Imperial Irrigation District
Water Conservation and Transfer Project
Draft
Habitat Conservation Plan
Draft
Environmental Impact Report/
Environmental Impact Statement

Volume 1

Prepared for

Imperial Irrigation District

U.S. Bureau of Reclamation

Prepared by

CH2MHILL

January 2002

Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)
Imperial Irrigation District Water Conservation and Transfer Project and
Draft Habitat Conservation Plan

State Clearinghouse No. 99091142

Co-Lead Agencies:	Lead Agency for the EIR: Lead Agency for the EIS:	Imperial Irrigation District (IID) U.S. Bureau of Reclamation (Reclamation)
Cooperating Agency:	U.S. Fish and Wildlife Service	
Responsible Agencies:	California Department of Fish and Game State Water Resources Control Board San Diego County Water Authority	

ABSTRACT

IID is proposing to implement a water conservation and transfer project that would serve and transfer the right to use up to 300,000 acre-feet per year of Colorado River water which IID is otherwise entitled to divert for use within IID's water service area in Imperial County, California. The conserved water would be transferred by IID to San Diego County Water Authority (SDCWA), Coachella Valley Water District (CVWD), and/or Metropolitan Water District (MWD). The terms of the water conservation and transfer transactions are set forth in the Agreement for Transfer of conserved water (IID/SDCWA Transfer Agreement) executed by IID and SDCWA in 1998, as amended, and a proposed Quantification Settlement Agreement (QSA) to be executed by IID, CVWD, and MWD. These transfers, which are to remain in effect for up to 75 years, will facilitate efforts to reduce California's diversions of Colorado River water in normal years to its annual 4.4 million acre-feet apportionment. The Secretary of the Interior must approve the change in the point of delivery for the transferred water.

The Proposed Project includes implementation of a Habitat Conservation Plan (HCP) to address impacts to covered species and habitats within the IID water service area, the right-of-way of the All American Canal (AAC), and the Salton Sea. Pursuant to Section 10(a)(1)(B) of the Endangered Species Act, USFWS must approve the HCP and issue a Section 10 permit to authorize the incidental take of covered species associated with IID's proposed water conservation and transfer project, as well as IID's ongoing operation and maintenance activities.

This Draft EIR/EIS has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969, as amended, and the California Quality Act of 1970.

Comments on this document must be submitted to one or both of the following by April 26, 2002:

Bruce D. Ellis Bureau of Reclamation Phoenix Area Office (PXAO-1500) P.O. Box 81169 Phoenix, AZ 85069-1169 Faxogram: 602-216-4006	Elston Grubaugh Manager of Resources, Management, and Planning Department Imperial Irrigation District P.O. Box 937 Imperial, CA 92251 Faxogram: 760-339-9009

For further information regarding this Draft EIR/EIS, please contact: Mr. Bruce Ellis at the Bureau of Reclamation, (602) 216-3854, or Mr. Grubaugh at the Imperial Irrigation District, (760) 339-9109.

Reclamation Statement No. INT-DES-01-44 Filing date: January 18, 2002

Form A

Notice of Completion and Environmental Document Transmittal

Mail to: State Clearinghouse, PO Box 3044, Sacramento, CA 95812-3044 916/445-0613

SCH # 99091142

Project Title: Imperial Irrigation District Water Conservation and Transfer Program
Lead Agency: Imperial Irrigation District Contact Person: Elston Grubaugh
Street Address: 333 East Barioni Boulevard P.O. Box 937 Phone: (760) 339-9109
City: Imperial Zip: 92251 County: Imperial

Project Location:
County: Imperial City/Nearest Community: Imperial, El Centro, Brawley
Cross Streets: Zip Code: Total Acres:
Assessor's Parcel No. Section: Twp. Range: Base:
Within 2 Miles: State Hwy #: Waterways:
Airports: Railways: Schools:

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☒ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ☐ Other

NEPA: ☐ NOI ☐ EA ☒ Draft EIS ☐ FONSI

Other: ☒ Joint Document ☐ Final Document ☐ Other

Local Action Type:
☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☐ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☒ Other (Water Plan)

Development Type:
☐ Residential: *Units* ___ *Acres* ___
☐ Office: *Sq.ft.* ___ *Acres* ___
☐ Commercial: *Sq.ft.* ___ *Acres* ___
☐ Industrial: *Sq.ft.* ___ *Acres* ___
☐ Educational
☐ Recreational
☐ Water Facilities: *Type* ___ *MGD*
☐ Transportation: *Type*
☐ Mining: *Mineral*
☐ Power: *Type*
☐ Waste Treatment: *Type*
☐ Hazardous Waste: *Type*
☒ Other: On-farm and System Conservation

Funding (approx.): Federal $ State $ Total $

Project Issues Discussed in Document:
☒ Aesthetic/Visual ☐ Flood Plain/Flooding ☐ Schools/Universities ☒ Water Quality
☒ Agricultural Land ☐ Forest Land/Fire Hazard ☐ Septic Systems ☒ Water Supply/Groundwater
☒ Air Quality ☒ Geologic/Seismic ☐ Sewer Capacity ☒ Wetlands/Riparian
☒ Archeological/Historical ☐ Minerals ☐ Soil Erosion/Compaction/Grading ☒ Wildlife
☐ Coastal Zone ☒ Noise ☐ Solid Waste ☒ Growth Inducing
☐ Drainage/Absorption ☐ Population/Housing Balance ☐ Toxic/Hazardous ☒ Land Use
☒ Economic/Jobs ☒ Public Services/Facilities ☒ Traffic/Circulation ☒ Cumulative Effects
☐ Fiscal ☒ Recreation/Parks ☐ Vegetation ☐ Other

Present Land Use/Zoning/General Plan Designation:

Project Description:

The IID Water Conservation and Transfer Project proposes the conservation by IID of up to 300 thousand acre-feet per year (KAFY) of Colorado River water and the transfer of this conserved water from IID to the San Diego County Water Authority (SDCWA), Coachella Valley Water District (CVWD), and/or Metropolitan Water District of Southern California (MWD).

The water conservation and transfer could occur under one of two scenarios:

- 130 to 300 KAFY to SDCWA (All Conservation Measures) (IID/SDCWA Transfer Agreement Implementation Only)
- Up to 200 KAFY to SDCWA and up to 100 KAFY to CVWD and/or MWD (QSA Implementation)

Water would be diverted from the Colorado River at Parker Dam and distributed to SDCWA, CVWD, and/or MWD. Water would be delivered to SDCWA and MWD via the Colorado River Aqueduct.

To comply with the federal Endangered Species Act (ESA) and California ESA, and to support issuance of state and federal incidental take authorizations required to implement the Proposed Project, IID, in consultation with USFWS and CDFG, has prepared an HCP to address impacts to species and habitats within the IID water service area, the right-of-way of the AAC, and the Salton Sea. Implementation of the HCP at the Salton Sea Portion could occur under one of two approaches:

- Approach 1: Hatchery and Habitat Replacement
- Approach 2: Use of Conserved Water as Mitigation

Reviewing Agencies Checklist — **Form A, continued**

KEY
S = Document sent by lead agency
X = Document sent by SCH
√ = Suggested Distribution

S **Resources Agency**
___ Boating and Waterways
___ Coastal Commission
___ Coastal Conservancy
S Colorado River Board
___ Conservation
X Fish & Game
___ Forestry & Fire Protection
S Office of Historic Preservation
S Parks and Recreation
S Reclamation Board
___ S.F. Bay Conservation & Development Commission
S Water Resources (DWR)

Business, Transportation & Housing
___ Aeronautics
___ California Highway Patrol
S CALTRANS District # _____
___ Department of Transportation Planning (headquarters)
___ Housing and Community Development
___ **Food and Agriculture**

Health and Welfare
S Health Services

State & Consumer Services
___ General Services
___ OLA (Schools)

Environmental Protection Agency
S Air Resources Board
___ California Waste Management Board
___ SWRCB: Clean Water Grants
___ SWRCB: Delta Unit
X SWRCB: Water Quality
X SWRCB: Water Rights
X Regional WCQB # 7 (Colorado River)

Youth and Adult Corrections
___ Corrections

Independent Commissions and Offices
___ Energy Commission
S Native American Heritage Commission
S Public Utilities Commission
___ Santa Monica Mountains Conservancy
S State Lands Commission
___ Tahoe Regional Planning Agency

___ Other

Public Review Period (to be filled in by lead agency)

Starting Date January 18, 2002 Ending Date April 26, 2002

Signature Date January 14, 2002

Lead Agency (Complete if applicable):	**For SCH Use Only:**
Consulting Firm: CH2M HILL	Date Received at SCH
Address: 155 Grand Avenue, Suite 1000	Date Review Starts
City/State/Zip: Oakland, CA 94612	Date to Agencies
Contact: Mike Concannon	Date to SCH
Phone: (510) 251-2426 extension 2079	Clearance Date
	Notes:

Applicant: Imperial Irrigation District
Address: 333 E. Barioni Blvd.
City/State/Zip: Imperial CA 92251
Phone: (760) 339-9109

Contents

18721

18723

18731

List of Tables

List of Figures

18744

Acronyms

°C	degrees Celsius
°F	degrees Fahrenheit
μg/g	micrograms per gram
μg/kg	micrograms per kilogram
μg/L	micrograms per liter
AAC	All American Canal
AAM	annual arithmetic mean
AB	Assembly Bill
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AF	acre feet/foot
AFY	acre feet per year
AGM	annual geometric mean
AOP	Annual Operating Plan
AQIA	air quality impact analysis
AQMP	Air Quality Management Plan
AWC	Arizona Wildlife of Concern
AZ DES	Arizona Department of Economic Security
BA	Biological Assessment
BACT	Best Available Control Technology
Basin	Colorado River Basin
Basin States	Arizona, Colorado, California, New Mexico, Utah, Wyoming
BCPA	Boulder Canyon Project Act of 1928
BIA	US Bureau of Indian Affairs
BLM	US Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern and Santa Fe

BO	Biological Opinion
BOD	biological oxygen demand
BOE	Bureau of Census
CAA	Federal Clean Air Act of 1970 and its 1977 and 1990 Amendments
CAAQS	California Ambient Air Quality Standards
California Plan	California's Colorado River Water Use Plan
CAP	Central Arizona Project
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDC	California Development Company
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CDMG	California Department of Conservation Division of Mines and Geology
CDOF	California Department of Finance
CEDD	California Employment Development Department
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHL	California Historical Landmark
CHRIS	California Historical Resources Information System
CID	Cibola Irrigation District
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Plan
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
COC	constituent of concern

COD	chemical oxygen demand
Compact	Colorado River Compact of 1922
Corps	US Army Corps of Engineers
CRA	Colorado River Aqueduct
CRBC	Colorado River Board of California
CRB RWQCB	Colorado River Basin Regional Water Quality Control Board
CRHR	California Register of Historic Places
CRSS	Colorado River Simulation System Model
CRWQCB	California Regional Water Quality Control Board
CRWUA	Colorado River Water Users Association
CSBOE	California State Board of Equalization
CSC	California species of special concern
CTR	California Toxics Rule
CVMSHCP	Coachella Valley Multiple Species Habitat Conservation Plan
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel scale
DCA	dichloromethane
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichlorethane
Decree	Decree in Arizona v. California
DEQ	Arizona Department of Environmental Quality
DOC	United States Department of Commerce
DOF	California Department of Finance
DOI	US Department of Interior
DOQQ	Digital Orthophoto Quarter Quadrangles
DOT	United States Department of Transportation

DPR	California Department of Parks and Recreation
Draft EIR/EIS	Draft Environmental Impact Report/Environmental Impact Statement
dw	dry weight
DWQIP	Drain Water Quality Improvement Plan
DWR	California Department of Water Resources
EBEP	Enclosed Bays Estuaries Plan
ECVP	Eastern Coachella Valley Plan
EDD	California Employment Development Department
EPA	United States Environmental Protection Agency
EPDC	expected peak day concentration
EQIP	Environmental Quality Incentives Program
ESA	Federal Endangered Species Act
ESP	Emergency Storage Project
ET	evapotranspiration
FAIRA	Federal Agriculture Improvement and Reform Act
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy Management Act
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act of 1981
ft	feet
ft/s	foot per second
FWQA	Federal Water Quality Administration
GIS	Geographic Information System
g/L	grams per liter
GM	geometric mean
HCP	Habitat Conservation Plan
HHI	health hazard index
IA	Implementation Agreement
ICAPCD	Imperial County Air Pollution Control District

ID	Irrigation District
IID	Imperial Irrigation District
IID Board	IID Board of Directors
IIDSS	Imperial Irrigation Decision Support System
ILC	Imperial Land Company
in/yr	inches per year
I-O	input-output
IOP	Inadvertent Overrun and Payback Policy
ISWP	Inland Surface Waters Plan
ITA	Indian Trust Asset
IWA	Imperial Wildlife Area
KAFY	thousand acre-feet per year
KCRC	Kumeyaay Cultural Repatriation Committee
kg/ha/yr	kilogram per hectare per year
KGRA	known geothermal resource areas
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hours
LCR	Lower Colorado River
LCRAS	Lower Colorado River Accounting System
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
L_{dn}	day/night average sound level
L_{eq}	equivalent noise level
LOS	level of service
LTVA	Long-Term Visitation Area
M	meter
MAF	million acre-feet
MAFY	million acre-feet per year
MAL	Maximum Allowable Limit
MCL	Maximum Contaminant Level

MCSP	Lower Colorado River Multi-Species Conservation Program
MDAQMD	Mojave Desert Air Quality Management District
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MHCP	Multiple Habitat Conservation Program
MHOCSP	Multiple Habitat Conservation and Open Space Program
MIG	Minnesota IMPLAN Group
MLD	Most Likely Descendant
mm	millimeter
MMI	Modified Mercalli Intensity
Model	Salton Sea Accounting Model
MOU	Memorandum of Understanding
mph	miles per hour
MSCP	Multi-Species Conservation Program
MSHCP	Multiple Species Habitat Conservation Plan
msl	mean sea level
MW	megawatt
MWD	Metropolitan Water District of Southern California
Mwhr	megawatt-hours
NAAQS	National Ambient Air Quality Standards
NCCP	National Communities Conservation Plan
N/DV	No. of collected samples per samples with detectable values
NECO	Northern California and Eastern Colorado Desert Coordinated Ecosystem Management Plan
NEPA	National Environmental Protection Act
NHPA	National Historic Preservation Act
NIB	Northerly International Boundary
NO_2	nitrogen dioxide
NOD	Notice of Determination
NOE	Notice of Exemption

NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NTP	Notice to Proceed
NTR	National Toxics Rule
NWR	National Wildlife Refuge
O&M	Operations and Maintenance
OHV	off-highway vehicle
O_3	ozone
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PEIR	Programmatic Environmental Impact Report
PL	Public Law
PM_{10}	particulate matter with a diameter of less than 10 micrometers
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PRC	Public Resources Code
Proposed Project	Water Conservation and Transfer Project
PSD	prevent significant deterioration
PUD	Public Utilities District
PVID	Palo Verde Irrigation District
QSA	Quantification Settlement Agreement
RCPG	Regional Comprehensive Plan and Guide
Reclamation	United States Department of Interior Bureau of Reclamation

ROC	reactive organic compounds
ROD	Record of Decision
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SANDAG	San Diego Association of Governments
SAR	sodium absorption ratio
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SDCWA	San Diego County Water Authority
SDG&E	San Diego Gas and Electric
Sea	Salton Sea
Secretary	Secretary of the Interior
Seven-Party Agreement	California Seven-Party Agreement of 1931
SHPO	State Historic Preservation Officer
SIA	Secretarial Implementation Agreement
SIP	State Implementation Plan
SLC	California State Lands Commission
SO_2	sulfur dioxide
SPRR	Southern Pacific Railroad
SR	State Route
SRA	State Recreation Area
SSA	Salton Sea Authority
SSAB	Salton Sea Air Basin
SVOC	semivolatile organic compounds
SVRA	State Vehicular Recreation Area
SWP	State Water Project

SWPPP	Stormwater Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
TBACT	toxics best available control technology
TCP	traditional cultural properties
TDS	total dissolved solids
THM	trihalomethane
TMDL	Total Maximum Daily Load
TRS	tailwater return system
TSS	total suspended solids
US	United States
USBEA	United States Department of Commerce Bureau of Economic Analysis
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound
Water Code	California Water Code
WA	Wildlife Area
WD	Water District
WMA	Wildlife Management Area
WRCC	Western Regional Climate Center
ww	wet weight

Glossary

Absorption	The process by which a substance is taken into and included within another substance (i.e., the intake of water by soil or the intake of gases, water, nutrients, or other substances by plants).
Acre-foot (AF)	A quantity of water sufficient to cover one acre to a depth of one foot (i.e., 43,560 cubic feet or 325,851 gallons).
Existing Setting	Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as a result of a proposed human action.
Allocation or Allotment	Refers to the distribution of water to specific persons or legal entities. A written contract establishes the legal entitlement to consume shares of a specific quantity of water.
Apportionment	For this Draft EIR/EIS, refers to the allocation of water available to each Lower Division state in normal, surplus, or shortage year, as set forth, respectively, in Articles II (B)(1), II (B)(2), and II (B)(3) or the Decree in *Arizona v. California*.
Appropriative Right	A right based on physical control of water and since 1914, a state-issued permit of license for its beneficial use.
Aqueduct	A pipe or channel designed to transport water from a remote source, usually by gravity.
Aquifer or Groundwater Basin	A geologic formation that stores, transmits and yields significant quantities of water to wells and springs.
Backwater	A relatively small, shallow area of a river with little or no current.
Benthic	Of, relating to, or occurring at the bottom of a body of water.
Biological Opinion	Document stating USFWS and NMFS opinion as to whether a federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat.
Candidate Species	Plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by USFWS.

Carriage Water	An additional amount of water or flow required to account for seepage and evaporation losses, measurement discrepancies between farm turnouts, and lateral heading measurements (the measurement device at the lateral heading may not equal the sum of farm turnout measurement devices along the lateral), and water depths (hydraulic head) in some cases to ensure the full delivery demands at farm turnouts particularly at the end of a lateral. For example, if a water used at the end of a lateral requires 2 cfs, more than likely 2.1 cfs is diverted at the lateral heading to account for the above items. Open channel delivery systems, lined or unlined, are not 11 percent efficient.
Colorado River Basin	The drainage basin of the Colorado River in the US.
Common Law	A body of court decisions based on custom, traditional usage and percent, as that of England, rather than codified written laws.
Conjunctive Use	The planned use and storage of surface and groundwater supplies to improve water supply reliability.
Consumptive Use	A use that makes water unavailable for other uses, usually by permanently removing it from local surface or groundwater storage as the result of evaporation and/or transpiration. Does not include evaporative losses from bodies of water. For this Draft EIR/EIS, the total water diversions from the Colorado River, less return flows to the River.
Consumptive Use of Applied Water	Consumptive use less the water supplied by precipitation.
Critical Habitat	Specific areas with physical or biological features essential to the conservation of a listed species and that may require special management considerations or protection. These areas have been legally designated via *Federal Register* notices.
Cropping Pattern	The acreage distribution of different crops in any period, usually one year in a given area such as a county, water agency, or farm.
Cultural resource	Building, site, district, structure, or object significant in history, architecture, archeology, culture, or science.
Deep percolation	The movement of water by gravity downward through the soil profile beyond the crop root zone.
Depletion	Loss of water from a stream, river, or basin resulting from consumptive use.

Discretionary Transfer Amount	The optional conservation and transfer of an additional amount of water up to 100 KAFY to CVWD and/or MWD, contingent upon IID's determination that the additional conserved water is available and SDCWA's determination of need.
Endangered Species	A species or subspecies (plant or animal) whose survival is in danger of extinction throughout all or a significant portion of its range.
Endemic	Existing naturally in the environment.
Entitlement	For this Draft EIR/EIS, refers to an authorization to beneficially consume Colorado River water pursuant to: (1) a decreed right; (2) a contract with the Secretary; or (3) a Secretarial reservation of water.
Environmental Impact Report (EIR)	A California state environmental decisionmaking report pursuant to the California Environmental Quality Act (CEQA).
Environmental Impact Statement (EIS)	A federal environmental decisionmaking report pursuant to the National Environmental Policy Act (NEPA).
Eutrophic	Describing a shallow water body with abundant organic matter and deficient levels of dissolved oxygen.
Evaporation	The process of liquid water becoming water vapor, including vaporization from water and land surfaces, but not from plant surfaces.
Evapotranspiration (ET)	The sum of water transpired and evaporated from plants and surrounding soil surfaces, expressed in feet per year.
Fallowed land	Land normally used for crop production but left uncultivated for one or more growing seasons.
Fingerlings	Juvenile forms of fishes.
Fishery	A collection of fishes that are of sport or commercial value.
Flow	Volume of water passing a given point per unit of time expressed in cfs. *Peak flow*- Maximum instantaneous flow in a specified period of time. *Return flow*- Portion of water previously diverted from a stream and subsequently returned to that stream or to another body of water.

Food web	Food and feeding interrelationship between plants and animals.
Forage fish	A fish that is eaten by other fish or other animals.
Gaging station	Specific location on a stream where systematic observations of hydrologic data are obtained through mechanical or electrical means.
Groundwater	Waters in groundwater basins (aquifers), underground streams, and underground flow of a surface stream
Habitat	(1) A specific set of physical conditions that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space. (2) The natural home or dwelling place of an organism.
Headgate	A manmade structure that diverts surface water.
Headwater	The source and upper part of a stream, lake, or river.
Herbivorous	Plant eating.
Hydroelectric Power	Electrical capacity produced by falling water.
Hydrology	The study of the science of water focussing on natural runoff and its effect on streamflow
Invertebrates	Animals without backbones.
Irrecoverable Water	That portion of delivered water degraded through beneficial use to a level that makes it uneconomical to reclaim or reuse.
Lacustrine	Lake-type environments with slower moving waters.
Lacustrine Basin	A low area formed at the bottom of a lake from material deposited in lake water and exposed when the water level was lowered.
Lateral Canal	Carries water from main canals to agricultural fields.
Law of the River	As applied to the Colorado River, a combination of federal and state statutes, interstate compacts, court decisions and decrees, federal contracts, an international treaty with Mexico, and formally determined operating criteria.
Leach Water	Water applied to flush excess salts from the root zone.
Lead Agency	The agency initiating and overseeing the preparation of an EIR and/or EIS.
Load	Amount of electrical power or energy delivered or required at a given point.

Lower Basin	The part of the Colorado River watershed below Lee Ferry, Arizona; covers parts of Arizona, California, Nevada, New Mexico, and Utah.
Lower Division	A division of the Colorado River system that includes the states of Arizona, Nevada, and California.
Lower Division States	Arizona, California, and Nevada as defined by Article II of the Colorado River Compact of 1922.
Macroinvertebrate	Animals without backbones that are large enough to be seen with the naked eye.
Mean Sea Level	National Geodetic Vertical Datum (NGVD) of 1929.
Megawatt (MW)	One million watts of electrical power (capacity).
Megawatt hour (MWh)	One million watt-hours of electrical energy.
Natural flow	Water flow that would exist without reservoir regulation, depletion, or out-of-basin diversions.
Nonoverlying	Land which is not located above a common aquifer and does not possess a shared right to a groundwater aquifer.
Nonriparian	Not pertaining to the bank of a river or any area where water naturally touches land.
Omnivorous	Meat and plant eating.
Overlying Right	A concept in which all property owners above a common aquifer possess a shared right to reasonable use of the groundwater aquifer.
Percolation	A qualitative term applying to the downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of one or less.
Perennial plant	A plant that has a life cycle of 3 years or more.
Permeability	The rate at which water moves through a wetted soil, expressed in inches per hour.
PH	A measure of acidity; equal to the negative logarithm of the hydrogen ion concentration.
Piscivorous	Fish eating.
Phytoplankton	Free-floating plants that are usually one-celled or composed of few cells.
PM_{10}	Particulate matter less than 10 microns in diameter.

Point of Diversion	The point at which water is diverted from flowing in a particular direction.
Precipitation	The total measurable supply of water to all forms of falling moisture, including dew, rain, mist; snow, hail, and sleet; usually expressed as depth of water on a horizontal surface on a daily, monthly, or yearly basis.
Present Perfected Rights	Water rights based upon diversion and beneficial use prior to the effective date of the Boulder Canyon Project (June 25, 1929). Generally these "perfected" water rights have a high priority as a result of their early date of diversion.
Primary Transfer Amount	An annual amount of water to be transferred to SDCWA as determined by IID; between a minimum of 130 KAFY and a maximum of 200 KAFY.
Priority	A ranking with respect to diversion of water relative to other water users.
Quantification Period	The 75-year period that the IA and QSA would be in effect.
Reach	A specified segment of a stream, channel, or other water conveyance.
Refugia	Isolated habitats that retain environmental conditions that were once widespread.
Reasonable and Beneficial Use	Refers to the appropriate consumptive use of water by an entitlement holder based on such factors as location of use, purpose of use, types of crops, condition of delivery facilities and past record of water orders. A California constitutional requirement that all water resources must be put to beneficial use preventing waste of unreasonable use or unreasonable method of use.
Return Flow	The portion of diverted water that returns to groundwater or stream system for potential rediversion or in-stream uses.
Right	A claim or title to anything that is enforceable by law such as a right to use water.
Riparian	Pertaining to the bank or shore of a water body.
Riverine	Riverlike environments with relatively fast-moving waters.
RiverWare	A commercial river system simulation computer program that was configured to simulate operation of the Colorado River for this EIS.

Ruderal	Vegetation that grows in response to human disturbances (e.g., along roadsides, field borders, or railroad rights of way).
Runoff	Water that leaves an area or field as surface flow.
Salinity	Total amount of dissolved solids in water in parts per million by weight when all carbonate is converted to oxide, bromide and iodide to chloride, and all organic matter is oxidized. Roughly equivalent to milligrams per liter.
Secretary	Secretary of the Interior of the United States of America.
Sediment	Unconsolidated solid material that comes from weathering of rock and is carried by, suspended in, or deposited by water or wind.
Seepage	Downward or lateral movement of water from a reservoir, canal, or pipe through a pervious or semipervious bottom.
Soluble	Capable of being dissolved in a fluid.
Statutory Law	A body of law based on statutes enacted by a legislature.
Structure (soil)	The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates.
Substrates	Solid materials to which organisms are attached or upon which they live.
Tailwater	Surface water runoff occurring at the end of an irrigated field when water that had been applied exceeds soil infiltration rates.
Texture (soil)	Relative proportion of sand, silt, and clay particles in a particular type of soil.
Threatened Animal Species	Any animal species likely to become endangered within the foreseeable future throughout all or a significant part of its range.
Threatened Plant Species	Any species likely to become endangered within the foreseeable future throughout all or a significant portion of its range, including species categorized as rare, very rare, or depleted.
Tile Water	Water collected in the tile drains on irrigated areas.
Tolerance Limits	Maximum or minimum criteria required to support life.
Total Dissolved Solids (TDS)	The total dry weight of solids dissolved in a liquid per unit volume (e.g., milligrams per liter).

Transpiration	The physiological process in which plant tissues give off water vapor to the atmosphere.
Tributary	River or stream flowing into a larger river or stream.
Trophic Dynamics	The interrelationship between different levels in the food chain depicting the passage of energy between trophic levels.
Trophic Levels	A nourishment level in a food chain in which organisms obtain their food in the same number of steps or in the same general manner. Plant producers constitute the lowest level, followed by herbivores and a series of carnivores at the higher levels.
Turnout	Device used on canals and laterals to deliver water to individual farm fields.
Upper Basin	The part of the Colorado River watershed above Lee Ferry, Arizona; that covers parts of Arizona, Colorado, New Mexico, Utah, and Wyoming.
Upper Division	A division of the Colorado River system that includes the states of Colorado, New Mexico, Utah, and Wyoming.
Vegetation type	A plant community with specific distinguishable characteristics described by the dominant vegetation present.
Water Conservation	Planned management to prevent or reduce loss or waste of water to enhance beneficial uses.
Watershed	An area that, because of topographic slope contributes water to a specified surface water drainage system, such as a stream or a river.
Wetlands	Periodically, seasonally, or continuously submerged landscapes populated by species and/or life forms differing from adjacent communities.
Zanjero	An IID employee responsible for control of water within a "run" of laterals and/or minor canals and at farm turnouts within his run or area of responsibility; also called the water tender or ditchrider.

Executive Summary

Introduction

This Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) addresses the environmental impacts that could result from implementing the proposed Imperial Irrigation District (IID) Water Conservation and Transfer Project (collectively referred to as the Proposed Project or Project). The Draft EIR/EIS was prepared in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) to inform the public and meet the needs of local, state, and federal permitting agencies. The United States (US) Department of the Interior (DOI), Bureau of Reclamation (Reclamation) is the federal Lead Agency under NEPA, and IID is the state Lead Agency under CEQA.

The Proposed Project involves implementation by IID of a long-term (75 years) water conservation program to conserve up to 300 thousand acre-feet per year (KAFY) of Colorado River water and the transfer of this conserved water by IID to the San Diego County Water Authority (SDCWA), Coachella Valley Water District (CVWD), and/or Metropolitan Water District of Southern California (MWD). The Proposed Project also includes a Habitat Conservation Plan (HCP) to address federal and state endangered species requirements under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). The terms of the water conservation and transfer transactions are set forth in the Agreement for Transfer of Conserved Water (IID/SDCWA Transfer Agreement) executed by IID and SDCWA in 1998, and the proposed Quantification Settlement Agreement (QSA) to be executed by IID, CVWD, and MWD.

If the QSA is executed, it would be implemented through Reclamation's draft Implementation Agreement (IA), which would commit the Secretary of the DOI (Secretary) to make Colorado River water deliveries in accordance with the QSA terms and conditions. Reclamation is preparing a Draft EIS for the IA; this EIS will also include analysis of Reclamation's Inadvertent Overrun and Payback Policy (IOP), which would establish requirements for payback of inadvertent overuse of Colorado River water. The IOP is a condition precedent to the execution of the IA and QSA and must be in place by the time these agreements go into effect. The Draft IA EIS also covers implementation of biological conservation measures to offset impacts of the Proposed Project on federally listed fish and wildlife species and their critical habitats in the historic floodplain of the LCR.

Project Background and History

IID's initial interest in developing water conservation and transfer projects was a response to proceedings before the State Water Resources Control Board (SWRCB) in the 1980s regarding IID's use of water. In both Decision 1600 (SWRCB 1984) and Order 88-20 (SWRCB 1988), SWRCB ordered IID to develop and implement a meaningful water conservation plan. In Decision 1600, SWRCB concluded: "A transfer of conserved water could partially satisfy future Southern California needs."

In 1996, the Secretary deferred further consideration of any long-term Colorado River surplus guidelines until California put in place a realistic strategy to ensure that it would be able to reduce its annual use of Colorado River water to 4.4 million acre-feet (MAF) in normal years or to meet its needs from sources that do not jeopardize the apportionments of others. Development of this strategy was considered by the Secretary to be a prerequisite for approval of any further cooperative Colorado River water transfers between California agencies. In an effort to prepare for likely reductions of Colorado River water available to California, the Colorado River Board of California prepared California's draft Colorado River Water Use Plan (California Plan).

The California Plan provides a framework for the state to coordinate and assist in the cooperative implementation of diverse programs, projects, and other activities that would reduce California's use of Colorado River water and facilitate conformance with California's annual apportionment. It involves the conservation of water within southern California and the transfer of conserved water from agricultural to predominantly urban uses. It also identifies future groundwater conjunctive use projects that would store Colorado River water when available. The proposed QSA is designed to include key contractual arrangements among IID, MWD, and CVWD, which are needed to implement major components of the California Plan. The Proposed Project, whether implemented with or without the QSA, would accomplish a key goal of the California Plan by transferring up to 300 KAFY of Colorado River water from IID to other users.

The Secretary has developed specific Interim Surplus Guidelines that will provide mainstream users of Colorado River water, particularly those in California that currently use surplus water, with a greater degree of predictability concerning the likelihood of a surplus determination in a given year during an interim period (from 2002 to 2016). The Interim Surplus Guidelines will be used to determine the conditions under which the Secretary may declare the availability and volume of surplus water for use within the States of Arizona, California, and Nevada. The guidelines facilitate California's transition to a reduced supply of Colorado River water, and adoption of the guidelines is a condition precedent to implementation of the QSA. The guidelines would be applied each year as part of the Annual Operating Plan for Colorado River Reservoirs. The guidelines provide certain benchmarks, or milestones, for reduction of California's Colorado River water use. In the event that these milestones are not achieved, the guidelines expressly provide that subsequent surplus determinations would be made on a more conservative basis until such time as California is in compliance with the required reductions.

Project Overview

IID's long-term water conservation program would be implemented within IID's water service area in Imperial County, California, which consists of approximately 500,000 acres. The six geographic subregions that are in the region of influence of the Proposed Project are as follows:

- **LCR:** The Lower Colorado River (LCR) and its historic 100-year floodplain, from Lake Havasu at Parker Dam to Imperial Dam.

- **IID Water Service Area and AAC:** The IID water service area and the All American Canal (AAC) right-of-way, which extends from the Imperial Valley east to Imperial Dam. As an irrigation district, IID holds rights to take water from the Colorado River and deliver it to farmers, tenants, and landholders in Imperial County. The water is delivered through the AAC into IID's system of irrigation canals that serve the lands within the IID water service area. IID's drainage system collects drainage water from the farmlands and conveys it to the New and Alamo Rivers and the Salton Sea.
- **Salton Sea:** The Salton Sea and its shoreline back to 0.5 feet around the Sea.
- **SDCWA Service Area:** The SDCWA service area, which includes 24 retail water agencies that serve about 90 percent of the population of San Diego County.
- **MWD Service Area:** The MWD service area, which includes 27 cities and water districts that provide water to about 17 million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura Counties.
- **CVWD Service Area:** The CVWD service area, which covers about 640,000 acres mostly in Riverside County but extending into Imperial and San Diego Counties. However, the Proposed Project affects only the portion of the CVWD service area that is entitled to receive Colorado River water, identified as Improvement District No. 1.

The six geographic subregions are shown in Figure 1-1 in Chapter 1 in this Draft EIR/EIS.

Under the Proposed Project, water conservation would be undertaken in the IID water service area using one or more of the following measures:

- On-farm irrigation system improvements, including on-farm irrigation management techniques, which would be implemented by landowners and tenants within IID's water service area.
- Improvements by IID to its water delivery system.
- Subject to certain contractual limitations set forth in the IID/SDCWA Transfer Agreement, fallowing measures to conserve water.

The water conserved by IID would be transferred to SDCWA, CVWD, and/or MWD, for use within the transferees' respective service areas.

Under the Proposed Project, the water transfer would occur in accordance with the terms of the IID/SDCWA Transfer Agreement and, as an alternative scenario that would apply if the QSA is finalized and implemented, in accordance with the modified water transfers provided for under the terms of the QSA. The Proposed Project thus includes the conservation by IID of up to 300 KAFY of water and transfer of that water under one of the following two scenarios:

- **IID/SDCWA Transfer Agreement Implementation Only:** Up to 300 KAFY is transferred to SDCWA pursuant to the terms of the IID/SDCWA Transfer Agreement. This scenario will apply if the QSA is not approved and implemented in its entirety.
- **QSA Implementation:** SDCWA would be limited to 130 to 200 KAFY from IID under the terms of the IID/SDCWA Transfer Agreement; CVWD would have the option of

acquiring up to 100 KAFY of water conserved by IID, in two increments of 50 KAFY each, for use within CVWD's service area. In addition, the QSA would grant MWD an option to acquire all or any portion of this 100 KAFY that CVWD does not acquire, for use in MWD's service area. Under the proposed QSA, the terms of the proposed water transfers to CVWD and MWD are set forth in agreements to be executed between IID and each recipient. This scenario will apply if the QSA is approved and implemented in its entirety.

Under the terms of the IID/SDCWA Transfer Agreement and the QSA and as part of the Proposed Project, IID would voluntarily limit its annual diversions of Colorado River water to 3.1 million acre-feet per year (MAFY), including the water conserved for transfer. Under the QSA, this commitment is subject to Reclamation's implementation of its proposed IOP, which would allow IID to pay back inadvertent exceedances of this diversion cap over a period of years.

The Proposed Project also includes implementation of a HCP to support its Incidental Take Permit applications in conformance with § 10(a)(1)(B) of ESA and § 2081(b) of CESA. The Incidental Take Permits would allow IID to conduct otherwise lawful activities that incidentally take federal and/or state listed and other specified unlisted species that are proposed for coverage in IID's HCP.

Through the HCP, IID is committing to certain management actions that would avoid, minimize, and mitigate the impacts of any take of proposed covered species that might result from covered activities, including aspects of IID's implementation of the IID/SDCWA Transfer Agreement, the QSA, and continuation of its routine water-related O&M activities. O&M activities are included to ensure that IID obtains all ESA and CESA approvals required to continue operation of its irrigation and drainage system for the duration of the Proposed Project. Issuance of an Incidental Take Permit by USFWS constitutes a federal action that requires evaluation under NEPA.

The geographic area covered by the HCP includes all lands comprising the approximately 500,000 acres of IID's water service area (including canal rights-of-way), the Salton Sea, lands owned by IID outside of its water service area that are currently submerged beneath the Salton Sea, and IID's rights-of-way along the AAC downstream from the point of diversion on the LCR, including the desilting basins at Imperial Dam. In addition, the HCP covers any take of covered species that use the Salton Sea if the take is as a result of IID's activities.

The HCP covers 96 listed and unlisted species under ESA and CESA and addresses the activities necessary to implement the Proposed Project within the IID water service area as well as IID's ongoing operation and maintenance (O&M) activities. The HCP includes conservation strategies for the five main habitats used by covered species in the HCP geographic area, including drain habitat, tamarisk scrub habitat, agricultural fields, the Salton Sea, and desert habitat. In addition, the HCP includes species-specific conservation strategies for the burrowing owl, the desert pupfish, and bats.

Project Purpose, Need, and Objectives

The purpose and need for the Proposed Project are described in accordance with NEPA and the objectives are described in accordance with CEQA.

Water Conservation and Transfer Objectives

The water conservation and transfer component of the Proposed Project is defined by the negotiated contractual provisions of two separate agreements: the IID/SDCWA Transfer Agreement and the proposed QSA. These agreements are intended to advance certain individual objectives of the parties to the agreements as well as certain common objectives. The purpose of this component of the Project is to meet the proponents' objectives and expectations for each agreement.

IID has determined that water conservation and transfer projects would provide a means for conserving water, benefiting IID and the recipient water agencies and their service areas in southern California. Water conservation and transfer projects accomplish two objectives: they respond to the SWRCB directive that IID develop and implement a conservation program, and they protect IID's water rights. Under California laws designed to encourage water conservation and voluntary transfers, title to conserved water remains with the transferring entity. On this basis, IID can allow conserved water to be used by another entity while retaining its historic water rights, which have been, and continue to be, the basis for economic activity in the Imperial Valley. Proceeds from a water transfer transaction could be used to fund the costs of implementing conservation measures, particularly the cost of on-farm conservation measures, as well as environmental mitigation costs and other implementation costs. In addition, IID anticipates that proceeds from the sale of conserved water would provide economic benefits to IID, the community, and cooperating landowners and tenants in the Imperial Valley.

The IID/SDCWA Transfer Agreement fulfills the following objectives for IID:

- To conserve water and transfer it in a market-based transaction that provides payments to IID to fund a water conservation program, including the cost of on-farm and system improvements, environmental mitigation costs, and other implementation costs.
- To develop a water conservation program that includes the voluntary participation of Imperial Valley landowners and tenants so that on-farm conservation measures, as well as water delivery system conservation measures, can be implemented.
- To implement a water conservation and transfer program without impairing IID's historic senior-priority water rights, in a manner consistent with state and federal law.
- To provide an economic stimulus to Imperial Valley's agricultural economy and the surrounding community.

The IID/SDCWA Transfer Agreement fulfills the following objectives for SDCWA:

- To acquire an independent, alternate, long-term water supply that provides drought protection and increased reliability for municipal, domestic, and agricultural uses.

- To diversify its sources of water supply and reduce its current dependence on a single source for imported water, in order to enhance the reliability of its water supply.
- To establish a stabilized, competitive price for a significant portion of its water supply.

Both the IID/SDCWA Transfer Agreement and the QSA incorporate crucial elements of California's draft Colorado River Water Use Plan (California Plan), which provides a framework to assist California in reducing its use of Colorado River water to its apportionment of 4.4 MAF in a normal year, and to mitigate the impact on California water agencies and water users associated with the reduction in diversions from the Colorado River. The broad purpose of the QSA, in particular, is to facilitate key elements of the California Plan. The parties to the QSA, which are IID, CVWD, and MWD, have determined that the QSA fulfills the following collective objectives of its proponents:

- To settle, by consensual agreement, long-standing disputes regarding the quantity, priority, use, and transferability of Colorado River water.
- To agree on a plan for the future distribution of Colorado River water among IID, CVWD, and MWD for up to 75 years, based on Colorado River water budgets for IID, CVWD, and MWD.
- To facilitate agreements and actions which, when implemented, would enhance the certainty and reliability of Colorado River water supplies available to IID, CVWD, and MWD, and would assist these agencies in meeting their water demands within California's apportionment of Colorado River water.
- To identify agreed-on terms and conditions for the conservation and transfer of specific amounts of Colorado River water within California.
- To provide incentives to promote conservation of Colorado River water.

Habitat Conservation Plan Objectives

For IID, the objectives of the HCP are:

- To minimize and mitigate the impacts of any take of covered species that might occur as a result of the implementation of the IID/SDCWA Transfer Agreement, the IID water conservation and transfer projects provided for under the QSA, the consensual cap on Colorado River water diversions by IID, and continuation of IID's routine O&M activities in connection with IID's water irrigation and drainage system.
- To provide regulatory assurances to IID that additional mitigation measures to address impacts on covered species would not be required beyond the measures described in the HCP.
- To support issuance of Incidental Take Permits under both the federal and the state Endangered Species Acts for the covered activities.

Reclamation's Purpose and Need

The Secretary proposes to take the federal action necessary to allow the implementation of the Proposed Project. Therefore, Reclamation's underlying purpose and need for the

Proposed Project are to facilitate implementation of the IID/SDCWA Transfer Agreement and the QSA. The Secretary's proposed draft IA represents the federal commitment to implement water deliveries to allow implementation of the QSA; the Proposed Project is a component of the IA, assuming full implementation of the QSA. A comparable implementation agreement would be required to represent the federal commitment to implement water deliveries to allow implementation of the IID/SDCWA Transfer Agreement, if the QSA is not fully implemented. The need for the federal action is to assist California in reducing its use of Colorado River water to its 4.4 MAF apportionment in a normal year. This reduction in California's use of Colorado River water would benefit the entire Colorado River Basin.

USFWS' Purpose and Need

The ESA is intended to identify species needing protection, means to determine the type of protective measures needed, and enforcement measures. The US Secretaries of the Interior (through USFWS) and Commerce (National Marine Fisheries Service, NMFS) are responsible for implementing the ESA.

The ESA provides for a process by which species are reviewed to determine whether they are to be listed and receive protection under the ESA. If a species is listed, this does not mean that individuals or habitat of that species cannot be affected. Sections 7 and 10 of the ESA provide provisions to "take" threatened or endangered species if consultation has concluded with a take authorization. Section 10(a)(1)(B) of the ESA allows USFWS to issue an Incidental Take Permit authorizing take that is incidental to an otherwise lawful activity if the applicant provides a conservation plan meeting the following factors identified in Section 10(a)(2)(B):

- The taking will be incidental.
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.
- The applicant will ensure that adequate funding for the plan will be provided.
- The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.
- The measures, if any, required under subparagraph (A)(iv) (i.e., any additional measures that USFWS may require as being necessary or appropriate for purposes of the plan) will be met, and USFWS has received any other assurances it requires that the plan will be implemented.

USFWS will determine whether the HCP meets the requirements of ESA and is sufficient to support issuance of Incidental Take Permits. The purpose and need for the HCP is:

- To minimize and mitigate the effects of implementing the covered activities described in the HCP on the covered species identified in the HCP.
- To satisfy the requirements for issuance of Incidental Take Permits pursuant to Section 10(a) of ESA by specifying measures to minimize the effects of the covered activities as well as measures that ensure habitat availability for covered species.

Other Proposed Agreements, Plans, and Projects Related to Resources Affected by the Proposed Project

There are several planned water resources management actions and programs that are closely related to the Proposed Project and that have undergone or are currently undergoing environmental review. Key agreements, programs, and projects that are related to the Proposed Project are listed below.

