies for this Final EIS/EIR. Because funding to construct the proposed canal lining project was recently appropriated by the State of California, Reclamation and CVWD, in coordination with other State and regional water resource agencies, prepared a Revised and Updated Draft EIS/EIR and recirculated it for public review. The purposes of preparing and circulating that revised draft document, as opposed to simply proceeding with a Final EIS/EIR based on the previous (1994) Draft EIS/EIR, were to (1) incorporate updated information on the proposed project's physical, human, and regulatory environment, (2) address comments received during the 1994 public review process, and (3) provide an opportunity for public review and comment on the Revised and Updated Draft EIS/EIR.

BACKGROUND

The Coachella Canal delivers approximately 330,000 acre-feet of Colorado River water each year to CVWD, situated on the north end of the Salton Sea. The canal loses approximately 32,350 acre-feet of water per year by seepage through the earthen sections from siphon 7 to siphon 32. The canal begins at a turnout on the All-American Canal (AAC) near the international boundary with Mexico and runs through the desert, east of the Salton Sea, before it enters the irrigated area of CVWD. The

¹ A previous (1994) Draft EIS/EIR for the Coachella Canal Lining Project incorrectly identified the total length of unlined canal sections as 33.4 miles.

canal was excavated through desert soils in the 1940s and was placed in operation as a partially unlined canal in 1948.

The first 49-mile section of the canal, which runs through the sandy soil of the East Mesa (as shown on Figure 1-1 in Chapter 1), had especially high leakage, so a new concrete-lined canal to replace it was completed in 1980 to conserve water pursuant to Title I of the Colorado River Basin Salinity Control Act (Public Law [P.L.] 93-320). The new canal, parallel to the existing canal, was connected to existing concrete structures. The last 37 miles of the canal were lined when the canal was originally constructed.

The proposed project lies along a section of the existing unlined canal between siphons 7 and 14 and 15 and 32. (Siphons are buried pipes by which the canal flow passes under desert washes and runoff channels.) This section of unlined canal was constructed in a mixture of gravel and clay soils. The rate of seepage from this section was not as high as in the first 49 miles, so lining of this reach was deferred. In 1991, the portion of the canal between siphons 14 and 15 was lined to test alternative canal lining methods. The lining of the remaining 33.2-mile portion of the canal between siphons 7 and 14 and 15 and 32 (also referred to as the “unlined canal”) is the subject of this EIS/EIR. The length of the unlined canal does not include the lengths of the pipe siphons (wash crossings), which are not proposed for replacement.

PURPOSE AND NEED

The purpose of this federal action is to conserve 30,850 acre-feet² annually of water presently being lost as seepage from the earthen reaches of the Coachella Canal. A specific quantity of conserved water would be assigned to the Department of the Interior to facilitate implementation of the San Luis Rey Indian Water Rights Settlement Act³ (P.L. 100-675, November 17, 1988). Remaining quantities of conserved water would be distributed to southern California to meet present water demand and to assist the State in attaining the goals of California’s Colorado River Water Use Plan.

² An acre-foot of water is the volume of a one-foot depth of water on an acre of ground, approximately 326,000 gallons. This is the amount of water an average family of four uses in and around the home in two years.

³ Conserved water would not be made available for transfer under the San Luis Rey Indian Water Rights Settlement Act until the separate environmental documentation for changes in the point of delivery has been completed and approved by the Secretary of the Interior.

Construction of the project was authorized by the Congress when the President of the United States in November 1988 signed P.L. 100-675, which expressly provides for this project to be accomplished without federal financing.

CANAL SEEPAGE

At present, an estimated 32,350 acre-feet of water seeps annually from the 33.2-mile unlined portion of the Coachella Canal under study. The seepage through the canal would continue at a rate of 1,500 acre-feet per year after canal lining. Thus, seepage reduction would equal approximately 30,850 acre-feet per year. It is possible that 4,500 acre-feet per year could be provided to the San Luis Rey Settlement parties if approved by the Secretary of the Interior. This would reduce the total conserved water to approximately 26,350 acre-feet per year after lining. The remainder of the conserved water could be made available to California's Colorado River water contractors and as a source of mitigation water for canal lining impacts to marsh/aquatic and desert riparian habitat along the canal.

The rate of seepage varies along the canal, depending on the type of material in which the canal was constructed (e.g., sand and gravel is highly permeable and clay is relatively impermeable). In some areas, the canal was excavated entirely in clay; in others, the canal was excavated through several feet of gravel and sand into clay; and elsewhere, the canal was excavated entirely in sand and gravel. Most of the canal seepage occurs where the canal was excavated through sand and gravel.

Along the first 15 miles of the canal downstream from siphon 7, the canal was excavated mostly in clay, with intermittent zones of gravel and sand contained in depressions in the clay formation. Seepage from this segment of canal is relatively low.