Proposed Quantification Settlement Agreement

The QSA is a consensual reallocation of Colorado River water based on a series of proposed agreements. These proposed agreements include water conservation/transfer and exchange projects among IID, CVWD, and MWD, including the Proposed Project, assuming implementation under the Proposed Project's second scenario (QSA Implementation). The proposed QSA provides part of the mechanism for California to reduce its water diversions from the Colorado River in normal years to its apportioned amount of 4.4 MAF under the California Plan.

IID, MWD, CVWD, and SDCWA are the co-lead agencies for the preparation, in accordance with CEQA, of a *Draft Program EIR for the Implementation of the Colorado River Quantification Settlement Agreement* (Draft QSA PEIR). The Draft QSA PEIR is a programmatic assessment of the environmental effects of implementation of the QSA by these California water agencies and is intended to provide an overall assessment of the multiple projects included in the QSA. The federal approvals required to implement water deliveries in accordance with the QSA will be evidenced by the Secretary's execution of the IA (see below).

Proposed Implementation Agreement, Inadvertent Overrun and Payback Policy, and Biological Conservation Measures

Implementation of the QSA requires certain federal actions, which are set forth in a proposed IA to be executed by the Secretary. To allow for the implementation of the QSA, the IA would commit the Secretary to make Colorado River water deliveries in accordance with the terms of the IA. Execution of the IA would result in changes in the amount and/or location and use of deliveries of Colorado River water which are necessary to implement the QSA.

Reclamation also proposes to adopt an Inadvertent Overrun and Payback Policy (IOP), which establishes requirements for payback of inadvertent overuse of Colorado River water by Lower Basin Colorado River water users. Reclamation's adoption of the IOP is a condition precedent to the execution of the IA and QSA, and the IOP must be in place by the time these agreements go into effect.

Reclamation also proposes to implement certain biological conservation measures to avoid potential impacts to federally listed fish and wildlife species or their associated critical habitats within the historic floodplain of the Colorado River, between Parker Dam (including Lake Havasu to its full pool elevation) and Imperial Dam, in accordance with USFWS's January 2001 Biological Opinion (BO). Reclamation is the lead agency for preparation, in accordance with NEPA, of a *Draft EIR for the Implementation Agreement (IA), Inadvertent Overrun and Payback Policy (IOP), and Related Federal Actions* (Draft IA EIS).

Proposed Lower Colorado River Multi-Species Conservation Program

The LCR MSCP is a partnership of state, federal, tribal, and other public and private stakeholders; its purposes are as follows:

- Conserve habitat and work toward the recovery of "included species" within the historic floodplain of the LCR, pursuant to ESA, and reduce the likelihood of additional species listings under the ESA.
- Accommodate current water diversions and power production and optimize opportunities for future water and power development, to the extent consistent with law.
- Provide the basis for federal ESA and CESA compliance via incidental take authorizations resulting from the implementation of the first two purposes.

The LCR MSCP covers the mainstream of the LCR from below Glen Canyon Dam to the southerly international boundary with Mexico. The program area includes the historic floodplain and reservoir full-pool elevations. Conservation measures would focus on the LCR from Lake Mead to the international boundary. The program is planned to be implemented over a 50-year period.

Proposed Salton Sea Restoration Project

Implementation of the IID/SDCWA Transfer Agreement and the QSA would change the amount of drainage water that enters the Salton Sea. The Salton Sea Restoration Project is evaluating actions to stabilize the elevation and reduce the salinity of the Salton Sea, pursuant to the Salton Sea Reclamation Act of 1998 [Public Law (PL) 105-372]. A revised draft EIS/EIR, including revised alternatives and modeling and impact analyses, is currently being prepared.

Both the Proposed Project and the Salton Sea Restoration Project have the potential to affect environmental resources at the Salton Sea. However, they are separate projects with different objectives and different timelines for implementation. The Lead Agencies for this Draft EIR/EIS have indicated that the Proposed Project must be assessed now so that, if approved, it will be available to provide reliable supplies of Colorado River water to California water agencies as early as 2002. Timely implementation of the Proposed Project will assist in meeting time deadlines for California's reduction of its Colorado River water use to 4.4 MAF in a normal year and in satisfying the requirements of Reclamation's Interim Surplus Guidelines Record of Decision (ROD). In contrast, no preferred alternative has yet been identified for the Salton Sea Restoration Project, and the project has not been authorized, approved, or funded by Congress. Implementation of the Proposed Project is not inconsistent with subsequent implementation of a restoration project for the Salton Sea.

Proposed Coachella Valley Water Management Plan

CVWD has prepared the Coachella Valley Water Management Plan to establish an overall program for managing its surface and groundwater resources in the future. The plan involves several actions to reduce the current overdraft of the groundwater in the CVWD service area. These actions include increased use of Colorado River water to reduce the need to pump groundwater, water recycling, and conservation measures to decrease the overall consumption of water. CVWD is the lead agency for preparation, in accordance with CEQA, of a *Draft Program EIR for the Groundwater Management Plan* (Draft CVWD Water Management PEIR), including the effects of receipt and use of conserved water by CVWD within its service area pursuant to the QSA.

A substantial portion of the additional water to be used from the Colorado River is associated with the implementation of the QSA. Under the QSA, from 55 to 155 KAFY of additional Colorado River and State Water Project (SWP) water would be used to replace an equivalent portion of the groundwater now used. Reducing the amount of groundwater pumping and increasing the use of Colorado River water would allow the overdrafted aquifer to begin to recover. Other elements of the Coachella Valley Water Management Plan are not dependent on implementation of the QSA.

Alternatives to the Proposed Project

Project alternatives were selected in accordance with both the CEQA Guidelines and NEPA requirements. A comprehensive alternatives identification, screening, and selection process evaluated 14 alternatives (including the No Project alternative), four of which were determined to: (1) meet most of the Project objectives; (2) have the potential to reduce impacts when compared to the Proposed Project; and/or (3) be potentially feasible. These four alternatives are carried forward for analysis in this Draft EIR/EIS and are described below.

Alternative 1: No Project

The No Project alternative is the scenario under which the Proposed Project is not constructed, permitted, nor implemented. The No Project alternative is not the environmental status quo. Rather, it is defined as "existing environmental conditions," as well as what would reasonably be expected to occur in the foreseeable future if the Proposed Project were not approved, based on current plans and consistent with available infrastructure. Under the No Project alternative, the IID/SDCWA Transfer Agreement would not be implemented, the QSA would not be finalized and implemented, and the HCP would not be finalized and implemented.

Alternative 2: Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-Farm Irrigation System Improvements as Exclusive Conservation Measure)

Alternative 2 is a scaled back version of the Proposed Project/HCP and includes only the minimum amount of water that could be transferred under the terms of the IID/SDCWA Transfer Agreement, which is 130 KAFY. The 130 KAFY would be conserved exclusively by on-farm irrigation system improvements in the IID water service area. It is important to note that Alternative 2 would not comply with the QSA (if the QSA were finalized) because no water would be made available for transfer to either CVWD or MWD. Under Alternative 2, the water conveyance methods of the Proposed Project would also apply (i.e., water transferred from IID to SDCWA would be diverted at Parker Dam and conveyed via the CRA).

This alternative was developed to reduce the impacts of the Proposed Project by reducing the amount of water conserved. Under Alternative 2, less water would be conserved and transferred than under the Proposed Project.

Alternative 2 was also anticipated to have an incrementally lower level of take of listed species and their habitats and less impact when compared to the amount of water conserved under the Proposed Project. However, reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements for biological resources. Potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar to those under the Proposed Project. Habitat conditions along the AAC would remain relatively unchanged. IID's ongoing O&M activities would be the same as those outlined in the proposed HCP. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP.

Alternative 3: Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

Alternative 3 represents a middle level of conservation between the Proposed Project and Alternative 2 by providing for water conservation and transfer of up to 230 KAFY using any type of conservation measure, including on-farm irrigation system improvements, water delivery system improvements, and/or fallowing. The first 130 KAFY would be transferred to SDCWA, and the remaining 100 KAFY would be conserved and transferred either to SDCWA or to CVWD and/or MWD. Water transferred from IID to SDCWA or MWD would be diverted at Parker Dam and conveyed via the CRA. Water transferred to CVWD would remain in the LCR; diversion would occur at Imperial Dam and water would be conveyed to the CVWD service area via the Coachella Canal.

As described under Alternative 2, alternatives were developed to minimize Project-related impacts. Under this alternative, less water would be conserved and transferred than under the Proposed Project.

This alternative was also anticipated to have an incrementally lower level of take and less impact relative to the amount of water conserved under the Proposed Project. However, as described under Alternative 2, reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements for biological resources. Potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar to those under the Proposed Project. Habitat conditions along the AAC would remain relatively unchanged. IID's ongoing O&M activities would be the same as those outlined in the proposed HCP. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP.

Alternative 4: Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing as Exclusive Conservation Measure)

Alternative 4 assumes that fallowing, rather than other conservation methods, would be the exclusive measure used to conserve water. Although fallowing is part of the water conservation program anticipated by the Proposed Project, fallowing as the exclusive conservation measure under Alternative 4 has been isolated as a separate alternative to identify its effects separately.

Fallowing of farmland could be used to meet water conservation objectives because it could reduce the amount of irrigation water that IID would be required to deliver to its water service area. Fallowing is defined as the non-use of farmland for crop production in order to conserve irrigation water, on a short-term or long-term basis.

To implement Alternative 4, the IID/SDCWA Transfer Agreement would need to be amended to allow fallowing as an acceptable method of on-farm water conservation under landowner contracts. The IID Board would also have to rescind or modify its adopted policies that do not currently support fallowing by landowners for purposes of transferring water.

Fallowing could be undertaken by landowners on land they own, lease, or purchase; or, fallowing could be undertaken by IID on land it owns, leases, or purchases. The purpose of the analysis of Alternative 4 is to analyze the potential environmental impacts of fallowing, rather than to predict the exact method of fallowing or who would do it.

In addition, as described under Alternatives 2 and 3, alternatives were developed to minimize Project-related impacts. Under Alternative 4, the use of fallowing as a conservation measure would minimize the impact of reduced flows to the Sea under the Proposed Project, as well as minimize related impacts that could potentially occur in relation to reduced flows to the Sea. However, potential impacts along and within IID's canal and drainage system and in and around the Salton Sea would be substantially similar to those under the Proposed Project. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP.

Environmentally Superior Alternative

Chapter 4, Alternatives Comparison, includes a detailed analysis and comparison of the Proposed Project with each of the alternatives. As required by CEQA this Chapter also identifies the environmentally superior alternative. CEQA Guidelines (Section 15126.6(e)2), Consideration and Discussion of Alternatives to the Proposed Project, state, "If the environmentally superior alternative is the No Project alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." For this Project, Alternative 2, the No Project Alternative, is environmentally superior to the others; therefore, the following discussion regarding the next environmental superior alternative is provided.

Determination of the environmentally superior alternative is somewhat driven by the selection of an HCP approach for the Salton Sea. Implementation of HCP (Salton Sea Portion) Approach 2 would avoid significant unavoidable impacts on recreation resources and air quality by maintaining Baseline flows to the Salton Sea. *Approach 2 would minimize but not avoid significant, unavoidable impacts on water quality and it would not avoid or minimize impacts on agricultural resources.* To minimize impacts to water quality (selenium impacts to the drains) and impacts on agricultural resources (conversion of prime farmland and farmland of statewide importance), the amount of water conserved and the method of conservation is the determining factor. Alternative 2, 130 KAFY with on-farm irrigation system improvements only along with HCP Approach 2 would avoid recreation, air quality, and agricultural resources impact and would minimize water quality impacts and is therefore the environmentally superior alternative. However, the Proposed Project includes the flexibility to be implemented with the same methods and quantities as Alternative 2 and so it could also, if implemented this manner, be considered environmentally superior.

Consultation and Coordination

The Lead Agencies have a responsibility under various mandates, including CEQA and NEPA, to conduct public involvement activities and to consult and solicit input from certain federal, state, and local agencies, and other interested parties. The following sections list the specific agencies and other interested parties that are considered Cooperating, Responsible, and/or Trustee Agencies for the purposes of this Draft EIR/EIS.

Cooperating Agencies

- USFWS

Responsible Agencies

- CDFG (also a Trustee Agency)
- SWRCB
- SDCWA

Trustee Agencies

- CDFG (also a Responsible Agency)
- California Department of Parks and Recreation (DPR)
- California State Lands Commission (SLC)

Public Scoping

The scoping process for the Proposed Project was designed to solicit input on the issues related to the Project description, the scope of the impact analysis, and the Project alternatives to be assessed in the Draft EIR/EIS from: (1) the public; (2) federal, state, and local agencies; and (3) other interested parties. Scoping meetings were attended by groups interested in the Proposed Project's potential water delivery system, on-farm conservation measures, and other aspects of the Proposed Project, including potential impacts to the LCR, the Salton Sea, and the SDCWA and IID water service areas.

The Lead Agencies conducted six public scoping meetings between October 12 and October 20, 1999, to solicit input from the public on potential environmental impacts, the significance of impacts, the appropriate scope of the Draft EIR/EIS, proposed mitigation measures, and potential alternatives to the Proposed Project.

In addition to the public scoping meetings mentioned above, a meeting with Indian tribes was held on April 18, 2000, in La Quinta, California. A specific invitation to address cultural resources was made at the meeting. Eight attendees representing three tribes, USFWS, and BIA attended the April 18 meeting. Questions raised by the tribal representatives included the following: whether or not the proposed project would affect Indian Trust Assets (ITAs); what would be the effects on groundwater pumping, especially in the CVWD service area; how the Draft EIR/EIS would address tribal impacts; and what would be the impacts to Salton Sea. In addition, water rights-related issues were raised.

Public Scoping Comments

This section summarizes the content of the written and oral comments submitted during the public scoping process. Generally, commentors were primarily concerned with hydrology and water quality, biological resources, and socioeconomic impacts.

Hydrology and Water Quality. The hydrology- and water quality-related comments were primarily concerned with the effect of the Project on water quality and quantity of the Salton Sea, Colorado River, the Colorado River Delta in Mexico, and other potentially affected streams and watercourses. Several commentors asked that the Draft EIR/EIS address the impacts of the Project at the various levels of water to be conserved and transferred to adequately identify all potential impacts.

Biological Resources. The majority of the biological resources comments focused on the potential impact of the Project on rare, threatened, and endangered species; on wetland habitats; and on proposed mitigation measures to reduce the impacts to a level of insignificance. Commentors also raised concerns over inflows of total dissolved solids (TDS) entering the Salton Sea and the potential impacts to fish and wildlife.

Socioeconomics. The majority of the socioeconomics comments were primarily concerned with the potential socioeconomic impact of the Project on the Salton Sea and Imperial Valley. Many commentors requested that the potential impacts to the agricultural economy of the Imperial Valley be addressed by the Draft EIR/EIS.

Other Areas of Known Controversy

Fallowing. Fallowing lands to conserve water for transfer is a controversial issue within the Imperial Valley, and has been opposed by members of the community based on potential socioeconomic impacts to third parties. The IID Board has adopted a policy stating that landowners participating in IID's water conservation program should not be compensated for fallowing as a means of conserving water for transfer. In addition, the IID/SDCWA Transfer Agreement currently prohibits fallowing as a means of conservation under IID's contracts with participating landowners for the first 200 KAFY. The QSA, however, does not prohibit fallowing. If fallowing is used to conserve water for the first 200 KAFY, the current restrictions on fallowing in the IID/SDCWA Transfer Agreement would need to be waived or modified.

Fallowing may be more desirable for the Salton Sea and endangered species than other conservation measures that are proposed as part of IID's water conservation program as it would minimize and/or avoid many of environmental impacts. It would, however, result in the loss of agricultural sector jobs and a decrease in the value of business output in Imperial County. Some of the adverse effects of fallowing are offset by beneficial effects of the local expenditure of transfer revenues, but the beneficial effects are not large enough to totally outweigh the adverse effects of fallowing.

Salton Sea. Concern has been expressed by environmental groups, Salton Sea area residents, the Salton Sea Authority, and other interested parties about the effect of reduced drainage inflows to the Salton Sea. The Salton Sea is a key stopping point and wintering area on the Pacific Flyway for migratory birds. According to the Salton Sea Authority, more than 400 species have been reported within the Salton Basin, of which about 100 species have been observed to use the resources of the Salton Sea. The Sea also provides recreational resources, including a productive sport fishery.

The Sea currently has an average salinity level of approximately 44,000 mg/L, and salinity is expected to increase as a result of evaporation and continued salt-laden inflows. The trend of increasing salinity threatens both the biological and the recreational resources at the Sea. Drainage inflows from agricultural irrigation in the IID water service area are the primary source of water for the Sea. Reduced drainage inflows as a result of the proposed water conservation program within the IID water service area are anticipated to accelerate the trend of increasing salinity. Concern has been expressed that this acceleration will affect the cost and feasibility of a Salton Sea restoration project.

Project Impacts Summary

The potential effects of the Proposed Project are evaluated for the following resources in this Draft EIR/EIS:

- Hydrology and Water Quality
- Biological Resources
- Geology and Soils
- Land Use
- Agricultural Resources
- Recreation
- Air Quality
- Cultural Resources
- Indian Trust Assets
- Noise
- Aesthetics
- Public Services and Utilities
- Transportation
- Socioeconomics
- Environmental Justice
- Transboundary Impacts

Table ES-1 summarizes, by resource area, the significant impacts for the Proposed Project, by resource area. Less than significant impacts are described in the first table of each resource area section.

Issues to be Resolved

The issues to be resolved by decision makers, based on the information included in this Draft EIR/EIS and other factors, are the selection of a preferred alternative and the selection of an HCP Approach for the Salton Sea. Four alternatives are presented with their environmental impacts. Additionally, two different approaches for mitigating impacts to the Salton Sea are presented along with their environmental impacts.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.1 Hydrology and Water Quality						
WQ-2: Increased selenium concentration in IID surface drain discharges to the Alamo River: Selenium concentration to 9.25 µ/L in the IID surface drain discharge to the Alamo River exceeding water quality criteria of 5 µ/L.	**Mitigation WQ-2:** No reasonable mitigation is available to reduce the concentration of selenium in the drains. The HCP IID Water Service Area Portion includes habitat replacement to mitigate the biological impacts resulting from the increased selenium; however, the selenium concentration itself would not be reduced by the HCP. (Significant and unavoidable impact.)	Significant and unavoidable.	Baseline selenium concentration in the IID surface drain discharge to the Alamo River of 6.32 µ/L.	Same as WQ-2 except selenium concentrations to 6.91 µ/L in the IID surface drain discharge to the Alamo River.	Same as WQ-2 except selenium concentrations to 8.88 µ/L in the IID surface drain discharge to the Alamo River.	Beneficial impact: selenium concentration decreases to 6.10 µ/L in the IID surface drain discharge to the Alamo River.
WQ-4: Increase in selenium concentration in the Alamo River at the outlet to the Salton Sea: Selenium concentration to 7.86 µ/L in Alamo River at the outlet to the Sea exceeding water quality criteria of 5 µ/L.	None available.	Significant and unavoidable.	Baseline selenium concentrations in Alamo River at the Outlet to the Sea of 6.25 µ/L.	Less than significant selenium concentrations maintained at 6.25 µ/L in Alamo River at the outlet to the Sea.	Same as WQ-4 except selenium concentrations to 7.39 µ/L in Alamo River at the outlet to the Sea.	Beneficial impact: selenium concentration decreases to 6.13 µ/L in Alamo River at the outlet to the Sea.
WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River: Selenium concentration to 8.30 µ/L in the IID Surface drain discharge to the New River exceeding water quality criteria of 5 µ/L.	**Same as Mitigation WQ-2.**	Significant and unavoidable.	Baseline selenium concentration in the IID Surface drain discharge to the New River of 6.51µ/L.	Same as WQ-5 except selenium concentrations to 7.15 µ/L in the IID Surface drain discharge to the New River.	Same as WQ-5 except selenium concentrations to 7.90 µ/L in the IID Surface drain discharge to the New River.	Less than significant impact: Minimal decrease in selenium concentrations to 6.50 µ/L in the IID Surface drain discharge to the New River.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea: Selenium concentration to 6.69 µg/L in the IID Surface drain discharge to the Salton Sea exceeding water quality criteria of 5 µg/L.	**Same as Mitigation WQ-2.**	Significant and unavoidable.	Baseline selenium concentration in the IID surface drain discharge to the Salton Sea of 4.80 µg/L.	Same as WQ-7 except selenium concentrations to 5.09 µg/L in the IID surface drain discharge to the Salton Sea.	Same as WQ-7 except selenium concentrations to 6.40 µg/L in the IID surface drain discharge to the Salton Sea.	Beneficial impact: selenium concentration decreases to 4.61 µg/L in the IID surface drain discharge to the Salton Sea.
3.2 Biological Resources						
No significant impacts (after mitigation) to biological resources were identified. See Table 3.2-1 for a summary of less than significant impacts.						
3.3 Geology and Soils						
No significant impacts (after mitigation) to geology and soils were identified. See Table 3.3-1 for a summary of less than significant impacts.						
3.4 Land Use						
No significant impacts (after mitigation) to land use were identified. See Table 3.4-1 for a summary of less than significant impacts.						

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.5 Agricultural Resources						
AR-1: Reclassification of up to 50,000 acres of Prime Farmland or Farmland of Statewide Importance: If fallowing were used as a conservation measure, it could be rotational, permanent or a combination of the two. The worst case impact of the Proposed Project would be the permanent fallowing of up to about 50,000 acres of land. This represents up to about 11 percent of the total net acreage in agricultural production within the IID water service area. Assuming all acreage included in the water conservation program was permanently fallowed, this would represent a significant, unavoidable impact to the agriculture resources of the IID water service area.	**Mitigation Measure AR-1:** The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under the Proposed Project. Otherwise, no mitigation measures have been proposed to avoid or minimize this impact.	Significant and unavoidable.	No permanent conversion of agricultural lands. Baseline of rotational fallowing of about 20,000 acres per year continues.	No impacts.	A3-AR-1: Reclassification of up to 38,300 acres of Prime Farmland or Farmland of Statewide Importance: Significant, unavoidable impact.	A4-AR-1: Reclassification of up to 50,000 acres of Prime Farmland or Farmland of Statewide Importance: Significant, unavoidable impact.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-AR-2 Conversion of agricultural lands from implementation of the HCP: The worst -case impacts to agricultural resources from the implementation of these components of the Proposed HCP would result in approximately 700 acres of agricultural lands converted to marsh habitat, native forest habitat, or new drainage channels to the Salton Sea. This represents less than 0.5 percent of the average annual net acreage in agricultural production within the IID water service area. However, if these lands are located on Prime Farmland or Farmland of Statewide Importance, implementation of the HCP (IID Water Service Area Portion) would result in a significant, unavoidable impact to agricultural resources.	**Mitigation Measure HCP-AR-2:** The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under the HCP (IID Water Service Area Portion). Otherwise, no mitigation measures have been proposed to avoid or minimize this impact.	Significant and unavoidable.	No permanent conversion of agricultural lands.	Same as HCP-AR-2.	Same as HCP-AR-2.	Same as HCP-AR-2.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.6 Recreation						
R-7: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable: The decline in Salton Sea elevation and surface area as a result of the Proposed Project would impact operational boat launching and mooring facilities that provide access to the Salton Sea for recreational boating. The Sea would recede from boating facilities gradually as inflows decline. This impact is anticipated when the elevation of the Salton Sea reaches -230 msl, which is predicted to occur in 2007.	**Mitigation Measure R-7:** Implement one of the following two mitigations: Select HCP (Salton Sea Portion) Approach 2. If Approach 2 is selected, impacts on elevation are avoided, and there are no impacts to boat launching facilities. OR If HCP (Salton Sea Portion) Approach 1 is selected, there would be impacts to the boat launching facilities, so boat launching facilities and access to them must be relocated as the Sea declines to provide ongoing boat launching opportunities. The relocation of these facilities may be temporary and ongoing until the Sea reaches its minimum and stable elevation, at which point permanent facilities must be provided.	Less than significant.		Same impact as R-7.	Same impact as R-7.	Same impact as R-7 but Salton Sea elevation reaches -230 in year 2008.

18784

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
R-8: Reduced sport fishing opportunities: Impacts to fisheries, including sport fish and aquatic habitat, could result from an accelerated decrease in the number of fish that inhabit the Salton Sea, as described in Section 3.2, Biological Resources. A reduction in the number of sport fish in the Salton Sea would potentially impact sport-fishing opportunities. Impacts to fisheries, including sport fish and aquatic habitat, potentially would result from an accelerated decrease in the number of fish that inhabit the Salton Sea, as described in Section 3.2, Biological Resources. Anglers' ability to catch sargo would be impacted 1 year earlier (2007) when compared to the Baseline; while life-cycle impacts to other key sport fish are predicted to begin in year 2010.	**Mitigation Measure R-8:** To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation via fallowing or other methods in the IID water service area to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea associated with reduced flow: increased salinity leading to elimination of the sport fishery, elevation decline, and decreased surface area. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives. With implementation of HCP Approach 2, this impact would be avoided; otherwise, the impact remains significant and unavoidable. Until an HCP Approach for the Salton Sea is selected, this impact will remain significant and unavoidable.	Significant and unavoidable unless HCP Approach 2 is implemented.	Life cycle of fish impacted beginning in year 2015.	Same as R-8: projected life-cycle impacts on fish begin in year 2010.	Same as R-8: projected life-cycle impacts on fish begin in year 2010.	Same as R-8, however projected life-cycle impacts on fish are predicted to occur in year 2012.

18785

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
R-9: Reduced opportunity for bird watching and waterfowl hunting: Many avian species rely on the aquatic resources of the Salton Sea for food and habitat. Increasing salinity at the Sea would have the following results: Decreased food supply for fish-eating birds because the reproductive ability of fish would decline (as discussed under Impact R-10 below). Increased disease resulting in direct mortality of avian species, as well as a loss of habitat for avian nesting and foraging sites. Details of the biological impacts to birds are described in Section 3.2, Biological Resources, Impacts BR-44, 46, and 47. The effect of the Proposed Project would be to accelerate changes in fish abundance and the subsequent response of piscivorous birds by about 11 years compared to the Baseline.	**Mitigation Measure R-9:** As described in Chapter 2, Description of the Proposed Project and Alternatives, and in Section 3.0, Environmental Analysis, there are two approaches under consideration for implementation of the Salton Sea Portion of the HCP. Implementation of each of these approaches would mitigate impacts to bird-viewing opportunities at the Salton Sea. HCP (Salton Sea Portion) Approach 1 would create a fish hatchery and 5K acres of ponds that would be maintained for the duration of the project and provide piscivorous birds with a food source to replace the Salton Sea fishery. The ponds would be accessible to the public for bird watching but not for hunting. This approach would mitigate the impact to bird watching to less than significant. The impacts to fowl hunting would remain significant.	Less than significant.	Under the No Project alternative, impacts to fish abundance and thus to piscivorous birds occur in approximately year 2023.	Same as R-9 except Alternative 2 would accelerate the occurrence of changes in fish abundance and the subsequent response of piscivorous birds by about 10 years compared to the Baseline.	Same as R-9 except Alternative 3 would accelerate the occurrence of changes in fish abundance and the subsequent response of piscivorous birds by about 11 years compared to the Baseline.	Same as R-9 except Alternative 2 would accelerate the occurrence of changes in fish abundance and the subsequent response of piscivorous birds by about 6 years compared to the Baseline.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
Mitigation Measure R-9 (cont.):	HCP (Salton Sea Portion) Approach 2 would include additional conservation via fallowing or other methods in the IID water service area to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea associated with the reduced flow: increased salinity leading to elimination of sport fishery, elevation decline, and decreased surface area. Implementation of this approach would avoid impacts to bird watching and hunting. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives.					

18787

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
R-10: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities: When water levels at the Salton Sea SRA drop to 230 feet below msl, it would be necessary to relocate facilities, such as Varner Harbor and campgrounds, that are now located near the water. It also would be necessary to re-establish existing roads and trails that lead to the water, particularly in areas such as Mecca Beach, Sneaker Beach, and Old Camp. Decreasing water levels would expose footings and other remnants of the campgrounds that were covered when the water elevation increased during the late 1970s. These would have to be removed for safety and aesthetic considerations. Implementation of the Proposed Project would result in the elevation of the Salton Sea reaching –230 msl by the year 2007, compared to 2010 under the Baseline, a three-year acceleration. In addition to accelerating the time when campgrounds are stranded from their existing location, the Proposed Project would result in an ultimate elevation of the Sea of approximately –250 compared to -235 under the Baseline.	**Mitigation Measure R-10:** Implement one of the following two mitigations: Select HCP (Salton Sea Portion) Approach 2. If Approach 2 is selected, impacts to the elevation are avoided, and there are no impacts to camping and ancillary facilities. OR If HCP (Salton Sea Portion) Approach 1 is selected, there would be impacts on the camping facilities, so these facilities must be relocated as the Sea declines to provide ongoing camping opportunities. The relocation of these facilities may be temporary and ongoing until the Sea reaches its minimum, stable elevation, at which point permanent facilities must be provided.	Less than significant.	Elevation -230 feet msl is reached in year 2010 and the 2077 elevation of the Salton Sea is predicted to be -235 feet msl.	Same as Impact R-10 except that Salton Sea elevation reaches -230 feet msl in year 2006, and the 2077 elevation of the Salton Sea is predicted to be -235 feet msl.	Same as Impact R-10 except that Salton Sea elevation reaches -230 feet msl in year 2007, and the 2077 elevation of the Salton Sea is predicted to be -242 feet msl.	Same as Impact R-10 except that Salton Sea elevation reaches -230 feet msl in year 2008, and the 2077 elevation of the Salton Sea is predicted to be -241 feet msl.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.7 Air Quality						
AQ-3: Windblown dust from fallowed land: Depending on the amount of land that is fallowed and the way the land is managed before and during fallowing, the potential exists for fugitive dust impacts. On occasion, existing concentrations of PM_{10} in the IID water service area violate national and state ambient air quality standards. To be conservative, this analysis concludes that the fugitive windblown dust emissions associated with additional exposed areas due to fallowing would be potentially significant. Up to 84,800 acres could be fallowed for the Proposed Project including conservation for transfer, for the IOP, and for HCP Approach 2.	**Mitigation Measure AQ-3:** As lands are fallowed, at least one of the following BMPs to minimize PM_{10} emissions must be implemented. BMPs could include, but are not limited to, the following: Implement conservation cropping sequences and wind erosion protection measures as outlined by the U.S. Department of Agriculture Natural Resources Conservation Service. Apply soil stabilization chemicals to fallowed lands. Re-apply drain water to allow protective vegetation to be established. Reuse irrigation return flows to irrigate windbreaks across blocks of land including many fields to reduce wind fetch and reduce emissions from fallowed, farmed, and other lands within the block.	Less than significant.	Continuation of current fallowing of about 20,000 acres per year.	Same as AQ-3 except the maximum number of fallowed acres would be 20,600.	Same as AQ-3 except the maximum number of fallowed acres would be 67,300.	Same as AQ-3.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
AQ-4: Emissions from construction and operation of on-farm and delivery system conservation measures for compliance with the IOP: In the worst-case scenario for air quality impacts, conservation of an average 59 KAFY for compliance with the IOP would be generated by constructing on-farm and water delivery system conservation measures. This scenario, however, is highly unlikely because IID is required to pay back overruns within 1-3 years, and it would be onerous to construct sufficient conservation measures as quickly as would be necessary to meet this payback deadline. If construction of certain on-farm measures is undertaken to conserve more than about 25 to 30 KAFY in any given year, there is potential to exceed general conformity *de minimus* thresholds (100 tons per year) for the nonattainment pollutants ozone (ROC and NOx) and PM_{10}.	**Mitigation Measure AQ-4:** If construction of sufficient magnitude is proposed for any given year, assuming construction emissions are determined to be the direct or indirect result of a federal action, a general conformity determination for that federal action would be required. General conformity requirements in the IID water service area are outlined in Rule 925 of the ICAPCD and the USEPA General Conformity Rule.	Less than significant.	Continuation of existing air quality conditions.	Same as AQ-4.	Same as AQ-4.	Same as AQ-4.

18790

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP2-AQ-6: Windblown dust from fallowing plus emissions due to construction and operation of on-farm and water delivery system conservation measures for HCP Approach 2: Implementation of HCP Approach 2 could be accomplished via construction of on-farm or water delivery system improvements or fallowing. It is most likely that this conserved water would be generated via fallowing. However, if conservation measures are constructed, the maximum that would be constructed in 1 year to provide mitigation for the Salton Sea as flows to the Sea are reduced would be measures that would save about 12 KAFY. Construction of measures to conserve 12 KAFY would result in similar impacts in the IID water service area and the AAC to those described for AQ-2 in Section 3.7.4, Impacts and Mitigation Measures. If fallowing is implemented, impacts would be similar to those described under Impact AQ-3.	**Mitigation Measure HCP2-AQ-6:** This impact would be less than significant with implementation of Mitigation Measures AQ-2 and AQ-3. (For AQ-2, see Section 3.7.4, Impacts and Mitigation Measures.)	Less than significant.	Continuation of existing air quality conditions.	Same as Impact HCP2-AQ-6.	Same as Impact HCP2-AQ-6.	Same as Impact HCP2-AQ-6.

18791

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
AQ-7: Indirect air quality impacts due to the potential for windblown dust from exposed shoreline: The predicted decrease in Sea level and increase in exposed area (50,000 acres compared to the Baseline) would increase the potential for dust suspension. Spatial variations in sediment characteristics and soil erodibility, temporal variations in wind conditions, and variation in factors contributing to the formation of salt crusts prevent any reasonable quantitative estimate of emissions and associated impacts from the exposed shoreline. Therefore, a qualitative assessment of the potential for dust suspension is provided in this Draft EIR/EIS. To be conservative, this analysis concludes that windblown dust from exposed shoreline may result in significant air quality impacts. (Details provided in Section 3.7 Impact AQ-7.)	**Mitigation Measure AQ-7:** To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID water service area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives. With implementation of this approach, this impact would be avoided; without it, this impact would remain potentially significant and unavoidable.	Significant and unavoidable.	16,000 acres of exposed shoreline predicted for 2077.	Same as AQ-7 except that 22,000 acres of exposed shoreline predicted.	Same as AQ-7 except that 39,000 acres of exposed shoreline predicted.	Same as AQ-7 except that 16,000 acres of exposed shoreline predicted.

18792

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.8 Cultural Resources						
CR-1: Construction of measures from water conservation program: Potential impacts to cultural resources could result because several conservation measures involve ground disturbance. It is difficult to quantify the relative impact of the conservation measures on archaeological sites that might be present. Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources could be significant. (Note that if fallowing is used as the exclusive conservation measure under the Proposed Project, there would be no impacts, and no mitigation measures would be required.)	**Mitigation Measure CR-1:** Construction of conservation measures can occur anywhere within the IID water service area; therefore, pre-Project surveys have not been conducted. Mitigation measures included in Section 3.8 CR-1 have been designed to provide assurances that if cultural resources are encountered during Project construction or operation, they will be handled appropriately.	Less than significant.	N/A	Same as CR-1.	Same as CR-1.	No impact.

18793

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
CR-2: Construction of conservation measures for IOP compliance: Potential impacts to cultural resources could result for the same reasons discussed above under Impact CR-1. Impacts on cultural resources could be significant.	**Mitigation Measure CR-2:** Construction of conservation measures can occur anywhere within the IID water service area; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply to this impact to provide assurances that if cultural resources are encountered during Project construction or operation, they will be handled appropriately.	Less than significant.	N/A	Same as CR-2.	Same as CR-2.	Same as CR-2.
HCP-CR-3: Creation of Managed Marsh Habitat: Potential impacts to cultural resources could result during ground disturbance and construction activities. For the same reasons as discussed above under Impact CR-1, impacts on cultural resources could be significant.	**Mitigation Measure HCP-CR-3:** The exact location of the managed marsh habitat in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply to this impact to provide assurances that if cultural resources are encountered during Project construction or operation, they will be handled appropriately.	Less than significant.	N/A	Same as HCP-CR-3.	Same as HCP-CR-3.	Same as HCP-CR-3.

18794

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP2-CR-4: Construction of conservation measures for HCP Approach 2: Potential impacts to cultural resources could result from ground disturbance and construction activities unless fallowing is the only conservation measure employed to conserve additional water for mitigation under this HCP approach. The amount of conservation would be scaled based on the amount of water to be conserved. For the same reasons as discussed above under Impact CR-1, impacts on cultural resources could be significant.	**Mitigation Measure HCP2-CR-4:** The exact location of the conservation measures in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply under this HCP approach to provide assurances that if cultural resources are encountered during Project construction or operation, they will be handled appropriately.	Less than significant.	N/A	Same as HCP2-CR-4.	Same as HCP2-CR-4.	Same as HCP2-CR-4.

18795

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
CR-5: Reduced Inflows to the Salton Sea: Reduced inflows to the Salton Sea from the Proposed Project's water conservation program (see Section 3.1, Hydrology and Water Quality) would lower the Sea's level. Lower Sea level would, in turn, expose submerged land. Newly exposed land could contain archaeological sites that could be vandalized if they were not protected. Newly exposed land could also be cultivated or developed, thus harming any archaeological sites if they were not protected.	**Mitigation Measure CR-5:** Gradual exposure of submerged lands could expose archaeological sites if they are present. The same mitigation measures listed under Mitigation Measure CR-1 would apply to this impact to provide assurances that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. In addition, a series of archaeological surveys at regular intervals (once every 3 years) will be conducted to check freshly exposed lands for the presence/absence of archaeological sites.	Less than significant.	16,000 acres of exposed shoreline predicted for 2077.	Same as CR-5 except that 22,000 acres of exposed shoreline predicted.	Same as CR-5 except that 39,000 acres of exposed shoreline predicted.	Same as CR-5 except that 16,000 acres of exposed shoreline predicted.

18796

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.9 Indian Trust Assets						
ITA-1: Potential adverse and/or beneficial impacts on ITAs from reduced inflow to Salton Sea: The Salton Sea is expected to decline from its current elevation of about -228 feet to about elevation -250 feet over the 75-year duration of the Proposed Project. This would result in the exposure of land containing natural and cultural resources that are considered by the Torres Martinez to be ITAs. This could have both adverse and beneficial impacts. Beneficial impacts could result from allowing scientific investigations of exposed resources, including archaeological data collection and natural resource exploitation. Exposure also could result in damage from vandalism and erosion.	None provided.	N/A	The 2077 elevation of the Salton Sea is predicted to be -235 feet msl.	Same as ITA-1 except that the 2077 elevation of the Salton Sea is predicted to be -242 feet msl.	Same as ITA-1 except that the 2077 elevation of the Salton Sea is predicted to be -247 feet msl.	Same as ITA-1 except that the 2077 elevation of the Salton Sea is predicted to be -241 feet msl.
3.10 Noise						
N-1: Noise impacts to sensitive receptors from construction of conservation measures: Noise resulting from construction could exceed County of Imperial construction noise standards, impacting sensitive receptors including riparian bird species.	**Mitigation Measure N-1:** Several measures would be implemented to reduce noise resulting from construction activities. (Measures are described in detail in Section 3.10.)	Less than significant.	N/A	A2-N-1: Noise impacts to sensitive receptors from construction of conservation measures: Less than significant impact with mitigation.	A3-N-1: Noise impacts to sensitive receptors from construction of conservation measures: Less than significant impact with mitigation.	No impact.

18797

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
N-2: Exposure to long-term operation noise: Several on-farm and delivery system conservation measures, including tailwater return systems, drip irrigation, lateral interceptor systems, mid-lateral reservoirs, and seepage interceptors, require the operation of pumps that produce noise at various levels, some more than 70 dBA at 50 feet. These pumps could potentially exceed the Normally Acceptable noise/land use compatibility guideline of 70 dBA.	**Mitigation Measure N-2:** If possible, conservation system pumps would be located at sufficient distances from sensitive receptors to ensure that noise levels at the receptor do not exceed the 70 dBA guideline. If there is no flexibility in placement of equipment, permanent or temporary barriers/semi-enclosures would be placed over the pumps to ensure adherence to the guideline. Implementation of this measure would reduce potentially significant noise impacts from conservation system pump operation in the IID water service area to a less than significant level.	Less than significant.	N/A	A2-N-2: Exposure to long-term operation noise: Less than significant impact with mitigation.	A3-N-2: Exposure to long-term operation noise: Less than significant impact with mitigation.	No impact.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
N-3: Noise impacts from lateral interceptor pumps: Lateral interceptor system pumps, which could operate up to approximately 50 percent of the time at 78 dBA, would exceed the county's operation noise standard of 75 dB (averaged sound level over 1 hour) for agriculture operations.	**Mitigation Measure N-3:** If possible, lateral interceptor system pumps would be located at sufficient distances from sensitive receptors to ensure that noise levels at the nearest receptor do not exceed the Normally Acceptable noise/land use compatibility guideline of 70 dBA. If there is no flexibility in placement of the pumps, permanent or temporary barriers/semi-enclosures will be placed over the pumps to ensure adherence to the standard. Implementation of this measure would reduce potentially significant noise impacts from lateral interceptor system pump operation in the IID water service area to a less than significant impact.	Less than significant.	N/A	No impact.	A3-N-3: Noise impacts from lateral interceptor pumps: Less than significant impact with mitigation.	No impact.

18799

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
N-4: Noise from compliance with the IOP: Conservation of 59 KAFY for the IOP can be accomplished via fallowing (about 9,800 acres) or other conservation measures. Noise impacts could occur during construction of additional on-farm irrigation system improvements or water delivery system improvements as described in Impact N-1 through N-3. This conservation would be in addition to the up to 300 KAFY for the Proposed Project and is part of the Proposed Project. If fallowing is selected for IOP compliance, about 9,800 additional acres would be required, and no noise impacts would occur.	**Mitigation Measure N-4:** See Mitigation Measures N-1 through N-3.	Less than significant.	N/A	Same as N-4.	Same as N-4.	Same as N-4.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-N-5: Noise impacts to sensitive receptors from construction of new marsh habitat or drain channels: Construction of new marsh habitat and drain channels would require the use of standard construction equipment such as backhoes, excavators, and utility trucks. Each of these pieces of equipment emits noise at a minimum of 77 dBA, which exceeds the County of Imperial construction noise standards. Therefore, the noise impact to sensitive receptors, including riparian bird species, from construction associated with creation of marsh habitat or drain channels is potentially significant.	**Mitigation Measure HCP-N-5.** Implementation of the measures described above in Mitigation Measure N-1, especially limiting construction activities to non-mating, non-nesting seasons, would reduce potentially significant noise impacts to less than significant levels.	Less than significant.	N/A	Same as HCP-N-5.	Same as HCP-N-5.	Same as HCP-N-5.

18801

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.11 Aesthetics						
Impact A-1: Impacts on aesthetics would result from a decrease in the elevation of the Salton Sea: The Proposed Project would primarily affect views of the Salton Sea landscape as seen from public shoreline recreation areas and more distant public roadways. The specific visual effects and their severity would vary according to the affected viewer's location and activity. In general, it is anticipated that views most affected by the Project would be at public recreation locations situated near the existing shoreline. The shoreline is excepted to decline to -250 feet msl by 2077.	**Mitigation Measure A-1:** These measures should implemented on an ongoing basis as the Sea recedes until it reaches its lowest and stable elevation, at which point they should be made permanent. The measures to be undertaken in the Salton Sea area include: Relocate recreation facilities and extend access to the new shoreline to provide quality public viewing opportunities of the Salton Sea and its shoreline. These facilities may be temporary until the Sea reaches its minimum and stable elevation. Develop interpretive facilities and material to be made available to the public at recreation areas and along public roadways. Interpretive displays may include historic photographs of the Salton Sea landscape and information about water conservation measures including their effects on Salton Sea water levels.	Less than significant.	The 2077 elevation of the Salton Sea is predicted to be -235 feet msl.	Same as A-1 except that the 2077 elevation of the Salton Sea is predicted to be -242 feet msl.	Same as A-1 except that the 2077 elevation of the Salton Sea is predicted to be -247 feet msl.	Same as A-1 except that the 2077 elevation of the Salton Sea is predicted to be -241 feet msl.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.12 Public Services and Utilities						
No significant impacts (after mitigation) to public services and utilities were identified. See Table 3.12-1 for a summary of less than significant impacts.						
3.13 Transportation						
No significant impacts (after mitigation) to transportation were identified. See Table 3.13-1 for a summary of less than significant impacts.						
3.14 Socioeconomics						
S-2: Net loss of 1,400 jobs and reduction in business output of $97.5 million with conservation by fallowing only.	The actual distribution of transfer revenues has not been identified by IID and might vary over the term of the Proposed Project. Some dollar value must be estimated to evaluate the potential impact; therefore, for this analysis it is assumed that all transfer revenues not spent by IID on water delivery system improvements, program administration, or environmental or mitigation measures pursuant to the Final EIR/EIS or HCP will be passed on to participating farmers.	N/A	Continuation of existing conditions, including the historic variation in agricultural employment levels.	No impact.	A3-S-2: Net loss of 1,090 jobs and reduction in business output of $75.8 million with conservation by fallowing only.	A4-S-1: Net loss of 1,400 jobs and reduction in business output of $97.5 million with conservation by fallowing only.

18803

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
S-3: Loss of 290 jobs and reduction in business output of $20 million from conserving IOP water by fallowing only.	Same as above.	N/A	Continuation of existing conditions, including the historic variation in agricultural employment levels.	Same as S-3.	Same as S-3.	Same as S-3.
HCP2-S-4: Loss of up to 750 jobs and reduction in business output of $52 million from fallowing under HCP Approach 2.	Same as above.	N/A	Continuation of existing conditions, including the historic variation in agricultural employment levels.	Same as HCP2-S-4.	Same as HCP2-S-4.	Same as HCP2-S-4.

18804

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Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
S-5: Adverse change in regional economic conditions would be accelerated by up to 11 years.	None provided unless HCP Approach 2 is selected.	N/A	Eventual loss of the majority of the recreation-related economic activity as a result of the deterioration of the biological resources that support current recreation activities. Decreased economic activity would put downward pressure on property values.	Same as S-5.	Same as S-5.	Same as S-5.

18805

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
3.15 Environmental Justice						
EJ-1: Potential Effects on Minority and Low-Income Populations: No tribal lands would be disproportionately affected within this subregion. However, farm laborers could be affected as a group by fallowing activities and on-farm irrigation system conservation measures, which would reduce the demand for farm labor in some areas. This effect would not disproportionately affect a specific community or area but could affect farm laborers, who are predominantly minority and low-income, as a population group. At the present time, no specific locations for fallowing have been identified. Under the worst case, up to 50,000 acres could be fallowed to provide conserved water for the transfer. Another 25,000 acres could be fallowed to provide water for mitigation and 8,900 for compliance with the IOP. The locations of land to be fallowed will depend on the willingness of the farmer to do so.	None provided.	N/A	Same as existing condition.	Same as EJ-1 except the maximum number of fallowed acres would be 20,600.	Same as EJ-1 except the maximum number of fallowed acres would be 67,300.	Same as EJ-1.

TABLE ES-1
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Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP2-EJ-1: Potential Effects on Minority and Low-Income Populations: As noted previously, land fallowing has the potential to directly affect farm laborer populations, depending on the scale of the fallowing program that is implemented. The effect on this population group would be a loss of employment resulting from the reduction in acres that are in agricultural production. It should be noted that 75,000 acres is a worst-case scenario, and that the number of acres to actually be fallowed may be substantially less, with a correspondingly smaller overall effect on farm employment. No other disproportionate effects are expected on other minority and low-income communities, including tribal groups.	None provided.	N/A	Same as existing condition.	Same as HCP2-EJ-1.	Same as HCP2-EJ-1.	Same as HCP2-EJ-1.

18807

1.0 Introduction, Purpose and Need, and Objectives

1.0 Purpose and Need, Objectives, and Background

1.1 Introduction

This Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) addresses the environmental impacts that could result from implementing the proposed Imperial Irrigation District (IID) Water Conservation and Transfer Project (collectively referred to as the Proposed Project or Project). The Draft EIR/EIS was prepared in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) to inform the public and meet the needs of local, state, and federal permitting agencies.

The United States (US) Department of the Interior Bureau of Reclamation (Reclamation) is the federal Lead Agency under NEPA, and IID is the state Lead Agency under CEQA. The Lead Agencies have directed and supervised the preparation of this Draft EIR/EIS and have independently evaluated its information and findings. The United States Fish and Wildlife Service (USFWS) is the federal agency authorized to issue Incidental Take Permits for the Proposed Project pursuant to Section 10 of the federal Endangered Species Act (ESA). USFWS is a Cooperating Agency under NEPA. Cooperating, Responsible, and Trustee Agencies are listed in Section 1.8.1.

The Proposed Project involves the conservation by IID of up to 300 thousand acre-feet per year (KAFY) of Colorado River water and the transfer of this conserved water from IID to the San Diego County Water Authority (SDCWA), Coachella Valley Water District (CVWD), and/or Metropolitan Water District of Southern California (MWD). The terms of the water conservation and transfer transaction between IID and SDCWA are set forth in the Agreement for Transfer of Conserved Water (IID/SDCWA Transfer Agreement) executed by IID and SDCWA in 1998, as amended (see Section 1.4.5 in this chapter and Section 2.2.4.1 in Chapter 2). The IID/SDCWA Transfer Agreement provides for the conservation and transfer of up to 300 KAFY from IID to SDCWA. A Summary of the IID/SDCWA Transfer Agreement is contained in Appendix A.

Subsequent to execution of the IID/SDCWA Transfer Agreement, the proposed Quantification Settlement Agreement (QSA) was negotiated among IID, CVWD, and MWD (see Section 1.4.7 in this chapter, and Section 2.2.4.2 in Chapter 2). Although not a potential signatory to the QSA, SDCWA is a member agency of MWD and participated in the negotiations. The QSA provides for a number of related agreements which would implement components of the settlement transaction. For ease of reference in this Draft EIR/EIS, a reference to the QSA is intended to include the related agreements provided for therein. A Summary of the proposed QSA and the related agreements provided for therein is contained in Appendix A. The IID/SDCWA Transfer Agreement and the QSA are available for review at IID Headquarters, 333 East Barioni Blvd., Imperial CA, 92251.

A number of conditions precedent must be satisfied before the QSA is finally approved and implemented by the participating agencies. If the QSA is approved and implemented, the transfer of conserved water from IID to SDCWA pursuant to the IID/SDCWA Transfer Agreement would be limited to 200 KAFY, and up to 100 KAFY would be transferred to CVWD and/or MWD pursuant to the QSA.

The Proposed Project thus includes two possible implementation scenarios:

- **IID/SDCWA Transfer Agreement Only:** If the QSA is not approved and implemented, up to 300 KAFY of conserved water would be transferred from IID to SDCWA pursuant to the IID/SDCWA Transfer Agreement.
- **QSA Implementation:** If the QSA is approved and implemented, up to 200 KAFY would be transferred from IID to SDCWA pursuant to the IID/SDCWA Transfer Agreement and an additional amount of up to 100 KAFY of conserved water would be transferred to CVWD and/or MWD.

The Proposed Project also includes implementation of a Habitat Conservation Plan (HCP) (see Appendix C) to address impacts to species and habitats within the IID water service area, the right-of-way of the All American Canal (AAC), and the Salton Sea.

This chapter describes the Project's purpose, need, and objectives. Following this description, the background and history of the Proposed Project are presented. Finally, this chapter provides an overview of other environmental compliance documents that are related to the Proposed Project, and a description of how local, state, and federal permitting agencies will use this document. A detailed description of the Proposed Project and alternatives to the Proposed Project is included in Chapter 2.

1.2 Project Purpose, Need, and Objectives

This section presents the purpose, need, and objectives of the Project. The purpose and need are described in accordance with NEPA, and the objectives are described in accordance with CEQA.

Under NEPA, an EIS "shall briefly specify the underlying purpose and need to which the agency is responding" with the proposed action (40 CFR § 1502.13). Reclamation's NEPA Handbook (1990) states that the purpose and need "should briefly describe why the action is needed and what the action is designed to accomplish." Taken together, the purpose and need for a project establish the basic parameters for identifying the range of alternatives to be considered in an EIS prepared in accordance with NEPA. For Reclamation, the underlying purpose and need for the Proposed Project is to facilitate implementation of the IID/SDCWA Transfer Agreement and the QSA. For USFWS, the underlying purpose and need for the HCP is to minimize and mitigate the effects of the Proposed Project on covered species.

Under CEQA, an EIR must include a "statement of objectives sought by the Proposed Project" (14 CCR § 15124[b]). These objectives are used to establish the range of alternatives to be considered in the Draft EIR/EIS for the purposes of CEQA (14 CCR § 15126[d]). For IID, the underlying objective of the Proposed Project is to meet the terms of and implement the IID/SDCWA Transfer Agreement, the QSA, and the HCP. The specific objectives for IID, and the purpose and need for Reclamation, are further described below.

1.2.1 Water Conservation and Transfer Objectives

The water conservation and transfer component of the Proposed Project is defined by the negotiated contractual provisions of two separate agreements: the IID/SDCWA Transfer Agreement and the proposed QSA. These agreements are intended to advance certain individual objectives of the parties to the agreements as well as certain common objectives. The purpose of this component of the Project is to meet the proponents' objectives and expectations for each agreement.

IID has determined that water conservation and transfer projects would provide a means for conserving water, benefiting IID and the recipient water agencies and their service areas in southern California. Water conservation and transfer projects accomplish two objectives: they respond to the State Water Resources Control Board (SWRCB) directive (see Section 1.4.4) that IID develop and implement a conservation program, and they protect IID's water rights. Under California laws designed to encourage water conservation and voluntary transfers, title to conserved water remains with the transferring entity. (See Section 2.2.4.3 in Chapter 2 for a more detailed description of California water law as applied to the Project.) On this basis, IID can allow conserved water to be used by another entity while retaining its historic water rights, which have been, and continue to be, the basis for economic activity in the Imperial Valley. Proceeds from a water transfer transaction could be used to fund the costs of implementing conservation measures, particularly the cost of on-farm conservation measures, as well as environmental mitigation costs and other implementation costs. In addition, IID anticipates that proceeds from the sale of conserved water would provide economic benefits to IID, the community, and cooperating landowners and tenants in the Imperial Valley.

The IID/SDCWA Transfer Agreement fulfills the following objectives for IID:

- To conserve water and transfer it in a market-based transaction that provides payments to IID to fund a water conservation program, including the cost of on-farm and system improvements, environmental mitigation costs, and other implementation costs.
- To develop a water conservation program that includes the voluntary participation of Imperial Valley landowners and tenants so that on-farm conservation measures, as well as water delivery system conservation measures, can be implemented.
- To implement a water conservation and transfer program without impairing IID's historic senior-priority water rights, in a manner consistent with state and federal law.
- To provide an economic stimulus to Imperial Valley's agricultural economy and the surrounding community.

The IID/SDCWA Transfer Agreement fulfills the following objectives for SDCWA:

- To acquire an independent, alternate, long-term water supply that provides drought protection and increased reliability for municipal, domestic, and agricultural uses.

- To diversify its sources of water supply and reduce its current dependence on a single source for imported water, in order to enhance the reliability of its water supply.
- To establish a stabilized, competitive price for a significant portion of its water supply.

Both the IID/SDCWA Transfer Agreement and the QSA incorporate crucial elements of California's draft Colorado River Water Use Plan (California Plan) (see Section 1.4.6), which provides a framework to assist California in reducing its use of Colorado River water to its apportionment of 4.4 million acre-feet (MAF) in a normal year, and to mitigate the impact on California water agencies and water users associated with the reduction in diversions from the Colorado River. The broad purpose of the QSA, in particular, is to facilitate key elements of the California Plan. The parties to the QSA, which are IID, CVWD, and MWD, have determined that the QSA fulfills the following collective objectives of its proponents:

- To settle, by consensual agreement, long-standing disputes regarding the quantity, priority, use, and transferability of Colorado River water.
- To agree on a plan for the future distribution of Colorado River water among IID, CVWD, and MWD for up to 75 years, based on Colorado River water budgets for IID, CVWD, and MWD.
- To facilitate agreements and actions which, when implemented, would enhance the certainty and reliability of Colorado River water supplies available to IID, CVWD, and MWD, and would assist these agencies in meeting their water demands within California's apportionment of Colorado River water.
- To identify agreed-on terms and conditions for the conservation and transfer of specific amounts of Colorado River water within California.
- To provide incentives to promote conservation of Colorado River water.

1.2.2 Habitat Conservation Plan Objectives

For IID, the objectives of the HCP are:

- To minimize and mitigate the impacts of any take of covered species that might occur as a result of the implementation of the IID/SDCWA Transfer Agreement, the IID water conservation and transfer projects provided for under the QSA, the consensual cap on Colorado River water diversions by IID, and continuation of IID's routine operation and maintenance (O&M) activities in connection with IID's water irrigation and drainage system.
- To provide regulatory assurances to IID that additional mitigation measures to address impacts on covered species would not be required beyond the measures described in the HCP.
- To support issuance of Incidental Take Permits under both the federal and the state Endangered Species Acts for the covered activities.

The components of the HCP are further described in Section 2.2.6 of Chapter 2 and in Appendix C.

1.2.3 Reclamation's Purpose and Need

The Secretary of the US Department of Interior (Secretary) proposes to take the federal action necessary to allow the implementation of the Proposed Project. Therefore, Reclamation's underlying purpose and need for the Proposed Project are to facilitate implementation of the IID/SDCWA Transfer Agreement and the QSA. The Secretary's proposed draft Implementation Agreement (IA) represents the federal commitment to implement water deliveries to allow implementation of the QSA; the Proposed Project is a component of the IA, assuming full implementation of the QSA. A comparable implementation agreement would be required to represent the federal commitment to implement water deliveries to allow implementation of the IID/SDCWA Transfer Agreement, if the QSA is not fully implemented. The need for the federal action is to assist California in reducing its use of Colorado River water to its 4.4 MAFY apportionment in a normal year. This reduction in California's use of Colorado River water would benefit the entire Colorado River Basin.

1.2.4 USFWS' Purpose and Need

The ESA is intended to identify species needing protection, means to determine the type of protective measures needed, and enforcement measures. The US Secretaries of the Interior (through USFWS) and Commerce (National Marine Fisheries Service, NMFS) are responsible for implementing the ESA.

The ESA provides for a process by which species are reviewed to determine whether they are to be listed and receive protection under the ESA. If a species is listed, this does not mean that individuals or habitat of that species cannot be affected. Sections 7 and 10 of the ESA provide provisions to "take" threatened or endangered species if consultation has concluded with a take authorization. Section 10(a)(1)(B) of the ESA allows USFWS to issue an Incidental Take Permit authorizing take that is incidental to an otherwise lawful activity if the applicant provides a conservation plan meeting the following factors identified in Section 10(a)(2)(B):

- The taking will be incidental.
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.
- The applicant will ensure that adequate funding for the plan will be provided.
- The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.
- The measures, if any, required under subparagraph (A)(iv) (i.e., any additional measures that USFWS may require as being necessary or appropriate for purposes of the plan) will be met, and USFWS has received any other assurances it requires that the plan will be implemented.

USFWS will determine whether the HCP meets the requirements of ESA and is sufficient to support issuance of Incidental Take Permits. The purpose and need for the HCP is:

- To minimize and mitigate the effects of implementing the covered activities described in the HCP on the covered species identified in the HCP.
- To satisfy the requirements for issuance of Incidental Take Permits pursuant to Section 10(a) of ESA by specifying measures to minimize the effects of the covered activities as well as measures that ensure habitat availability for covered species.

1.3 Project Location and Region of Influence

The Project's region of influence comprises the areas that would be affected by the Project's water conservation and transfer components, which are described in Chapter 2, Description of the Proposed Project and Alternatives. Based on the locations of the Project components, six geographic subregions comprise the Project's region of influence:

- **LCR:** This subregion is defined as the lower Colorado River (LCR) and its historic 100-year floodplain, from Lake Havasu full pool elevation at Parker Dam to Imperial Dam.
- **IID Water Service Area and AAC:** This subregion is defined as the IID water service area and the AAC right-of-way, which extends from the Imperial Valley east to Imperial Dam.
- **Salton Sea:** This subregion is defined as the Salton Sea.
- **SDCWA Service Area:** This subregion is defined as the SDCWA service area.
- **MWD Service Area:** This subregion is defined as the MWD service area.
- **CVWD Service Area:** This subregion is defined as the CVWD service area. However, the Proposed Project affects only the portion of the CVWD service area that is entitled to receive Colorado River water, identified as Improvement District No. 1.

The six geographic subregions are depicted in Figure 1-1 and described below. For the purposes of the environmental setting descriptions and impact analyses (see Chapter 3) in this Draft EIR/EIS, the region of influence within these subregions could vary depending on the environmental resource being considered. If the geographic subregions for a particular environmental resource area differ from those shown in Figure 1-1, the modified subregions and the rationale for the modification are described in the environmental setting section for the specific environmental resource area.

1.3.1 LCR

As stated above, this subregion is defined as the LCR and its historic 100-year floodplain, including the full pool elevations from Lake Havasu at Parker Dam to Imperial Dam. Section 1.4.2 provides an overview of the allocation of Colorado River water among water rights holders in California and the key LCR diversion facilities. Figure 1-2 shows the key distribution facilities along the LCR. Further information on the federal and state laws, regulations, policies, and other decisions that govern the allocation of Colorado River water is presented in Section 3.1, Hydrology and Water Quality.

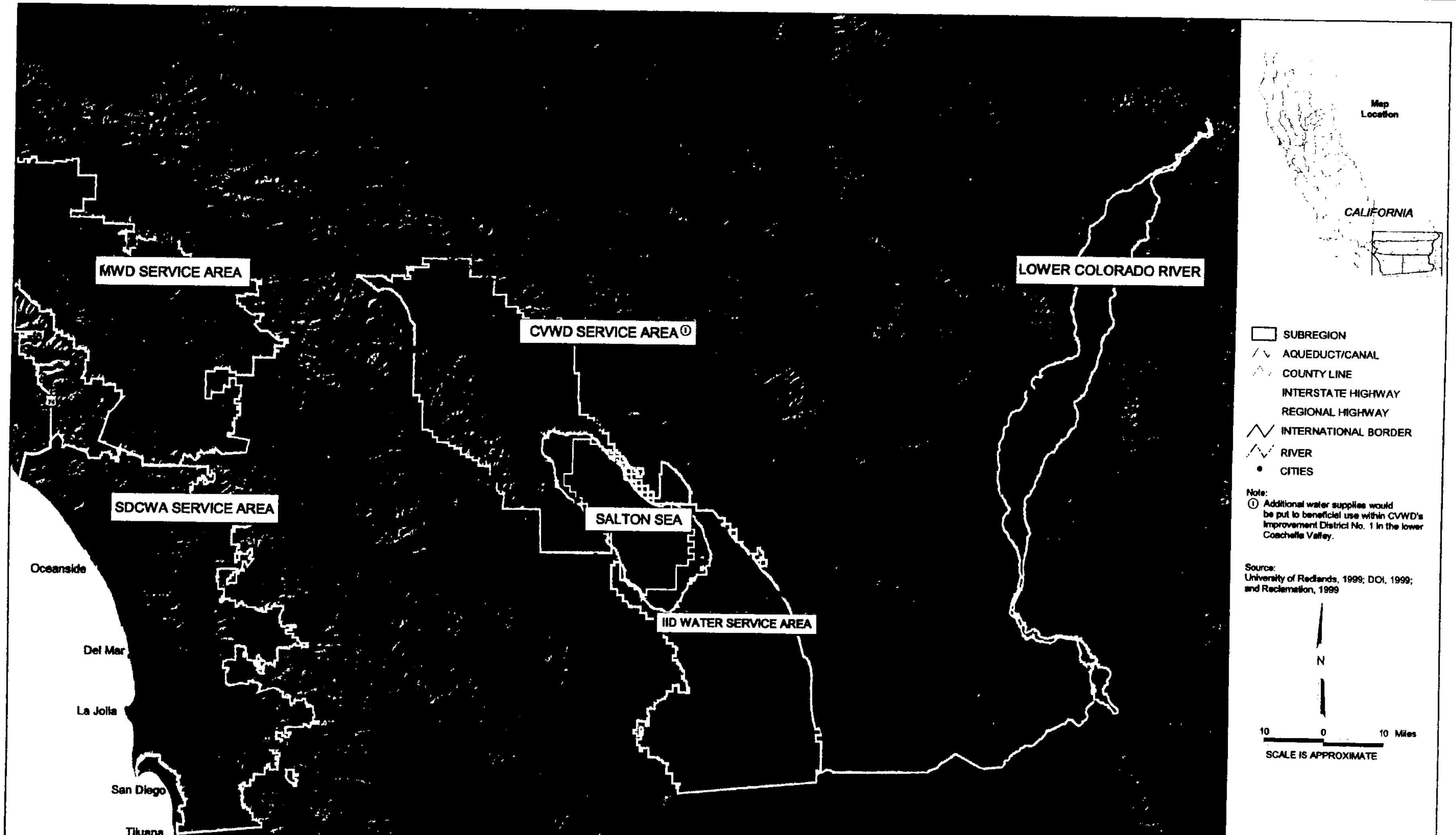

Figure 1-1
Proposed Project Geographic Subregions
IID Water Conservation and Transfer Project Draft EIR/EIS

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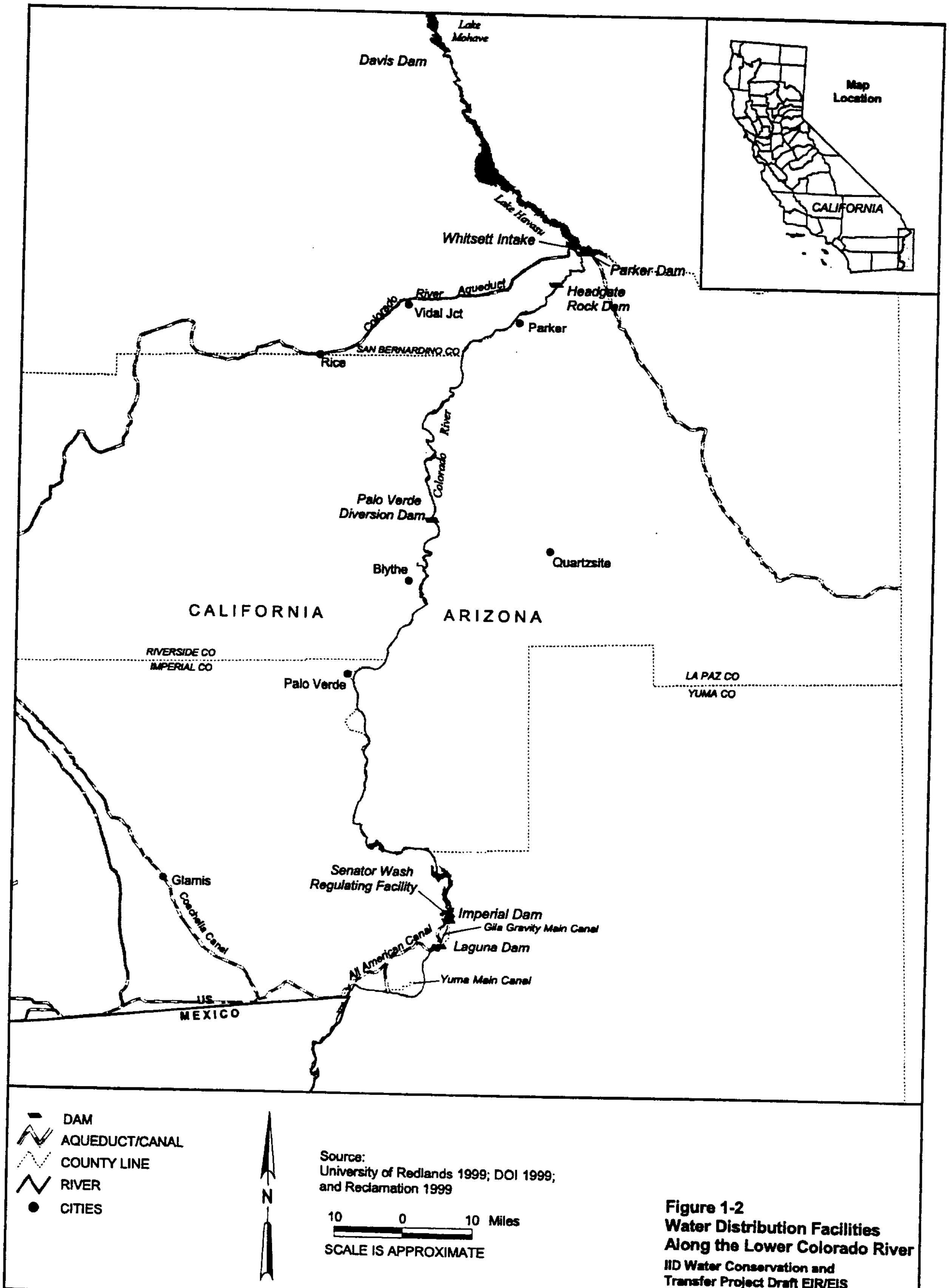

Source:
University of Redlands 1999; DOI 1999; and Reclamation 1999

Figure 1-2
Water Distribution Facilities Along the Lower Colorado River
IID Water Conservation and Transfer Project Draft EIR/EIS

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1.3.2 IID Water Service Area and All American Canal

IID is an irrigation district, a limited-purpose public agency, formed under the laws of the State of California. IID holds rights to take water from the Colorado River and deliver it to farmers, tenants, and landowners in Imperial County. IID provides agricultural water to approximately 500,000 acres of some of the most intensively farmed land in the nation. Irrigated agriculture is the primary economic enterprise within IID's water service area, the extent of which is shown in Figure 1-3. Landowners and tenants within IID's water service area conduct on-farm operations, which include crop irrigation (i.e., applying water to fields) and maintaining on-farm drainage systems. IID does not have authority to approve or disapprove land use, water use, or crop selection by farmers.

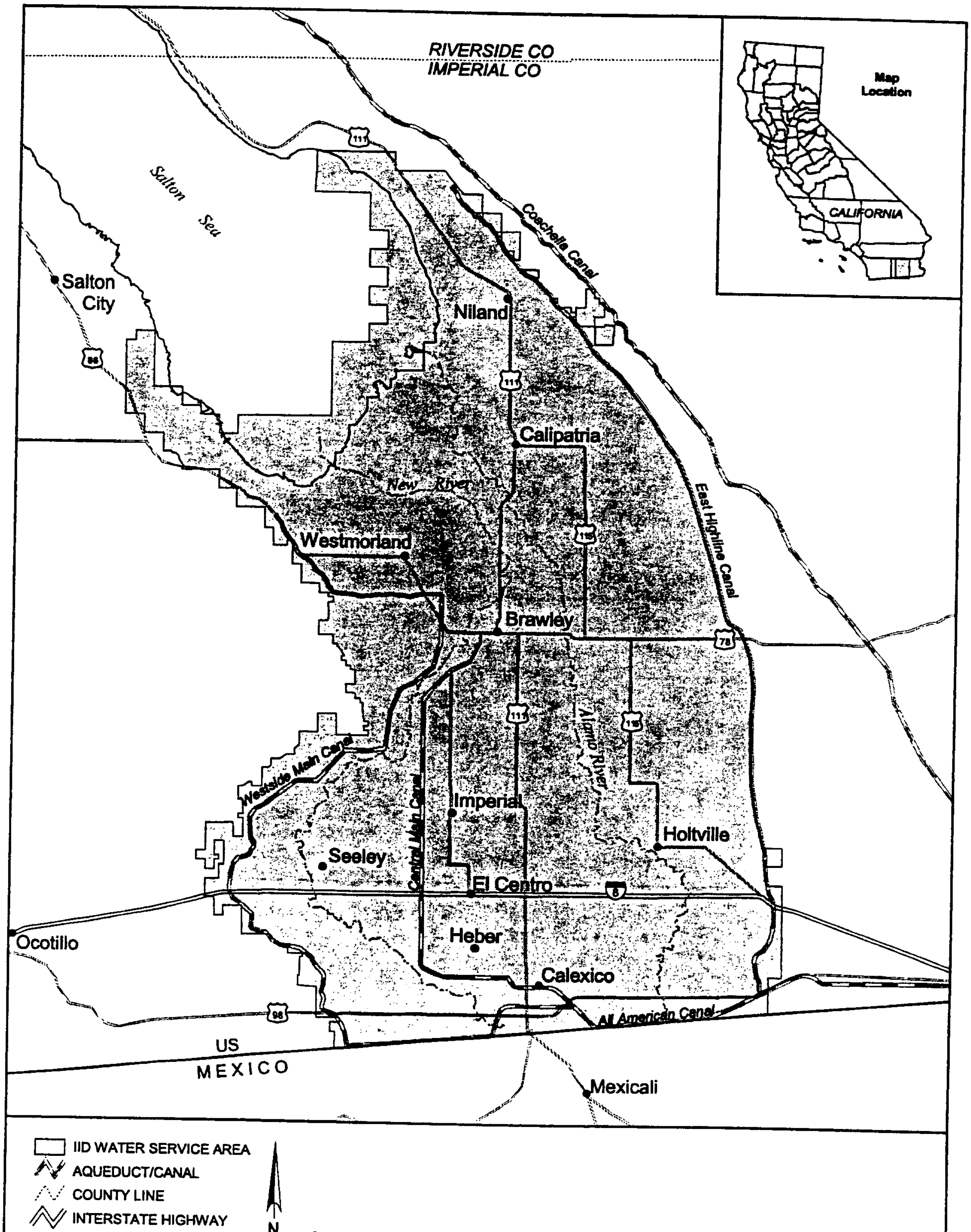
IID's operational activities are associated with irrigation (i.e., the diversion, measurement, conveyance, and delivery of Colorado River water to customers within the IID water service area through its canal system) and drainage [i.e., the collection, removal, measurement, and transport of drainage waters to the Salton Sea (see Figure 1-4) through its drain system]. The major features of this irrigation and drainage system are illustrated in Figure 1-5. Figure 1-6 shows the canals and drains in the IID water service area, and Figure 1-7 shows the flow of water through the IID irrigation and drainage system.

1.3.2.1 Irrigation

To deliver water to its service area, IID diverts water from the Colorado River at Imperial Dam. This water is desilted and conveyed by gravity through the 82-mile AAC to three primary main canals. These primary main canals (East Highline, Central Main, and Westside Main) branch off the AAC as it moves across the southern portion of the Imperial Valley. The main canals supply water to numerous lateral canals throughout the irrigated service area of IID. The lateral canals carry water from the main canals to farm fields; turnouts are used on the canals and laterals to deliver water to individual farm fields. All canals and laterals are owned and operated by IID.

In total, IID operates and maintains a delivery system consisting of approximately 1,667 miles of canals, including approximately 1,114 miles of concrete-lined canals, approximately 537 miles of unlined earthen canals, and approximately 16 miles of pipe (IID 2000). To improve system efficiencies, IID uses seven independent regulating reservoirs to level out the variability in water supply and demand. The supply of water must be ordered from Lake Havasu one week in advance; the quantity is based on the estimated demand. Actual demand is affected by weather conditions.

In addition, three lateral interceptor systems are in place, with several more planned. These systems capture lateral spillage (i.e., operational discharge) for reuse within the irrigation system. Each of the three lateral interceptor systems discharges to a reservoir. The captured discharge is used for water regulation and delivery purposes. Like the regulating reservoirs, lateral interceptor systems conserve water and provide improved service to farmers. Chapter 2, Description of the Proposed Project and Alternatives, further describes the function of lateral interceptor systems, regulating reservoirs, and other water irrigation and drainage facilities in IID's water service area.



Source:
University of Redlands 1999; DOI 1999; and Reclamation 1999

Figure 1-3
IID Water Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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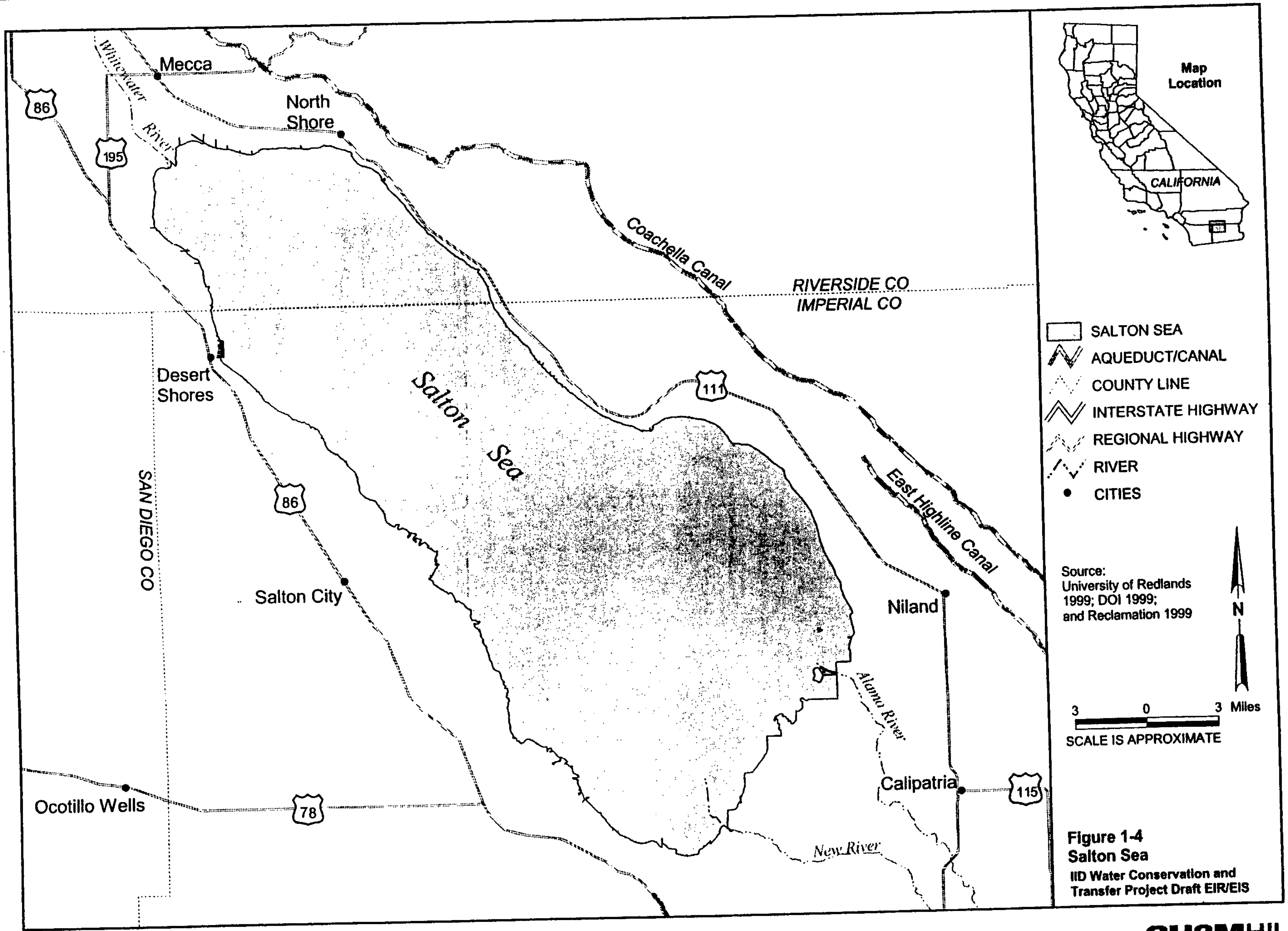

Figure 1-4
Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

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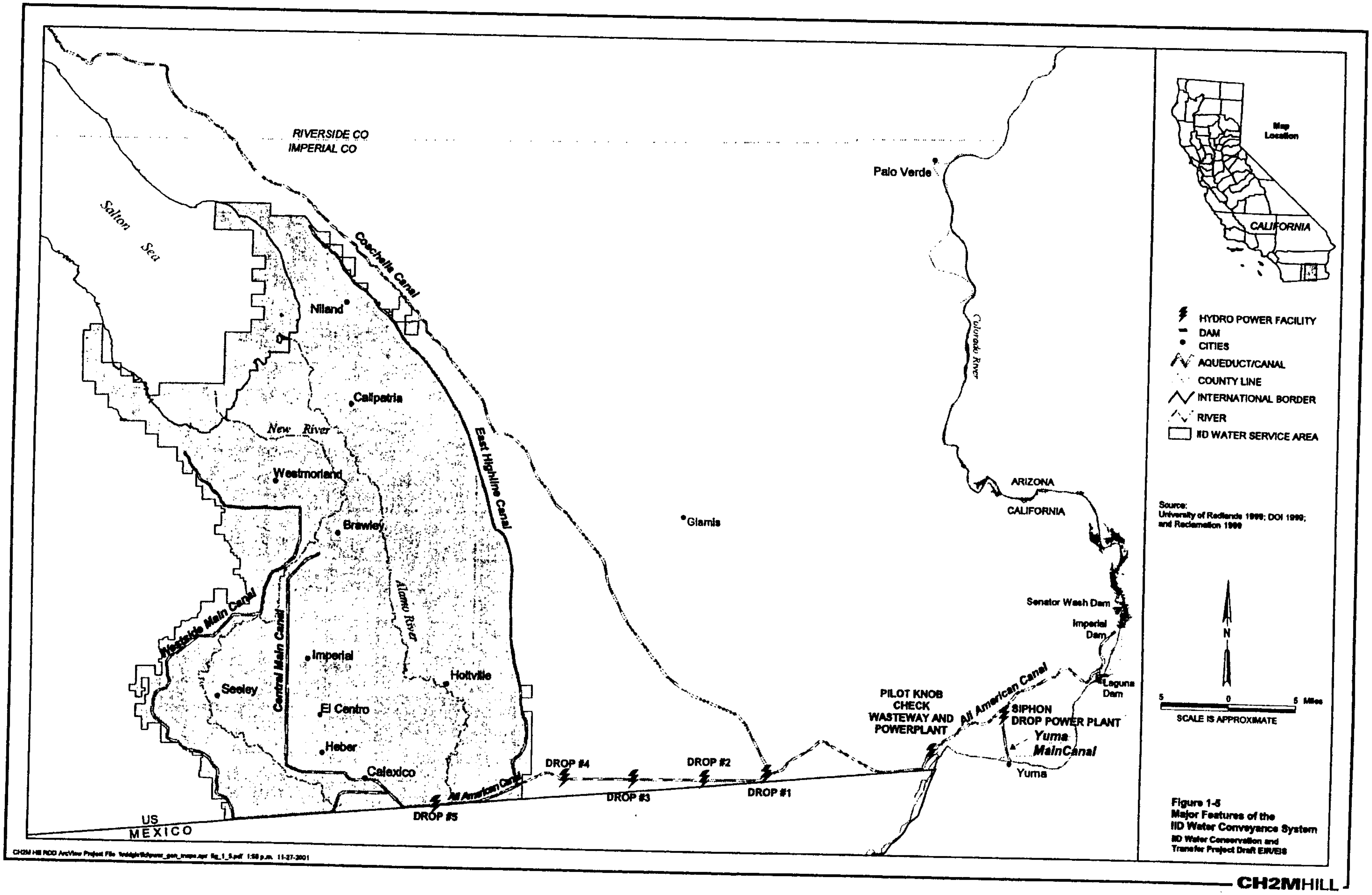

Figure 1-5
Major Features of the IID Water Conveyance System
IID Water Conservation and Transfer Project Draft EIR/EIS

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1.3.2.2 Drainage

IID's drainage operations include collection, conveyance, measurement, and discharge of drainage water through IID's main and lateral drain system to the New and Alamo Rivers and the Salton Sea. IID is obliged, as stated in its rules and regulations covering drainage, to provide a drain outlet for every 160 acres of farmland within its water service area. To do so, IID operates a complex drainage system consisting of 1,456 miles of open and closed (pipeline) drains, 750 surface and subsurface drainage pumps, thousands of miles of subsurface drains (or tile drains) (which are owned by Imperial Valley farmers), and associated collection pipelines and water recovery systems (IID 2000). As with the canal system, the drain system is composed of main and lateral drains.

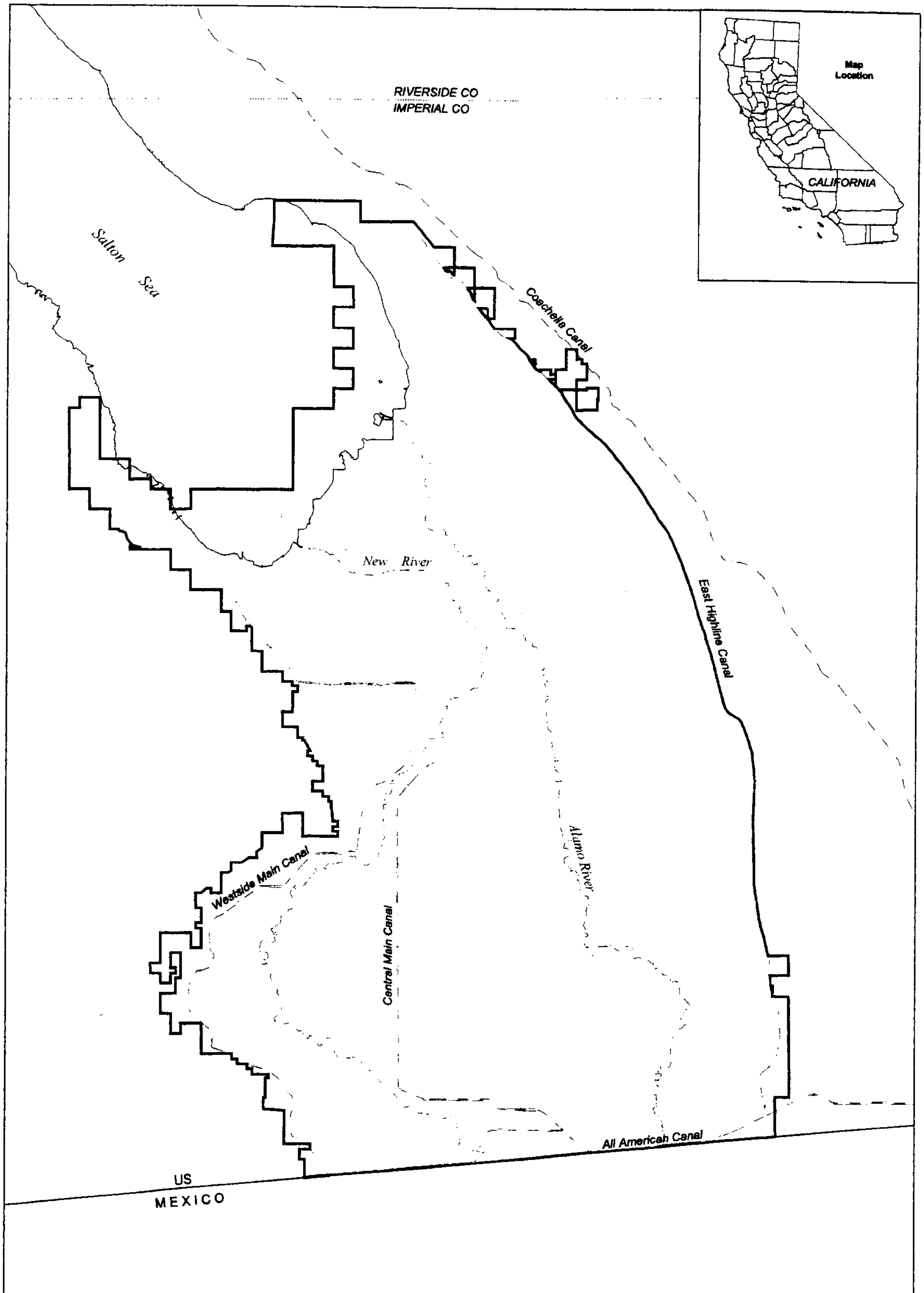
Irrigation water that percolates through the soil is collected by on-farm subsurface tile drains and, to a lesser extent, by surface drains. The open drains (mostly lateral drains) collect tailwater and tile water from area farms, as well as operational discharge water emanating from IID's irrigation system. Tailwater is irrigation water that runs off the lower ends of fields and is discharged into drains or is collected in sumps from which it is pumped to the nearest drain or river or directly to the Salton Sea. Tilewater is subsurface drainage water generated primarily through salt-leaching operations performed by farmers. Currently, more than 35,000 miles of subsurface tile drains have been installed by Imperial Valley farmers. Outlets for subsurface tile drains into lateral drains can be at intervals as close as 660 feet but are generally at intervals of 0.25 to 0.50 miles. IID estimates that more than 14,000 subsurface tile drain outlets release drain water from its customers into the drainage system.

Operational discharge is water resulting from lateral fluctuations, carriage water, or delivery changes in farmers' water orders. Most operational water discharges into IID's surface drain system although some operational water discharges directly to the New or Alamo Rivers or to the Salton Sea.

1.3.3 SDCWA Service Area

SDCWA was incorporated in 1944 under the County Water Authority Act (Stats. 1943, c. 545, as amended) for the purpose of augmenting San Diego County's minimal local water resources with a safe, reliable, and sufficient supply of imported water (see Figure 1-8). SDCWA provides its 24-member retail water agencies with water for domestic and agricultural uses. More than 2.8 million people, or approximately 90 percent of San Diego County's total population, receive their water through SDCWA. This number is expected to increase by an additional 1 million by 2015.