Along the next 16 miles, the canal was excavated mostly in gravel and sand deposits (a broad alluvial fan). Seepage from this segment is much greater than from the first segment of the unlined canal. This portion of the canal is upslope from the Salt Creek area and part of the Frink Springs/Imperial Hot Mineral Spa area. This area includes marsh/aquatic and desert riparian vegetation which is supported by canal seepage and natural springs.

Along the remaining four miles of the unlined canal, the canal was excavated mostly in sandstone deposits. Seepage in this area is relatively low.

HYDROLOGIC EFFECTS OF SEEPAGE

Prior to construction of the canal, the only surface manifestations of groundwater were springs and artesian wells downslope from where the canal is now located. This water originates from beneath layers of clay that confine and pressurize groundwater. The uppermost clay layer generally lies tens of feet below the ground surface at the canal and becomes gradually shallower until it reaches the ground surface a mile or two downslope from the canal.

Since construction of the canal, seepage has produced shallow groundwater under the canal and under the land to the west of the canal, on top of the clay layer that confines the artesian groundwater below. This has created a perched groundwater table.

This seepage-dependent water table drains toward the Salton Sea because the top of the clay, like the ground surface, slopes toward the Salton Sea. At some distance downslope from the canal, because of the downslope thinning of the overlying alluvium, the seepage-dependent perched water table eventually surfaces and has induced the growth of phreatophytes (plants that extract their moisture requirements directly from the groundwater). Seepage also manifests as scattered wet soil and surface trickles downslope from the canal. Also, a portion of the water discharged from shallow wells (mostly privately operated) is canal seepage. Most of these effects occur along the 16-mile portion of the canal (siphons 18 to 29) that was constructed in gravelly sand.

A small amount of surfacing seepage water is used by local residents and resorts for landscaping and garden maintenance and for agricultural uses such as aquaculture farms for rearing fish.

The seepage water used by local citizens is subject to recovery by the Federal Government, and the present local users have no legal rights to its continued use. (However, CVWD could deliver domestic water at standard rates to affected groundwater users within the district's service area.) The Federal Government owns the Coachella Canal, and Colorado River water is delivered to CVWD under a contract between CVWD and the Secretary of the Interior (Secretary). The terms of the contract do not permit these uses of canal seepage.

ALTERNATIVE PLANS

It was originally anticipated that the 34.6 miles of unlined canal between siphons 7 and 32 would be replaced with a new parallel canal, as was done along the first 49 miles of the canal.

In 1987, the idea was proposed to line the canal underwater with a sheet of polyvinylchloride plastic covered by a three-inch-thick concrete lining. The idea has now been developed to the degree that it is considered a viable option, one that could be constructed with less land disturbance than the parallel canal. This innovation triggered the current proposal to line the canal. More recently, another method was proposed, namely to divert canal water around each individual section of the canal through temporary pipes and then dry out the section and line it by conventional means.

Based on these lining methods, the following array of alternatives was formulated:

- Conventional Lining Alternative
- Underwater Lining Alternative
- Parallel Canal Alternative
- No Action Alternative

The Conventional Lining Alternative was selected as the preferred alternative.

The underwater lining method was field tested in the Coachella Canal In-Place Lining Prototype Project along the 1.4-mile section of the Coachella Canal between siphons 14 and 15. The results of the test were used to prepare plans and cost estimates for lining the Coachella Canal under water. The test also produced information on the effect of the lining process on canal water quality and seepage.

Each of the lining methods proposed could be used for the project, alone or in combination. CVWD would continue to operate and maintain the canal during and after it is lined. The mitigation program would also require operation and maintenance support.

USE OF CONSERVED WATER

Conserved water would, in effect, be left in the Colorado River system. The water would then be available for use in California under the Secretary's water delivery contracts in which California's apportionment to the use of Colorado River water is allocated. For the purposes of analysis in this EIS/EIR, it is assumed that this water would be diverted by MWD at Lake Havasu in accordance with a proposed Quantification Settlement Agreement and the Federal Secretarial Implementation Agreement for which separate CEQA and NEPA analyses, respectively, are pending. P.L. 100-675

provides that four California agencies, Palo Verde Irrigation District (PVID), Imperial Irrigation District (IID), CVWD, and/or Metropolitan Water District of Southern California (MWD), may fund project construction; however, the State of California is providing funding for the Coachella Canal Lining Project under California Water Code §12560 et seq. With implementation of a proposed Quantification Settlement Agreement among CVWD, MWD, and IID, approximately 21,500 acre-feet per year would be made available to MWD, and 4,500 acre-feet per year would be made available for facilitating implementation of the San Luis Rey Indian Water Rights Settlement Act. The remaining 4,850 acre-feet of conserved water are expected to be managed by CVWD for environmental mitigation purposes. Conserved water would not be made available for transfer under the San Luis Rey Indian Water Rights Settlement Act until the separate environmental documentation for changes in the point of delivery has been completed and approved by the Secretary of the Interior.