SDCWA's mission is related solely to meeting water supply demands. SDCWA does not have the authority to approve either land use plans or building permits within its service area; such authority is exercised by the County of San Diego and by incorporated cities within the SDCWA service area, which includes the city of San Diego. SDCWA, however, in conjunction with the San Diego Association of Governments (SANDAG), has evaluated the long-term water requirements of existing and planned future land uses within its service area. SDCWA has also compared these needs against existing and potential water resources in a Water Resources Plan (SDCWA 2000), which included projections through the year 2015. Current projections by SDCWA indicate that total annual water demand within its



DRAIN
CANAL
AQUEDUCT/CANAL
RIVER
COUNTY LINE
IID WATER SERVICE AREA BOUNDARY

N

Source:
University of Redlands 1999;
DOI 1999; and Reclamation 1999

5 0 5 Miles
SCALE IS APPROXIMATE

Figure 1-6
Canals and Drains in the IID Water Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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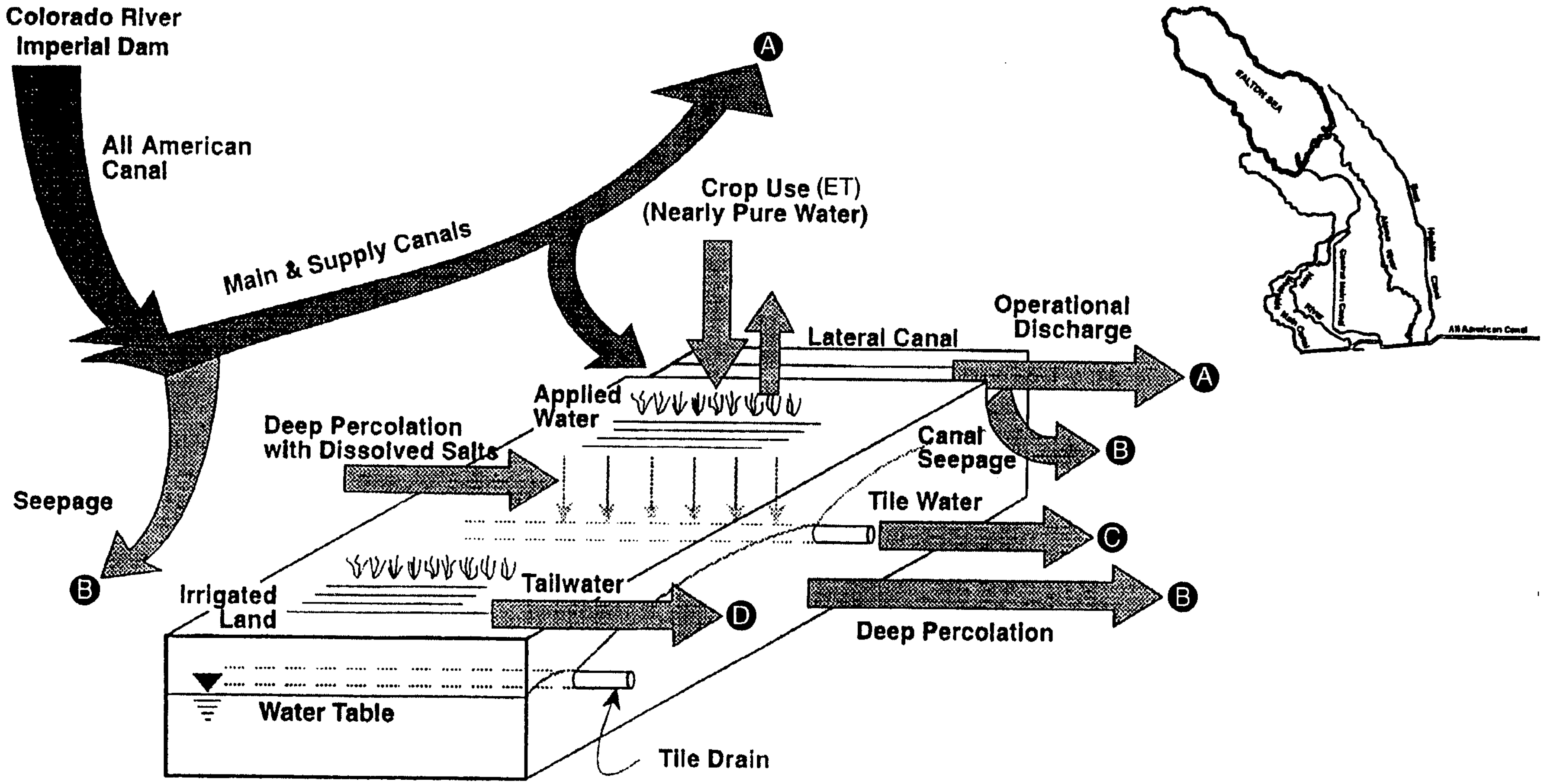


A Unused water from a canal can discharge to a surface drain, directly to a river, or directly to the Salton Sea. Most lateral canals discharge to a surface drain.

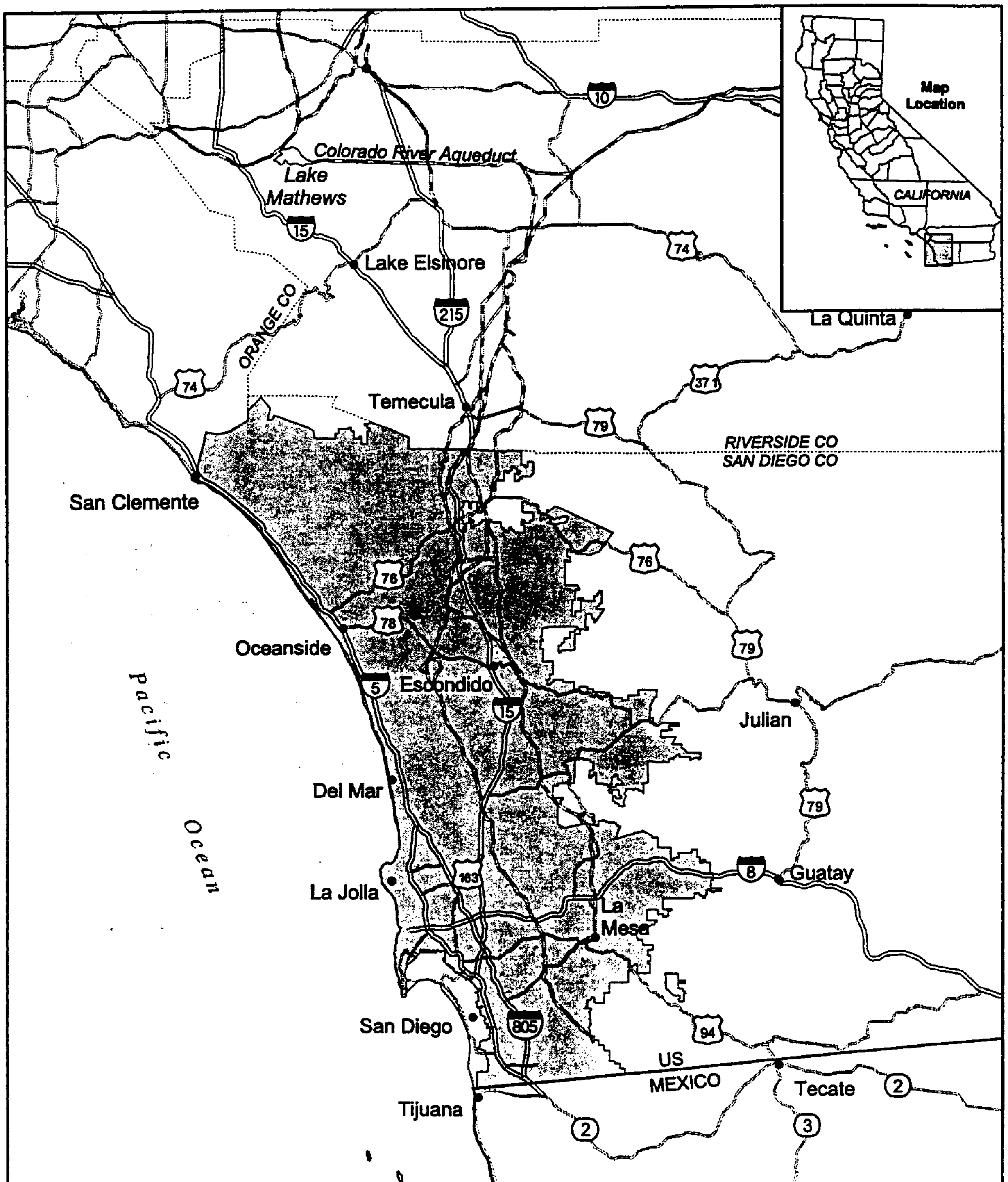
B Seepage from unlined canals or reservoirs, which in essence becomes deep percolation, can follow one of two paths. One is slow movement to the Salton Sea, involving travel times of many years to decades. The second path is interception by tile drains or surface drains. The latter path is estimated to be two percent of total seepage.

C Subsurface water collected by tile drains normally discharges to surface drains, although a few tile drains discharge to a river or the Salton Sea. Tile drain outlets along a surface drain are typically spaced every 400 to 500 feet.

D Water runoff (tailwater) from irrigated fields discharges by gravity to surface drains or is collected in sumps, from where it is pumped to the nearest surface drain or river.

Source: IID 1994

Figure 1-7
Pathway for Water Flow through the IID Water Irrigation and Drainage System
IID Water Conservation and Transfer Project Draft EIR/EIS



SDCWA SERVICE AREA
AQUEDUCT/CANAL
COUNTY LINE
INTERSTATE HIGHWAY
REGIONAL HIGHWAY
INTERNATIONAL BORDER
CITIES

N

Source:
University of Redlands 1999;
DOI 1999; and Reclamation 1999

5 0 5 Miles
SCALE IS APPROXIMATE

Figure 1-8
SDCWA Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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service area will increase during the next 20 years from approximately 526 KAFY in 1995 to approximately 787 KAFY in 2015. Although some enhancement of local water resources during that period is anticipated, imported water must continue to provide the majority of the region's total water supply.

Depending on rainfall, availability of local resources (i.e., surface water supplies, groundwater wells, recycled water, and desalinated brackish groundwater), and demand, 75 to 95 percent of water used within the SDCWA service area is imported (SDCWA 2001).

Currently, all water imported by SDCWA is purchased from MWD (the only source of imported water to the region). MWD diverts water from the Colorado River under its water delivery contracts with the Secretary through the Colorado River Aqueduct (CRA), and MWD also obtains water from the State Water Project (SWP). The SWP brings water from the Sacramento-San Joaquin Delta through the California Aqueduct to southern California. Depending on the time of year and MWD policy determinations, between 75 and 100 percent of the water purchased by SDCWA from MWD comes from the Colorado River. MWD is described further in Section 1.3.4.

Since first receiving imported water from MWD in 1947, SDCWA has relied solely on MWD water supplies to satisfy the region's increasing need for imported water. For years, MWD consistently met SDCWA's water requirements, and MWD has stated that future water needs will also be satisfied. However, SDCWA's interest in diversifying its imported water supply sources increased in 1991 during a prolonged drought when MWD water supply cutbacks of up to 31 percent substantially affected SDCWA's ability to meet demands. Therefore, SDCWA has determined that it needs to examine alternate water sources to meet a portion of the region's imported water requirements and to bolster the reliability of its water supply.

1.3.4 MWD Service Area

MWD is a consortium of 26 cities and water districts, including SDCWA, that provides water to approximately 17 million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura Counties for primarily municipal and industrial uses. MWD was formed in 1928 under the Metropolitan Water District Act which was passed by the state legislature to build the CRA, a facility MWD owns and operates. In addition, MWD purchases water from the SWP as a SWP contractor. See Figure 1-9 for the location and extent of MWD's Service Area.

MWD has a fourth priority entitlement of 550 KAFY within California's normal-year 4.4 MAFY apportionment of Colorado River water (see Table 1-1 in Section 1.4.2). Beyond the 4.4 MAFY normal-year limitation, MWD has a fifth priority right to an additional 662 KAFY, which includes the combined 5a priority right to 550 KAFY and 5b priority right to 112 KAFY.[1] Until 1996, MWD kept the CRA full; the CRA has an annual capacity to carry 1.3 MAFY, primarily apportioned but unused water from Arizona and Nevada and unused

[1] In 1946, the City of San Diego agreed to merge its priority 5b rights to 112 KAFY with, and into, the rights of MWD (see Table 1-1).

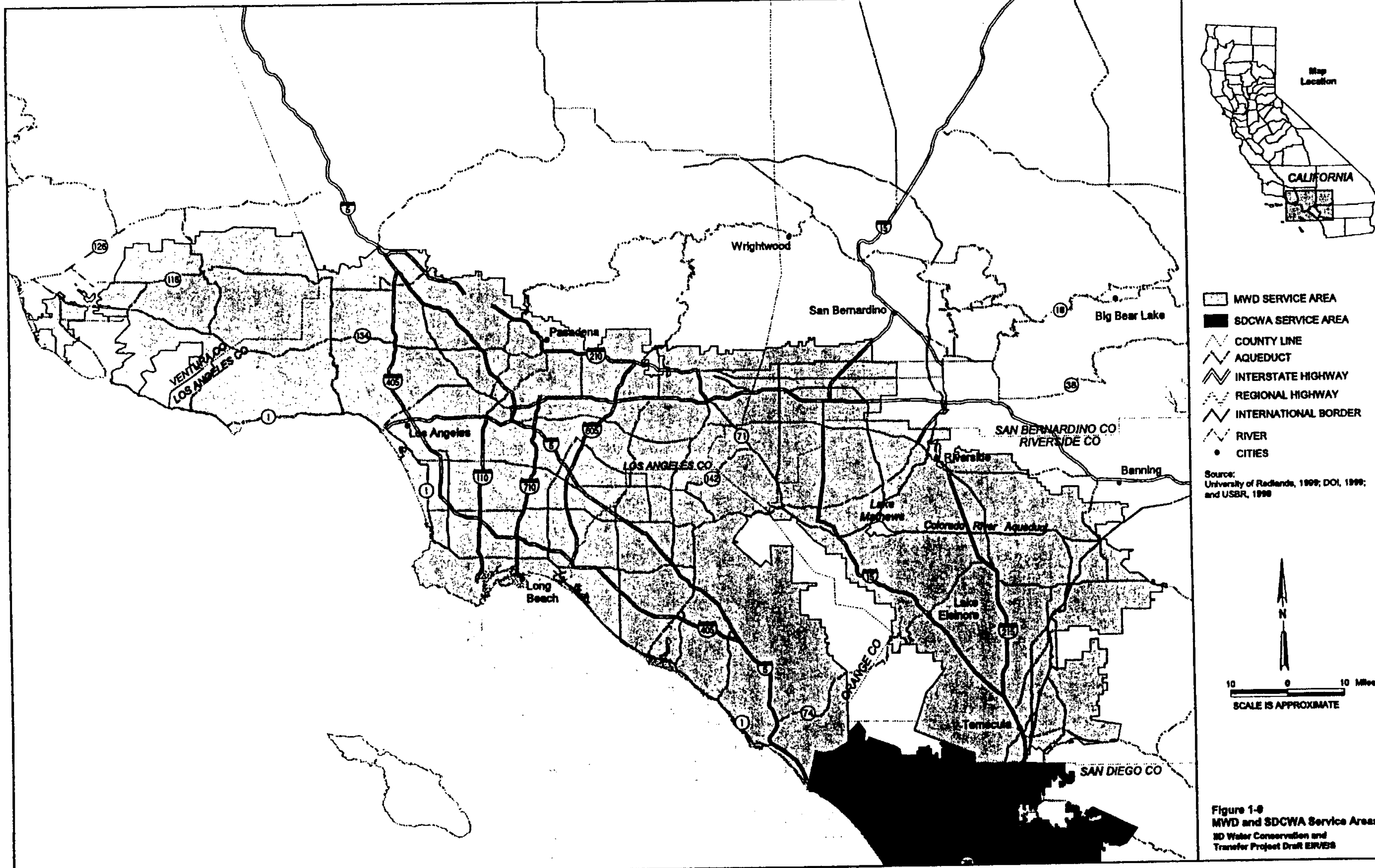

Figure 1-9
MWD and SDCWA Service Areas
SD Water Conservation and Transfer Project Draft EIR/EIS

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California agricultural water. By 1997, however, Arizona began taking nearly all of its 2.8 MAFY apportionment following substantial completion of the Central Arizona Project (CAP). Since 1996, MWD has been able to keep the CRA full mainly through the Secretary's annual declarations of surplus Colorado River water.

1.3.5 CVWD Service Area

CVWD is a local government agency, which was formed in January 1918 under the County Water District Act [California Water Code (Water Code) § 30000 *et seq.*]. Nearly 640,000 acres are within its service area boundaries. Most of this land is in Riverside County, but the CVWD service area also extends into Imperial and San Diego Counties. Only a portion of the CVWD service area (Figure 1-10), defined as Improvement District No. 1, is entitled to receive Colorado River water via the AAC and the Coachella Canal. Along with IID, CVWD has Priority 3 rights to 3.85 MAFY of Colorado River water minus the quantity used by holders of Priorities 1 and 2 (see Table 1-1 in Section 1.4.2), for use in Improvement District No. 1. CVWD's Priority 3 rights are subordinated to IID's rights as a result of the 1934 Compromise Agreement between IID and CVWD.

CVWD is responsible for domestic water importation and distribution; wastewater collection, reclamation, and redistribution; regional flood protection; irrigation water importation and distribution; irrigation drainage collection and disposal drainage; groundwater management; and water conservation. Water travels 159 miles to the CVWD service area from Imperial Dam on the Colorado River to Lake Cahuilla, a terminal reservoir on the Coachella Canal to CVWD's Improvement District No. 1. The Coachella Canal is 122 miles long and branches from the main AAC. It has a capacity of 2,578 acre-feet (AF) in a 24-hour period, which is 941.2 KAFY (CVWD 2000).

1.4 Background and History of the Colorado River, IID's Water Rights, and Development of the Proposed Project

This section provides the background and history of the Proposed Project, including an overview of the allocation of Colorado River water among water rights holders in California and the key LCR diversion facilities. Additionally, the SWRCB decisions related to the Proposed Project, the development of the IID/SDCWA Transfer Agreement, and the QSA are also discussed. Further information on the federal and state laws, regulations, policies, and other decisions that govern the allocation of Colorado River water is presented in Section 3.1, Hydrology and Water Quality.

1.4.1 Description of the Colorado River

From its headwaters in the Rocky Mountains of Colorado, the Colorado River flows southwest for 1,470 miles to the Gulf of California in Mexico. It drains an area of approximately 242,000 square miles, and the river or its tributaries travel through parts of seven Colorado River Basin (Basin) states in the US. The Colorado River is also the International Boundary between the US and Mexico for approximately 17 miles between Arizona and Mexico. From the International Boundary, it travels southward to form the boundary between the Mexican states of Baja California and Sonora before flowing into the Gulf of California.

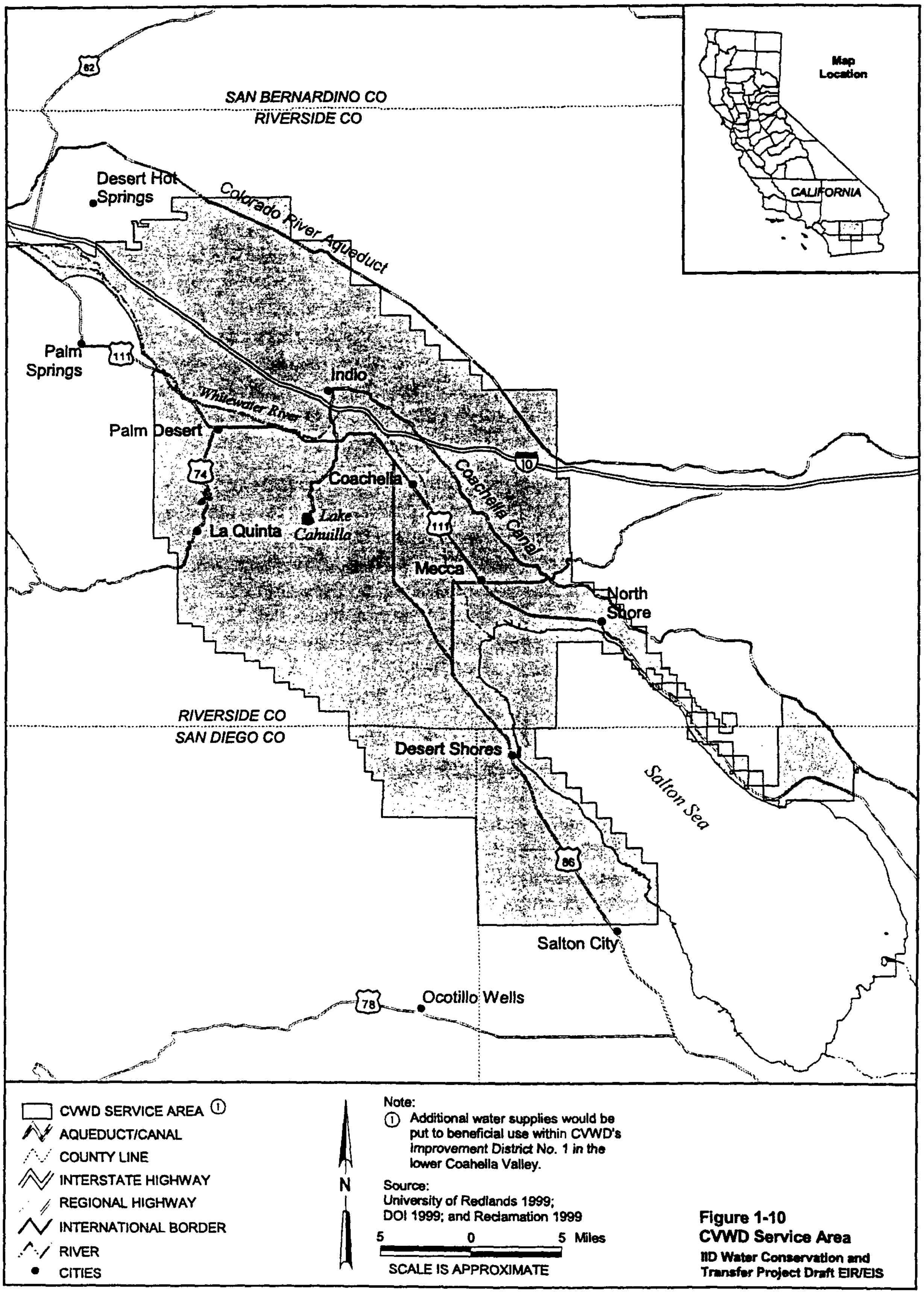

Figure 1-10
CVWD Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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The Upper Basin includes portions of Arizona, Colorado, New Mexico, Utah, and Wyoming; the Lower Basin consists of portions of Arizona, California, Nevada, and New Mexico. In addition to the Upper and Lower Basin states, other traditional users of Colorado River water include the Republic of Mexico and several Indian tribes within the US. Figure 1-11 shows the location and extent of the Colorado River Basin. The major tributaries of the Colorado River include the Green, Yampa, White, Gunnison, Dolores, San Juan, Little Colorado, Virgin, Bill Williams, and Gila Rivers. The dividing point between the Upper and Lower Basins, as defined in the Colorado River Compact of 1922 (Compact), is at Lee Ferry, Arizona, approximately 17 miles downstream of Glen Canyon Dam.

The Colorado River's unregulated flow is subject to great annual variation, and reservoirs have been constructed on the River to regulate this variability. Two reservoirs - Lake Powell (behind Glen Canyon Dam) in the Upper Basin and Lake Mead (behind Hoover Dam) in the Lower Basin - have a combined, active-storage capacity of approximately 51 million acre-feet (MAF). Additional facilities on the Colorado River with relevance to California include the Davis, Parker, Headgate Rock, Palo Verde, Imperial, and Laguna Dams. Lake Mohave (behind Davis Dam) is a regulating reservoir with a power plant at the dam. Lake Havasu (behind Parker Dam) is the forebay and desilting basin for MWD's CRA in California and the CAP canal in Arizona. A power plant is also located at the dam. Palo Verde Dam serves as the Colorado River diversion structure for irrigated agriculture in eastern Riverside County, California, and the Imperial Dam serves as the Colorado River diversion structure for the AAC in California, which supplies water to IID, CVWD, and the Gila Gravity Main Canal in Arizona.

The Laguna Dam serves as a desilting basin on the Colorado River. Off-stream regulatory storage is provided by the Senator Wash Dam. Figure 1-2 illustrates the location of the LCR, along with its key water distribution and regulation facilities.

1.4.2 Law of the River

Over the years, common law, federal and state laws, interstate compacts, an international treaty, court decisions, federal contracts, federal and state regulations, and multi-party agreements have developed to collectively govern the use of the Colorado River. This body of law is commonly referred to as the "Law of the River." This overview does not describe the entire body of law known as the Law of the River.

Two concepts are key to understanding the Law of the River: the concept of "apportionment" and the concept of "priority." "Apportionment," which is also referred to as "entitlement," is the volume of water that an individual or entity has a legal right to divert within a given time period. The right to divert is usually limited to a certain diversion rate, point(s) of diversion, purpose(s) of use, and place of use (service area). "Priority" refers to an entity's right to take its apportionment relative to all other entities with entitlements. The highest-priority entitlement is exercised first, then the next -highest -priority entitlement is exercised next, and so on through the descending priorities as long as supplies are sufficient. Priority becomes crucial when not enough water is available to satisfy demand. The timing and amount of flow in a river are variable, so it is not always possible to meet all water demands. In times of shortage, those with the lowest-priority entitlement might

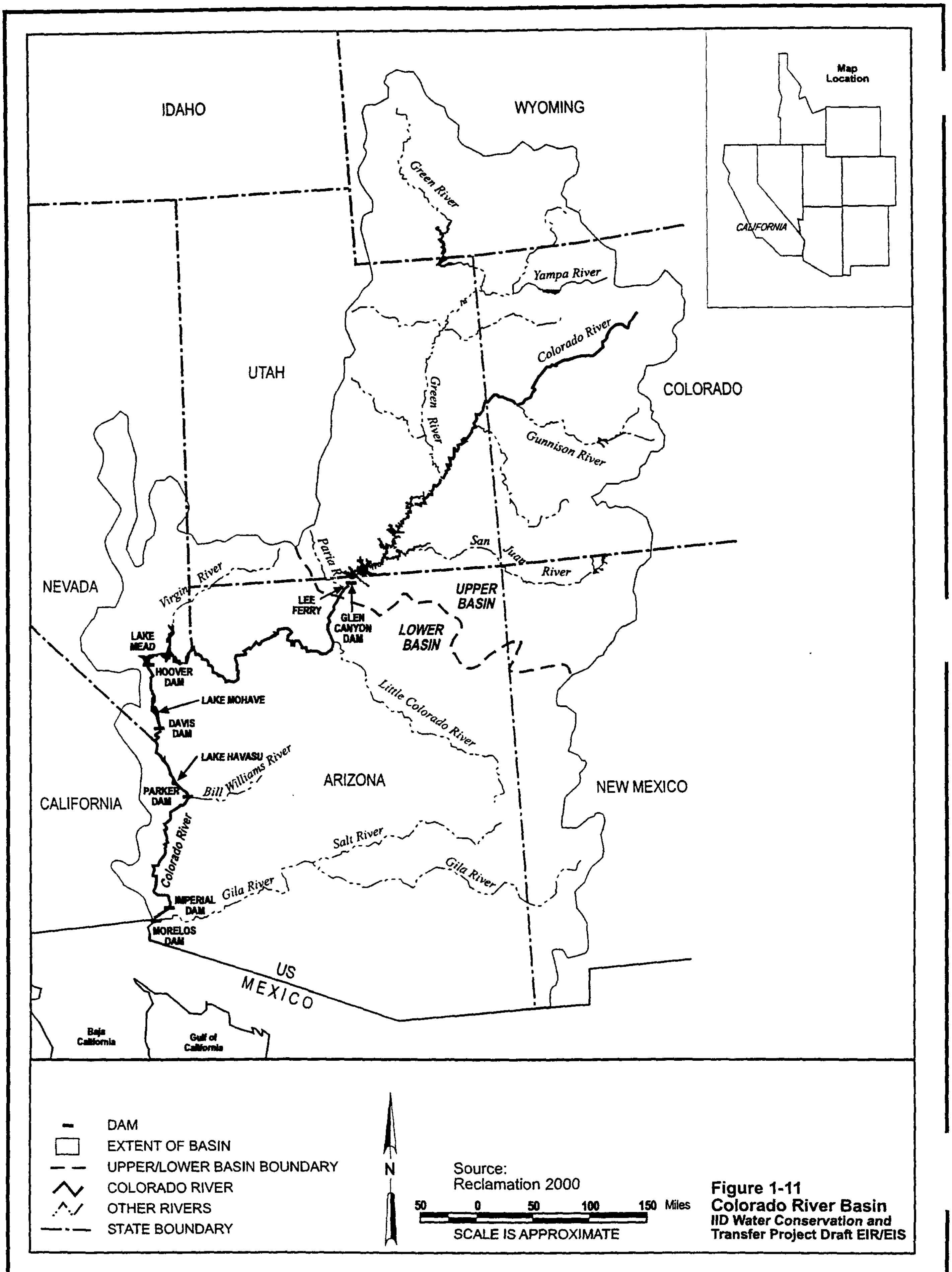

Figure 1-11
Colorado River Basin
IID Water Conservation and Transfer Project Draft EIR/EIS

155202.08.02•Colorado River Basin•11/27/01•ccc•SFO receive only a portion of their entitlement. In times of severe shortages, even higher-priority entities might receive less than their full entitlement.

An appropriative water right is the right to divert or extract water for use on nonriparian or nonoverlying land, or for nonriparian or nonoverlying uses. Most entities that hold water rights to Colorado River water are appropriative users. The priority of most appropriative water rights in the western US, including California, is based on the date the water was first diverted and put to beneficial use. This is commonly referred to as the "first in time, first in right" doctrine. In the context of Colorado River water, the term "present perfected rights" refers to water rights based on diversion and beneficial use, and thereby "perfected" under state law, prior to the effective date of the Boulder Canyon Project Act (BCPA) of June 25, 1929. Generally these "perfected" water rights have a high priority as a result of their early date of diversion.

In the 1920s, the US government became involved in the storage, delivery, and use of Colorado River water for irrigation and domestic uses. In 1928, Congress enacted the BCPA (effective in 1929), which authorized the Secretary to construct Hoover Dam and the AAC and to contract for the delivery and use of water from these facilities for irrigation and domestic uses. Congress conditioned the BCPA on the ratification of the 1922 Compact by at least six of the Colorado River Basin states, including California. The BCPA was further conditioned upon the California state legislature irrevocably and unconditionally agreeing to limit California's aggregate annual consumptive water use (diversions less returns to the river) of and from the Colorado River to no more than 4.4 MAFY of the 7.5 MAFY apportioned to the Lower Basin states by the Compact, plus not more than one-half of any excess or surplus waters unapportioned by the Compact, with such use to be always subject to the terms of the Compact.

By 1929, six states, including California, had ratified the Compact. The California legislature passed the California Limitation Act, which satisfied the conditions precedent in the BCPA. Shortly thereafter, the Secretary constructed Hoover Dam and the AAC and executed contracts for water delivery and use from those facilities. Arizona ratified the Compact in 1944.

Prior to entering into water delivery contracts with California agencies, the Secretary requested those agencies to agree to relative priorities of rights among themselves. In response, seven major California agencies having interests in the Colorado River executed the California Seven-Party Agreement of 1931 (Seven-Party Agreement) that established quantities and priorities to the use of Colorado River water made available to California, which were incorporated into water delivery contracts subsequently entered into with the Secretary. Table 1-1 shows the quantities and priorities established by the Seven-Party Agreement.

TABLE 1-1
Table 1-1The Priority System Established by the Seven-Party Agreement

Priority	Description	Annual AF
1	Palo Verde Irrigation District–gross area of 104,500 acres	
2	Yuma Project (Reservation District) – not exceeding a gross area of 25,000 acres	
3a	Imperial Irrigation District and lands in Imperial and Coachella Valleys to be served by AAC[2]	3,850,000[1]
3b	Palo Verde Irrigation District –16,000 acres of mesa lands	
4	Metropolitan Water District and/or City of Los Angeles	550,000
	SUBTOTAL	**4,400,000**
5a	Metropolitan Water District and/or City of Los Angeles and/or others on coastal plain	550,000
5b	City and/or County of San Diego[3]	112,000
6a	Imperial Irrigation District and lands in Imperial and Coachella Valleys	
6b	Palo Verde Irrigation District–16,000 acres of mesa lands	300,000[4]
7	Agricultural use	all remaining water
	TOTAL	**5,362,000[5]**

Notes:
[1]The total amount of water available to satisfy Priorities 1, 2, 3a, and 3b is 3.85 MAFY.
[2]CVWD's Priority 3 rights are secondary to IID's rights as a result of the 1934 Compromise Agreement between IID and CVWD.
[3]In 1946, the City of San Diego agreed to merge its rights with, and into, the rights of MWD.
[4]The total amount of water available to satisfy Priorities 6a and 6b is 300 KAFY.
[5] The California Plan describes the strategy to assist California to reduce its annual use to its legal apportionment of 4.4 MAF in normal years, or to meet its needs from sources that do not jeopardize the apportionments of others (see Section 1.5.1).

As shown in Table 1-1, allocation volumes for each diverter are not specific within Priorities 1-3 and 6, but they are quantified with an aggregate maximum limitation. That is, the individual diverters do not have exact apportionments, but the sum of their respective apportionments are capped at an aggregate, maximum amount. The maximum amount of Colorado River water rights under the Seven-Party Agreement is 5.362 MAF, or 0.962 MAF more than California's total basic apportionment of 4.4 MAF in a normal year. Therefore, diversions of more than 4.4 MAF under Priorities 5a, 5b, and 6 are dependent on surplus water being available, or on Arizona or Nevada not diverting their full apportionments.

In 1964, the US Supreme Court entered its Decree setting forth the BCPA apportionment of water available for release from water controlled by the US in the Colorado River to users in Arizona, California, and Nevada. The Decree also established certain federal reserved rights, and provided for the quantification of present perfected rights, all to be supplied from the apportionments of the respective states. As noted in Section 1.4.2, in the context of Colorado River water, "present perfected rights" refers to water rights based upon diversion and beneficial use prior to the effective date of the BCPA (June 25, 1929). The aggregate annual diversion entitlements of miscellaneous and Indian present perfected rights holders within California who are not parties to the Seven Party Agreement is approximately 75 KAF.

Under the Decree, a "normal year" is a year in which sufficient mainstream Colorado River water is available for release to satisfy 7.5 MAF of annual consumptive use in the three Lower Division states (California, Arizona, and Nevada). A "surplus year" is one in which sufficient mainstream water is available for release to satisfy in excess of 7.5 MAF of annual consumptive use in the three Lower Division states. A "shortage year" is one in which insufficient mainstream water is available for release to satisfy 7.5 MAF of annual consumptive use in the three Lower Division states.

The Decree requires the Secretary to release mainstream water controlled by the US as follows: In a normal year, the Secretary shall make 2.8 MAF available to Arizona, 4.4 MAF available to California, and 0.3 MAF available to Nevada. In a surplus year, the Secretary, in addition to the normal year allocations, shall apportion 50 percent of the water in excess of 7.5 MAF for use in Arizona and 50 percent for use in California. As a result of a subsequent contract between Nevada and the US, this has now been modified so that 46 percent of the surplus is apportioned for use in Arizona and four percent is apportioned for use in Nevada. In a shortage year, the Secretary must first satisfy present perfected rights in order of priority and then apportion the remaining water consistent with the BCPA and the Decree, but in no event shall more than 4.4 MAF be apportioned for use in California, including all present perfected rights.

Lastly, the Decree provides the Secretary with authority to make available water apportioned to but unused by a state during a particular year for consumptive use in another Lower Division state. Such apportionment does not give any right to the use of that water in subsequent years. California has been the beneficiary of this provision in that it has historically been allowed to divert water that was allocated to but not used by Arizona and Nevada. Pursuant to the US-Mexico treaty of 1944, Mexico is guaranteed 1.5 MAF in normal years and 1.7 MAF in surplus years.

1.4.3 IID's Water Rights

This section describes IID's Colorado River water rights. For a more detailed discussion of the allocation of Colorado River water and a definition of terms, refer to Section 1.4.2, Law of the River, and the glossary in this Draft EIR/EIS.

IID's Appropriative Rights. IID holds legal title to all its water and water rights in trust for landowners within the District [Water Code § 20529 and 22437; Bryant v. Yellen, 447 U.S. 352, 371 (1980), fn. 23]. IID's rights to appropriate Colorado River water are long standing. Beginning in 1885, IID's predecessors-in-interest made a series of appropriations of Colorado River water under California law for use in the Imperial Valley. Pursuant to then-existing California law, these appropriations were initiated by posting public notices for approximately 7 MAFY at the point of diversion and recording such notices in the Office of the County Recorder. IID was formed in 1911 and became the holder of approximately 7 MAFY of pre-1914 state-based appropriative rights.

As a result of the Seven-Party Agreement, which is described in Section 1.4.2, IID agreed to limit its California pre-1914 appropriative water rights in quantity and priority to the apportionments and priorities contained in the Seven-Party Agreement. Following execution of the Seven-Party Agreement, between 1933 and 1936, IID filed eight California applications to appropriate water pursuant to the California Water Commission Act. IID filed these applications without waiving its rights as a pre-1914 appropriator, and the applications sought, through state proceedings, rights to the same quantity of Colorado River water as had been originally appropriated - more than 7 MAFY. However, the applications also incorporated the terms of the Seven-Party Agreement, thus incorporating the apportionment and priority parameters of the Seven-Party Agreement into IID's appropriative applications. Permits were granted on the applications in 1950.

IID's Contract with the Secretary. As described in Section 1.4.2, California was apportioned 4.4 MAFY out of the Lower Division apportionment of 7.5 MAFY, plus 50 percent of any available surplus water pursuant to the BCPA. On September 28, 1931, the Secretary adopted general regulations incorporating the terms of the Seven-Party Agreement. The apportionment of California's share of Colorado River water was made by the Secretary of the Interior by entering contracts with California right holders. The Secretary entered into a permanent water service delivery contract with the IID on December 1, 1932.

Subordination by CVWD. At the time the IID entered into its contract with the Secretary, the lands to be served with Colorado River water in the Coachella Valley to the north were anticipated to become a part of the IID. However, the Coachella farmers eventually decided that they preferred to have their own delivery contract with the Secretary, and an action was brought by CVWD to protest IID's court validation of the 1932 IID water service contract with the Secretary of the Interior. In 1934, IID and CVWD executed a compromise agreement that allowed CVWD to have its own contract with the Secretary but provided that CVWD would subordinate its Colorado River entitlement in perpetuity to IID's entitlement.

In summary, IID has senior water rights to the Colorado River established under state law, when California is limited to 4.4 MAFY, in the amount of 3.85 MAFY minus the amounts used by Priorities 1 and 2. Although Priorities 1 and 2 are not fixed quantities, the average annual use for Priorities 1 and 2 (minus return flows) is approximately 420,000 AFY, leaving approximately 3.4 MAFY for use by IID.

1.4.4 IID's Development of Water Conservation and Transfer Projects

IID's initial interest in developing water conservation and transfer projects was a response to proceedings before the SWRCB in the 1980s regarding IID's use of water. In both Decision 1600 (SWRCB 1984) and Order 88-20 (SWRCB 1988), SWRCB ordered IID to develop and implement a meaningful water conservation plan. SWRCB noted that California is limited to 4.4 MAF of Colorado River water in a normal year. Under such circumstances, MWD would be limited to 550 KAF, less than one-half of its historical diversions. In Decision 1600, SWRCB concluded: "A transfer of conserved water could partially satisfy future Southern California needs."

In Order 88-20, SWRCB found conservation of 367.9 KAFY to be a reasonable long-term goal for IID's Water Conservation Plan and found that a transfer from IID's water service area to urban areas of Southern California would be beneficial for California. SWRCB directed IID to use diligent efforts to secure sufficient funding to implement the Water Conservation Plan. SWRCB retained jurisdiction to review and monitor IID's conservation actions.

IID determined that a water transfer project would provide a means of protecting its water rights. As discussed above, under California laws designed to encourage water conservation and voluntary transfers, title to conserved water remains with the transferring party. Thus, IID could allow conserved water to be used by another entity while retaining its historic water rights, which have been, and continue to be, an important basis for economic activity in the Imperial Valley.

In 1988, IID and MWD entered into an Agreement for Implementation of a Water Conservation Program and Use of Conserved Water (1988 IID/MWD Agreement) which provided for MWD to bear the costs of various conservation projects implemented by IID within the IID water service area. As compensation for these costs, MWD is entitled to divert from the Colorado River an amount of water equal to the amount conserved by the conservation projects. The conservation projects have been fully implemented, and the estimated amount of conserved water generated by the projects at full implementation is approximately 100 to 110 KAFY.

1.4.5 IID/SDCWA Transfer Agreement

To conserve additional water for transfer, IID sought to develop a water conservation program that includes: (1) on-farm irrigation system conservation measures, which require the participation of Imperial Valley landowners and tenants; and (2) water delivery system conservation measures. IID also required a contractual mechanism for funding the costs of such a conservation program, including costs of water delivery system and on-farm irrigation system improvements and facilities, landowner incentives to implement on-farm conservation measures, environmental mitigation costs, and other implementation costs. In addition, IID anticipated that the proceeds from sale of conserved water would provide economic benefits to cooperating landowners, tenants, and IID, and an economic stimulus to the Imperial Valley. The proceeds would also fund the costs of implementing conservation measures, environmental mitigation, and mitigation of third-party impacts.

With these objectives in mind, IID and SDCWA began discussions for a water conservation and transfer agreement in mid-1995. The IID/SDCWA Transfer Agreement is the result of these negotiations and is considered by each party to be viable and mutually beneficial. The IID/SDCWA Transfer Agreement is further described in Section 2.2.4.1 in Chapter 2 and a Summary is included in Appendix A.

This Draft EIR/EIS evaluates implementation of the IID/SDCWA Transfer Agreement as a separate transaction (providing up to 300 KAFY to SDCWA), which is one scenario for implementation of the Proposed Project. This Draft EIR/EIS also evaluates the modified water transfers that would take place if the QSA is approved and implemented as described in Section 1.4.7 below, which is a second scenario for implementation of the Proposed Project.

1.4.6 California's Colorado River Water Use Plan

In 1996, the Secretary deferred further consideration of any long-term Colorado River surplus guidelines until California put in place a realistic strategy to ensure that it would be able to reduce its annual use of Colorado River water to 4.4 MAFY in normal years or to meet its needs from sources that do not jeopardize the apportionments of others. Development of this strategy was considered by the Secretary to be a prerequisite for approval of any further cooperative Colorado River water transfers between California agencies. In an effort to prepare for likely reductions of Colorado River water available to California, the Colorado River Board of California prepared the California Plan, which was released in draft form in May 2000 and is available for public review at www.crb.water.ca.gov/reports.htm.

The California Plan provides a framework for the state to coordinate and assist in the cooperative implementation of diverse programs, projects, and other activities that would reduce California's use of Colorado River water and facilitate conformance with California's annual apportionment. It involves the conservation of water within southern California and the transfer of conserved water from agricultural to predominantly urban uses. It also identifies future groundwater conjunctive use projects that would store Colorado River water when available. The proposed QSA, described in Section 1.4.7 below, is designed to include key contractual arrangements among IID, MWD, and CVWD, which are needed to implement major components of the California Plan. The Proposed Project, whether implemented with or without the QSA, would accomplish a key goal of the California Plan by transferring up to 300 KAFY of Colorado River water from IID to other users.

1.4.7 Quantification Settlement Agreement

Subsequent to execution of the IID/SDCWA Agreement, IID, CVWD, and MWD negotiated the terms of the proposed QSA. Although not a signatory to the proposed QSA, SDCWA is a member agency of MWD. SDCWA participated in the QSA negotiations and benefits or is affected by certain of its terms. The QSA is a consensual reallocation of Colorado River water based on a series of proposed agreements, which include water conservation/transfer and exchange projects among IID, CVWD, and MWD. The proposed QSA provides part of the mechanism for California to reduce its water diversions from the Colorado River in normal years to its apportioned amount of 4.4 MAF under the California Plan (see Section 1.4.6). The implementation of the proposed QSA, which includes water conservation and water transfers from agricultural use to principally urban use, would result in a net reduction of Colorado River diversions to California.