The federal approval of transfers and exchanges of the conserved Coachella Canal water among California's Colorado River contractors will be made through the Secretary's approval of an Implementation Agreement. NEPA compliance for that federal approval will be carried out prior to agency action.

HYDROLOGIC EFFECTS OF CANAL LINING

Lining the canal would reduce the amount of seepage water which contributes to the shallow groundwater which is downslope from the canal. This would reduce the amount of water available to seepage-induced vegetation along the canal and would reduce the flow of certain springs and wells.

Lining the canal, without mitigation, would reduce the amount of water in Salt Creek, which discharges into the east side of the Salton Sea. This would not be considered a significant impact to surface water resources, but it would contribute to significant impacts to biological resources unless mitigated. Without mitigation, it is anticipated that after lining the flow of Salt Creek at Highway 111 may occur only during the winter months because of high spring and summer consumption by vegetation in the upstream tributary areas along the creek bottom. Mitigation measures are provided in this EIS/EIR to account for potential impacts to biological resources that would result from reductions in Salt Creek flows.

In the Frink Springs and Hot Mineral Spa areas, shallow wells that have static water elevations above the subsurface layer of the (prehistoric Lake Cahuilla) lakebed clay would potentially go dry after

canal lining. Deep artesian wells would not be affected because the near-surface lakebed clay extends under the canal and prevents canal seepage from supplementing the artesian aquifer below. What is now called Frink Springs appeared on railroad survey maps from the 1850s, and the initial well in the Hot Mineral Spa area was dug when the canal was under construction (i.e., before canal seepage entered the local perched groundwater table), indicating that these features are not seepage dependent.

COMPARISON OF ALTERNATIVES

Table S-1 presents a comparison of the physical differences and cost variations among the alternatives. The construction cost does not include the cost of environmental mitigation measures.

Table S-1. Summary of Physical Properties and Costs

Dimension	Existing canal	Conventional lining	Underwater lining	Parallel canal
Length of canal to be lined (miles)	33.2	33.2	33.2	32.5
Excavation volume (million cubic yards)	–	0.4	2.3	9.9
Concrete volume (cubic yards)	–	97,500	175,500	121,400
Sand and gravel volume (cubic yards)	–	105,000	520,000	120,000
Canal water width, average (feet)	66	43	80	43
Water depth, maximum (feet)	6.0	11.2	9.0	11.2
Side Slopes ¹	2:1	1.5:1	2.5:1	1.5:1
Water volume ² (acre-feet)	1,180	1,131	1,679	1,131
Water velocity ² (feet per second)	1.5 to 2.0	1.4 to 2.9	0.8 to 2.0	1.4 to 2.9
Water conserved ³ (acre-feet per year)	–	30,850	29,850	30,850
Construction cost ⁴ (millions of dollars)	–	61.8	103.8	79.1

¹ Horizontal distance to vertical distance.

² At typical waterflow (500 cubic feet per second).

³ Does not include deduction for water that may be required to mitigate surface water and biological resource impacts.

⁴ January 2001 dollars. Does not include cost of environmental mitigation.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Without mitigation, the proposed canal lining alternatives would result in potentially significant impacts related to biological resources (including marsh/aquatic, desert riparian, and terrestrial habitat and special status species), large mammal escape, canal fisheries, cultural resources, and air

quality. With the exception of air quality impacts associated with each of the action alternatives and cultural resource impacts associated with the Parallel Canal Alternative, all impacts would be reduced to less than significant levels through the incorporation of mitigation measures. Construction-related pollutant emissions associated with the Conventional Lining, Underwater Lining, and Parallel Canal alternatives would exceed CEQA significance thresholds; however, prevailing winds would disperse these pollutants over the uninhabited Chocolate Mountains Aerial Gunnery Range. Accordingly, these pollutants would not cause significant effects. Pending consultation with the State Historic Preservation Officer, historical resource impacts to the canal associated with the Parallel Canal Alternative may be significant and unmitigable. Each environmental issue area addressed in this EIS/EIR is summarized below with respect to the proposed project. (See also Table 2-7 in Chapter 2.0, which provides a matrix comparison of the alternatives and their respective impacts). Where one of the specific canal lining alternatives would have a noticeably different effect on an environmental resource than the other alternatives, each alternative and its effects are addressed individually. There are significant effects of delivery to, or use of, water in the MWD service area.

Geographic Setting, Geologic Resources, and Seismicity

None of the alternatives would significantly affect geologic resources or expose people to geologic hazards. Lining the canal with concrete would not make it more susceptible to cause flooding in a seismic event.

Surface Water

The proposed project would not create significant surface water impacts; however, mitigation measures are provided under “Marsh/Aquatic and Desert Riparian Habitat Along Coachella Canal” to maintain the flow levels in Salt Creek.

Coachella Canal

For the Conventional Lining and Parallel Canal alternatives, water volume in the 33.2-mile segment of the canal would be reduced from 1,180 acre-feet to 1,131 acre-feet under typical flow conditions of 500 cubic feet per second (ft³/s). The Underwater Lining Alternative would increase water volume in the canal to 1,679 acre-feet. The resulting impacts would be less than significant.

Surface Seeps and Flows

Seepage from the unlined portion of the Coachella Canal is estimated at approximately 32,350 acre-feet per year. The seepage water causes moist soil, surface trickles, and pools downslope from the canal in a few locations. Some of the water is used by landowners along the canal for landscaping and other purposes. If the canal was lined, seepage from the canal would be reduced by approximately 30,850 acre-feet per year (Conventional Lining and Parallel Canal alternatives) or 29,850 acre-feet per year (Underwater Lining Alternative). As a result, the shallow (perched) groundwater table would diminish in most locations. The seeps and rivulets supported exclusively by seepage from the canal would no longer have canal seepage as a source, and, as discussed previously, the discharge of wells and springs producing a percentage of seepage water would decrease. This would affect local biological resources (discussed below). Non-seepage supported seeps and flows would remain. Landowners who use seepage-dependent flows do not have a legal right to the water; accordingly, the loss of these flows would not constitute a significant impact. Landowners could, however, contract directly with CVWD to purchase domestic water for landscaping and irrigation to offset their loss.

Salt Creek

As discussed earlier in this chapter, the canal lining project has the potential to alter surface flows in Salt Creek. To mitigate this loss of flows and the resulting effects on biological resources, water would be provided, either from the canal or another source as authorized by P.L. 100-675, to maintain flows in Salt Creek at pre-canal-lining levels (i.e., 623 acre-feet per year, based on mean annual flows from 1996 through 1999, as measured by the U.S. Geological Survey near State Highway 111). This measure is described under “Marsh/Aquatic and Desert Riparian Habitat Along the Coachella Canal.”

Colorado River

Based on the technical appendix prepared by Reclamation for the 1994 All-American Canal Lining EIS, the proposed project would reduce the average flow of the lower Colorado River by approximately one-third of one percent, and it would reduce the level of the river downstream from Blythe, California by approximately one-tenth of an inch. More recent analysis completed by Reclamation for the “Final Biological Assessment for Proposed Surplus Water Criteria, Secretarial Implementation Agreements for California Water Plan Components and Conservation Measures on the Lower Colorado River (Lake Mead to Southerly International Boundary)” (Reclamation 2000c)

confirmed the inconsequential nature of this reduction in flow. Based on the data used for the analysis in the Biological Assessment, a 26,000-acre-foot reduction in flow was calculated to reduce surface water elevation in the Colorado River between 0.0 inch and 0.19 inch at various locations between Parker Dam and Imperial Dam. This change would not be significant to the resources along the river, but the change is included among the cumulative impacts discussed in Chapter 4.0

Salton Sea

Lining the canal would not measurably affect water levels at the Salton Sea because flows from Salt Creek would be maintained at their current levels (as described above), and little to no seepage-dependent groundwater flows reach the Salton Sea from the project area.

Groundwater

In general, the canal-fed shallow groundwater in the area of the unlined canal would gradually diminish after lining. This would not constitute a significant impact to groundwater resources, although it would contribute to biological resource impacts, including a reduction in the amount of water available to seepage-induced vegetation (see “Marsh/Aquatic and Desert Riparian Habitat Along the Coachella Canal,” below).

The effect on wells and springs downslope from the canal would depend on the amount of canal seepage that enters the groundwater system. Where the upper clay layer extends up under the canal, the seepage is trapped in a perched aquifer above the clay layer, and the seepage is prevented from mixing with the deep groundwater below the clay layer. Under these conditions, lining the canal would not affect the flow of deep springs or wells downslope from the canal. However, where the upper clay layer does not extend up under the canal, seepage may mix with the deeper groundwater and may be a portion of the water which flows from springs or discharges from wells. For the reasons given above, the reduction of groundwater recharge associated with the canal lining project would not be significant.

Water Quality

The proposed project would have no significant impacts on the quality of water in the canal, the Salton Sea, or in the Colorado River.

Marsh/Aquatic and Desert Riparian Habitat Along the Coachella Canal

Without mitigation, the proposed project would have significant impacts on phreatophytes (plants that thrive on a high groundwater table). As mitigated, impacts would be less than significant.