If the QSA is fully approved by the participating agencies and if the conditions to implementation of the QSA are satisfied or waived, SDCWA would be limited to the primary amount (130 to 200 KAFY) of transferred water under the IID/SDCWA Transfer Agreement, CVWD would have an option to acquire up to 100 KAFY, and MWD would have an option to acquire any portion of the 100 KAFY that CVWD elects not to acquire. The second scenario for implementation of the Proposed Project assessed in this Draft EIR/EIS provides for the water transfers that will apply if the QSA is implemented.

IID, MWD, CVWD, and SDCWA are the co-lead agencies for the preparation, in accordance with CEQA, of a *Draft Program EIR for the Implementation of the Colorado River Quantification*

Settlement Agreement (Draft QSA PEIR) (CVWD, et al. 2002). The QSA is further described in Section 2.2.4.2 in Chapter 2 and the Draft QSA PEIR is further described in Section 1.5.2. The federal approvals required to implement water deliveries in accordance with the QSA will be evidenced by the Secretary's execution of the Implementation Agreement (IA). The assessment under NEPA required for execution of the IA is described in Section 1.5.3.

1.5 Projects and CEQA/NEPA Documentation Related to the Proposed Project

This section describes the planned water resources management actions and programs affecting the allocation and distribution of Colorado River water that are closely related to the Proposed Project. These actions and programs have undergone or are currently undergoing environmental review. Figure 1-12 illustrates the relationship between the Proposed Project and other closely related environmental actions/documents.

Some of the actions and programs listed below have impacts that could result in cumulative impacts in combination with those of the Proposed Project. These are assessed in Chapter 5, Other NEPA and CEQA Considerations. Other projects that also could contribute to cumulative impact when combined with the Proposed Project, but that are less closely related to the allocation and distribution of Colorado River water, are also described in Chapter 5.

1.5.1 Interim Surplus Guidelines and Related EIS

As discussed in Section 1.4.6 above, California has developed the California Plan to assist in reducing its use of Colorado River water to its annual apportionment. The Secretary has developed specific Interim Surplus Guidelines that will provide mainstream users of Colorado River water, particularly those in California that currently use surplus water, with a greater degree of predictability concerning the likelihood of a surplus determination in a given year during an interim period (from 2002 to 2016). The Interim Surplus Guidelines will be used to determine the conditions under which the Secretary may declare the availability and volume of surplus water for use within the States of Arizona, California, and Nevada. The guidelines facilitate California's transition to a reduced supply of Colorado River water, and adoption of the guidelines is a condition precedent to implementation of the QSA. The guidelines would be applied each year as part of the Annual Operating Plan for Colorado River Reservoirs. The guidelines provide certain benchmarks, or milestones, for reduction of California's Colorado River water use. In the event that these milestones are not achieved, the guidelines expressly provide that subsequent surplus determinations would be made on a more conservative basis until such time as California is in compliance with the required reductions.

The Final Interim Surplus Guidelines EIS assesses the impacts of these guidelines (Reclamation 2000f) and a Record of Decision (ROD) was approved (Federal Register, Vol. 66, No. 17, January 25, 2001, Notices) (Reclamation 2002). A copy of the Final Interim Surplus Guidelines EIS and ROD is available from Reclamation, Yuma Office, P.O. Box D, Yuma AZ 85366.

The Interim Surplus Guidelines are assumed to be in effect for purposes of the assessment of the Proposed Project set forth in this Draft EIR/EIS. The Proposed Project will assist California in meeting the benchmarks for reduction of Colorado River water use included in the guidelines.

1.5.2 Proposed QSA and Draft QSA PEIR

The proposed QSA negotiated by IID, MWD, and CVWD is described in Section 1.4.7. The QSA authorizes a number of diverse programs and activities, including the water conservation and transfer projects included in the Proposed Project, assuming implementation under the second scenario (QSA Implementation).

IID, MWD, CVWD, and SDCWA are the co-lead agencies for the preparation, in accordance with CEQA, of the Draft QSA PEIR (CVWD, et al. 2002). The Draft QSA PEIR is a programmatic assessment of the environmental effects of implementation of the QSA by these California water agencies and is intended to provide an overall assessment of the multiple projects included in the QSA. The Draft QSA PEIR is expected to be available for public review in connection with this Draft EIR/EIS. The document is available from MWD, 700 N. Alameda Street, Los Angeles CA 90012.

The QSA includes the allocation of conserved water to be generated by certain projects that have previously been assessed in final CEQA/NEPA documentation. The QSA PEIR is expected to incorporate information from this documentation, described below, in assessing the QSA program:

- **All American Canal Lining Project EIR/EIS:** The Final EIS/EIR for the All American Canal Lining Project, Imperial County, California (Reclamation and IID 1994, reviewed and determined to still be adequate in 1999), assessed the construction of a 23-mile lined canal parallel to the existing All American Canal. The purpose of the project is to conserve a portion of the water being lost through seepage from the existing canal. The project has the potential to conserve approximately 67,700 AFY. This project has been approved although not yet constructed. This document is available at IID Headquarters, 333 East Barioni Blvd., Imperial CA 92251.
- **Coachella Canal Lining Project EIR/EIS:** The Final EIS/EIR for the Coachella Canal Lining Project, Riverside and Imperial Counties, California, was prepared by Reclamation and CVWD in April 2001, to assess the lining of the Coachella Canal. The purpose of the project is to conserve approximately 30,850 AFY of water 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 the California Plan. The document is available from Reclamation, Yuma Office, P.O. Box D, Yuma AZ 85366, and from CVWD, P.O. Box 1058, Coachella CA 92236.

California Plan

- Requires California to reduce its use of Colorado River water from average of 5.3 MAFY to 4.4 MAFY in a normal year.

QSA ①

- IID Water Conservation and Transfer Project and HCP
- Coachella Canal Lining Project
- All American Canal Lining Project
- Other Components ②

Impacts evaluated in Draft QSA PEIR

IID Water Conservation and Transfer Project EIR/EIS and HCP

1. **IID Forbearance at 3.1 MAFY, Subject to the IOP**
   – IID commitment to reduce Colorado River water use to 3.1 MAFY
2. **Water Conservation ③**
   Any Combination of:
   – On-farm Irrigation System Improvements
   – Water Delivery System Improvements
   – Fallowing
3. **Water Transfer under Two Scenarios:**
   – IID/SDCWA Transfer Agreement Implementation Only: 130 to 300 KAFY to SDCWA
   – QSA Implementation: Up to 200 KAFY to SDCWA and up to 100 KAFY to CVWD and/or MWD
4. **Change in Point of Diversion**
   – Reclamation's approval of change in point of diversion from Imperial to Parker Dam for water transferred to SDCWA and/or MWD
5. **Habitat Conservation Plan**
   – IID's compliance with federal and California endangered species acts

Impacts of the IOP are also assessed in the Draft IA EIS.

Impacts of water use by CVWD are also evaluated in the Coachella Valley Water Management Plan PEIR.④ Impacts of water use by MWD are also evaluated in the Draft QSA PEIR.

Impacts of change in point of diversion are also evaluated in the Draft IA EIS and Draft QSA PEIR.

Project Alternatives

1. No Project
2. 130 KAFY Conservation and Transfer to SDCWA (on-farm irrigation system improvements as exclusive conservation measure)
3. 230 KAFY Conservation and Transfer to SDCWA, CVWD, and/or MWD (all conservation measures)
4. 300 KAFY Conservation and Transfer to SDCWA, CVWD, and/or MWD (fallowing as exclusive conservation measure)

COLOR KEY

- (white) Impacts Evaluated in IID Water Conservation and Transfer Project EIR/EIS and HCP
- (shaded) Impacts Evaluated in Other Environmental Compliance Documents

ACRONYMS

QSA	Quantification Settlement Agreement
IID	Imperial Irrigation District
SDCWA	San Diego County Water Authority
CVWD	Coachella Valley Water District
MWD	Metropolitan Water District
PEIR	Program Environmental Impact Report
IA	Implementation Agreement
IOP	Inadvertent Overrun and Payback Policy
MAFY	Million Acre Feet per Year
KAFY	Thousand Acre Feet per Year
HCP	Habitat Conservation Plan

FOOTNOTES

① The proposed QSA is a consensual reallocation of Colorado River water among IID, CVWD, and MWD for up to 75 years. It provides part of the mechanism for California to reduce its Colorado River water diversions under the California Plan.

② For a complete decription of QSA components, see Draft QSA PEIR.

③ Details of water conservation measures are included in Chapter 2.

④ The release of the Coachella Valley Management Plan PEIR is pending. Relevant impacts from available portions of that document are included in this Draft EIR/EIS.

Figure 1-12
Relationship of this Draft EIR/EIS to Other Projects and Ongoing Environmental Compliance Documents

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- **1988 IID/MWD Agreement EIR:** The Final EIR for Modified East Lowline and Trifolium Interceptors, and Completion Projects (IID 1994) assesses water conservation projects pursuant to the 1988 IID/MWD Agreement (see Section 1.4.4 above), including two new lateral interceptor systems (lined canals that extend across the lower reaches of lateral canals to capture unused flows) and a set of 13 potential "completion projects," such as additional lateral interceptor systems, seepage recovery, canal/lateral lining, water conservation/flood control through land retirement, and new reservoir construction. The projects provided for under the 1988 IID/MWD Agreement have been fully implemented, but conserved water will continue to be available for transfer as a result of the projects. The Final EIR is also available at IID Headquarters, 333 East Barioni Blvd., Imperial CA 92251.

This Draft EIR/EIS has relied upon the information developed in the Draft QSA PEIR in assessing the cumulative impacts of the Proposed Project's second implementation scenario (QSA Implementation), together with other QSA activities. The QSA PEIR is also intended to provide a project-level assessment under CEQA for MWD's receipt and use of water transferred pursuant to the QSA. This Draft EIR/EIS has included only a programmatic assessment of MWD's receipt of conserved water from IID under the Proposed Project, second scenario (QSA Implementation).

1.5.3 Proposed Implementation Agreement, Inadvertent Overrun and Payback Policy, Biological Conservation Measures in USFWS' Biological Opinion, and Draft IA EIS

Implementation of the QSA requires certain federal actions, which are set forth in a proposed IA to be executed by the Secretary. The IA would commit the Secretary to make Colorado River water deliveries in accordance with the terms of the IA, to allow for the implementation of the QSA (see Sections 1.4.7 and 1.5.2). Execution of the IA would result in changes in the amount and/or location and use of deliveries of Colorado River water, which are necessary to implement the QSA.

Reclamation also proposes to adopt an Inadvertent Overrun and Payback Policy (IOP), which establishes requirements for payback of inadvertent overuse of Colorado River water by Lower Basin Colorado River water users. Reclamation's adoption of the IOP is a condition precedent to the execution of the IA and QSA, and the IOP must be in place by the time these agreements go into effect.

Reclamation proposes to implement certain biological conservation measures to avoid potential impacts to federally listed fish and wildlife species or their associated critical habitats within the historic floodplain of the Colorado River, between Parker Dam (including Lake Havasu to its full pool elevation) and Imperial Dam, resulting from: (1) the Interim Surplus Guidelines (see Section 1.5.1); and (2) the change in the diversion point for up to 400 KAFY, which is required to implement the IA and the water transfers included in the Proposed Project. These measures were developed and agreed to by Reclamation and USFWS in response to a Biological Assessment (BA) submitted by Reclamation in August 2000 (Reclamation 2000), and were incorporated into the USFWS Biological Opinion (BO) for Interim Surplus Criteria, dated January 2001 (Reclamation 2001c).

Reclamation is the lead agency for preparation, in accordance with NEPA, of a *Draft EIR for the Implementation Agreement (IA), Inadvertent Overrun and Payback Policy (IOP), and Related Federal Actions (Draft IA EIS)* (Reclamation 2002).

The information and assessment included in the Draft IA EIS and BO are incorporated by reference into this Draft EIR/EIS. The Draft IA EIS and BO are available for public review in connection with this Draft EIR/EIS from Reclamation, Yuma Office, P.O. Box D, Yuma AZ 85366.

This Draft EIR/EIS does not assess the impacts of the IOP. However, because Reclamation's adoption of the IOP is a condition precedent to implementation of the IA and QSA, this Draft EIR/EIS analyzes the impacts of IID's compliance with the IOP in the implementation of the Proposed Project. The biological conservation measures assessed in the Draft IA EIS are intended to avoid all impacts to federally listed fish and wildlife species or their associated habitats within the historic floodplain of the Colorado River, which could result from the implementation of the Proposed Project.

1.5.4 Proposed Coachella Valley Water Management Plan

CVWD has prepared the Coachella Valley Water Management Plan (CVWD 2000) to establish an overall program for managing its surface and groundwater resources in the future. The overall plan involves several actions to reduce the current overdraft of the groundwater in the CVWD service area. These actions include increased use of Colorado River water to reduce the need to pump groundwater, water recycling, and conservation measures to decrease the overall consumption of water.

A substantial portion of the additional water to be used from the Colorado River is associated with the implementation of the QSA. Under the QSA, from 55 to 155 KAFY of additional Colorado River and SWP water would be used to replace an equivalent portion of the groundwater now used. Reducing the amount of groundwater pumping and increasing the use of Colorado River water would allow the overdrafted aquifer to begin to recover. Other elements of the Water Management Plan are not dependent on implementation of the QSA.

CVWD is the lead agency for preparation, in accordance with CEQA, of a *Draft Program EIR for the Groundwater Management Plan* (Draft CVWD Water Management PEIR), including the effects of receipt and use of conserved water by CVWD within its service area pursuant to the QSA. Upon its completion, the Draft CVWD Water Management PEIR will be available for public review in connection with this Draft EIR/EIS from CVWD, P.O. Box 1058, Coachella CA 92236, or on the web at cvwd.org. The Coachella Valley Water Management Plan (CVWD 2000), on which the Draft CVWD Water Management Plan PEIR assessment is based, will also be available from CVWD, P.O. Box 1058, Coachella CA 92236. This Draft EIR/EIS includes a programmatic assessment of CVWD's receipt and use of conserved water from IID, based upon information available as a result of preparation of the Draft CVWD Water Management PEIR. The information and assessment, included in the Draft CVWD Water Management PEIR when it is finalized, relating to the effects of use of conserved water obtained from IID will supplement the programmatic assessment in this Draft EIR/EIS.

1.5.5 SDCWA/MWD Exchange Agreement

SDCWA has entered into a separate agreement with MWD, the SDCWA/MWD Water Exchange Agreement, to accommodate the physical conveyance of transferred water via the CRA and a water exchange. Pursuant to this agreement, an amount of water equal to the conserved water to be transferred from IID to SDCWA will be diverted into the CRA operated by MWD, and, in exchange, MWD will deliver water in like amount and quality to SDCWA via MWD's conveyance facilities. SDCWA and MWD approved a Notice of Exemption (NOE) providing that the exchange transaction is categorically exempt from assessment under CEQA.

This Draft EIR/EIS does not assess the physical conveyance of the water via the CRA or the water exchange between SDCWA and MWD. This Draft EIR/EIS has relied upon the NOE for its determination that implementation of the SDCWA/MWD Water Exchange Agreement is categorically exempt from the provisions of CEQA pursuant to CEQA Guidelines Section 15301. The NOE is incorporated into this Draft EIR/EIS by reference. The NOE is available from IID, Public Information Department, 1284 Main Street, El Centro CA 92243. The SDCWA/MWD Water Exchange Agreement is also reviewed in the QSA PEIR.

1.5.6 Summary of Relationship Between This Draft EIR/EIS and Related CEQA/NEPA Documentation

This Draft EIR/EIS will assess, at a project level, the effects of the conservation of water within the IID water service area to the extent required to implement the Proposed Project, the effects of a change in the point of diversion on the Colorado River in order to transfer conserved water to SDCWA or MWD, and the effects of receipt and use of conserved water by SDCWA within the SDCWA Service Area.

The effects of receipt and use by MWD within the MWD service area of conserved water transferred from IID to MWD under the Proposed Project are assessed at a programmatic level in this Draft EIR/EIS. A project-level assessment of MWD's receipt and use of this transferred water will be set forth in the Draft QSA PEIR, which is currently being prepared by MWD, IID, CVWD, and SDCWA as co-lead agencies (see Section 1.5.2).

The effects of receipt and use by CVWD within CVWD's Improvement District No. 1 of conserved water transferred from IID to CVWD under the Proposed Project are assessed at a programmatic level in this Draft EIR/EIS. A more detailed assessment of CVWD's receipt and use of this transferred water will be set forth in the Draft CVWD Water Management PEIR, which is currently being prepared by CVWD as lead agency (see Section 1.5.4). To the extent further project-level or supplemental assessment is required for CVWD's and/or MWD's use of such conserved water, such assessment will be contained in subsequent documentation that would tier from the applicable programmatic document.

The effects of the federal actions required to implement the transfer of water from IID to SDCWA and/or MWD under the Proposed Project, assuming implementation of the QSA (the second scenario for implementation of the Proposed Project), including the change in the point of delivery, are assessed in the Draft IA EIS prepared by Reclamation, which is incorporated into this Draft EIR/EIS by reference. This Draft EIR/EIS relies upon the assessment developed in the Draft IA EIS and provides an assessment of the federal actions required to implement the transfers to SDCWA under the Proposed Project, assuming that the QSA is not implemented (the first scenario for implementation of the Proposed Project).

Effects on federally listed species and their habitats along the LCR and conservation measures to avoid effects on biological resources as a result of implementing the proposed actions in the Interim Surplus Guidelines EIS and the change in the point of delivery of 400 KAFY from Imperial Dam to Lake Havasu, including the change in the point of diversion on the Colorado River that is required for the water transfers to SDCWA and MWD under the Proposed Project (under either implementation scenario), are described in the USFWS' BO (issued on January 12, 2001), which is also incorporated into this Draft EIR/EIS by reference. The BO provides incidental take authorization under the ESA for federally listed species as a result of those changes in Reclamation's operations.

This Draft EIR/EIS assesses the effects on state-listed species and their habitats along the LCR as a result of the Proposed Project. Incidental take authorization for impacts to state-listed species is expected to be obtained through issuance by California Department of Fish and Game (CDFG) of a permit under CESA Section 2081 for the benefit of IID, SDCWA, and MWD. This Draft EIR/EIS is intended to provide the biological information necessary to support issuance of such incidental take authorization.

The environmental documents mentioned above are also described in Table 1-2. Figure 1-12 illustrates the relationship between the Proposed Project and the key, associated environmental compliance documents. Summaries of the documents incorporated by reference were excerpted from the project-specific environmental impact analyses.

TABLE 1-2
Documents Related To This Draft EIR/EIS

Project Component	Federal and/or State Action	Associated Environmental Documentation
Priority 3a Colorado River water capped at to 3.1 MAFY. IID consensually limits its consumptive use of Priority 3a water to a specified amount of 3.1 MAFY subject to adjustment as provided in the QSA and IOP.	Secretary shall deliver Colorado River water to Imperial Dam in an amount up to, but not more than, IID's Priority 3a cap.	1. The IA EIS provides NEPA compliance for the Secretary's delivery of Colorado River water in conformance with IID's Priority 3a cap. 2. The QSA PEIR provides program-level CEQA compliance for IID's Priority 3a cap. 3. This EIR/EIS provides project-level CEQA compliance for IID's Priority 3a cap.
Transfer of conserved water (up to 200 KAFY) to SDCWA. An amount of water equivalent to the amount of water conserved in the IID water service area would be transferred to SDCWA. At SDCWA's election, the water would be delivered to Lake Havasu.	Secretary shall deliver Colorado River water to Lake Havasu in an amount equal to that amount of water conserved by IID for the benefit of SDCWA in accordance with the provisions, including the point of delivery, of the IID/SDCWA Transfer Agreement and IA.	1. The IA EIS provides NEPA compliance for the change in point of diversion of up to 200 KAFY from Imperial Dam to Lake Havasu. 2. The IA EIS provides program-level NEPA compliance for the IID/SDCWA Transfer Agreement, as modified by the QSA.

TABLE 1-2
Documents Related To This Draft EIR/EIS

Project Component	Federal and/or State Action	Associated Environmental Documentation
	USFWS has issued incidental take authorization for federally listed species on the LCR that could be affected by Reclamation's implementation of the change in the point of delivery. CDFG will issue incidental take authorization for state-listed species on the LCR that could be affected by the change in the point of diversion. SWRCB will approve IID's petition to transfer water under the Water Code.	3. The QSA PEIR provides project-level CEQA compliance for the change in point of diversion of up to 200 KAFY from Imperial Dam to Lake Havasu. 4. The QSA PEIR provides program-level CEQA compliance for the IID/SDCWA Transfer Agreement. 5. This EIR/EIS provides project-level CEQA compliance for the IID/SDCWA Transfer Agreement. 6. This EIR/EIS provides project-level NEPA and CEQA compliance for the water conservation and transfers by IID, and for the HCP for impacts to the IID water service area and Salton Sea. 7. CEQA Notice of Exemption was prepared by SDCWA for the SDCWA/MWD Water Exchange Agreement. 8. USFWS' BO provides incidental take authorization for federally listed species potentially affected by Reclamation's implementation of the change in the point of delivery. 9. This EIR/EIS provides project-level CEQA compliance for the issuance of an incidental take permit for state-listed species on the LCR as a result of the change in the point of diversion. 10. This EIR/EIS provides CEQA compliance for SWRCB's approval of IID's petition to transfer water under the Water Code.
Transfer of conserved water (up to 100 KAFY) to CVWD and/or MWD. An amount of water equivalent to the amount of water conserved in the IID water service area, which CVWD elects to acquire, would be made available at Imperial Dam; any amount not acquired by CVWD may be acquired by MWD.	Secretary shall deliver Colorado River water to Imperial Dam in an amount equal to that amount of water conserved by IID for the benefit of CVWD in accordance with the provisions of the IA. In the event CVWD may decline a portion of this water, the Secretary shall instead deliver such portion of water to IID or MWD in accordance with the provisions of the IA.	1. The IA EIS provides NEPA compliance for the potential change in point of diversion of up to 100 KAFY from Imperial Dam to Lake Havasu, and for the use of conserved water delivered to CVWD and/or MWD. 2. The QSA PEIR provides project-level CEQA compliance for the change in point of diversion of up to 100 KAFY from Imperial Dam to Lake Havasu.

TABLE 1-2
Documents Related To This Draft EIR/EIS

Project Component	Federal and/or State Action	Associated Environmental Documentation
	USFWS has issued incidental take authorization for federally-listed species on the LCR, which could potentially be affected by Reclamation's implementation of the change in the point of delivery. CDFG will issue incidental take authorization for state-listed species on the LCR which could be affected by the change in the point of diversion. SWRCB will approve IID's petition to transfer water under the Water Code.	3. The QSA PEIR provides project-level CEQA compliance for MWD use of any amount of conserved water not acquired by CVWD. 4. This EIR/EIS provides project-level NEPA and CEQA compliance for the water conservation and transfers by IID. 6. CEQA compliance for CVWD use of conserved water will be included in the Coachella Valley Water Management Plan PEIR. 7. USFWS' BO provides incidental take authorization for federally listed species potentially affected by Reclamation's implementation of the change in the point of delivery. 8. This EIR/EIS provides project-level CEQA compliance for the issuance of an incidental take permit for state-listed species on the LCR as a result of the change in the point of diversion. 9. This EIR/EIS provides CEQA compliance for SWRCB's approval of IID's petition to transfer water under the Water Code.
Habitat Conservation Plan. The HCP supports IID's Incidental Take Permit applications in conformance with § 10(a)(1)(B) of ESA and § 2081(b) of CESA.	USFWS will issue incidental take authorization for federally listed species potentially affected by water conservation by IID in IID's Water Service Area, the right-of-way of the AAC, and the Salton Sea, based upon the HCP. CDFG will issue incidental take authorization for state-listed species potentially affected by water conservation by IID in IID's Water Service Area, the right-of-way of the AAC, the Salton Sea, based upon the HCP.	1. This EIR/EIS provides project-level NEPA and CEQA compliance for issuance of incidental take permits in conformance with §10(a)(1)(B) of ESA and § 2081(b) of CESA and implementation of the HCP.

1.6 Other Proposed Projects Related to Resources Affected by the Proposed Project

1.6.1 Proposed Lower Colorado River Multi-Species Conservation Program

The LCR Multi-Species Conservation Program (LCR MSCP) is a partnership of state, federal, tribal, and other public and private stakeholders with an interest in managing the water and related resources of the LCR Basin. The purposes of the LCR MSCP are as follows:

- Conserve habitat and work toward the recovery of "covered species" within the historic floodplain of the LCR, pursuant to the federal ESA and reduce the likelihood of additional species listings under the ESA.
- Accommodate current water diversions and power production and optimize opportunities for future water and power development, to the extent consistent with law.
- Provide the basis for federal ESA and CESA compliance via incidental take authorizations resulting from the implementation of the first two purposes.

The LCR MSCP covers the mainstream of the LCR from below Glen Canyon Dam to the southerly international boundary with Mexico. The program area includes the historic floodplain and reservoir full-pool elevations. Conservation measures would focus on the LCR from Lake Mead to the international boundary. The comprehensive program is planned to be implemented over a 50-year period. It will address future federal agency consultation needs under the Section 7 of the ESA and non-federal agency needs for approval of incidental take authorization for endangered species under ESA Section 10. The LCR MSCP is intended to provide long-term ESA and CESA compliance and incidental take authorization for a number of actions affecting the LCR. A Draft EIS/EIR, BA, and habitat conservation plan are being prepared to analyze the impacts of the LCR MSCP. Reclamation and USFWS are the lead agencies under NEPA, and MWD is the lead agency under CEQA.

The LCR MSCP is a conservation program, and it will not authorize water transfers or changes in the point of diversion. The actions that are anticipated to be covered by the LCR MSCP on a long-term basis include changes in the point of diversion of up to 1.574 MAFY of Colorado River water. The change in the point of diversion for the first 400 KAFY of this total amount, including the transfers anticipated by the Proposed Project, are covered by a consultation by Reclamation with USFWS under ESA Section 7. The Draft IA EIS prepared by Reclamation (see Section 1.5.3) assesses the biological conservation measures identified as a result of that consultation to avoid impacts on species and their habitats along the LCR as a result of the diversion of 400 KAFY.

1.6.2 Proposed Salton Sea Restoration Project

Implementation of the IID/SDCWA Transfer Agreement and the QSA would change the amount of drainage water that enters the Salton Sea. The Salton Sea Restoration Project is evaluating actions to stabilize the elevation and reduce the salinity of the Salton Sea, pursuant to the Salton Sea Reclamation Act of 1998 [Public Law (PL) 105-372]. The Act directed the Secretary to:

> ...complete all studies, including, but not limited to environmental and other reviews, of the feasibility and benefit-cost of various options that permit the continued use of the Salton Sea as a reservoir for irrigation drainage and: (i) reduce and stabilize the overall salinity of the Salton Sea; (ii) stabilize the surface elevation of the Salton Sea; (iii) reclaim, in the long term, healthy fish and wildlife resources and their habitats; and (iv) enhance the potential for recreational uses and economic development of the Salton Sea.

To implement this directive, the Salton Sea Authority, as the California lead agency under CEQA, and Reclamation, as the federal lead agency under NEPA, released a Draft EIS/EIR in January 2000 that evaluated proposed Salton Sea Restoration Project alternatives. A revised Draft EIS/EIR, including different alternatives and revised modeling and impact analysis, is currently being prepared.

It is anticipated that a Draft Alternatives Report (Reclamation 2000g), describing specific project objectives and the alternatives that are currently being developed for the Salton Sea Restoration Project, will be made available for public review in January 2002.

Both the Proposed Project and the Salton Sea Restoration Project have the potential to affect environmental resources at the Salton Sea. However, they are separate projects with different objectives and different timelines for implementation. The Lead Agencies for this Draft EIR/EIS have indicated that the Proposed Project must be assessed now so that, if approved, it will be available to provide reliable supplies of Colorado River water to California water agencies as early as 2002. Timely implementation of the Proposed Project will assist in meeting time deadlines for California's reduction of its Colorado River water use to 4.4 MAF in a normal year and in satisfying the requirements of Reclamation's Interim Surplus Guidelines ROD (see Section 1.5.1). In contrast, no preferred alternative has yet been identified for the Salton Sea Restoration Project, and the project has not been authorized, approved, or funded by Congress.

Implementation of the Proposed Project is not inconsistent with subsequent implementation of a restoration project. The Salton Sea Reclamation Act anticipated reductions in inflows as a result of water conservation and expressly directed the Secretary, in evaluating restoration options, to:

> ...apply assumptions regarding water inflows into the Salton Sea Basin that encourage water conservation, account for transfers of water out of the Salton Sea Basin, and are based on a maximum likely reduction in inflows into the Salton Sea Basin which could be 800,000 acre-feet or less per year.

1.7 Agency Use of this Draft EIR/EIS and Required Project Approvals

This Draft EIR/EIS was prepared to meet environmental compliance requirements for federal and state agencies. IID is the Lead Agency for CEQA compliance, and Reclamation is the Lead Agency for NEPA compliance. This environmental process includes a public comment period, during which the public is asked to supply the Lead Agencies with comments on this Draft EIR/EIS. During the public comment period, public meetings and/or hearings will be held so that the Lead Agencies can receive the public's oral and written comments.

Once the public comment period closes, the Lead Agencies will consider and respond to the comments and produce a Final EIR/EIS. As described below, each of the Lead Agencies will review the Final EIR/EIS and issue separate decisions as to whether to approve and/or certify the Final EIR/EIS prior to taking action on the Project. The federal, state, and local permits and authorizations required for the Project are further described below.

1.7.1 Federal Approvals

Implementation of the Project would require certain federal actions or approvals, including approvals by Reclamation and compliance with NEPA, ESA, and other related federal environmental laws, statutes, Executive Orders, and regulations. Reclamation and USFWS are the two federal agencies responsible for issuing federal approvals for the Project. This Draft EIR/EIS is intended to provide NEPA compliance for these federal actions and approvals.

1.7.1.1 Reclamation

In order to implement the Proposed Project, Reclamation must agree to deliver water to facilitate the transfer transactions, including the change in the point of delivery of conserved water to be transferred from IID to SDCWA and/or MWD from Imperial Dam to the intake of the CRA at Lake Havasu.

If the Proposed Project is implemented under the second scenario (QSA Implementation), the IA to be executed by the Secretary to facilitate the QSA (see Section 1.5.3) will evidence the federal approval of modifications to Reclamation's operations necessary to implement the water transfers included in the Proposed Project. The IA requires NEPA compliance, and the environmental compliance for this federal action is set forth in the Draft IA EIS, which is incorporated by reference into this Draft EIR/EIS.

If the Proposed Project is implemented under the first scenario (IID/SDCWA Agreement Implementation Only), the Secretary must agree to modifications to Reclamation's operations as necessary to implement the water transfers to SDCWA pursuant to the IID/SDCWA Agreement. This Draft EIR/EIS is intended to provide the NEPA compliance for this federal action; for purposes of this analysis, this Draft EIR/EIS relies upon and incorporates the analysis in the Draft IA EIS.

Reclamation must implement the biological conservation measures assessed in the Draft IA EIS in order to avoid impacts to federally listed species and their habitats as a result of the changes in the point of delivery of water transferred to SDCWA and/or MWD pursuant to the Proposed Project. This federal action is assessed in the Draft IA EIS, which is incorporated into this Draft EIR/EIS by reference.

As a condition precedent to implementation of the QSA, Reclamation must adopt the IOP. This federal action is being assessed in the Draft IA EIS. After review of the Final IA EIS and the Final EIR/EIS, Reclamation will issue a ROD.

1.7.1.2 USFWS

USFWS is responsible for oversight of the federal ESA and is a Cooperating Agency under NEPA for this Draft EIR/EIS. As part of the Proposed Project, IID is preparing an HCP (see Appendix C) in support of an application to receive an Incidental Take Permit under Section 10(a) of the ESA for impacts of the Proposed Project on species and habitats within IID's Water Service Area, the right-of-way of the AAC, and the Salton Sea. The HCP addresses the impact of the potential take of 96 listed and unlisted species that could result from IID's activities associated with implementation of the Proposed Project. Approval of the HCP and issuance of an Incidental Take Permit by USFWS are federal actions requiring compliance with NEPA, as well as a consultation under ESA Section 7. The requirements for approval of an HCP to support issuance of an Incidental Take Permit are described in Section 1.2.4 above.

As discussed in Section 1.5.3, ESA compliance for the impacts of the change in the point of diversion on the Colorado River required for the water transfers to SDCWA and MWD which are part of the Proposed Project, will be provided by the Section 7 consultation between Reclamation and USFWS, the BA submitted by Reclamation, the BO issued by USFWS, and the assessment provided in the IA EIS.

1.7.2 State Approvals

This section describes the approvals by California state agencies that are necessary to implement the Proposed Project. The Proposed Project requires compliance with CEQA, CESA, and other related state laws, statutes, and regulations. SWRCB and CDFG are two state agencies responsible for issuing state approvals of the Project.

1.7.2.1 SWRCB

SWRCB approval is required under the Water Code for certain water transfers. Also, under SWRCB Decision 1600 and Order 88-20 (see Section 1.4.4), IID was directed to develop meaningful water conservation activities, and SWRCB retained jurisdiction over those activities. To implement the water transfers, IID and SDCWA filed a petition on July 22, 1998, as amended on October 9, 1998, with the SWRCB, requesting approval of a long-term change in IID's Permit 7643 (Application 7482), to allow the conservation and transfer of up to 300 KAFY from IID to SDCWA, CVWD, and/or MWD, including a change in the point of diversion for transfers to SDCWA and MWD, and changes in the place and purpose of use of IID's water right. The petition requires the following actions by SWRCB:

- Determine that California law (Water Code Sections 1011, 1012, and 1013) applies to, and governs, the Project, and that IID's senior water rights are unaffected by the transfers. Also determine that the conserved water transferred retains the same priority as if it had been diverted by IID and used within IID's water service area.
- Determine that the Project is in furtherance of SWRCB Decision 1600, SWRCB Order WR 88-20, Article X, Section 2 of the California Constitution, and Sections 100 and 109 of the Code.
- Determine that the Project further establishes reasonable and beneficial use of water by IID.

- Agree to verify the quantity of conserved water transferred for each year of the Project by confirming that: (1) IID is enforcing the contractual obligations of landowners within IID's water service area to undertake water conservation efforts; (2) IID has undertaken water conservation efforts, if applicable; and (3) IID's diversions at Imperial Dam (less return flows) have been reduced in an amount at least equal to the quantity of conserved water transferred.

This Draft EIR/EIS provides CEQA compliance for the SWRCB's approval of IID's water conservation and transfers.

1.7.2.2 CDFG

CDFG is responsible for oversight of CESA. CESA Section 2081 allows CDFG to authorize the take of a state-listed species if all of the following conditions are met:

- The take is incidental to an otherwise lawful activity.
- The impacts of the authorized take are minimized and fully mitigated. The measures required to meet this obligation must be roughly proportional in extent to the impact of the authorized taking of the species. Where various measures are available to meet this obligation, the measures required shall maintain the applicant's objectives to the greatest extent possible. All required measures shall be capable of successful implementation. For purposes of Section 2081, impacts of taking include all impacts on the species that result from any act that would cause the proposed taking.
- The permit is consistent with CDFG regulations.
- The applicant must ensure adequate funding to implement the minimization and mitigation measures, and for monitoring compliance with, and effectiveness of, those measures.
- The permit will not jeopardize the continued existence of the species.

IID is preparing an application for an Incidental Take Permit under Section 2081 of CESA for the impacts of the Proposed Project on the state-listed species in the IID water service area, right-of-way of the AAC, and Salton Sea. The application will include the location where the project or activity is to occur, an analysis of whether and to what extent the project or activity could result in the taking of species to be covered by the permit, an analysis of the impacts of the proposed taking on the species, an analysis of whether issuance of the incidental take permit would jeopardize the continued existence of a species, the proposed measures to minimize and fully mitigate the impacts of the proposed taking, a proposed plan to monitor compliance with the minimization and mitigation measures and the effectiveness of the measures, and a description of the funding source and the level of funding available for implementation of the minimization and mitigation measures.

This Draft EIR/EIS provides CEQA compliance for CDFG's approval of a Section 2081 permit for the incidental take of state-listed species in the IID water service area, the right-of-way of the AAC, and the Salton Sea. In addition, this Draft EIR/EIS is intended to provide an assessment under CEQA for CDFG's approval of a Section 2081 permit to IID, SDCWA, and MWD for the impacts to state-listed species on the LCR as a result of implementation of the Proposed Project.

Potential effects on federally listed and state-listed species in the Coachella Valley resulting from use of conserved water transferred from IID will be addressed through separate ESA and CESA processes. Incidental take coverage, as necessary for this element of the Project, will be obtained by CVWD through a regional HCP process, or a process specific to the use of the transferred water.

1.7.3 Local Approvals

1.7.3.1 IID

To comply with CEQA, the Final EIR/EIS must be certified by IID before IID can take final action to implement the IID/SDCWA Transfer Agreement or the QSA, or to enter into the HCP or an implementation agreement with USFWS or a Section 2081 permit with CDFG. The Final EIR/EIS must also be certified by IID before other Responsible Agencies (see Section 1.8.1.2) can issue permits or take other discretionary actions in connection with the Project. IID's Board of Directors (IID Board) is responsible for determining the adequacy of the Final EIR/EIS under CEQA. If the Final EIR/EIS meets CEQA requirements, IID's Board of Directors will certify the document, make the appropriate environmental findings, and issue an Notice of Determination (NOD).

1.7.3.2 SDCWA

SDCWA must review the Final EIR/EIS and determine that it is adequate under CEQA for SDCWA's use in its role as a Responsible Agency prior to taking final action to implement the IID/SDCWA Transfer Agreement. SDCWA's Board of Directors is responsible for making this determination. If the Board determines that the Final EIR/EIS meets CEQA requirements, the Board will confirm the adequacy of the document, make the appropriate environmental findings, and issue an NOD.

1.8 Consultation and Coordination

The Lead Agencies have a responsibility under various mandates, including CEQA and NEPA, to conduct public involvement activities and to consult with and solicit input from certain federal, state, and local agencies, federally recognized Indian tribes, and other interested parties. This section briefly describes the agency coordination and public scoping activities conducted by the Lead Agencies with respect to this Draft EIR/EIS. A more detailed description of the consultation and coordination activities that occurred in connection with this Draft EIR/EIS is included in a Scoping Summary Report (IID 2000) (see Appendix B).

1.8.1 Agency Coordination and Consultation

Because IID coordinated with federal, state, and local agencies, and Indian tribes early and continuously during preparation of this Draft EIR/EIS, potential concerns have been identified, addressed, and assessed. Ongoing coordination with identified agencies facilitated the environmental review, and the approval and permitting process for the Project. As appropriate, consultation with agencies and Indian tribes continues. The types of agencies included the coordination and consultation activities are:

- Agencies and other interested parties that have jurisdiction over the Proposed Project by law.
- Agencies and other interested parties that have special expertise on the environmental issues that should be addressed in the Draft EIR/EIS.
- Agencies that are defined as Cooperating Agencies[2] under NEPA or Responsible Agencies[3] or Trustee Agencies[4] under CEQA in relation to the Project.
- Federally recognized Indian tribes whose interests may be affected by the Project.

The following sections list the specific agencies and other interested parties that are considered Cooperating, Responsible, and/or Trustee Agencies for the purposes of this Draft EIR/EIS.

1.8.1.1 Cooperating Agencies

- USFWS

1.8.1.2 Responsible Agencies

- CDFG (also a Trustee Agency)
- SWRCB
- SDCWA

1.8.1.3 Trustee Agencies

- CDFG (also a Responsible Agency)
- California Department of Parks and Recreation (DPR)
- California State Lands Commission (SLC)

1.8.2 Public Scoping

The scoping process for the Proposed Project was designed to solicit input on the issues related to the Project description, the scope of the impact analysis, and the Project alternatives to be assessed in the Draft EIR/EIS from: (1) the public; (2) federal, state, and local agencies; and (3)other interested parties. Scoping meetings were attended by groups interested in the Proposed Project's potential water delivery system, on-farm conservation measures, and other aspects of the Proposed Project, including potential impacts to the LCR, the Salton Sea, and the SDCWA service area, and the IID water service area.

The NEPA Notice of Intent (NOI) was published in the Federal Register on September 27, 1999, and the CEQA Notice of Preparation (NOP) was distributed by the California State Clearinghouse on September 29, 1999. In addition, on November 6, 2000, Reclamation published an amended NOI. Copies of the two NOIs and the NOP are included in this Draft

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[2] Cooperating Agencies under NEPA include any federal agencies other than the lead agency that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment (40 CFR § 1508.5).

[3] Responsible Agencies under the CEQA Guidelines include public agencies other than the Lead Agency that have discretionary approval power over the project (40 CFR § 15381).

[4] Trustee Agencies under the CEQA Guidelines include California state agencies that have jurisdiction by law over natural resources affected by a project that are held in trust for the people of the State of California (40 CFR § 15386).

EIR/EIS in Appendix B. Additional notification was provided by publishing meeting notices in newspapers of general circulation. The public scoping meetings were advertised in six local newspapers: *Imperial Valley Press, Desert Sun, San Diego Union Tribune, Los Angeles Times, El Sol del Valle,* and *Las Vegas Review-Journal/Sun.*

The Lead Agencies conducted six public scoping meetings between October 12 and October 20, 1999 to solicit input from the public on potential environmental impacts, the significance of impacts, the appropriate scope of the Draft EIR/EIS, proposed mitigation measures, and potential alternatives to the Proposed Project. The six meetings' locations and dates are provided below. The number of attendees at each meeting is noted in parentheses.

1) Brawley, California, Tuesday, October 12, 1999 (27 attendees)
2) Salton City, California, Wednesday, October 13, 1999 (88 attendees)
3) El Centro, California, Thursday, October 14, 1999 (28 attendees)
4) Las Vegas, Nevada, Monday, October 18, 1999 (8 attendees)
5) Carlsbad, California, Tuesday, October 19, 1999 (13 attendees)
6) San Diego, California, Wednesday, October 20, 1999 (22 attendees)

In addition to the public scoping meetings mentioned above, a meeting with Indian tribes was held on April 18, 2000, in La Quinta, California. A specific invitation to address cultural resources was made at the meeting. The following groups were invited:

- Torres-Martinez Desert Cahuilla Indians
- Morongo Band of Mission Indians
- Cabazon Indians
- Augustine Band of Mission Indians
- Bureau of Indian Affairs

Eight attendees representing three tribes, USFWS, and BIA attended the April 18 meeting. Questions raised by the tribal representatives included the following: whether or not the proposed project would affect Indian Trust Assets (ITAs); what would be the effects on groundwater pumping, especially in the CVWD service area; how the Draft EIR/EIS would address tribal impacts; and what would be the impacts to Salton Sea. In addition, water rights-related issues were raised.

1.8.2.1 Public Scoping Comments

This section summarizes the content of the written and oral comments submitted during the public scoping process. A scoping summary report was published by CH2M HILL on March 10, 2000. (The text of the scoping summary report is included in this Draft EIR/EIS as Appendix B. Its appendices are available from IID Headquarters, 333 East Barioni Blvd., Imperial CA 92251.) Generally, commentors were primarily concerned with hydrology and water quality, biological resources, and socioeconomic impacts.

Hydrology and Water Quality. The hydrology- and water quality-related comments were primarily concerned with the effect of the Project on water quality and quantity in the Salton Sea, Colorado River, the Colorado River Delta in Mexico, and other potentially affected streams and watercourses. Several commentors asked that the Draft EIR/EIS address the impacts of the Project at the various levels of water to be conserved and transferred to adequately identify all potential impacts.

Biological Resources. The majority of the biological resources comments focused on the potential impact of the Project on rare, threatened, and endangered species; on wetland habitats; and on proposed mitigation measures to reduce the impacts to a level of insignificance. Commentors also raised concerns over inflows of total dissolved solids (TDS) entering the Salton Sea and the potential impacts to fish and wildlife.

Socioeconomics. The majority of the socioeconomics comments were primarily concerned with the potential socioeconomic impact of the Project on the Salton Sea and Imperial Valley. Many commentors requested that the potential impacts to the agricultural economy of the Imperial Valley be addressed by the Draft EIR/EIS.

1.9 Project Impacts Summary

The potential effects of the Proposed Project are evaluated for the following resources in this Draft EIR/EIS:

- Hydrology and Water Quality
- Biological Resources
- Geology and Soils
- Land Use
- Agricultural Resources
- Recreation
- Air Quality
- Cultural Resources
- Indian Trust Assets
- Noise
- Aesthetics
- Public Services and Utilities
- Transportation
- Socioeconomics
- Environmental Justice
- Transboundary Impacts

Refer to Table ES-1 for a summary, by resource area, of the potential effects for each component of the Proposed Project.