In the vicinity of the Coachella Canal, phreatophyte habitat includes marsh/aquatic (wetland) and desert riparian vegetation types. Lining the Coachella Canal would reduce the amount of seepage from the canal that flows underground and downslope and supports seepage-induced aquatic/marsh 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 xerically adapted desert riparian types in some areas that go dry or in areas where the groundwater level drops due to seepage reduction but is still supplied by natural groundwater sources; and transition of desert riparian types to upland types in areas with no groundwater supplies from either source.

The previous (1994) Draft EIS/EIR assessed project impacts to wetlands habitat along the Coachella Canal. The estimates of potential vegetation loss were based on an analysis of the growth of marsh/aquatic and desert riparian vegetation after the canal was first put into operation. In preparing the Revised and Updated Draft EIS/EIR, the initial vegetation assessments were updated using 1998 infra-red satellite images, supplemented by 1998 true color satellite images. Also, a field assessment of changes in vegetation communities and structural type was conducted in August 2000. The extent of vegetation in the project area was further updated in this Final EIS/EIR as a result of input from resource agencies and the Center for Natural Lands Management and based on additional field verification conducted in October and November 2000.

The updated vegetation mapping showed that there are 456 acres of marsh/aquatic and 7,421 acres of desert riparian habitat in the project area. The marsh/aquatic habitat is particularly important for the endangered Yuma clapper rail and the California black rail. Of the desert riparian habitat, approximately 71 percent consists of stands of salt cedar, and an additional 18 percent consists of salt cedar mixed with native vegetation. Of more value to wildlife, however, are the areas with native vegetation, and these include screwbean mesquite, cottonwood-willow, California fan palm, and honey mesquite.

Without mitigation, the loss of seepage-dependent marsh/aquatic and desert riparian habitat would represent a significant environmental impact. Lining the canal would potentially (without mitigation) cause the loss of 122 acres of marsh/aquatic habitat and 4,576 acres of desert riparian

habitat. Some vegetation, however, is supported by both canal seepage and artesian groundwater discharge not connected with the canal. In these areas, it is predicted that an additional 1,339 acres of desert riparian habitat would survive but would be less vigorous.

Impacts to marsh/aquatic and desert riparian habitat would be either avoided through the provision of water to sustain the existing vegetation or through mitigation on an acre-for-acre basis, based on ecological equivalency. In this manner, impacts to 105 acres of the 122 acres of potentially affected marsh/aquatic habitat would be avoided, and 17 acres of new marsh/aquatic habitat would be created as mitigation. Restoration or creation of desert riparian habitat would occur at a 1:1 ratio for native vegetation communities, while salt cedar and mixed salt cedar/native vegetation habitat would be mitigated at a lower ratio reflecting the low wildlife value associated with salt cedar. As mitigated, impacts to marsh/aquatic and desert riparian habitat would be less than significant.

Terrestrial Habitat

Without mitigation, project construction would have a significant effect on terrestrial habitat. As mitigated, impacts would be less than significant.

If the Conventional Lining Alternative is selected, the installation of bypass pipelines along the canal would generally degrade and, to some extent, crush vegetation in a 65-foot-wide corridor along the canal. Of approximately 29,000 acres of undisturbed terrestrial habitat in the project area, construction of the Conventional Lining Alternative would affect approximately 246 acres of previously undisturbed terrestrial habitat; construction of the Underwater Lining Alternative would affect approximately 177 acres; and construction of a parallel canal would affect approximately 768 acres. Individual trees and/or valuable habitat would be avoided as much as practicable. Project mitigation would consist of terrain restoration, replantings, and stockpiling and redistributing topsoil in areas where blading is required. Impacts to mature vegetation would be mitigated by replacing trees at a 2:1 ratio. As mitigated, impacts would be reduced to less than significant levels.

Special Status Species

Several species of sensitive, unique, and protected plants and animals may occur in the project area. As used in this EIS/EIR, the term “Special Status Species” refers to species that are federally listed as, or are a candidate for listing as, threatened or endangered; are otherwise provided federal protection; and/or are listed by or are otherwise afforded protection by the State of California. Special status species that may occur within the project area include:

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- federally and State-listed endangered desert pupfish;
 - federally listed endangered and State-listed threatened Yuma clapper rail;
 - State-listed threatened California black rail;
 - federally and State-listed endangered southwestern willow flycatcher;
 - federally and State-listed endangered least Bell's vireo;
 - federally and State-listed threatened desert tortoise;
 - federal special protection species flat-tailed horned lizard;
 - federal and State candidate for listing Palm Springs round-tailed ground squirrel;
 - State special concern species LeConte's thrasher;
 - State special concern species burrowing owl;
 - State special concern species Palm Springs pocket mouse; and
 - State special plant species fairyduster.

The federally and State-listed endangered razorback sucker (*Xyrauchen texanus*) has not been recorded as occurring in the Coachella Canal; however, it is also addressed in this EIS/EIR due to concerns expressed by California Department of Fish and Game (DFG). Bighorn sheep may occasionally migrate down from the Chocolate and Orocopia Mountains to use the project area as a water source. These are not, however, the federally listed endangered and state-listed threatened Peninsular bighorn sheep (*Ovis canadensis cremnobates*), as had been reported in previous NEPA/CEQA documentation for the proposed project.

Without mitigation, impacts to some of these species (e.g., desert pupfish, Yuma clapper rail, California black rail) could occur through the loss of canal seepage-dependent habitat. As mitigated, impacts to these species would be avoided. Project construction could also result in impacts to species potentially present in areas that would be affected directly by project construction (e.g., desert tortoise, burrowing owl, Palm Springs pocket mouse, fairyduster). Impacts to these species would either (1) be less than significant due to the low likelihood of these species occurring in the project area, the limited number of individuals that would be affected in comparison to the species' regional population, and in consideration of the respective species' sensitivity, or (2) be avoided or mitigated to less than significant levels. For example, the potential to encounter desert tortoise along the canal is considered low, but potential impacts to this species would be mitigated through pre-construction surveys, relocation of tortoises to outside of the construction area, and creation of replacement burrows for any tortoise burrows located within the construction footprint.

Large Mammal Escape

The proposed project would reduce the drowning hazard for large mammals by providing escape ridges along the canal's side slopes and by providing escape ramps in areas of high wildlife visitation.

Large mammals such as mule deer and bighorn sheep may use the canal as a water source. Adding a smooth concrete lining to the canal could increase the drowning hazard for large mammals which may drink from it; accordingly, each of the canal lining alternatives would include the provision of slip-formed escape ridges in the concrete lining. In addition to the escape ridges, in areas of high wildlife visitation, such as at siphon 20, escape ramps would be added to the canal. The escape ridges, extending out approximately 1.5 inches in parallel, horizontal rows every 18 inches, would allow large mammals to approach and exit the waterline with less hazard of drowning than exists under current conditions. The effectiveness of escape ridges was demonstrated in a test of the Coachella Canal In-Place Prototype Lining Project (conducted between siphons 14 and 15). That project entailed a canal side slope of 2.5-to-1 (horizontal to vertical), and the Underwater Lining Alternative would create a similar 2.5-to-1 canal side slope. The Conventional Lining and Parallel Canal alternatives, would result in a steeper 1.5-to-1 canal side slope. Post-construction monitoring of another Reclamation canal—the concrete-lined Towaoc Canal near Cortez, Colorado—indicated that deer can safely traverse a canal with 1.5-to-1 side slopes. As a precautionary measure, however, post-lining monitoring for the Conventional Lining and Parallel Canal alternatives would be conducted to ensure that large mammals can enter and exit the canal area safely. If warranted by testing or monitoring results, additional escape ramps or other escape measures would be added to the canal. As mitigated, impacts to large mammals would be less than significant.

Canal Fishery

Without mitigation, the proposed project would cause significant impacts to the canal fishery. As mitigated, impacts would be less than significant.

The canal contains game and nongame fish. The fishery is dominated by channel catfish and also contains populations of largemouth bass, sunfish, and flathead catfish. Other species are common carp, threadfin shad, and striped bass. Channel catfish, bass, and sunfish provide recreational fishing. The canal has also been stocked with triploid grass carp, an exotic species that have been introduced to keep the canal cleaned of aquatic weeds.

The canal lining alternatives would eliminate canal bank vegetation, which provides food and cover, particularly for shoreline gamefish. These changes would cause the number of fish in the canal to decline. Mitigation for the changes, aimed at maintaining the fishery, would consist of installing artificial reefs in the lined canal, or other measures that would similarly increase the ability of the lined canal to support fish populations. The reefs would provide cover for hatchling fish and habitat for aquatic organisms on which they feed, thus mitigating impacts to less than significant levels.

Cultural Resources

Without mitigation, cultural resource impacts associated with the project alternatives could represent a significant impact. Impacts associated with the Conventional Lining and Underwater Lining alternatives would be mitigated to less than significant levels. Construction of the Parallel Canal Alternative, which would essentially entail abandoning and replacing the existing canal, could (pending consultation with the State Historic Preservation Officer) constitute an unmitigable impact to the canal, which is potentially a historical resource.