1.10 Draft EIR/EIS Organization and Contents

The Proposed Project and the schedule for its implementation are described in detail in Chapter 2 of this Draft EIR/EIS. The existing setting, environmental impacts of the Proposed Project and Project alternatives, and mitigation measures for potentially significant effects are described in Chapter 3 for each resource considered. Project alternatives, including alternatives eliminated from consideration and the No Project alternative, are considered in Chapter 4. Other long-term CEQA/NEPA considerations, including growth-inducing impacts, cumulative impacts, and significant irreversible environmental changes, are discussed in Chapter 5. The remaining sections include a list of Draft EIR/EIS recipients; list of preparers; references; list of persons, agencies, and organizations consulted; a glossary of technical terms; a list of acronyms; and an index.

2 Description of the Proposed Project and Alternatives

2.1 Introduction

This section describes the Proposed Project and alternatives to the Proposed Project as required by CEQA and NEPA. The Proposed Project alternatives were developed in accordance with both NEPA and CEQA requirements for analysis of a reasonable range of alternatives (see Section 2.3). This Draft EIR/EIS assesses the Proposed Project, including the HCP, and alternatives to the Proposed Project and HCP, as described below:

Proposed Project: Water Conservation and Transfer under two Scenarios:

- 130 to 300 KAFY to SDCWA (All Conservation Measures) (IID/SDCWA Transfer Agreement Implementation Only)
- Up to 200 KAFY to SDCWA and up to 100 KAFY to CVWD and/or MWD (QSA Implementation)

Implementation of the HCP (IID Water Service Area Portion)

Implementation of the HCP (Salton Sea Portion):

- Approach 1: Hatchery and Habitat Replacement
- Approach 2: Use of Conserved Water as Mitigation

Alternative 1: No Project

Alternative 2: Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

Implementation of the HCP (IID Water Service Area Portion)

Implementation of the HCP (Salton Sea Portion):

- Approach 1: Hatchery and Habitat Replacement
- Approach 2: Use of Conserved Water as Mitigation

Alternative 3: Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

Implementation of the HCP (IID Water Service Area Portion)

Implementation of the HCP (Salton Sea Portion):

- Approach 1: Hatchery and Habitat Replacement
- Approach 2: Use of Conserved Water as Mitigation

Alternative 4: Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

Implementation of the HCP (IID Water Service Area Portion)

Implementation of the HCP (Salton Sea Portion):

- Approach 1: Hatchery and Habitat Replacement
- Approach 2: Use of Conserved Water as Mitigation

The Proposed Project is discussed in detail in Section 2.2. The water conservation and transfer alternatives are discussed in detail in Section 2.3. In accordance with NEPA requirements and CEQA guidelines, a wide range of alternatives was considered for the initial analysis. Appendix D includes a discussion of the methodology used to screen proposed alternatives and identify the alternatives to be assessed in this Draft EIR/EIS. It also discusses the alternatives that were considered but eliminated from detailed assessment and the criteria used to make these determinations. A summary of the appendix is included in Section 2.3.

2.2 Proposed Project

This section includes a brief overview of the Proposed Project. After this overview, the following components of the Proposed Project are described in detail:

- Voluntary commitment by IID to limit to 3.1 MAFY its annual diversions of Priority 3 Colorado River water.
- Conservation by IID of water through the use of various measures (including fallowing) in the IID water service area for transfer to other agencies, IOP compliance, and mitigation.
- Water transfer from IID to SDCWA under the terms of the IID/SDCWA Transfer Agreement.
- Water transfer from IID to CVWD and/or MWD under the terms of the QSA.
- Change in the point of diversion of transferred water on the Colorado River and associated approvals needed from Reclamation.
- Implementation of the HCP.

2.2.1 Overview of the Proposed Project

The Proposed Project involves implementation by IID of a long-term water conservation program within IID's water service area in Imperial County, California to conserve up to 300 KAFY of Colorado River water, which IID would otherwise divert for use within its water service area (see Section 1.4.3. in Chapter 1 for a discussion of IID's water rights). IID's water service area consists of approximately 500,000 acres and is shown on Figure 1-3 in Chapter 1. For a description of IID's water service area and operations, see Section 1.3.2 in Chapter 1.

Under the Proposed Project, water conservation would be undertaken in the IID water service area using one or more of the following measures:

- On-farm irrigation system improvements, including on-farm irrigation management techniques, which would be implemented by landowners and tenants within IID's water service area.
- Improvements by IID to its water delivery system.
- Subject to certain contractual limitations set forth in the IID/SDCWA Transfer Agreement, fallowing measures to conserve water.

Under the Proposed Project, the water transfers would occur in accordance with the terms of the IID/SDCWA Transfer Agreement (see Section 1.4.5 in Chapter 1) and, as an alternative scenario if the proposed QSA (see Section 1.4.7 in Chapter 1) is finalized and implemented, in accordance with the modified water transfers provided for under the terms of the QSA. The Proposed Project thus includes the conservation by IID of up to 300 KAFY of water, and transfer of that water under one of the following two scenarios:

- **IID/SDCWA Transfer Agreement Implementation Only**: Up to 300 KAFY are transferred to SDCWA pursuant to the terms of the IID/SDCWA Transfer Agreement. This scenario will apply if the QSA is not approved and implemented in its entirety.
- **QSA Implementation**: SDCWA would be limited to 130 to 200 KAFY from IID; CVWD would have the option of acquiring up to 100 KAFY of water conserved by IID, in two increments of 50 KAFY each, for use within CVWD's service area. In addition, the QSA grants to MWD an option to acquire all or any portion of this 100 KAFY that CVWD does not acquire, for use in MWD's service area. Under the proposed QSA, the terms of the transfer to SDCWA (130 to 200 KAFY) are governed by the IID/SDCWA Transfer Agreement; and the terms of the proposed water transfers to CVWD and MWD are set forth in acquisition agreements to be executed between IID and each recipient. This scenario will apply if the QSA is approved and implemented in its entirety.

Under either scenario, an implementation agreement would be required to commit the Secretary to deliver conserved water to its recipients. The water conserved by IID would be transferred to SDCWA, CVWD, and/or MWD, for use within the recipients' respective service areas. For a detailed description of SDCWA's, CVWD's, and MWD's service area, see Section 1.3 and Figure 1-1 in Chapter 1.

Under the terms of the IID/SDCWA Transfer Agreement and the QSA, and as part of the Proposed Project, IID would voluntarily limit its annual diversions of Priority 3 Colorado

River water to 3.1 MAFY, including the water conserved for transfer, subject to certain adjustments set forth in the agreements. Under the QSA, this commitment is subject to implementation by Reclamation of its proposed IOP, which would allow IID to pay back inadvertent exceedances of this diversion cap over one or more succeeding years.

This Draft EIR/EIS provides the environmental analysis required under NEPA and CEQA to issue federal and state approvals for the Proposed Project. To comply with ESA and CESA, and to support issuance of state and federal incidental take authorizations required to implement the Proposed Project, IID, in consultation with USFWS and CDFG, has prepared an HCP to address impacts to species and habitats within the IID water service area, the right-of-way of the AAC, and the Salton Sea (see Appendix C). This Draft EIR/EIS provides the environmental analysis required under NEPA and CEQA to support issuance of incidental take permits by USFWS under ESA Section 10 and by CDFG under CESA Section 2081, for species and activities covered by the HCP. In addition, this Draft EIR/EIS provides the environmental analysis required under CEQA to support issuance of incidental take permits by CDFG under Section 2081, for impacts to state-listed species along the LCR.

This Draft EIR/EIS also provides the environmental analysis required by SWRCB for its approval of IID's water conservation and transfers (see Section 1.7.2 in Chapter 1). Other environmental analyses that are related to implementation of the Proposed Project are described in Section 1.5 in Chapter 1.

2.2.2 IID's Voluntary Cap on its Colorado River Water Diversions and Reclamation's Inadvertent Overrun and Payback Policy

This section discusses IID's voluntary commitment under the QSA and IID/SDCWA Transfer Agreement to limit its Priority 3 Colorado River water diversions to 3.1 MAFY, subject to certain adjustments set forth in each agreement and including amounts transferred under each agreement (see Appendix A). If the Proposed Project is implemented under the first scenario (IID/SDCWA Transfer Agreement Implementation Only), the consensual cap specified in the IID/SDCWA Transfer Agreement will apply. If the Proposed Project is implemented under the second scenario (QSA Implementation), the consensual cap specified in the QSA will apply. For ease of reference, IID's cap is described in this Draft EIR/EIS as 3.1 MAFY, but it is intended to include the adjustments provided for under the applicable agreement.

The IA, which implements the QSA, would commit the Secretary to deliver water to IID in conformance with the consensual cap on IID's diversions set forth in the QSA. Execution of the QSA is contingent upon execution by the Secretary of the IA. The IA is a federal action that is being assessed by Reclamation, along with certain related actions, in the Draft IA EIS (see Section 1.5.3 in Chapter 1). This Draft EIR/EIS summarizes and incorporates by reference the analysis of the IA set forth in the Draft IA EIS. The assessment of the Proposed Project in this Draft EIR/EIS under the scenario that includes QSA implementation assumes that the IA is in place.

Under the terms of the QSA, IID's agreement to limit its diversions is contingent upon Reclamation's adoption of the proposed IOP, which would establish procedures to pay back inadvertent exceedances of its diversion cap over one or more succeeding years. Adoption of the IOP is a federal action that is being assessed by Reclamation in the Draft IA EIS (see

Section 1.5.3 in Chapter 1). This Draft EIR/EIS does not assess the impacts of the IOP; however, because the IOP is anticipated to be in place, this Draft EIR/EIS assesses IID's compliance with the IOP in connection with implementation of the Proposed Project.

2.2.2.1 IID's Voluntary Cap on its Priority 3 Colorado River Water Diversions

Water that is conserved by IID and transferred under the Proposed Project to SDCWA, CVWD, and/or MWD would constitute a portion of the Colorado River water that IID is entitled to divert under its Priority 3 Colorado River water right (see Section 1.4.3 in Chapter 1 for additional discussion of IID's water rights). Under the IID/SDCWA Transfer Agreement and the QSA, IID would agree to limit its consumptive use of Colorado River water under Priority 3a to 3.1 MAFY for the term of the Proposed Project. This consensual limitation of Priority 3a consumptive use constitutes a forbearance of IID's right to divert, for reasonable and beneficial use, up to the entire balance (after Priorities 1 and 2) of the 3.85 MAFY amount allocated in the aggregate to Priorities 1, 2, and 3 under the Seven Party Agreement. This forbearance increases the certainty of Colorado River water availability to CVWD and facilitated the participating agencies' agreement on the proposed QSA terms.

The effect of the cap on IID's diversions is greater under the second scenario for the Proposed Project (QSA Implementation). Under the QSA, IID's total Colorado River water use would be reduced by an amount between 410 and 490 KAFY (including conservation under the Proposed Project and the existing 1988 IID/MWD Agreement - see Table 2-1), leaving between 2.69 and 2.61 MAFY of Priority 3a Colorado River water for consumptive use by IID. As part of the QSA, proposed annual Colorado River water budgets were developed for IID, CVWD, and MWD. The QSA water budgets in a normal year (a year when 4.4 MAF are available for use within California) are shown in Table 2-1. IID's proposed water budget is shown specifically in Table 2-2.

2.2.2.2 Reclamation's Inadvertent Overrun and Payback Policy

Under the QSA, IID's commitment to limit its Priority 3 diversions of Colorado River water is subject to implementation by Reclamation of its proposed IOP, which would allow IID to pay back inadvertent exceedances of this diversion cap over one or more succeeding years. The Draft IA EIS defines the IOP as the following:

> An inadvertent overrun is defined as Colorado River water that is diverted, pumped, or received by an entitlement holder in excess of the water user's entitlement for that year and deemed to be beyond the control of the water user. The IOP applies to all quantified Colorado River water entitlements in the Lower Division states and can only be applied to quantified consumptive use entitlements or entitlements that would take the remaining quantity of a State's fixed apportionment...Under the IOP, payback would be required to begin in the calendar year that immediately follows the release date of the Decree Accounting Record that reports inadvertent overruns for a Colorado River water user (Reclamation 2002).

TABLE 2-1
Annual Colorado River Water Budgets with Implementation of the QSA[1]

Water Budget (< > indicates water transfer to others)	Budget Cap and Adjustments
	IID
3,100 KAF	Priority 3 Water Use Cap
< 100 to 110 KAF >	To MWD per the IID/MWD 1988 Agreement
< 130 to 200 KAF >	To SDCWA – Transfer of conserved water
< 56.2 KAF >	To MWD as part of the AAC Lining Project[1]
< 11.5 KAF >	To San Luis Rey Indian Water Rights Settlement parties via MWD as part of the AAC Lining Project
< 100 KAF >	To CVWD and/or MWD – Transfer of conserved water
< 11.5 KAF >	For Miscellaneous and Federal Present Perfected Rights[2]
2,610 to 2,690 KAF	Net Annual IID Water Budget
	CVWD
330 KAF	Priority 3 Water Use Cap
< 21.5 KAF >	To MWD: Coachella Canal Lining Project
< 4.5 KAF >	To San Luis Rey Indian Water Rights Settlement parties via MWD: Coachella Canal Lining Project
20 KAF	From MWD – Per Revised Terms of the 1989 Approval Agreement
100 KAF	From IID – Transfer of conserved water
35 KAF	From MWD – Exchange of SWP and Colorado River water
< 3 KAF >	To account for Miscellaneous and Federal Present Perfected Rights[3]
456 KAF	Net Annual CVWD Water Budget
	MWD
550 KAF	Priority 4 Water Use Cap
100 – 110 KAF	KAF From IID – IID/MWD 1988 Agreement (existing conservation)
< 20 KAF >	To CVWD – Per Revised Terms of the 1989 Approval Agreement
56.2 KAF	From IID: All-American Canal Lining Project
21.5 KAF	From CVWD: Coachella Canal Lining Project
< 35 KAF >	To CVWD – Exchange of SWP and Colorado River water
< 47 + KAF >	To account for Miscellaneous and Federal Present Perfected Rights[4]
625 – 635 KAF	Net Annual MWD Water Budget

Source: Reclamation 2002
Notes:
[1] This table is from Reclamation's Draft IA EIS, which is incorporated into this Draft EIR/EIS by reference. The IA commits the Secretary to deliver Colorado River water in conformance with certain terms of the QSA. Further information on this table can be found in the Draft IA EIS.
[2] At IID's option, this forbearance could be charged to IID's water rights under Priorities 6, 7, or 3, as available.
[3] At CVWD's option, this forbearance could be charged to CVWD's water rights under priorities 6, 7, or 3, as available.
[4] At MWD's option, this forbearance could be charged to any water available to MWD in that year.

TABLE 2-2
IID's Proposed Water Budget under the QSA

Water Budget (< > indicates water transfer to others)	Budget Cap and Adjustments	Additional Notes
3,100 KAF	Priority 3 Water Use Cap	
< 100 to 110 KAF >	To MWD per the 1988 IID/MWD Agreement	The 1988 IID/MWD Agreement is described in Section 1.4.4 in Chapter 1. Under this agreement, MWD is entitled to request and divert from the Colorado River an amount equal to the amount of water conserved by certain conservation projects paid for by MWD, estimated to range from 100 to 110 KAFY. Water began to be available under this agreement in 1990; the project reached full implementation in 1998. The impacts of the 1988 IID/MWD Agreement were addressed in a previous environmental assessment.
< 130 to 200 KAF >	To SDCWA – Transfer of conserved water	Transfer of conserved water to SDCWA is described in Section 2.2.4.1 in this Draft EIR/EIS.
< 56.2 KAF >	To MWD as part of the AAC Lining Project[1]	The AAC Lining Project is described in Section 1.5.2 in Chapter 1 and Section 5.3 in Chapter 5 in this Draft EIR/EIS.
< 11.5 KAF >	To San Luis Rey Indian Water Rights Settlement parties via MWD as part of the AAC Lining Project	The San Luis Rey Indian Water Rights Settlement Act, enacted by Congress in 1988 as amended in 2000 (Title I of Public Law 100- 675), authorized a settlement of water rights claims to San Luis Rey River water. This settlement is expected to be facilitated through the use of 11.5 KAFY of water conserved by the AAC lining project and 4.5 KAFY conserved by the Coachella Canal lining project. Environmental compliance is provided for in the Draft IA EIS, Coachella Canal Lining Project Final EIR/EIS, and the AAC Lining Project Final EIR/EIS. Use of the water by certain settlement parties (the La Jolla, Pala, Pauma, Rincon and San Pasqual Bands of Mission Indians) will require additional environmental analysis.
< 100 KAF >	To CVWD and/or MWD – Transfer of conserved water	Transfer of conserved water to CVWD and/or MWD is described in Section 2.2.4.2 in this Draft EIR/EIS.
< 11.5 KAF >	For Miscellaneous and Federal present perfected rights	The QSA provides for IID's forbearance of use of 11.5 KAFY of Colorado River water to satisfy, at DOI's request, certain miscellaneous and Indian present perfected rights (see Section 1.4.2 in Chapter 1 of this Draft EIR/EIS) to Colorado River water. The 11.5 KAFY covered by IID's forbearance described above could be charged against IID's Priority 3, 6, or 7 water rights, at IID's option. To the extent the 11.5 KAFY is provided from IID's Priority 3 water right, that amount is included in the diversions subject to IID's contractual limitation on its Priority 3 diversions of Colorado River water at 3.1 MAFY, as described above and in the QSA.
2,610 to 2,690 KAF	Net Annual IID Water Budget	

Source: Reclamation 2002
Notes:
[1] In surplus years (as defined in the Draft IA EIS), IID would have a right to use this water with certain restrictions.

Therefore, in addition to the level of water conservation required under the Proposed Project's second scenario (QSA Implementation) to implement the transfers to SDCWA, CVWD, and/or MWD, IID's water conservation program (see Section 2.2.3), could include additional conservation (an annual average of approximately 59 KAFY) to ensure compliance with the cap on IID's Priority 3 diversions and/or the IOP. Under the Proposed Project's first scenario (IID/SDCWA Transfer Agreement Implementation Only), IID would be limited to its legal diversions and would need to implement additional conservation measures to avoid or pay back any exceedances. The IOP is further described in Reclamation's Draft IA EIS.

2.2.3 IID's Water Conservation Program

2.2.3.1 Water Conservation Program Overview

To meet IID's obligations under the Proposed Project, IID would select water-conservation measures for its service area, which may include:

- On-farm irrigation system improvements, including on-farm irrigation management techniques, which would be implemented by landowners and tenants within IID's water service area.
- Water improvements by IID to its water delivery system.
- Subject to certain contractual limitations set forth in the IID/SDCWA Transfer Agreement, fallowing measures to conserve water, which would be implemented by landowners and tenants within IID's water service area and/or IID.

IID's ability to implement a water conservation program will vary over time, depending on the availability and feasibility of water delivery system improvements, the extent of participation of IID water service area landowners and tenants, variations in climate and hydrological conditions, changes in agricultural economics, changes in technology, and other factors that are not within IID's control. Because of the need for variability and flexibility, the water conservation program under the Proposed Project includes a broad range of conservation measures that could be implemented in various combinations, and the program could change from year to year, or even from agricultural season to season, over the term of the Proposed Project. Therefore, the water conservation program assessed in this Draft EIR/EIS includes conservation measures that are predicted to yield the minimum and maximum reasonable case environmental impacts, so that the range of the type and severity of potential impacts can be understood. The specific components of the water conservation program will be determined by the IID Board and could vary over time, but the impacts will be encompassed within the ranges assessed in this Draft EIR/EIS. Section 2.2.3.5 contains additional information about the administration of IID's proposed water conservation program.

The following discussion describes currently available water conservation measures that can be implemented using existing technology. Other measures could be introduced from time to time during the term of the Proposed Project and included as part of the conservation program as long as the range of environmental impacts is covered by the analysis included in this Draft EIR/EIS.

2.2.3.2 On-farm Irrigation System Conservation Measures

This section describes the ways in which landowners or tenants in the IID water service area could conserve water by installing new on-farm irrigation system improvements or by employing on-farm irrigation management techniques. All on-farm irrigation system improvements achieve water conservation by making on-farm irrigation more efficient. This means that less water would be diverted at the farm's headgate to meet crop water needs; if crop water needs are met with less water, drainage (tail water) will be reduced. On-farm irrigation conservation measures, as well as associated construction activities, are described in Table 2-3. They are also illustrated in Figures 2-1(a) through 2-1(c).

2.2.3.3 Water Delivery System Conservation Measures

This section describes the ways in which IID could conserve water by modifying the infrastructure of its water delivery system. Water delivery system conservation measures and associated construction activities are listed in Table 2-4. Figures 2-2(a) through 2-2(c) illustrate the water delivery system conservation measures. Figure 2-3 shows existing lateral interceptor systems and reservoirs, Figure 2-4 shows proposed lateral interceptor systems and reservoirs, Figure 2-5 shows existing and proposed seepage recovery systems, Figure 2-6 shows existing conveyance lining facilities, and Figure 2-7 shows proposed conveyance lining facilities.

TABLE 2-3
On-farm Irrigation System Conservation Measures

Conservation Measure	Description	Construction Activities[1]
Tailwater Return System (TRS)	Pumps surface irrigation tailwater back to the head ditch, thereby reducing both the delivery requirement and the volume of water discharged to IID drain(s). The use of a TRS to achieve water conservation is most applicable for soils with relatively low infiltration rates; approximately 75 percent of farms in the IID water service area have soils that meet this criterion. Some or all of the tailwater is captured and pumped to the same field or another field for reuse, thereby achieving water conservation.	TRS consists of three basic constructed components: a pond (typically 4 acre feet [AF] in capacity), a pumping plant (typically 3 to 4 cfs capacity), and a 12"-diameter pipeline. Pond: Typically a 1- to 3-acre surface pond with a 4' excavation is used. Excavated soil could be spread on fields or used to elevate farm roads. Drop Boxes and Culverts: Excavation to install drop boxes and culverts along roads and pond (6' deep by 13' wide). Pumping Plant: Mounted on manhole installed 8' deep. Diesel pumps fenced, electric pumps not fenced. Pipeline, 12" diameter: Installed by digging a trench (4' deep); applying bedding to protect pipe; backfilling trench.
Cascading Tailwater	Allows tailwater to cascade by gravity to the head ditch of a lower field adjacent to the tailwater ditch. Some or all of the tailwater can be reused by the lower field, thereby achieving water conservation.	Cascading tailwater can be accomplished by placing drainpipes with drop-box inlets through embankment between fields, just upstream of each head ditch check. Drainpipe with Drop Box: Section of the existing concrete-lined head ditch would be removed. Excavated soil would be required to install drainpipe (4' to 5' depth). Drop box would be installed between the tailwater ditch and the adjacent field's head ditch.

TABLE 2-3
On-farm Irrigation System Conservation Measures

Conservation Measure	Description	Construction Activities[1]
Level Basins	Divides field into level basins and floods each basin at a relatively high flow rate. Irrigation water is applied to a uniform depth across each basin and immediately shut off with little or no tailwater resulting. Conservation is thereby achieved by reducing or eliminating tailwater by using a more efficient crop water delivery system.	In most cases, removal of the existing head ditch would be required prior to leveling. Fields would be divided into basin sizes based on infiltration rate of the soil. Each field would then be leveled and berms (approximately 2' high) would be created around each basin. Concrete-lined ditch would be constructed by compacting earth fill to form a pad and then excavating the ditch. The area would be graded, and concrete lining would be applied (1.5" thick). Sections of the ditch would be left unlined, and gates (to control water flow) would be placed by hand. Remaining unlined portions of the ditch would then be lined by hand.
Shorten Furrows/ Border Strips	Distribution uniformity of furrow and border strip irrigation can be improved by shortening the length of irrigation runs. This is typically accomplished by adding a new head ditch in the middle of a half-mile-long field, thus dividing it into two quarter-mile fields. Water can be supplied to the new head ditch by using a new carry ditch down the side of the field or by constructing a new farm gate on the lateral. To fill the crop's root zone at the bottom end of a long field, long water run times are required, which causes more infiltration at the upper end of the field than needed by the crop's root zone and more tailwater at the lower end of the field. If the field length or irrigation run is shortened, water running and soil contact times are shortened at the upper end of the field, which reduces tailwater and infiltration losses. Conservation is thereby achieved by reducing or eliminating tailwater using a more efficient crop water delivery system.	Construction of a concrete-lined ditch (same method as above) and new carry ditch or a new farm gate. Construction of a new carry ditch (if lined, it would be accomplished by method above; if unlined, construction would be accomplished by method above, without concrete lining). 1) If sufficient elevation is available in the lateral, a new delivery can be added to IID water delivery system and to a 0.50 mile of concrete irrigation head ditch installed by the farmer. 2) If water is not available and the cost of new delivery gate is prohibitive, a 0.25 mile carry ditch can be used to connect to delivery ditch. Remove a section of the existing concrete-lined head ditch after saw cutting (when head ditch is dry). Excavator would remove section from concrete lateral and excavate area for new gate, install the gate, pour concrete to stabilize the gate, and backfill.
Narrow Border Strips	Narrowing the width of border strips can improve distribution uniformity along the length of fields by increasing advance time and depth of flow. This measure conserves water in exactly the same manner as shortened Furrows/Border Strips by reducing or eliminating tailwater using a more efficient crop water delivery system.	Construction involves adding additional outlets to head ditch, and removing a section of the existing concrete ditch with a backhoe after saw cutting when the head ditch is dry. Excavate soil for pipe placement (2' to 3' deep) and backfill trench. Outlet pipe is 12" in diameter and has a gate to control water flow onto the field. Pouring concrete stabilizes the new pipe and gate.
Laser Leveling	Achieves a uniform mainfall and sidefall in a field to enhance the distribution uniformity of applied water. More efficient water application is achieved by creating uniform field slopes, which in turn cause a more uniform field-wide irrigation water application. Conservation is achieved by reducing or eliminating tailwater using a more efficient crop water delivery system.	Laser leveling is accomplished with a laser-guided scraper.

TABLE 2-3
On-farm Irrigation System Conservation Measures

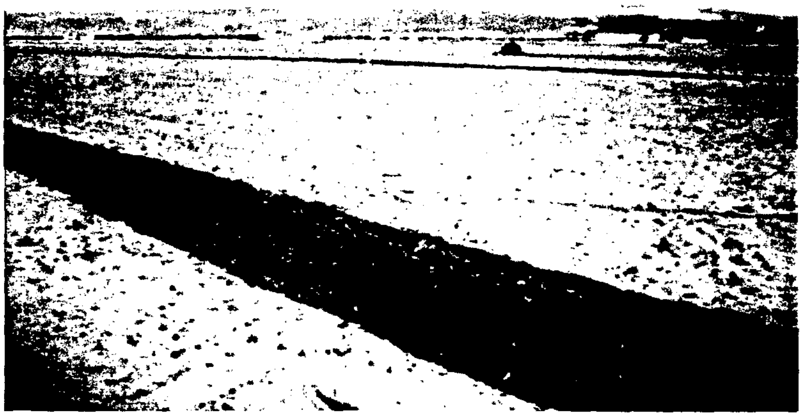
Conservation Measure	Description	Construction Activities[1]
Multi-Slope	For furrow and border strip irrigation, distribution uniformity can be improved by varying the slope of the field so the head of the field has a greater slope than the end of the field. This measure conserves water in exactly the same manner as shortened Furrows/Border Strips by decreasing the water soil contact time at the upper end of the field by increasing water velocity due to a steeper slope at the upper end of the field. Tailwater is reduced by a flatter slope at the bottom end of the field, which increases the water/soil contact time for better crop root zone infiltration. Conservation is achieved by reducing or eliminating tailwater by using a more efficient crop water delivery system.	Construction involves changing the slope of the field by grading land so that grade is steeper near head ditch and gradually gets less steep at the end of the field.
Drip Irrigation	Water is run through drip tubing, which consists of pipes with small holes. The drip tubing is either buried or lies above the ground next to the crop. Water slowly drips out at a slow rate to irrigate crop. In general, drip irrigation reduces the losses of water to deep percolation, evaporation and field runoff by its ability to control the amount of water applied to the root zone of the crop. Conservation is achieved by reducing or eliminating tailwater by using a more efficient crop water delivery system.	The installation of a drip irrigation system involves the construction of four components: a reservoir, a pumping system, a filtration system, and a distribution system. Reservoir construction is the same as it is for TRS (although the reservoir would be located at head of the field). The purpose of the reservoir is to store irrigation water that will be pumped out and applied to the field. Reservoir size (4' to 5' deep and 15' to 25' wide) varies by farm size and farmer method. Soil excavated from the pond would be compacted and used to form an embankment (3' high) around the pond. Pumping system construction similar to TRS. Manhole adjacent to reservoir, constructed like TRS system, to pump water to the filtration system. Filtration system composed of 5'- to 6'- high sand filters. Excavate 2' deep and pour concrete pad. Install three to five filters on top of the concrete pad. Network of pipes ranging from 3" to 12" diameter form the distribution system throughout field; total of approximately 1.5 miles, or 8,000 feet, of pipe exist for each 80-acre section. Dig trench by excavating 3', lay pipe, and backfill. Length of drip emitter tube dependent on crop type and type of emitter – subsurface tube laid with tractor that digs trench and lays tube all at once; surface drip tube laid by hand.
Cutback[2]	Cutback irrigation is initiated with a high flow rate to advance the water down the field as quickly as possible without causing erosion. When the water reaches a predetermined distance down the field, the flow is reduced to minimize tailwater, resulting in improved uniformity. Conserves water in exactly the same manner as shortened Furrows/Border Strips by reducing the water/soil contact time at the upper end of the field. Conservation is achieved by reducing or eliminating tailwater by using a more efficient crop water delivery system.	Cutback irrigation is accomplished by controlling the flow rates of water advancing down a field. This is an on-farm irrigation management technique. There are no on-farm construction activities associated with this technique.

Notes:
[1] Construction information is for a standard design profile based on typical construction scenarios.
[2] Cutback is an on-farm irrigation management technique. On-farm irrigation management techniques, which do not require physical improvements to on-farm or water delivery facilities, generally consist of improvements to the supervision and administration of existing on-farm systems, including irrigation scheduling, water measurement, soil moisture measurement, and use of additional farm labor. On-farm irrigation management techniques would also require use of soil-moisture measurement devices and climatic monitoring station data from existing IID water service area stations.

TABLE 2-4
Water Delivery System Conservation Measures

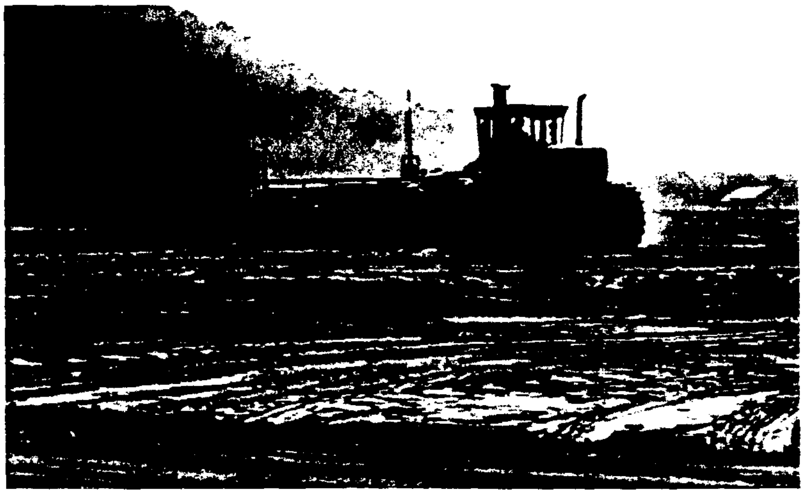
Conservation Measure	Brief Description	Construction Activities[1]
Lateral Interceptor System	Collects operational discharge from a lateral canal into a new canal. Stores collected water in reservoir until water is needed.	Construction typically requires a 50' easement. Fill dirt is imported to construct a 40'-wide embankment, and the remaining 10' are quitclaimed back to the property owner. Four main construction steps: Raise existing concrete lining (~1') at ends of laterals; construct new interceptor channel; construct reservoir (approximately 300 to 400 AF) with pump station; install pipeline. Reservoir construction is described below under Mid-Lateral Reservoir.
Mid-Lateral Reservoir	Small reservoirs are located along lateral canals to balance high to low flow fluctuations.	Construction of small reservoirs (2 to 10 acres) at critical locations along the lateral canal system, typically planned for locations one-half to two-thirds of the way down the lateral; installation of a pump station 2 to 5 cfs, low head, high volume, mix or axle flow, single stage, oil lube pump, 15-horsepower motor; and installation of structure and measuring devices, including reservoir inlet, inlet gate, reservoir outlet, and slide gate.
Regulating Reservoir	Used to match demand flows to delivery flows. Conservation is achieved by reduction in operational discharge.	Construction of a regulating reservoir is similar to construction of Mid-Lateral Reservoirs (see above). Typical size is 30 to 40 acres.
Seepage Interceptor	Conserves water by collecting canal leakage and/or seepage in surface or subsurface collector pipes along a canal, then pumps the water back into the same canal.	For surface drains, a check structure is placed at a location where the drain turns away from the water delivery canal. The seepage water is returned to the canal with the installation of a collector sump, pump, and pipeline. For subsurface drains, a collector sump, pump, and underground pipeline are installed.
Conveyance Lining	Lining sections of earthen canals that show seepage with concrete or use of pipelines to reduce that seepage.	Three typical components to construction: Preparation of existing channel and pad preparation (2' to 6' bottom); trenching and lining; hand-forming transitions at check structure with delivery.

Notes:
[1] Construction information is for a standard design profile based on typical construction scenarios.



Laser Leveling

USDA NRCS Practice Code 466



Multi-Slope

USDA NRCS Practice Code 464

Drip Irrigation

USDA NRCS Practice Code 441

Figure 2-1a
On-Farm Conservation Measures
IID Water Conservation and Transfer Project Draft EIR/EIS

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Tailwater Return or Pump Back System

USDA NRCS Practice Code 447

Shorten Furrow or
Border Strips,
Narrow Border Strips

USDA NRCS Practice Code 388

Figure 2-1b
On-Farm Conservation Measures
IID Water Conservation and Transfer Project Draft EIR/EIS

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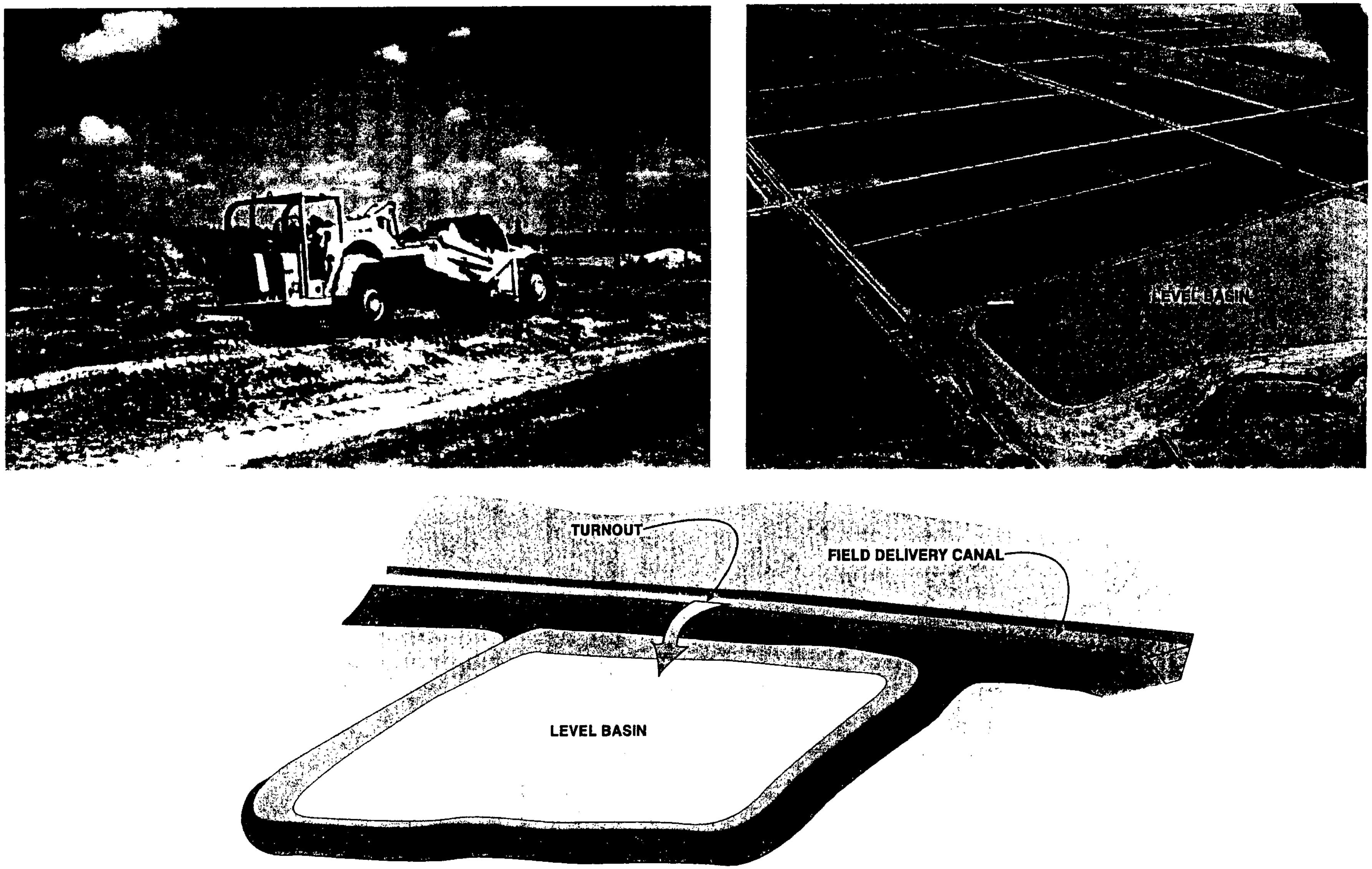

Figure 2-1c
Level Basin
IID Water Conservation and Transfer Project Draft EIR/EIS

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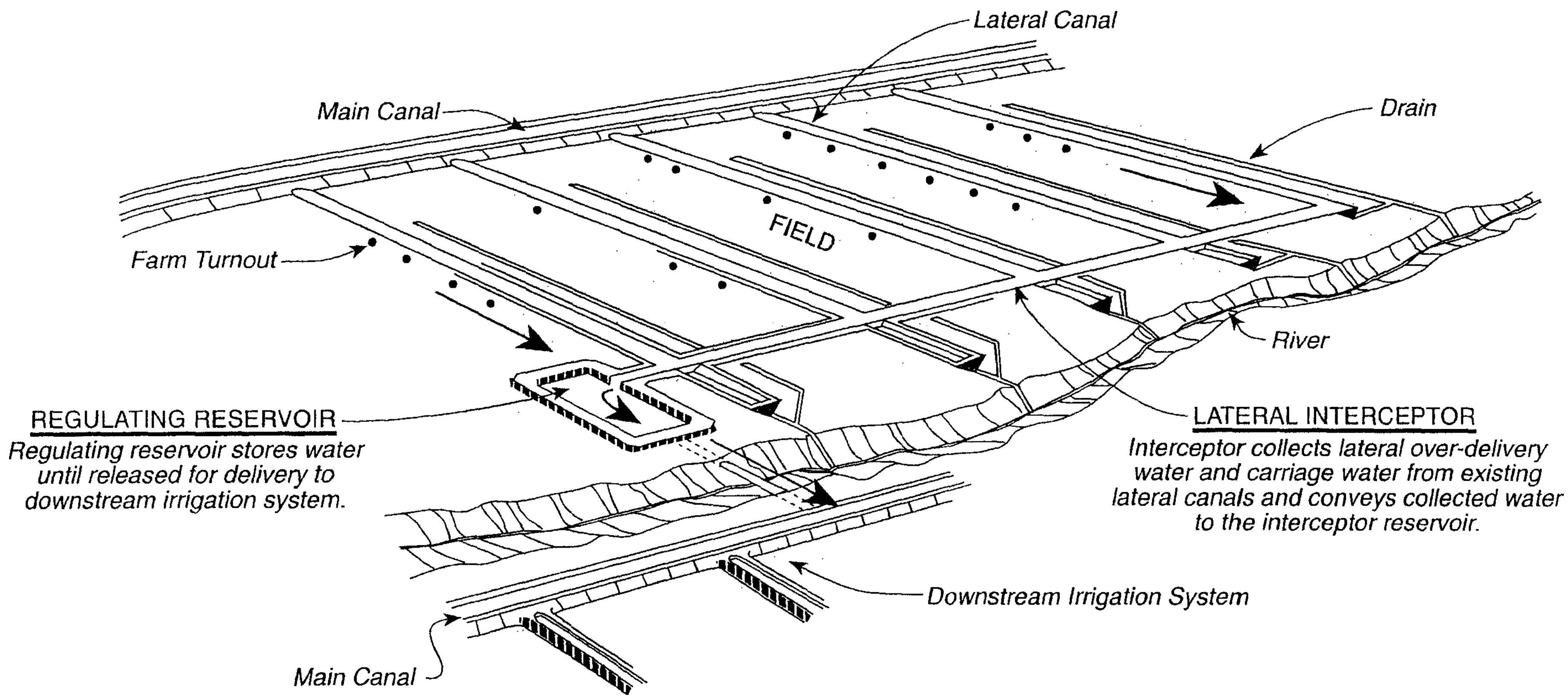

Figure 2-2a
Conceptual Lateral Interceptor System
IID Water Conservation and Transfer Project Draft EIR/EIS

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2.2.3.4 Fallowing

Fallowing is defined, in broad terms, as the non-use of farmland for crop production during the growing season. This definition covers varied methods of implementation. Fallowing can be implemented for different time periods. For example, a field could be removed from production on a permanent or long-term basis (i.e., for more than 4 years), or production could cease temporarily or periodically (i.e., rotational fallowing) for one or more growing seasons (less than 4 years), or for one or more crops.

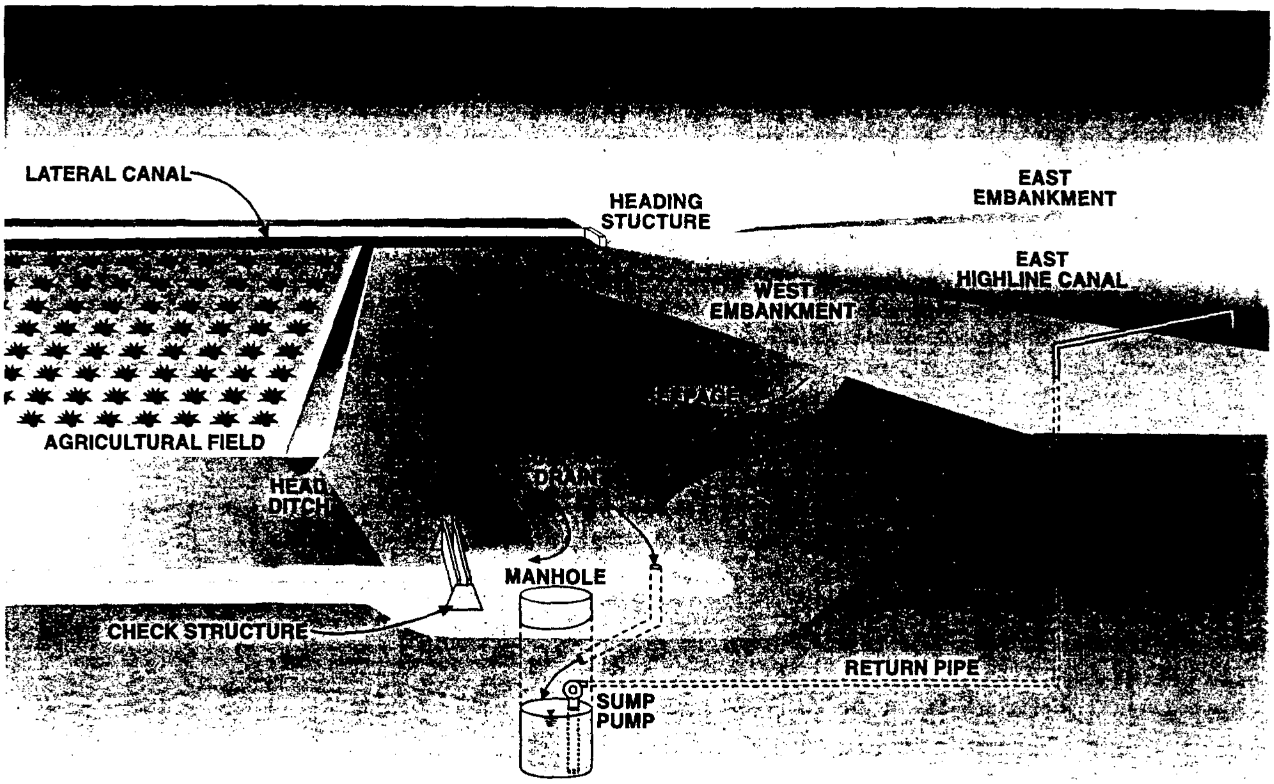
Fallowing can also be implemented for different purposes. For example, farmers could choose to fallow a portion of a field, or some or all of their fields, as a result of poor market conditions, or to improve the land by taking it out of production temporarily. Rotational fallowing is a land management practice that allows a farmer to "rest and rehabilitate" a piece of land, usually on a temporary basis. Rotational fallowing of irrigated fields may improve farmland by allowing additional leaching during the rest period. Under a rotational fallowing program, the fallowed land is returned to production, usually in an improved state. Imperial Valley farmers have implemented many variations of temporary or rotational fallowing. Historically, approximately 20,000 acres of farmland within the IID water service area are fallowed each year.

For purposes of the Proposed Project, fallowing is defined as non-use of farmland for crop production for a period of time to conserve irrigation water. Under the Proposed Project, fallowing could be used as a conservation measure, and the conserved water generated by this means could be used for any of the following purposes:

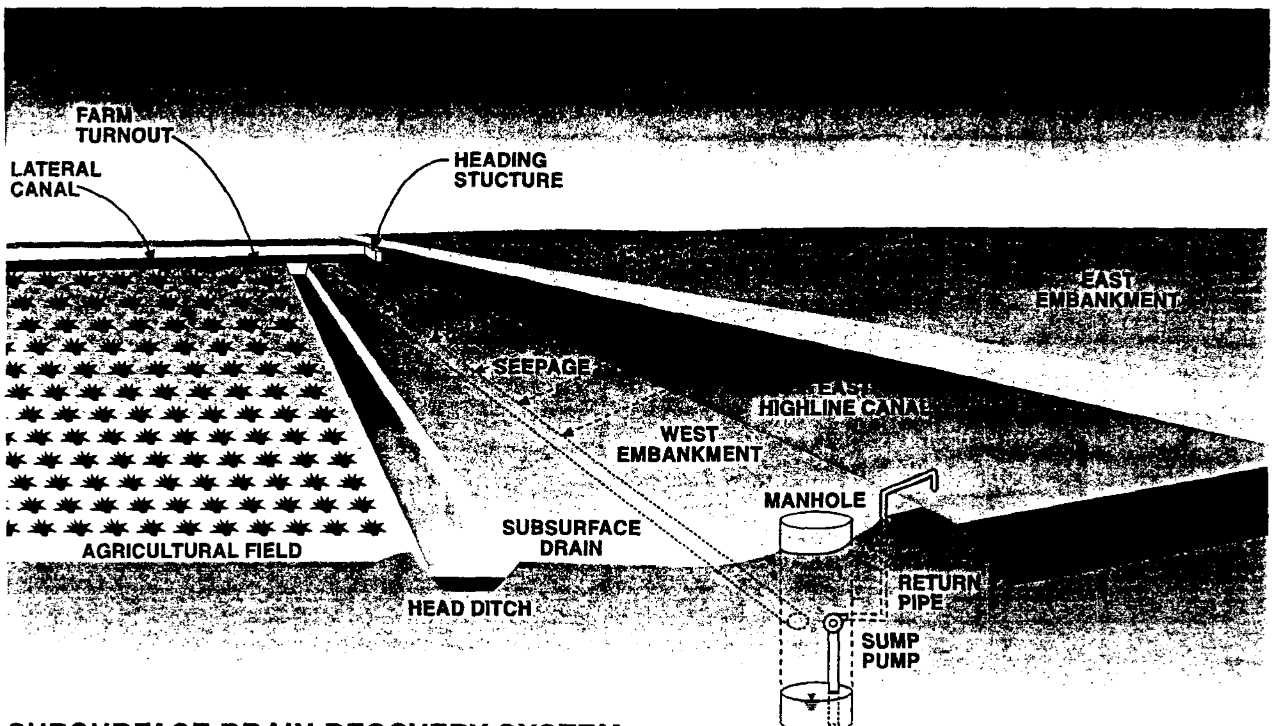
- To comply with IID's contractual limitation on its annual Priority 3 diversions as set forth in the IID/SDCWA Transfer Agreement or the QSA.
- To comply with potential payback requirements of the IOP.
- For transfer of up to 300 KAFY to SDCWA, subject to the restrictions on fallowing contained in the IID/SDCWA Transfer Agreement, which are described below.
- For transfer of up to 100 KAFY to CVWD and/or MWD pursuant to the QSA.
- To implement habitat enhancement or other measures provided in this Draft EIR/EIS or HCP.

The amount of water needed for these purposes may vary from year to year, or even from season to season, throughout the term of the Proposed Project.

Implementation of Fallowing. Landowners within the IID water service area could implement fallowing by entering into contracts with IID to cease crop production on a portion of their fields, or on some or all of their fields, on a short-term or long-term basis. IID could fallow land that it owns or controls in the same manner. For purposes of assessing the impacts of fallowing in this Draft EIR/EIS, the amount of water conserved by the cessation of crop production at a particular field has been estimated based on historic use.



SURFACE DRAIN RECOVERY SYSTEM



SUBSURFACE DRAIN RECOVERY SYSTEM

Figure 2-2b
Conceptual Seepage Recovery Systems
IID Water Conservation and Transfer Project Draft EIR/EIS

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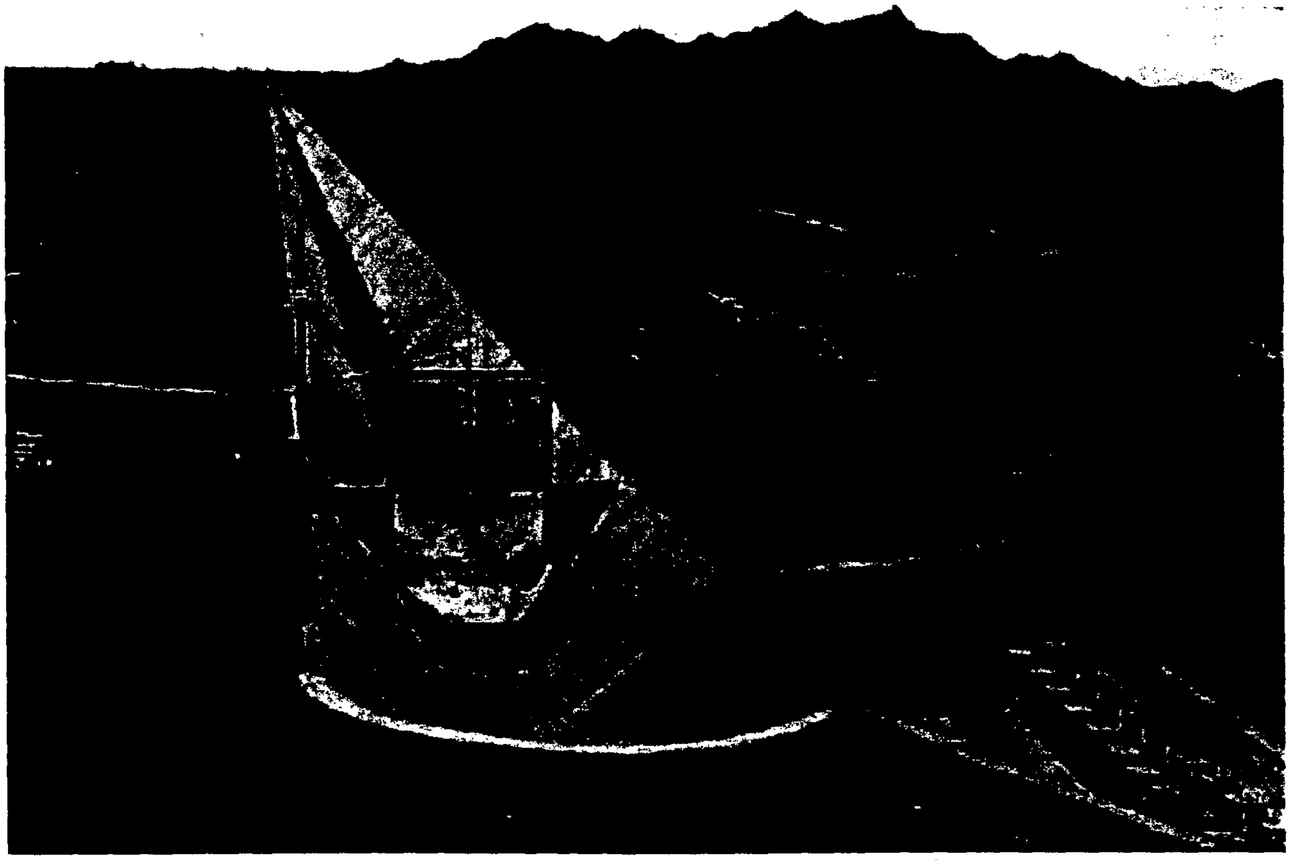

Source:
USDA, Natural Resources Conservation
Service-practice code 428A

Figure 2-2(c)
Conveyance Lining
IID Water Conservation and Transfer Project Draft EIR/EIS

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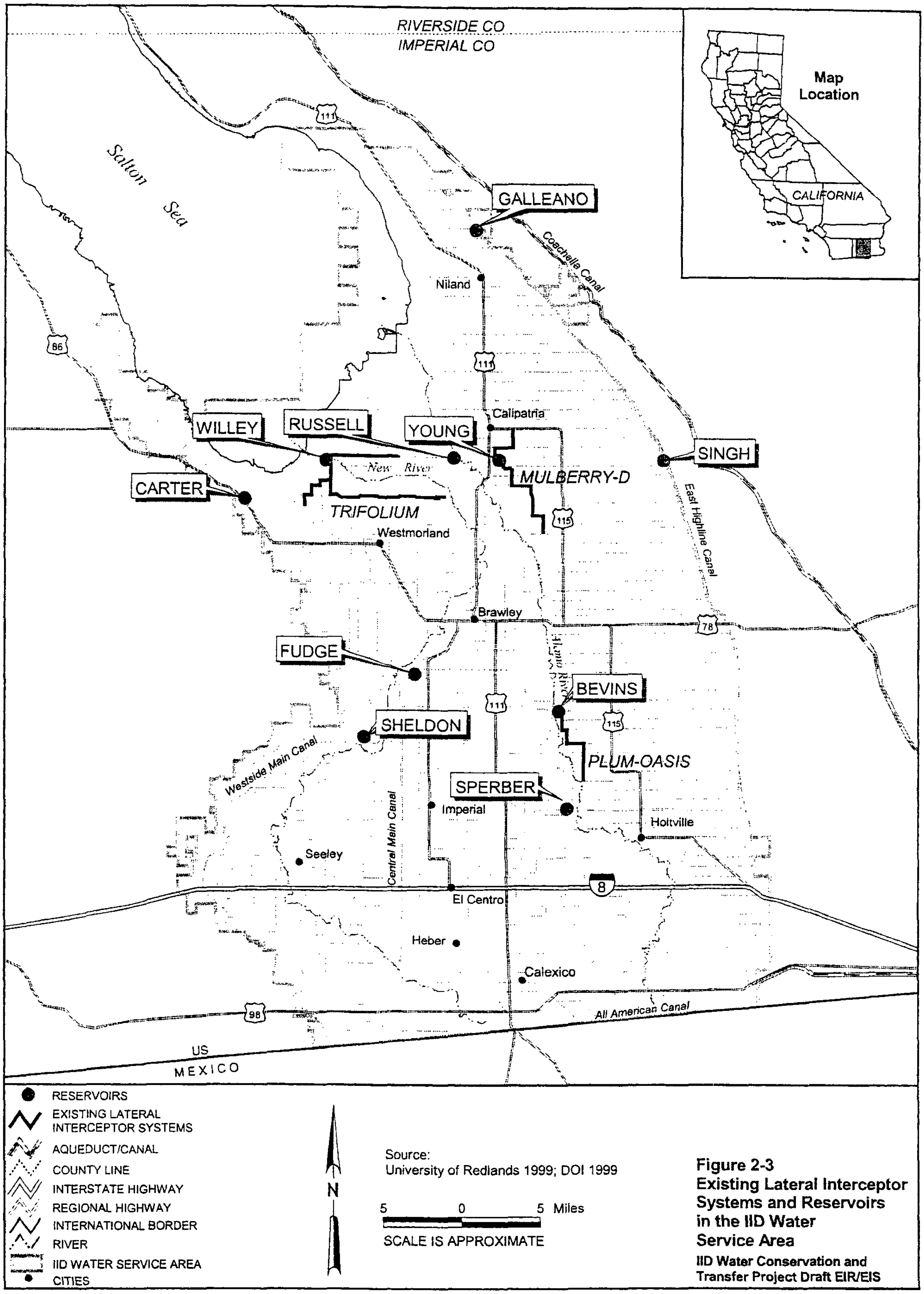
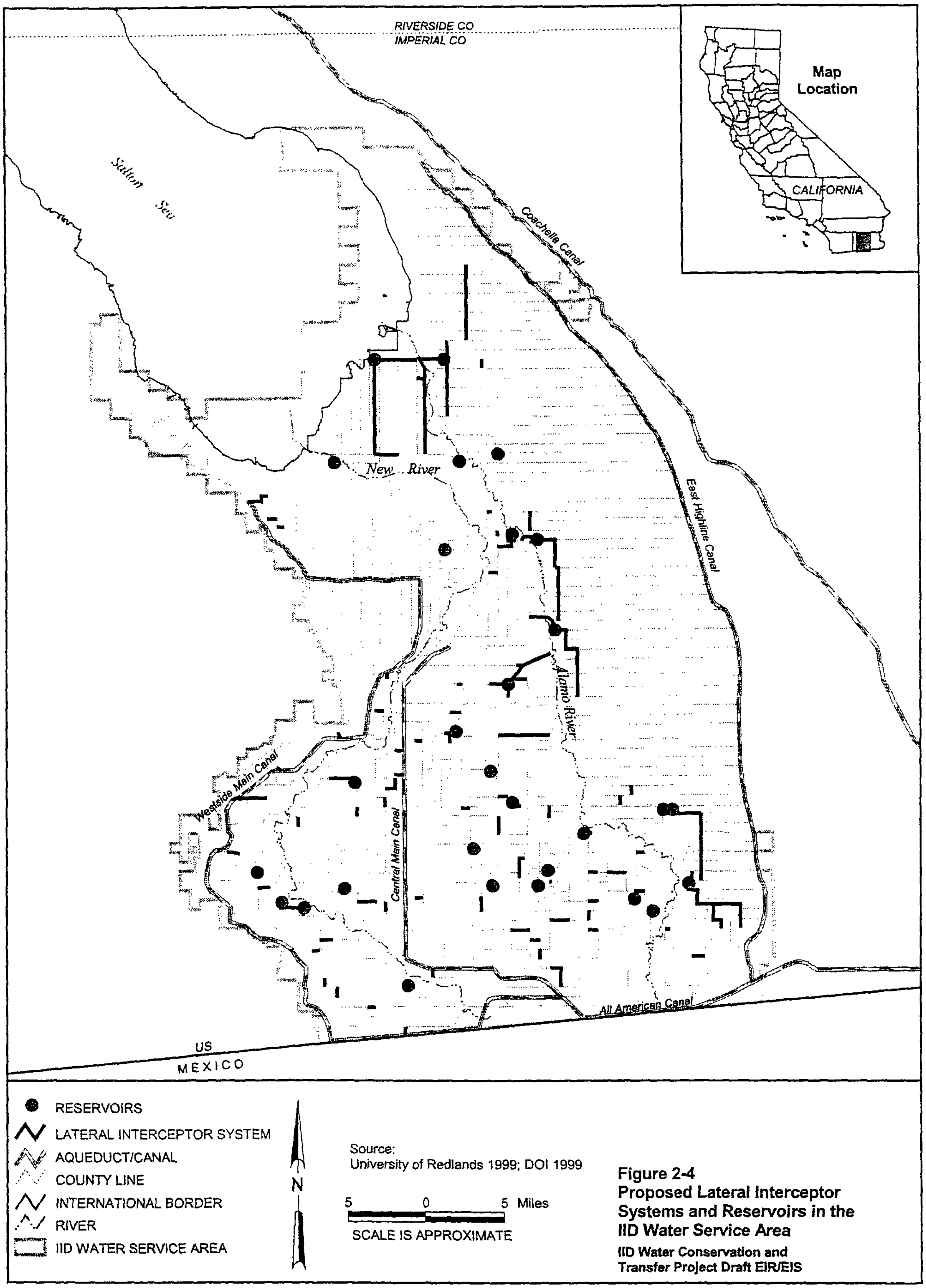


Figure 2-3
Existing Lateral Interceptor Systems and Reservoirs in the IID Water Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS



Source:
University of Redlands 1999; DOI 1999

Figure 2-4
Proposed Lateral Interceptor Systems and Reservoirs in the IID Water Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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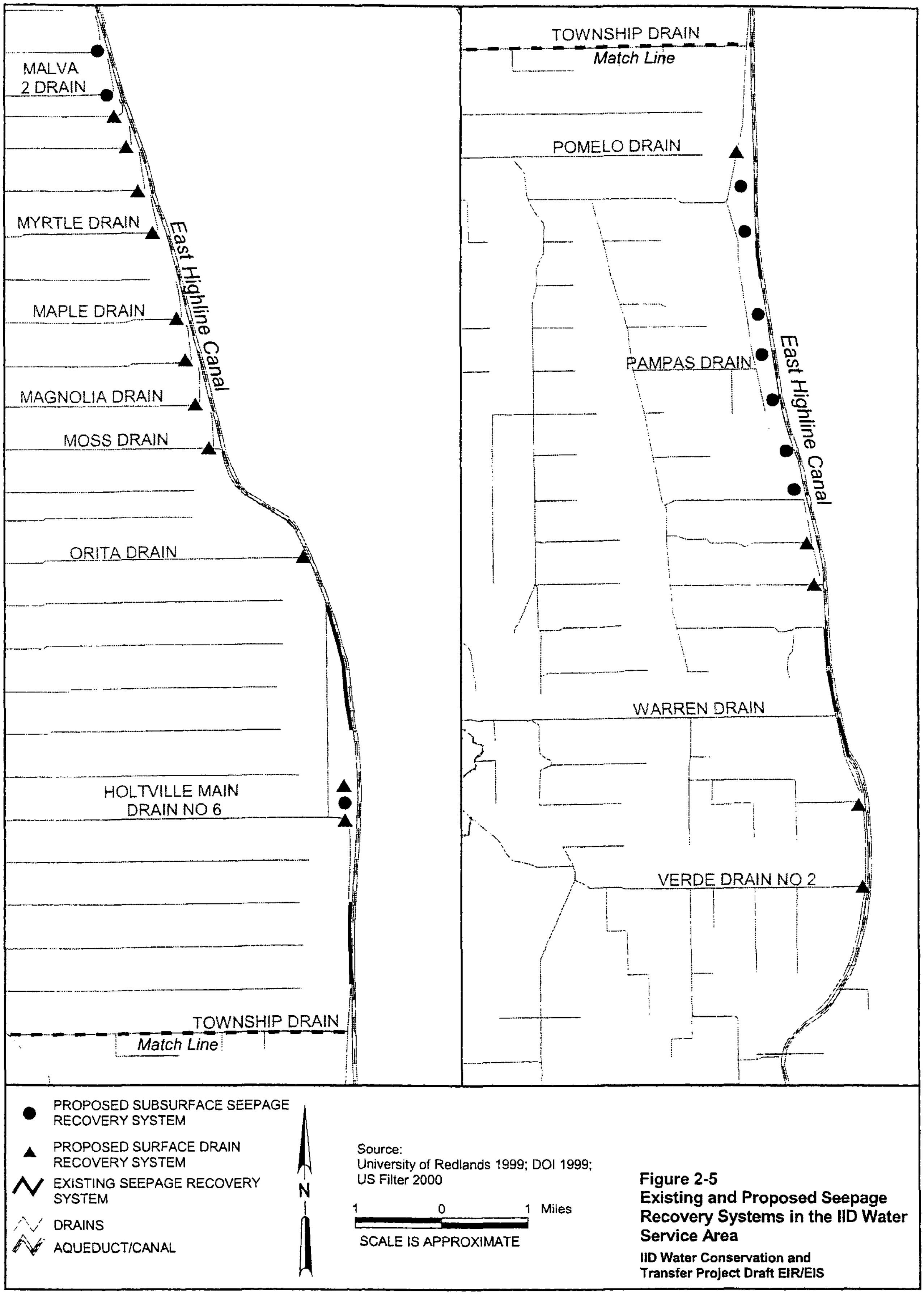

Figure 2-5
Existing and Proposed Seepage Recovery Systems in the IID Water Service Area

IID Water Conservation and Transfer Project Draft EIR/EIS

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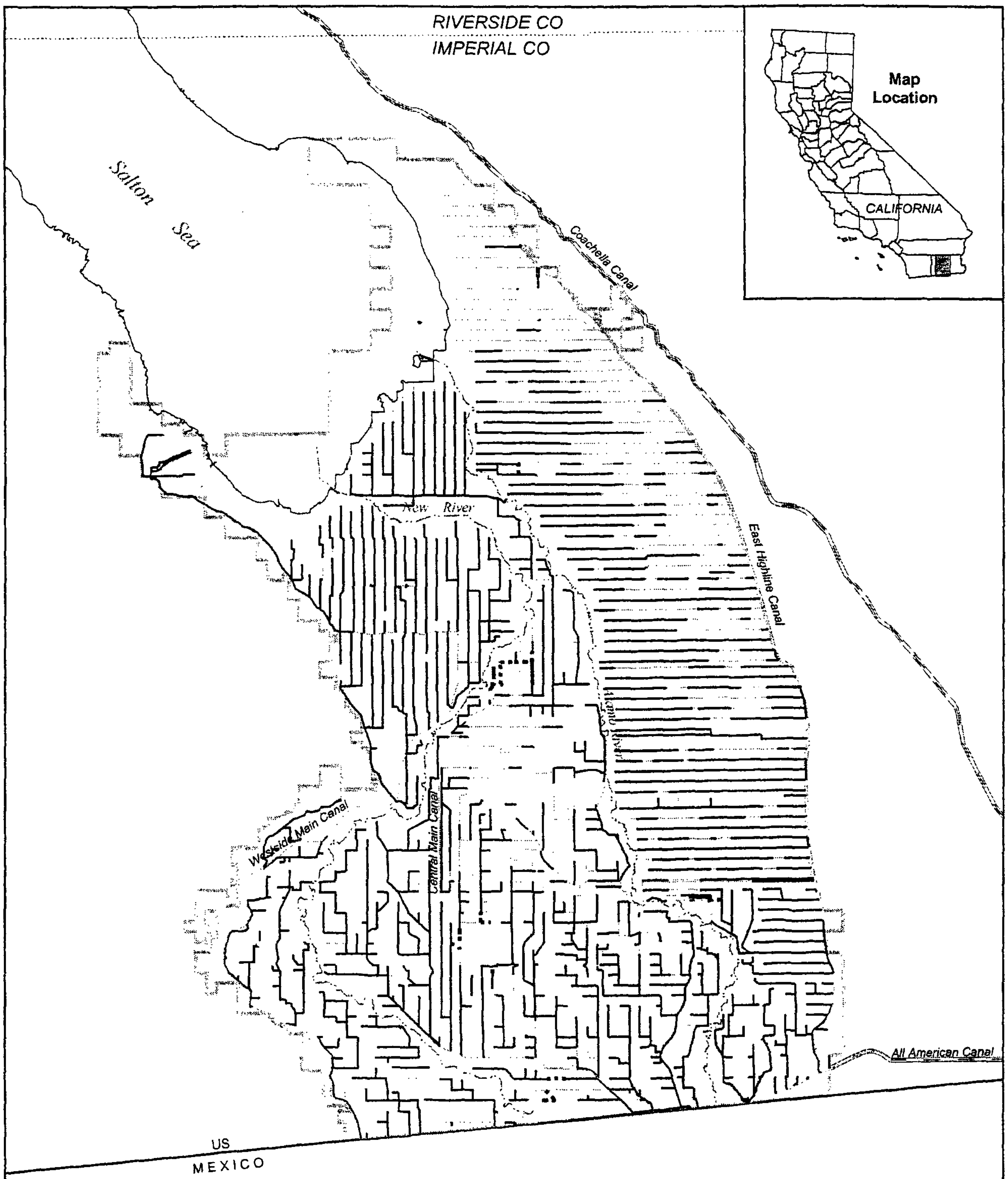

Source:
University of Redlands 1999; DOI 1999

Figure 2-6
Existing Lined Conveyance Facilites in the IID Water Service Area

IID Water Conservation and Transfer Project Draft EIR/EIS

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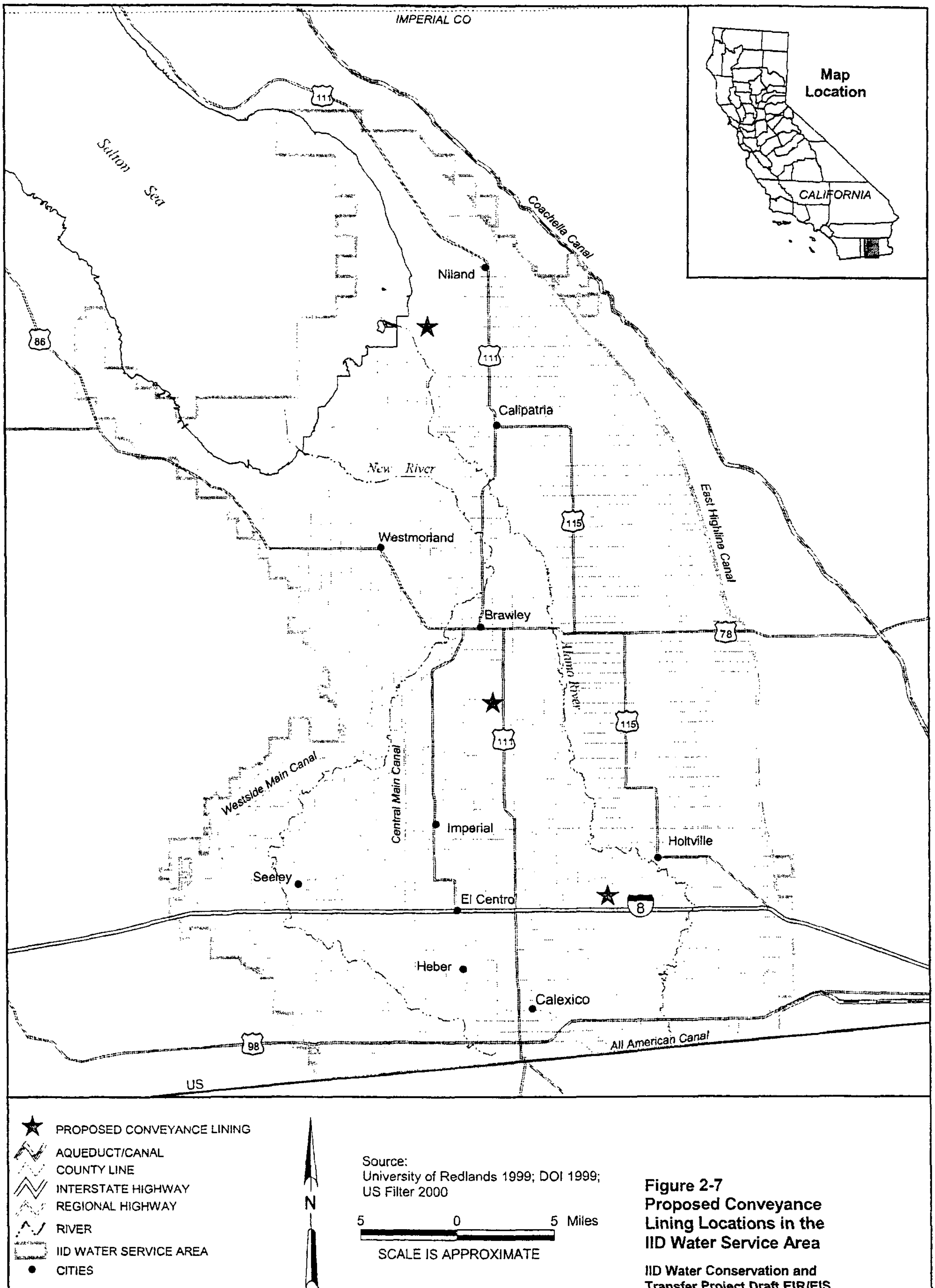

Figure 2-7
Proposed Conveyance Lining Locations in the IID Water Service Area

IID Water Conservation and Transfer Project Draft EIR/EIS

CH2M Hill RDD ArcView Project File \\rddgis\iid\prop_int.apr fig_2_7.pdf 11:17 a.m. 11-27-2001

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Conserved water created by fallowing for transfer would be diverted from the LCR at Parker Dam (for delivery through the CRA in the case of water transferred to SDCWA and MWD) or at Imperial Dam (for delivery through the AAC and the Coachella Canal in the case of water transferred to CVWD). This conserved water would not travel through the IID distribution system or be delivered to the fallowed field(s).

As an example to illustrate the fallowing concept, assume that: (1) 33 percent of applied irrigation water flows from the field as surface runoff (tailwater) and subsurface drainage (tilewater); and (2) a particular field under production has a Baseline use of 6 AFY per acre of irrigation water, which is used as follows: 4 AF are consumptively used by the crop (evapotranspiration), and 2 AF flow into the drain system as a combination of tailwater and tilewater. If the landowner participates in the conservation program by fallowing this field (ceasing all agricultural production for a year), and assuming that no water is used to preserve the field's condition, then the fallowing method could produce 6 AF of conserved water per acre of land. Water delivered to the fallowed field would be reduced by 6 AF, and, as a result, drainage flow to the Salton Sea would be reduced by 2 AF.

Contractual Restrictions under the IID/SDCWA Transfer Agreement. As discussed in Section 2.2.4.1 below, the IID/SDCWA Transfer Agreement provides for the conservation and transfer to SDCWA of a "primary" amount of conserved water (130 to 200 KAFY) and an additional "discretionary" amount (up to 100 KAFY), as long as IID does not transfer the discretionary amount to CVWD and/or MWD (under the terms of the QSA or otherwise). Under the IID/SDCWA Transfer Agreement, the parties' obligations are contingent upon IID entering into contracts with landowners within 120 days to implement on-farm irrigation system improvements sufficient to yield, when water conservation efforts have been fully implemented, at least 130 KAFY of the total primary amount (see Sections 7.1(c) and 8.1(c) of the IID/SDCWA Transfer Agreement). The IID/SDCWA Transfer Agreement further provides that fallowing would not be a permitted conservation method under IID's contracts with landowners (see Section 14.2 of the IID/SDCWA Transfer Agreement). Thus, unless the anti-fallowing provisions of the IID/SDCWA Transfer Agreement are waived or modified, on-farm fallowing by landowners could not be used to conserve the primary amount to be transferred to SDCWA; however, the IID/SDCWA Transfer Agreement does not prohibit fallowing by IID (as opposed to individual landowners) to conserve the primary amount or fallowing by either IID or landowners to create the discretionary amount.

The QSA does not prohibit or restrict fallowing as a conservation measure. Thus, all of the water that could be transferred to CVWD and/or MWD could be generated by fallowing.

Policy Issues. In addition to the contractual restrictions set forth in the IID/SDCWA Transfer Agreement, the IID Board has adopted certain policies regarding fallowing as part of guidelines intended to govern IID's water transfer policy and negotiation of the IID/SDCWA Transfer Agreement.

In Resolution 4-95 (adopted on April 4, 1995), the IID Board acknowledged that "water is the vital natural resource of the Imperial Valley and the very foundation for all present and future economic development," and that "[a]griculture has been, and will continue to be, central to the way of life and economic vitality of the Imperial Valley." Resolution 4-95 provides, among other things, that the IID Board shall:

> "...3. Diligently protect the future economic well-being of the Imperial Valley by ensuring that its water resources are put to their highest and best use....
>
> 7. Maintain and enhance the economic well-being of Imperial Valley and its residents by proactively promoting and supporting opportunities to transfer conserved water, if and when:
>
> - The transfer is economically beneficial to Imperial Valley landowners and residents.
> - Adverse third-party impacts, if any, are appropriately addressed.
> - Environmental impacts, if any, are deemed to be in compliance with existing federal and state law."

IID Board Resolution 5-96 (adopted on February 6, 1996) provides that: "IID is not in favor of a fallowing program - any water conservation and transfer program should focus on other methods of conservation . . . ." IID Board Resolution 17-98 (adopted on July 14, 1998), which specifies procedures for developing a water conservation plan, acknowledges that "any no fallowing rule should preclude a participating landowner from receiving compensation if he/she fallows land for the purpose of transferring water."

Fallowing is also not in keeping with IID Board policies to utilize the water transfer program to encourage investment in on-farm irrigation system improvements that increase irrigation efficiency.

The conservation program included in the Proposed Project is designed to allow IID to implement many different conservation measures and to vary the mix of measures over the lengthy term of the Proposed Project. This flexibility allows IID to adapt the program to changing circumstances and still meet its obligation to conserve a fixed annual amount. Flexibility is also important in attracting landowners to agree to participate in the conservation program. Fallowing may be a desirable component of the IID water conservation program for a number of reasons, which could include the following:

- Fallowing may be perceived as a way to reduce the farmer's financial risk of participation in the conservation program.
- Fallowing may be easier to implement and manage than other on-farm or system conservation measures.
- Short-term fallowing would preserve the soil as a resource and would allow agricultural lands to be productive and useful in responding to national/international food needs over the term of the Proposed Project.

- It might be easier to start and stop conservation by fallowing on a temporary or emergency basis if IID must generate additional conserved water to pay back inadvertent overruns in compliance with the IOP.
- Fallowing may mitigate farmers' risks and help sustain farmers' businesses by providing a guaranteed income during periods of poor economic conditions.
- Temporary fallowing could be used to "jump-start" the on-farm conservation program by providing up-front funding to participants who would later implement on-farm irrigation system improvements.
- If a portion of the water conserved by fallowing could be used for specific environmental mitigation, the impacts to species and their habitats resulting from the conservation activities could be reduced.

Over the 75-year term of the Proposed Project, the IID Board may wish to change its policies regarding fallowing, and the restrictions on fallowing in the IID/SDCWA Transfer Agreement may also be waived or modified by the parties. To provide maximum flexibility for current and future IID Boards to implement a conservation program with varying conservation measures, the Proposed Project includes, for purposes of the environmental assessment set forth in this Draft EIR/EIS, the potential use of fallowing to generate some, all, or none of the required conserved water.

Water Rights Issues. As described in Section 1.4.2 in Chapter 1, the Law of the River governs the use of Colorado River water by entitlement holders. IID holds the water rights to Colorado River water in trust for use in the Imperial Valley. No water rights are allocated to parcels of land, individual farmers, or resources such as the Salton Sea.

Normally, non-use of a water right subjects the holder of the right to a risk of loss of the right by forfeiture or abandonment. However, if fallowing is implemented as a conservation measure in connection with the Proposed Project, it should constitute use by IID, rather than non-use.

The IID/SDCWA Transfer Agreement relies upon Water Code Sections 1011 and 1012. Section 1011 provides that a cessation or reduction in the use of an appropriative water right due to "water conservation" efforts is deemed a reasonable beneficial use of the water and that such conserved water may be transferred. As of the date of execution of the IID/SDCWA Transfer Agreement in 1998, Section 1011(a) provided that:

> "(a) When any person entitled to the use of water under an appropriative right fails to use all or any part of the water because of water conservation efforts, any cessation or reduction in the use of the appropriated water shall be deemed equivalent to a reasonable beneficial use of water to the extent of the cessation or reduction in use. . . .
>
> . . . . For purposes of this section, the term "Water Conservation" shall mean the use of less water to accomplish the same purpose or purposes of use allowed under the existing appropriative right."

In 1999, subsequent to execution of the IID/SDCWA Transfer Agreement, Section 1011(a) was amended to change the definition of "water conservation" to read as follows:

> "For purposes of this section, the term 'water conservation' shall mean the use of less water to accomplish the same purpose or purposes of use allowed under the existing appropriative right. Where water appropriated for irrigation purposes is not used as a result of temporary land fallowing or crop rotation, the reduced usage shall be deemed water conservation for purposes of this section. For the purpose of this section, 'land fallowing' and 'crop rotation' mean those respective land practices, involving the non-use of water, used in the course of normal and customary agricultural production to maintain or promote the productivity of agricultural land."

In addition, Section 1012 of the Water Code provides:

> "Notwithstanding any other provision of law, where any person, public agency, or agency of the United States undertakes any water conservation effort, either separately or jointly with others entitled to delivery of water from the Colorado River under contracts with the United States, which results in reduced use of Colorado River water within the Imperial Irrigation District, no forfeiture, diminution, or impairment of the right to use the water conserved shall occur, except as set forth in the agreements between the parties and the United States."

Even if there were any uncertainty as to whether conservation of water constitutes use of water, Water Code Section 1005 provides that any water right to water flowing along a state boundary that is subject to an interstate compact to which California is a party (e.g., the Colorado River), and to the extent such right relates to quantities that the US has contracted to deliver to a state agency or public district (e.g., IID).

> "shall not be subject to any requirement or limitation provided by law relating to the time . . . within which such water shall be put to use, or relating to the continuity of use of such water; and water contracted to be delivered from such stream, shall be reserved to the contractor therefor without diminution by reason of the contractor's failure to apply such water to use during any period . . ."

IID has stated that it does not intend the water conservation and transfer program to adversely impact its historic water rights. The petition for SWRCB approval of the transfers requests a determination by SWRCB, among other things, that: (1) the 1998 version of Water Code Section 1011 and Sections 1012 and 1013 apply to the transaction and IID's senior water rights are unaffected by the transfer of conserved water; (2) the transfer of conserved water by IID is in furtherance of SWRCB Decision 1600, SWRCB Water Rights Order 88-20, Article X, Section 2 of the California Constitution, and Sections 100 and 109 of the Water Code as in effect in 1998; and (3) the transfer of conserved water by IID establishes the reasonable and beneficial use of the conserved water by IID.

IID has also sought confirmation by Reclamation and the Secretary that the water transfer program, including use of conserved water for compliance with IID's diversion cap, the IOP and/or for mitigation purposes, is in compliance with applicable reasonable use requirements. The Draft IA, which would implement the QSA, provides:

> ...subject to IID's implementation of such conservation measures, and absent any material adverse change in IID's irrigation practices or material advances in technology associated with economically feasible irrigation efficiency, and assuming the continued effectiveness of the QSA, the Secretary as of the date of execution of [the IA] does not anticipate any need to assess IID's reasonable and beneficial use of water prior to Year 20 (as Year 20 is defined in the QSA).

Prior to implementing fallowing to generate any portion of the conserved water required to implement the Proposed Project, IID intends to require confirmation by state and federal authorities that fallowing is an acceptable method of conservation and that use of conserved water generated by fallowing constitutes a reasonable and beneficial use in full compliance with the Law of the River and would not adversely affect IID's entitlement to Colorado River water.

2.2.3.5 Water Conservation Program Administration

The recipients of water conserved by IID (i.e., SDCWA, CVWD, and/or MWD) will make a per-AF payment to IID in exchange for use of the conserved water. IID would administer the water conservation program, including on-farm irrigation system, water delivery system, and fallowing components, to ensure that conservation measures are implemented according to contracts that would be established between farmers and IID and to verify that sufficient water is conserved to meet IID's contractual obligations under the IID/SDCWA Transfer Agreement and QSA.

Agricultural water users participating in the on-farm conservation program would implement on-farm irrigation system measures, pursuant to contractual agreements with IID, in exchange for a payment by IID. The contractual agreements would state the amount of water to be conserved on an annual basis; this amount would be used to determine each participating farmer's annual allotment of water to ensure that the contracted conservation amount is being met. For water delivery system measures that IID implements, IID would determine the volume of water conserved annually using standard water measurements.

IID would be responsible for all record keeping, including on-farm verification visits, O&M of measurement devices, records of delivery dates and delivery volumes, and conserved water calculations. IID would also be responsible for all financial accounting activities related to the disbursement of conservation payments to participating water users.

2.2.4 Water Transferees and Transfer Agreements

This section describes the mechanisms by which water could be transferred to SDCWA, CVWD, and/or MWD. Under the first scenario for the Proposed Project (IID/SDCWA Transfer Agreement Implementation Only), up to 300 KAFY would be transferred to SDCWA in accordance with the IID/SDCWA Transfer Agreement. Under the second scenario for the Proposed Project (QSA Implementation), 130 to 200 KAFY would be transferred to SDCWA and up to 100 KAFY would be transferred to CVWD and/or MWD.

This section also presents a brief overview of how California's water transfer law is applied to the Proposed Project.

2.2.4.1 Water Transfer to SDCWA under the Terms of the IID/SDCWA Transfer Agreement

On April 29, 1998, IID and SDCWA executed the IID/SDCWA Transfer Agreement (also see Section 1.4.5 in Chapter 1), which defines the negotiated, contractual terms of the proposed water transfer to SDCWA. The IID/SDCWA Transfer Agreement is a long-term transaction involving the conservation by IID of up to 300 KAFY and the subsequent transfer of the conserved water to SDCWA. The conserved water would consist of Colorado River water that otherwise would be diverted by IID for use within IID's water service area in Imperial County, California. The transferred water is intended for use within SDCWA's service area in San Diego County, California. IID's and SDCWA's service areas are shown in Figures 1-3 and 1-8, respectively, in Chapter 1.

Under the IID/SDCWA Transfer Agreement, SDCWA would acquire from IID conserved water consisting of two components, a "primary" amount and a "discretionary" amount. The "primary" component is an annual amount to be determined by IID, between a minimum of 130 KAFY and a maximum of 200 KAFY. The primary transfer would be phased in, beginning at 20 KAF in the first year of the transfers and increasing in approximately 20-KAFY increments until a stabilized, primary transfer amount is established.

The "discretionary" component involves the optional conservation and transfer of an additional amount of up to 100 KAFY, contingent upon IID's determination that the additional conserved water is available and on SDCWA's determination of need. The discretionary transfer would commence no earlier than the 11th year after commencement of the primary transfer (year 2013) and would be phased in over a period of between 2 and 10 years. (The IID/SDCWA Transfer Agreement also provides that IID could transfer the discretionary amount (100 KAFY) to CVWD and/or MWD, in lieu of transfer of such amount to SDCWA, to settle disputes between IID and those other water agencies. The QSA implements this exception, which provides the second scenario for the Proposed Project, discussed below in Section 2.2.4.2.)

The IID/SDCWA Transfer Agreement has an initial term of 45 years after transfers commence. Once the primary and discretionary amounts are established and fully phased in, IID must continue to conserve and transfer these amounts, and SDCWA must continue to acquire these amounts, for the initial term of 45 years. Thereafter, IID and SDCWA each have an option to extend the term for an additional 30 years, to Year 2077. Thus, the water transfers between IID and SDCWA could continue for up to 75 years. Under certain conditions, up to 34 KAFY could be recalled by IID at the end of the initial 45-year term.

The IID/SDCWA Transfer Agreement includes certain provisions for determining the price payable by SDCWA for the transferred water. This includes a base contract price, including a shortage premium payment that applies when there are significant shortfalls in Colorado River water supplies, and a mechanism for market-based price determination.

The IID/SDCWA Transfer Agreement also provides that the Proposed Project would be governed by Water Code provisions § 1011, 1012 and 1013. It also provides that the conserved water to be transferred to SDCWA would arise from, and retain, IID's Priority 3

Colorado River water right, which is a very senior water right. For a discussion of the priority of Colorado River water rights and IID's water rights, see Sections 1.4.2 and 1.4.3, respectively, in Chapter 1. For a discussion of California law as applied to the water transfers, see Section 2.2.4.3. The parties do not intend, as part of the Proposed Project, to transfer or grant to SDCWA, or to any other party, any ownership interest in, or control over, IID's senior water rights.

2.2.4.2 Water Transfers to SDCWA, CVWD, and/or MWD under the Terms of the QSA

The proposed QSA was negotiated by and among IID, CVWD, and MWD, with the participation of representatives of the Secretary, Reclamation, California Department of Water Resources (DWR), and SDCWA. This negotiation occurred subsequent to, and partly as a response to, execution of the IID/SDCWA Transfer Agreement. The QSA provides for a broad series of actions, transactions, and agreements that implement major components of the California Plan. As described in Section 1.4.6, the California Plan is designed to bring California's use of Colorado River water into conformance with its basic apportionment. If the QSA is finally approved by the participating agencies and if the conditions precedent to implementation are satisfied or waived, the second scenario for the Proposed Project (QSA Implementation) would apply.