The canal runs parallel to, and as close as one-quarter mile from, the shoreline of the ancient Lake Cahuilla, placing it directly within an archaeologically sensitive region. The remains of prehistoric fishing camps and other signs of temporary use are present in the area. Additionally, the Salt Creek-Dos Palmas Springs area has been used by the Cahuilla Indians for ceremonial purposes, including cremations.

The proposed project could cause significant impacts to archaeological resources that may be located in the area affected by project construction. Class III archaeological surveys of land affected by construction would be made prior to construction. Potentially significant impacts to the cultural resources identified would be mitigated by avoiding or professionally recovering these resources. Avoidance would be more feasible with the Conventional Lining and Underwater Lining alternatives, based on the degree of flexibility associated with bypass pipeline location, than it would for the Parallel Canal Alternative, which would entail substantial excavation. Surveys and any necessary recovery of archaeological resources would be conducted in compliance with Section 106 of the National Historic Preservation Act and, if Native American burial sites are encountered, the Native American Graves Protection and Repatriation Act. With this mitigation, impacts to archaeological resources would be mitigated to less than significant levels.

Based on the Coachella Canal's age (51 years) and the importance it played in the development of the Coachella Valley, it is potentially a historical resource. As a result, actions that affect the canal,

such as lining it with concrete, may (pending consultation with the State Historic Preservation Officer) constitute a significant historical resource impact. For the Conventional Lining and Underwater Lining alternatives, this impact could be mitigated through appropriate documentation of the existing canal prior to construction (e.g., an Historic American Engineering Record). The Parallel Canal Alternative, which would entail abandoning the existing canal and replacing it with new canal sections constructed along a parallel alignment, could constitute an unmitigable impact to the historical resource values of the canal.

Indian Trust Assets

Indian Trust Assets are legal interests in property held in trust by the United States for Indian Tribes and individuals. There are two Indian Trust Assets that either occur in the vicinity of the Coachella Canal or that were evaluated to determine if they would be affected by the proposed project: (1) the Torres-Martinez Indian Reservation and (2) facilitation of implementation of the San Luis Rey Indian Water Rights Settlement Act (P.L. 100-675 Title I).

The proposed project would have no effect on the Torres-Martinez Indian Reservation. With regard to the San Luis Rey Indian Water Rights Settlement, the proposed project would be beneficial because it would provide 4,500 acre-feet of water each year to facilitate implementation of the settlement.

Recreation

Without mitigation, project construction could restrict access to the Bradshaw Trail, a recreational trail maintained by the U.S. Department of the Interior, Bureau of Land Management (BLM). This impact would be mitigated to less than significant levels by maintaining access to the trail during construction. There would be no other significant recreational resource impacts associated with the project alternatives.

Land Ownership and Use

The proposed project would not cause significant land ownership or use impacts. With the exception of the Parallel Canal Alternative where as much as 31 acres would need to be acquired, the canal lining alternatives would not require any additional land for construction; however, project or biological mitigation could entail acquisition of privately owned land in or near the BLM-designated Dos Palmas Area of Critical Environmental Concern. Property owners would be compensated for

the fair market value of their property in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and applicable State law. Accordingly, while ownership patterns in the area may change, this change would not constitute a significant environmental impact.

Sand and Gravel Supplies

Impacts to sand and gravel resources would not be significant.

The canal lining alternatives would require between 105,000 and 520,000 cubic yards of gravel for construction. Gravel would be obtained from local sources and the project would not substantially reduce the quantity of sand and gravel available for other projects in the region.

Impacts associated with the development of new sand and gravel resources, if needed, would be subject to supplemental environmental documentation, and quarry operators would be required to obtain appropriate permits. This would mitigate potential impacts to biological and cultural resources that may be affected by project-related sand and gravel extraction.

Transportation

The proposed project would include the development and implementation of a traffic control plan as part of project design. With the implementation of this plan, transportation impacts would be less than significant. Travelers on the local road network may experience some delays associated with project construction, but these would not be of sufficient frequency or duration to represent a significant transportation impact. There would be no noticeable long-term increase in traffic associated with maintaining the lined canal.

Air Quality

Air quality impacts would be significant without mitigation. As mitigated, impacts would exceed emission thresholds established by the South Coast Air Quality Management District and would be considered significant under CEQA. Mitigation would, however, reduce emissions to less than federal Clean Air Act *de minimis* levels, with the exception of oxides of nitrogen (NO_x) emissions associated with the Parallel Canal Alternative. Accordingly, Reclamation would need to complete a Clean Air Act General Conformity determination prior to approving the Parallel Canal Alternative

if it were chosen. No such determination would be required for the Conventional Lining or Underwater Lining Alternatives.

The proposed project would result in short-term impacts related to air quality. Based on calculations prepared for this project, construction emissions for the Conventional Lining Alternative would exceed the South Coast Air Quality Management District significance thresholds for particulate matter less than ten microns in diameter (PM_{10}). Although mitigation measures would substantially reduce PM_{10} emissions, the emission levels would remain above the established CEQA significance thresholds even after mitigation. The Underwater Lining and Parallel Canal alternatives would exceed PM_{10} and NO_x significance criteria. The short-term NO_x emissions would exceed these thresholds due to the amount and duration of diesel equipment activity during construction. Although the emissions could not be mitigated to less than significant levels, the prevailing winds would generally carry these pollutants east over the unpopulated Chocolate Mountains Aerial Gunnery Range, where they would disperse. Thus, while pollutant emissions would be significant under CEQA, they would not, as mitigated, cause significant effects for the following reasons:

- impacts would be short-term (limited to two or three years of project construction),
- all practicable air quality mitigation measures would be implemented, and
- pollutants generated by the proposed project would generally disperse over an unpopulated aerial gunnery range.

Hydroelectric Power

Impacts to hydroelectric power generation would not be significant and no mitigation would be required.

The affected hydroelectric power environment for the Coachella Canal Lining Project consists of those hydroelectric generating facilities located on the Colorado River between Lake Havasu (where river water is diverted to the Colorado River Aqueduct) and Imperial Dam (where river water is diverted to the AAC). There are four dams along this stretch of river (Parker, Headgate Rock, Palo Verde Diversion, and Imperial Dams), but only two of these—Parker Dam and Headgate Rock Dam—have hydroelectric powerplants.

Impacts to these facilities would result in decreased releases from Parker Dam by the amount of water diverted upstream at Lake Havasu, if approved. This incremental reduction in flows would not substantially affect hydroelectric power generation, and it would not constitute a significant impact.

Public Safety

The proposed project would have less than significant impacts during construction. This assessment of construction safety effects takes into account that standard construction safety measures, such as restricting public access to the construction site, would be implemented, as would a traffic control plan in all construction areas. In the long term, the proposed project would improve safety because escape ladders would be added every 750 feet along the canal and because escape ridges and strategically placed escape ramps (described under “Large Mammal Escape”) would also materially reduce drowning hazards at the canal.

Socioeconomics Aspects

The proposed project would result in short-term, beneficial impacts to the local economy. There would be no significant, adverse socioeconomic impacts associated with any of the alternatives.

Local Community Structure

Under each canal lining alternative, 210 or fewer construction contractors and management workers (including family members) would be expected to arrive from outside the area. Compared to the populations of cities in the Coachella Valley and the Imperial Valley, the arrivals would be small in number and are not expected to have a significant effect on the structure and utilities of local communities.

Because of the short duration of the construction period, many workers would bring mobile homes and travel trailers. The occupancy of resorts and trailer parks in the vicinity of the project would increase during construction.

Employment and Income

The canal lining alternatives would have a beneficial impact on the local economy. The estimated total economic benefit to the local area would be \$24.5 million for the Conventional Lining

Alternative, \$45.8 million for the Underwater Lining Alternative, and \$31.5 million for the Parallel Canal Alternative.

Immigration from Mexico

The Immigration and Naturalization Service Border Patrol (Border Patrol) maintains surveillance for transport of illegal immigrants along the canal. The canal lining alternatives would not have a significant effect on the ease of surveillance.

Minority and Low-Income Populations

The effects of project construction (e.g., noise, air quality, traffic) would not be disproportionately focused on minority or low-income populations, and the proposed project would be in compliance with the requirements of Executive Order 12898, "Environmental Justice."

Farming

The proposed project would affect aquaculture farming; however, aquaculture operators are among the unauthorized users of the canal seepage water.

Growth Inducement

The proposed project would not induce growth in the Coachella Valley or Imperial Valley, near the area in which the project would be constructed, or on the southern California coastal plain, where the conserved water would assist in maintaining existing diversions to this region.

CONSULTATION AND COORDINATION

Development of the canal lining alternatives, impact assessments, and mitigation measures were coordinated with the California water agencies affected, federal and State agencies having responsibility for natural resources, the Torres Martinez Desert Cahuilla Indian community, other Native American tribal organizations, and the general public. As part of the previous (1994) Draft EIS/EIR preparation process, numerous working sessions and meetings were held among interested agencies, and public meetings were held in the project area. Additional meetings with resource agencies, including the U.S. Fish and Wildlife Service (FWS), California Department of Fish and Game (DFG), Bureau of Land Management (BLM), and California Department of Parks and

Recreation, were held during preparation of the Revised and Updated Draft EIS/EIR and this Final EIS/EIR. Informal consultation with the FWS pursuant to Section 7 of the federal Endangered Species Act is ongoing. Additionally, contacts with Native American tribal organizations have also been re-initiated for this project.

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