Among other things, the QSA provides for:

- The transfer by IID of up to 200 KAFY of conserved water to SDCWA pursuant to the terms of the IID/SDCWA Transfer Agreement (i.e., the "primary" transfer amount provided for under the IID/SDCWA Transfer Agreement).
- CVWD's option to acquire up to 100 KAFY of water conserved by IID, in two 50-KAFY increments (in lieu of the discretionary transfer of this amount to SDCWA). Although acquisition of the conserved water is optional for CVWD, IID is obligated to conserve and transfer this amount if the option is exercised by CVWD. The terms of the transaction are set forth in the IID/CVWD Acquisition Agreement, which is one of the related agreements provided for in the QSA (see Appendix A).
- MWD's option to acquire any portion of the 100 KAFY of conserved water that is available to, but not acquired by CVWD. MWD's acquisition is also optional, but IID is obligated to conserve and transfer this amount if the option is exercised by MWD. The terms of the transaction are set forth in the IID/MWD Acquisition Agreement, which is one of the related agreements provided for in the QSA (see Appendix A).

Table 2-5 shows the various water recipients and the amount of water each recipient could receive under the Proposed Project's second scenario (QSA Implementation).

Under the QSA, the transfer of up to 100 KAFY of conserved water to CVWD and/or MWD is divided into two increments of 50 KAFY each. Transfer of the first 50-KAFY increment to CVWD would commence no earlier than January 1, 2007, and the amount transferred in the initial year increases thereafter in 3- to 5- KAFY increments over a period of 10 to 17 years until the 50-KAFY amount is fully phased in. Transfer of the second 50-KAFY increment to CVWD or MWD would commence no earlier than the year following the year in which the first increment reaches 50 KAFY. The amount transferred in the initial year increases thereafter in 3- to 5- KAFY increments over a period of 10 to 17 years until it reaches

TABLE 2-5
Water Transfers under Proposed Project's Second Scenario: QSA Implementation

Year	Minimum Primary Transfer to SDCWA (130 KAFY)	Maximum Primary Transfer to SDCWA (200 KAFY)	Transfer to CVWD or MWD (100 KAFY)	Total IID Transfer (SDCWA at 130 KAFY)	Total IID Transfer (SDCWA at 200 KAFY)	Notes
2002	20.0	20.0		20.0	20.0	Primary transfer to SDCWA commences
2003	40.0	40.0		40.0	40.0	
2004	60.0	60.0		60.0	60.0	
2005	82.5	82.5	2.5	85.0	85.0	Early water transfer commences
2006	105.0	105.0	5.0	110.0	110.0	
2007	122.5	122.5	7.5	130.0	130.0	1st 50 KAFY transfer commences to CVWD and/or MWD
2008	130.0	140.0	10.0	140.0	150.0	
2009	130.0	160.0	15.0	145.0	175.0	
2010	130.0	180.0	20.0	150.0	200.0	
2011	130.0	200.0	25.0	155.0	225.0	Maximum, annual primary transfer to SDCWA
2012	130.0	200.0	30.0	160.0	230.0	
2013	130.0	200.0	35.0	165.0	235.0	
2014	130.0	200.0	40.0	170.0	240.0	
2015	130.0	200.0	45.0	175.0	245.0	
2016	130.0	200.0	50.0	180.0	250.0	
2017	130.0	200.0	55.0	185.0	255.0	2nd 50 KAFY transfer commences from IID to CVWD and/or MWD. Transfer of this increment is the responsibility of MWD, and not IID, after Year 2047.
2018	130.0	200.0	60.0	190.0	260.0	
2019	130.0	200.0	65.0	195.0	265.0	
2020	130.0	200.0	70.0	200.0	270.0	
2021	130.0	200.0	75.0	205.0	275.0	
2022	130.0	200.0	80.0	210.0	280.0	
2023	130.0	200.0	85.0	215.0	285.0	
2024	130.0	200.0	90.0	220.0	290.0	
2025	130.0	200.0	95.0	225.0	295.0	
2026	130.0	200.0	100.0	230.0	300.0	Maximum transfers
2047	200.0	200.00	100.0	230.0	300.0	IID and SDCWA each have option to extend the terms of the IID/SDCWA Transfer Agreement for 30 additional years
2077	200.00	200.00	100.0	230.0	300.0	Project term ends

50 KAFY. However, under the terms of the QSA, MWD (not IID) is responsible for providing the second 50 KAFY to CVWD after the 45th year of the QSA term. It is unknown at this time what mechanism will be used by MWD to provide this water to CVWD, and a subsequent environmental assessment by MWD and/or CVWD is anticipated. This Draft EIR/EIS is not intended to provide environmental compliance for CVWD's acquisition of this 50-KAFY increment from MWD.

Under a proposed amendment to the IID/SDCWA Transfer Agreement (the amendment is conditioned upon implementation of the QSA), IID will make an additional 10 KAF (called the "early water transfer") available to SDCWA in the following increments: 2.5 KAF in 2005, 5 KAF in 2006, and 2.5 KAF in 2007. The QSA provides for early water transfers from IID to MWD. MWD has an option to acquire 2.5 KAF in 2005, 5 KAF in 2006, and 2.5 KAF in 2007. In addition, if CVWD postpones its acquisition of the first 50 KAFY increment available under the QSA beyond 2007, MWD could also receive an additional 5 KAF in 2006, 7.5 KAF in 2007, and 10 KAFY from 2007 up to 2014.

As with the IID/SDCWA Transfer Agreement, the conserved water to be transferred to CVWD or MWD under the QSA would arise under, and retain, IID's Priority 3 water right. The parties do not intend to transfer or grant to CVWD, MWD, or any other entity any ownership interest in, or control over, IID's senior water rights.

2.2.4.3 California Water Transfer Law as Applied to the Project

As explained in Section 1.4.3, IID's Colorado River water rights are held as both California pre-1914 appropriative rights and as California permitted appropriative rights. The IID/SDCWA Transfer Agreement contains a number of conditions precedent, including that SWRCB approve the transfer. Under these conditions precedent, SWRCB must also make certain findings confirming (among other things) that IID's senior water rights are unaffected by the transfer of conserved water to SDCWA, and that the conserved water retains the same priority as if the water had been diverted by IID and used within IID's water service area.

To implement the IID/SDCWA Transfer Agreement, IID and SDCWA filed a petition with SWRCB under Water Code §§ 1700 *et seq.*, §§ 1735 *et seq.* and §§ 1011-1012, based on IID's permitted appropriative right under Permit 7643, which authorizes IID to divert 7,239,680.25 AFY at Imperial Dam for irrigation and domestic use. The petition was filed without waiving IID's pre-1914 appropriative rights. The petition seeks approval of a change in the point of diversion from Imperial Dam to Lake Havasu to enable the conserved water to be transported through the CRA. No change would occur in the purpose of use or place of use within the meaning of Water Code § 1011.

Under common and statutory laws of California, an appropriator may change the point of diversion of water, and the place and purpose of its use, if such actions do not result in substantial injury to legal users of water, or unreasonably affect fish, wildlife, or instream beneficial uses. The rules regarding change of place and purpose of use have now been codified in the Water Code. Sections 1700 to 1705.5 allow a person with an appropriative right "under the Water Commission Act or this Code" to change the place and/or purpose of use with permission from SWRCB. To establish a change of place or purposes of use in such circumstances, the appropriator must show that the "change will not operate to the injury of any legal user of the water involved" (Water Code § 1702). If the appropriative right is one derived by virtue of an appropriation other than under the Water Commission Act or the Code, such as is also the case with IID's right, the appropriator may unilaterally change the place or purpose of use "if others are not injured by such change" (Water Code § 1706).

Under Water Code § 1011, a transfer of conserved water resulting in reduced usage by IID is deemed a reasonable beneficial use of the water by IID. Thus, if the "use" is by IID, the location of the use is legally still within IID's water service area. Even in the absence of Water Code § 1011, IID, as a California appropriator, has a legal right to seek a change in the place of use of its appropriated water, so long as other legal users of water would not be adversely affected. Enactments, such as Water Code §§ 1011 and 1012, are merely extensions of the long-standing principle that an appropriator can change the point of diversion and place, or purpose of use if other legal users of water are not injured.

If the QSA is executed and implemented, up to 100 KAFY of conserved water could be transferred to CVWD and/or MWD. Any transfer of conserved water to MWD would be accomplished, like the transfer to SDCWA, by a change in the point of diversion of an amount equal to the amount conserved from Imperial Dam to Lake Havasu to facilitate conveyance through the CRA to MWD's service area.

Any transfer of conserved water to CVWD would be accomplished by IID conserving the water, allowing CVWD to divert the water at Imperial Dam and transport the water to CVWD via the Coachella Canal for use within CVWD's service area (Improvement District No. 1).

In summary, both types of IID's appropriative water rights (pre- and post-1914) allow a change in point of diversion, place of use, and the purpose of use if there is no substantial injury to other legal water users. In addition, common and statutory law in California recognizes that conserved water could be transferred. The Proposed Project would not injure or affect the rights of other Colorado River water users because only conserved water is being transferred, and no other water users have historically used or depended on IID's irrigation drainage. However, SWRCB will make the final determination of whether there is injury to other water users in connection with its review of the request for approval of the water transfers.

2.2.5 Physical Conveyance of Conserved Water

This section describes the method of conveyance of conserved water to CVWD, SDCWA, and MWD. It also describes the federal action necessary to permit the conveyance of conserved water to the SDCWA and MWD service areas.

2.2.5.1 Conveyance of Conserved Water to CVWD

No change in the point of diversion from the Colorado River is required for the water transfer from IID to CVWD. Conserved water to be transferred by IID to CVWD would be diverted at Imperial Dam (IID's existing diversion point), and conveyed to CVWD through the AAC to the Coachella Canal at Drop 1, where it would flow to the CVWD service area

(Improvement District No. 1[1]). No water conveyance facilities would be expanded, and no new facilities would be constructed, as part of the Proposed Project to convey conserved water to CVWD.

2.2.5.2 Conveyance of Conserved Water to SDCWA

SDCWA has no existing facilities to transport water from the LCR or the IID water service area to the SDCWA service area. To avoid the construction of new conveyance facilities, the IID/SDCWA Transfer Agreement anticipates using the CRA to transfer Colorado River water to SDCWA. The CRA, which is owned and operated by MWD, transports water from Lake Havasu on the Colorado River to Lake Mathews in Riverside County, California (see Figure 1-2 and Section 1.4.1 in Chapter 1). The CRA is the sole existing water delivery facility connecting the Colorado River and coastal Southern California.

SDCWA and MWD have entered into the SDCWA/MWD Exchange Agreement to implement the transfer of conserved water to SDCWA by means of a water exchange (see Section 1.5.5 in Chapter 1). The SDCWA/MWD Exchange Agreement provides that an amount of water equal to the amount of water conserved by IID for transfer to SDCWA would be diverted into the CRA at MWD's Whitsett Intake at Lake Havasu, and an equivalent amount of water would be delivered by MWD to the SDCWA service area. Currently, SDCWA purchases all of its imported water from MWD. Under the SDCWA/MWD Exchange Agreement, SDCWA would receive, for use in the SDCWA service area, the same blend of water from MWD that it currently receives from MWD. That is, the blending of Colorado River water with SWP water and other MWD water sources would remain the same, and no measurable change in water quality or quantity would occur in the SDCWA service area as a result of implementing the Proposed Project and the SDCWA/MWD Exchange Agreement. No new facilities, operations, or maintenance practices would be required to convey, receive, or use the water resulting from the IID transfer.

SDCWA and MWD have determined that the water exchange transaction described in the SDCWA/MWD Exchange Agreement is exempt from CEQA compliance, and an NOE has been filed (see Section 1.5.5). This Draft EIR/EIS relies upon the NOE and does not assess the potential impacts of the SDCWA/MWD Exchange Agreement.

2.2.5.3 Conveyance of Conserved Water to MWD

Conserved water to be transferred from IID to MWD would be diverted from the Colorado River into the CRA at MWD's Whitsett Intake at Lake Havasu.

2.2.5.4 Federal Actions Necessary to Convey Conserved Water to SDCWA and MWD

To transfer conserved water to SDCWA or MWD, Colorado River water in an amount equal to the amount conserved would be diverted from the Colorado River into the CRA at Lake Havasu behind Parker Dam, which is 143 miles upstream from IID's normal diversion point at Imperial Dam (see Figure 1-2 in Chapter 1). IID's annual diversions of Colorado River water at Imperial Dam would be reduced by the amount of water diverted at Lake Havasu for transfer to SDCWA and/or MWD.

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[1] For the purposes of this Draft EIR/EIS, the CVWD service area is defined as "Improvement District No. 1." See Section 1.3 in Chapter 1 for further information.

The Secretary, acting through Reclamation, releases and delivers Colorado River water pursuant to contracts entered into under federal law (see Section 1.4.2 in Chapter 1). Implementation of the Proposed Project is subject to federal action, consisting of the Secretary's agreement to deliver Colorado River water to the water recipients.

Under the Proposed Project's second scenario (QSA Implementation), the federal action consists of execution and implementation of the IA (see Section 1.5.3 in Chapter 1) whereby the Secretary agrees to release and deliver Colorado River water under the terms of the IA, to allow implementation of the QSA. The Draft IA EIS prepared by Reclamation assesses the federal actions required to implement the QSA (see Section 1.5.3 in Chapter 1), including the change in the point of diversion on the LCR, mitigation measures designed to avoid impacts to species and habitats along the LCR, and the IOP. The analysis set forth in the Draft IA EIS is incorporated by reference into this Draft EIR/EIS.

Under the Proposed Project's first scenario (IID/SDCWA Transfer Agreement Implementation Only), an implementation agreement would be entered into whereby the Secretary would agree to deliver to the CRA water conserved by IID for transfer to SDCWA. This Draft EIR/EIS assesses the federal action required for the Proposed Project's first scenario; however, the assessment relies upon the analysis contained in the Draft IA EIS.

2.2.6 Habitat Conservation Plan

2.2.6.1 Habitat Conservation Plan Overview

IID has prepared an HCP (see Appendix C) as part of the Proposed Project to support its Incidental Take Permit applications in conformance with § 10(a)(1)(B) of ESA and § 2081(b) of CESA. The Incidental Take Permits would allow IID to conduct otherwise lawful activities that incidentally take federal and/or state-listed and other specified unlisted species that are proposed for coverage in IID's HCP. These activities are discussed in Section 2.2.6.4 and further defined in Appendix C.

Through the HCP, IID is committing to certain management actions that would avoid, minimize, and mitigate the impacts of any take of proposed covered species that might result from covered activities, including aspects of IID's implementation of the IID/SDCWA Transfer Agreement, the QSA, and continuation of its routine water-related O&M activities. O&M activities are included to ensure that IID obtains all ESA and CESA approvals required to continue operation of its irrigation and drainage system for the duration of the Proposed Project. Issuance of an Incidental Take Permit by USFWS constitutes a federal action that requires evaluation under NEPA.

This section summarizes the timing of HCP implementation, the geographic extent of HCP coverage, the duration for which the HCP would be enforced, the species covered by the HCP, and the Proposed Project's activities covered by the HCP. The full text of the HCP is provided in Appendix C in this Draft EIR/EIS. This Draft EIR/EIS provides the environmental analysis required under NEPA and CEQA to issue ESA and CESA permits and approvals for IID's water-related operations and the Proposed Project.

2.2.6.2 Timing of HCP Implementation

IID would commence compliance with the HCP measures immediately upon issuance of the Incidental Take Permits by the USFWS and CDFG.

2.2.6.3 Geographic Area Covered by the HCP

IID conveys and delivers water diverted from the LCR at Imperial Dam to customers in the Imperial Valley in IID's service area via the AAC. The HCP area includes all lands comprising the approximately 500,000 acres of IID's water service area (including canal rights-of-way), the Salton Sea, lands owned by IID outside of its water service area that are currently submerged beneath the Salton Sea, and IID's rights-of-way along the AAC downstream from the point of diversion on the LCR, including the desilting basins at Imperial Dam. In addition, the HCP covers any take of covered species that use the Salton Sea if the take is as result of IID's activities. Figure 2-8 shows the geographic area covered by the HCP.

2.2.6.4 Species Proposed For Coverage in the HCP

IID is seeking Incidental Take Permits that would authorize take of 96 listed and unlisted species under ESA and CESA. Table 2-6 (below) lists the common names of the species proposed for coverage by the HCP. Further detail on the individual species and habitats used by the species are found in Section 1.5 of the HCP (Appendix C in this Draft EIR/EIS).

2.2.6.5 Duration of the HCP

The Incidental Take Permits would have a permit life of 75 years, which is commensurate with the duration of the Proposed Project. During that time, incidental take coverage for species currently unlisted would provide IID with regulatory assurance that no additional mitigation would be required by IID should a covered species become listed in the future. Further information on the duration of the HCP and Incidental Take Permits can be found in Section 1.6 of the HCP (Appendix C in this Draft EIR/EIS).

2.2.6.6 Activities Covered by the HCP

As stated above, the HCP and Incidental Take Permits would cover the activities necessary to implement the Proposed Project that would be undertaken by IID or farmers within the IID water service area. The HCP and Incidental Take Permits also would cover ongoing O&M activities conducted by IID.

The general activities covered by the HCP include:

- Water conservation and water use activities, including irrigation and drainage by farmers, tenants, and landowners to whom IID delivers water;
- Water conservation activities undertaken by IID;
- Activities by IID in connection with the diversion, conveyance, and delivery of Colorado River water to users within IID's water service area; and
- Activities by IID in connection with the collection of irrigation or drainage waters within its service area and conveyance to the Salton Sea.

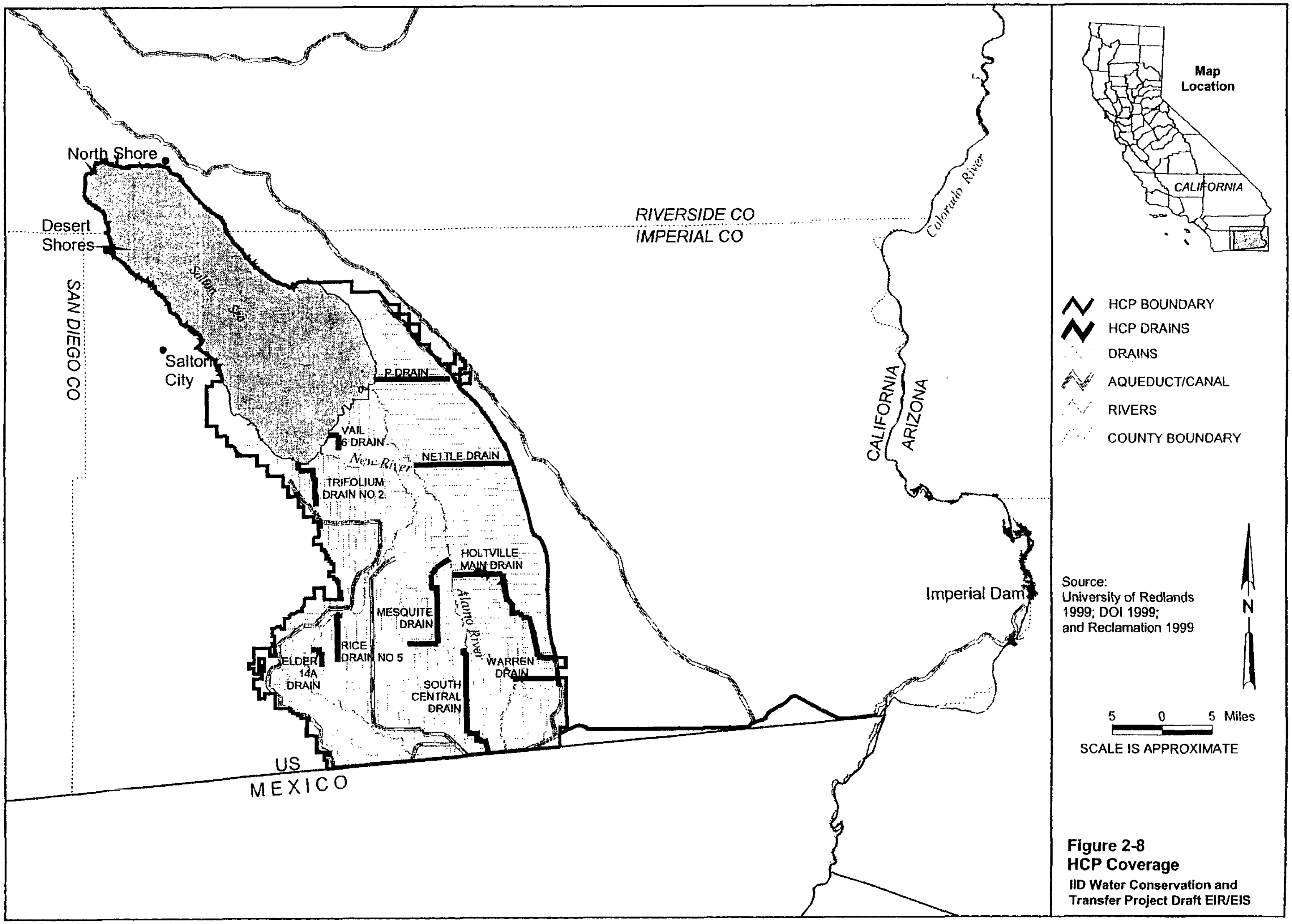

Figure 2-8
HCP Coverage
IID Water Conservation and Transfer Project Draft EIR/EIS

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TABLE 2-6
Species Proposed for Coverage in the HCP

Species Common Name		
Invertebrates	**Birds (con't.)**	Van Rossem's gull-billed tern
Cheeseweed moth lacewing	Reddish egret	Crissal thrasher
Andrew's dune scarab beetle	Yellow warbler	LeConte's thrasher
Fish	White-tailed kite	Arizona Bell's vireo
Desert pupfish	Southwestern willow flycatcher	Least Bell's vireo
Razorback sucker	Merlin	**Mammals**
Amphibians and Reptiles	Prairie falcon	Pallid bat
Colorado River toad	Peregrine falcon	Mexican long-tongued bat
Desert tortoise	Greater sandhill crane	Pale western big-eared bat
Banded gila monster	Bald eagle	Spotted bat
Flat-tailed horned lizard	Yellow-breasted chat	Western mastiff bat
Lowland leopard frog	Least bittern	California leaf-nosed bat
Western chuckwalla	Loggerhead shrike	Western small-footed myotis
Couch's spadefoot toad	Laughing gull	Occult little brown bat
Colorado desert fringed-toed lizard	California black rail	Southwestern cave myotis
Birds	Long-billed curlew	Yuma myotis
Cooper's hawk	Osprey	Pocketed free-tailed bat
Sharp-shinned hawk	Black skimmer	Big free-tailed bat
Tricolored blackbird	Bank swallow	Nelson's bighorn sheep
Golden eagle	Gila woodpecker	Jacumba little pocket mouse
Short-eared owl	Elf owl	Yuma Hispid cotton rat
Long-eared owl	Wood stork	Colorado River hispid cotton rat
Burrowing owl	Brown-crested flycatcher	**Plants**
Aleutian Canada goose	Harris' hawk	Peirson's milk-vetch
Ferruginous hawk	Large-billed savannah sparrow	Flat-seeded spurge
Swainson's hawk	American white pelican	Wiggin's croton
Western snowy plover	Brown pelican	Foxtail cactus
Mountain plover	Double-crested cormorant	Algodones Dunes sunflower
Vaux's swift	Summer tanager	Munz's cactus
Black tern	White-faced ibis	Giant Spanish needle
Northern harrier	Purple martin	Sand food
Western yellow-billed cuckoo	Vermilion flycatcher	Orocopia sage
Gilded flicker	Yuma clapper rail	Orcutt's aster
Black swift	California least tern	
Fulvous whistling-duck	Elegant tern	

Further description of the activities covered by the HCP is provided in Section 1.7 of the HCP (Appendix C in this Draft EIR/EIS).

2.2.6.7 Implementation of the HCP Conservation Strategies

IID would implement conservation strategies to avoid, minimize, and mitigate, to the maximum extent practicable, the impact of any take of proposed covered species. In coordination with USFWS and CDFG, IID has developed conservation strategies for the five main habitat types used by proposed covered species within the geographic area covered by the HCP, including: 1) Salton Sea; 2) tamarisk scrub; 3) drain; 4) desert; and 5) agricultural habitats. In addition, specific strategies were developed for desert pupfish, burrowing owl, razorback sucker, and 25 other species. These strategies are summarized below and described in detail in the HCP in Appendix C in this Draft EIR/EIS. Within each of the resource areas, the HCP is evaluated as follows:

- **HCP (IID Water Service Area Portion):** This category includes the conservation strategies in the IID water service area for tamarisk scrub, drain, desert, and agricultural habitats.
- **HCP (Salton Sea Portion):** This category includes two approaches to mitigate the potential take of piscivorous birds in the Salton Sea as follows:
  - **Approach 1:** Hatchery and Habitat Replacement
  - **Approach 2:** Use of Conserved Water as Mitigation

HCP (IID Water Service Area Portion)

The habitat conservation strategies associated with the HCP (IID Water Service Area Portion) are described below.

Tamarisk Scrub Habitat Conservation Strategy. The proposed covered species associated with tamarisk scrub habitat are primarily riparian species that find optimal habitat in vegetation consisting of cottonwoods, willows, and other native riparian plant species. Many of the native riparian plant communities in the desert southwest have been replaced by nonnative plant species, particularly tamarisk. Tamarisk scrub habitat is not optimal habitat for the species that use this habitat in the HCP area but is the only available tree-dominated habitat in the HCP area. Information on proposed covered species that use the tamarisk scrub habitat can be found in Section 2.3.4.2 of the HCP (Appendix C in this Draft EIR/EIS).

The biological goal of the Tamarisk Scrub Habitat Conservation Strategy is to maintain the species composition, relative abundance, and life history functions of covered species using tamarisk scrub habitat within the HCP area. Further details on the approach to the tamarisk scrub habitat conservation strategy and biological goals can be found in Section 3.4.3 of the HCP.

The Tamarisk Scrub Habitat Conservation Strategy consists of compensating for removal of tamarisk scrub and minimizing and avoiding disturbance during construction activities. If a net loss of tamarisk scrub occurs with implementation of the Proposed Project, native tree habitat would be created. Creation of native tree habitat would provide higher quality habitat than that provided by tamarisk scrub habitat, increase habitat diversity in the HCP area, and provide true tree habitat for covered species. Key elements of the strategy are shown below, and details of the implementation of these elements can be found in Section 3.4.4 of the HCP:

- Minimize take, including disturbance, of covered species as a result of construction activities.
- Create or acquire, and protect native tree habitat if tamarisk scrub or native tree habitat is permanently removed as a result of construction activities.

Drain Habitat Conservation Strategy. Wet area habitats created by IID's irrigation and drainage activities are collectively referred to as "drain habitat." Drain habitat in the HCP area occurs in association with IID's drainage and conveyance system, managed marshes on state and federal refuges, private duck clubs, and unmanaged vegetation adjacent to the Salton Sea. Proposed covered species using drain habitat in the HCP area include species that use it exclusively (e.g., Yuma clapper rail) as well as species that use the resources of the habitat but do not depend on it (e.g., northern harrier). A list of the proposed covered species that use the drain habitat is found in Section 2.3.4.3 of the HCP.

The biological goal of the Drain Habitat Conservation Strategy is to maintain the species composition, relative abundance, and life history functions of proposed covered species using drain habitat within the HCP area. Further details on the drain habitat conservation strategy and biological goals are found in Section 3.5.3 of the HCP. Key elements of the strategy are listed below, and details of the implementation of these elements can be found in Section 3.5.4 of the HCP.

- Create at least 190 acres and up to 652 acres of managed marsh habitat to offset water quality effects and compensate for any effects of water-related O&M activities.
- Minimize disturbance and mortality/injury of proposed covered species potentially resulting from dredging the mouths of the New and Alamo Rivers.

Desert Habitat Conservation Strategy. The HCP area supports little native desert habitat. The primary occurrence of native desert habitat in the HCP area is along the AAC within IID's right-of-way and is depicted in Figure 3.2.10 in Section 3.2, Biological Resources, in this Draft EIR/EIS. Two principal desert habitats are supported in the HCP area: creosote bush scrub and dunes.

The potential for the Proposed Project to take species using desert habitat is generally low. Activities with the greatest potential to take a covered species are O&M activities along the AAC, East Highline Canal, and Westside Main Canal. The biological goal of the Desert Habitat Conservation Strategy is to maintain viable populations of covered species that occupy desert habitats in the HCP area. This goal will be achieved by avoiding and minimizing the potential for death or physical injury of individuals of the covered species, and improving habitat contiguity and persistence to compensate for changes in habitat quality or quantity caused by construction activities. Further details on the goals of the desert habitat conservation strategy and biological goals can be found in Section 3.6.3 of the HCP. Key elements of the desert habitat conservation strategy are listed below and are explained in detail in Section 3.6.4 of the HCP:

- Implementation of a worker education program.

- Implementation of interim measures to avoid and minimize the potential for take of covered species during O&M and construction activities.
- Refinement of avoidance and minimization measures based on species surveys and adaptive management program.
- Conducting surveys to determine the occurrence of proposed covered species in the right-of-way.
- Protection of habitat outside of the rights-of-way when construction activities reduce the quality or availability of native desert habitat.

Agricultural Habitat Conservation Strategy. Irrigated agricultural land is the dominant land cover type in the Imperial Valley and comprises most of the HCP area. Foraging is the predominant use of agricultural fields by covered species although these areas are also used as resting habitats. Proposed covered species potentially using agricultural habitat in the HCP area include resident breeding species, migratory breeding species, short-term residents during winter or migration, and transient species that are found in the HCP area irregularly during migration or other wanderings. A complete list of the proposed covered species that use the agricultural habitat is found in Section 2.3.4.6 of the HCP.

The biological goal of the agricultural field conservation strategy is to maintain agriculture as the primary economic enterprise in the IID water service area to continue to provide foraging habitat for proposed covered species associated with agricultural field habitat. This goal is to be achieved by implementing the water conservation and transfer programs for the IID/SDCWA Water Transfer Agreement and the QSA, and this HCP. The IID/SDCWA Transfer Agreement is intended to protect and preserve IID's water rights and the feasibility and economic viability of agriculture production within IID's service area. In addition, the QSA will settle, by consensual agreement, long-standing disputes among the QSA parties regarding the priority and use of Colorado River water by IID, and it will confirm IID's right to implement the water transfers specified in the QSA. Thus, the QSA will enhance the certainty and reliability of Colorado River water supplies available to IID and will assist IID in meeting demands for water for agricultural use, thus facilitating continued agricultural production.

The continued use of the Imperial Valley by proposed covered species associated with agricultural fields depends primarily upon the perpetuation of agricultural production. The regulatory certainty provided by the incidental take authorization and assurances obtained with implementation of the HCP combined with implementation of the water transfer programs would increase the likelihood that agricultural production will remain the predominant land use in the HCP area. Species that exploit agricultural habitats would continue to be supported with implementation of water conservation and transfer programs and HCP because successful implementation of these programs would encourage continued agricultural production. Further details on the agricultural habitat conservation strategy and biological goals are found in Section 3.8 of the HCP.

Desert Pupfish Habitat Conservation Strategy. Desert pupfish occur in many of the drains constructed and maintained by IID that discharge directly into the Salton Sea. Desert pupfish occupying the agricultural drains could be taken as a result of IID's drain maintenance activities. The biological goals of the desert pupfish conservation strategy are to maintain viable populations of desert pupfish in the HCP area. This will be accomplished by maintaining or increasing pupfish habitat in IID's drains relative to the current levels (i.e., no net loss) and by minimizing the potential for IID's drain maintenance and construction activities and the water conservation program to result in the incidental take of desert pupfish. As previously described, these goals are augmented and supported by the Salton Sea measures designed to maintain connectivity among drain populations of pupfish and to promote recovery by establishing additional population refugia. The specific goals of the desert pupfish strategy will be achieved by implementing measures that:

- Ensure that IID will operate and maintain its drainage system in a manner that will maintain current levels of pupfish drain habitat.
- Minimize the effects of potential increases in the concentration of selenium and possible other contaminants in the drainage system resulting from water conservation.
- Enhance the potential for increasing the amount of pupfish habitat in areas exposed as the Salton Sea recedes.
- Examine the efficacy of modifying drain maintenance activities to reduce the potential for take of pupfish and adjust maintenance activities based on the findings.
- Avoid or minimize the potential for take of pupfish by IID construction activities.

Further information on species-specific conservation strategy for the desert pupfish can be found in Section 3.7.2 of the HCP.

Burrowing Owl Habitat Conservation Strategy. Burrowing owls are found in the earthen banks of agricultural canals and drains in the HCP area. Drain and canal maintenance activities have the greatest potential to affect burrowing owls. Impacts to burrowing owl habitat are expected to occur primarily during IID's O&M activities and during construction of water conservation measures. The overall biological goal of the Burrowing Owl Conservation Strategy is to maintain a self-sustaining population of burrowing owls across the current range of the owl encompassed by the HCP area. The specific objective is to maintain adequate burrow availability and community parameters (e.g., burrowing mammals, foraging habitat), to the extent that IID can influence these parameters, at levels to support the initial distribution and relative abundance of owls on lands covered by the HCP and affected by the covered activities. Key elements of the burrowing owl habitat conservation strategy are the following:

- Implementation of a worker and farmer education program.
- Minimization of the potential for O&M activities to injure individual owls.
- Continuation of maintenance practices that create suitable habitat conditions.
- Installation of additional burrows if construction activities would impact occupied burrows.

Further information on species-specific conservation strategy for the burrowing owl can be found in Section 3.7.1 of the HCP.

Razorback Sucker Conservation Strategy. Razorback suckers are known to occur in the All American and East Highline Canal systems. Razorback suckers in these canals could be impacted when IID dewaters sections of the canals to conduct maintenance and repairs. Under the HCP, IID will ensure that a person qualified to capture and handle razorback suckers and that meets the approval of the USFWS and CDFG is present when canals are dewatered. Any razorback suckers found in the canals would be salvaged and transported to the Colorado River. Further information on this strategy can be found in Section 3.7.3 of the HCP.

Approach to Other Species. Of the 96 species proposed for coverage by the HCP, the USFWS and CDFG identified 25 species for which existing information on the ecology and distribution in the HCP area is limited or that might not occur in the HCP area. These species are listed in Table 3.9-1 of the HCP. The approach to covering these species is to implement a research program to better understand the presence, distribution, and ecological requirements of these species in the HCP area. Based on the results of the research program, IID would implement measures to avoid, minimize, and mitigate the impacts of any take of these activities resulting from the covered activities. Further information on this conservation strategy can be found in Section 3.9 of the HCP.

HCP (Salton Sea Portion)

The Salton Sea Habitat Conservation Strategy, including the two approaches, is described below for the HCP (Salton Sea Portion).

Salton Sea Habitat Conservation Strategy. The primary potential effects of the covered activities on proposed covered species associated with the Salton Sea relate to an increased rate of salinization and increased rate and magnitude of decline in the surface elevation. To address the earlier reduction in fish abundance expected from the acceleration of the salinization of the sea, IID and others developed two possible approaches. In identifying potential mitigation approaches to address the earlier reduction in fish availability at the Salton Sea, IID recognized and considered the following:

- The salinity of the Salton Sea will continue to increase in the absence of the proposed water conservation and transfer programs and reduce the suitability of the Salton Sea for fish-eating birds.
- It is unreasonable and impractical for the water conservation and transfer programs to bear the burden of restoring the Salton Sea.
- The level of mitigation should be scaled to the impact attributable to the water conservation and transfer programs.

In accordance with these considerations, IID and others have developed and are considering two approaches for minimizing and mitigating the impact of the anticipated take of piscivorous birds. IID has not identified a preferred approach for addressing piscivorous birds but presents the two approaches, which are under consideration in the Draft HCP, as means to seek input on which approach, or combination of approaches, is most appropriate. Both approaches are evaluated in this Draft EIR/EIS (Approach 1 is evaluated programmatically and Approach 2 is evaluated in detail) and are described below. Other approaches that were considered but eliminated from consideration are described in the HCP.

As described in Section 1.4.3 in Chapter 1 and Section 2.2.3.4 of this Chapter 2, IID holds the rights to Colorado River water use in the Imperial Valley in trust for landowners within the IID water service area. The Salton Sea is an agricultural drainage repository that has no legal entitlement to Colorado River water. In order to implement a mitigation strategy which requires the provision of Colorado River water to the Sea or for the benefit of the Sea, IID intends to require confirmation by state and federal authorities that such water use constitutes a reasonable and beneficial use in full compliance with the Law of the River and would not adversely affect IID's entitlement to Colorado River water.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement. Under this approach proposed by USFWS and CDFG, IID would implement a phased approach for maintaining fish to provide foraging opportunities for piscivorous birds at the Salton Sea. In the first phase, IID would construct a hatchery to ensure continued availability of tilapia as forage base for piscivorous birds. It is expected that as salinity in the Salton Sea increases, tilapia reproduction would be affected before adult survival is threatened. IID would stock tilapia in the Salton Sea when CDFG determines that natural reproduction of tilapia has ceased in the Salton Sea based on annual young-of-year abundance surveys conducted by CDFG. IID would continue stocking tilapia in the Salton Sea for as long as they could continue to survive and grow or until the Salton Sea Restoration Project was funded and its implementation initiated, whichever occurs first. If the Salton Sea Restoration Project was initiated, that project could fund continued operation of the stocking program until the salinity level of the Salton Sea was low enough to allow fish to naturally reproduce.

The hatchery element would be intended to extend the period of time when fish would be present in the Salton Sea. Juvenile and adult tilapia are capable of withstanding high salinity levels; tilapia have been collected at a salinity as high as 120 ppt. However, the ability of tilapia to reproduce is more sensitive to salinity. At salinity above 60 ppt, tilapia reproduction has been predicted to decline. The hatchery under this approach would be used to replace reproduction of tilapia lost in the Sea because of high salinity. Because juvenile and adult tilapia can tolerate higher salinity levels, the hatchery would extend the time that the Sea supports fish. This extension would have the dual benefit of continuing to support fish as prey for fish-eating birds and providing additional time for implementation of a long-term restoration project.

Hatchery operations likely would be located near the Salton Sea on land not currently under cultivation. The acreage could vary depending on the level of production needed to augment natural reproduction. For the purpose of planning, it is anticipated that up to 50 acres would be needed to accommodate the hatchery operation. The facility would be designed to ensure that any discharge hatchery effluent to the Salton Sea would be adequately treated to avoid adverse water quality impacts. Water requirements would vary depending on the volume of production.

The second component of the approach would be initiated if a long-term Salton Sea Restoration Project were not implemented before the Sea could no longer support fish. Under this component of the approach, IID would create 5,000 acres of ponds at the Salton Sea that would support fish and provide a forage base for piscivorous birds. The purpose of these ponds would be to maintain some foraging opportunities at the Salton Sea for piscivorous birds for the remainder of the permit term. The objective of creating ponds would be to maintain a level of foraging habitat that would help ensure that piscivorous birds would continue to be represented at the Salton Sea. IID would stock the ponds with tilapia (from continued hatchery operations) and manage the ponds to provide foraging opportunities for covered piscivorous bird species for the remainder of the 75-year permit term. If the Salton Sea Restoration Project was implemented at any time during the term of the permit, IID would contribute the remaining funding committed to the creation and operation of a hatchery and for creation and management of ponds to the Salton Sea Restoration Project.

The ponds would be about 5 feet deep and constructed using berms. To obtain the soil characteristics necessary for berm construction, the ponds would be constructed on farmland. The construction cut and fill would be balanced such that transport of soil to or from the construction site would not be required. The ponds would likely be constructed along the southern edge of the Salton Sea in land blocks 160 and 640 acres in size. The water supply for the mitigation ponds would be of the same quality as that delivered to farmers. Based on preliminary calculations performed by CDFG, close to 30 KAFY of water would be required to maintain the ponds. The water associated with the 5,000 acres of farmland removed from production to construct the ponds would be sufficient to support the evapotranspiration (ET) losses in the ponds if the historic water use on those acres was equivalent to about 6 AFY per year. If historic water use were less, additional conservation could be required to generate water necessary to maintain the ponds. In addition to the water necessary to support the ponds, additional water could be necessary to provide adequate water circulation in the ponds. The requirements for water circulation would not be defined until the specific pond locations were identified and the characteristics of the pond system design developed. Any impacts associated with obtaining water to maintain circulation in the ponds would be addressed in subsequent environmental documentation.

This acreage requirement and general approach would remain the same regardless of the alternative selected. However, the timing of hatchery operation and possible pond construction would vary depending on the amount of water conserved. Current salinity projections suggest that hatchery operations to augment fish reproduction could be necessary as early as 2012 under conservation of 300 or 230 KAFY and 2013 for conservation of 130 KAFY. Pond construction, if needed, would take place sometime after 2012, depending on how long fish survive in the Salton Sea. Tilapia have been recorded at a salinity of 120 ppt although the ultimate salinity tolerance of tilapia at the Salton Sea could be less. If tilapia were to persist in the Salton Sea until the salinity reaches 120 ppt, salinity projections suggest that pond construction under conservation of 300 KAFY would not take place until about 2052; conservation of 230 KAFY would not occur until 2073. Under 130 KAFY of conservation, tilapia would persist through the entire 75 years of the HCP term. For the purpose of evaluating potential impacts of implementing this approach, however, it was assumed that the 5,000 acres of ponds would be constructed at some time during the permit term. The precise timing of the construction would not substantially influence the impact of implementing this component of the approach.

In addition to the measures addressing impacts to piscivorous birds, IID would implement measures to address:

- Potential impacts to pupfish resulting from the acceleration of salinization of the Sea.

- Potential impacts to the suitability of nesting islands for gull-billed terns and black skimmers that could result from an accelerated decline in the water surface elevation.
- Potential impacts to proposed covered species associated with tamarisk scrub that could result from an accelerated decline in the water surface elevation.

The measures to address these impacts that IID would implement are as follows. For desert pupfish, IID would ensure that connectivity is maintained among pupfish drains in the event that the Salton Sea becomes unsuitable for pupfish. For potential impacts to nesting island for gull-billed terns and black skimmers, IID would construct nesting islands suitable for these species. To address potential impacts to proposed covered species associated with tamarisk scrub, IID would monitor areas of tamarisk scrub adjacent to the Salton Sea and create or acquire, and protect native tree habitat if monitoring shows a net loss in the amount of tamarisk scrub. Additional description of these measures is contained in Section 3.3 of the HCP (Appendix C of this EIR/EIS).

HCP (Salton Sea Portion) Approach 2: Use of Conserved Water as Mitigation. Approach 1 outlines an approach to mitigate the potential take of piscivorous birds using hatchery production and creating replacement habitat. In lieu of this approach, IID could reduce or avoid Project effects on salinity and mitigate impacts on piscivorous birds by providing additional water inflow to the Salton Sea. This approach, which could be used in combination with other approaches, would avoid or mitigate Project-related reductions in flow to the Sea. This mitigation strategy would maintain salinity and elevation changes on the baseline trajectory, thereby avoiding salinity increases and elevation decreases resulting from the Project.

Under this approach, water for mitigation purposes could be provided from additional conservation, including on-farm irrigation system improvements, water delivery system improvements, and/or fallowing, or from any other water source, or any combination of these measures.

For example, IID could fallow or otherwise conserve an amount of water equivalent to the Project-related inflow reduction and allow the conserved water to flow to the Sea. (This amount would be in addition to the amount of water conserved for transfer.) If all water conservation was achieved through fallowing, approximately 50,000 acres of fallowed land would be required to generate the 300 KAFY necessary for transfer and an additional 25,000 acres of fallowing would be required to generate the water necessary to offset changes in inflow to the Sea. The fallowing of an additional 9,800 acres would be required to provide water necessary for the compliance with the IOP.

2.2.6.8 Other HCP Commitments

As part of the HCP, IID would implement a monitoring and adaptive management program to assess the effectiveness of the HCP conservation measures and guide management decisions to meet the HCP's overall conservation goals. Appendix C in this Draft EIR/EIS contains a detailed description of the monitoring and compliance measures that would be implemented under the HCP. Funding assurances are also included to guarantee that the HCP conservation measures are successfully implemented. The funding assurances also address changed circumstances that could arise during the life of the Incidental Take Permits.

2.3 Project Alternatives

2.3.1 Selection of Project Alternatives

Project alternatives were selected in accordance with both the CEQA Guidelines and NEPA requirements. A comprehensive alternatives identification, screening, and selection process was conducted, and an Alternatives Analysis Report (see Appendix D) was written. The Alternatives Analysis Report includes a detailed description of CEQA/NEPA requirements for alternatives, how alternatives were identified, potential alternatives, screening criteria used for evaluation of alternatives, and rationale for including or excluding each of the alternatives for further analysis in this Draft EIR/EIS. The analysis evaluated 14 alternatives (including the No Project alternative), four of which were determined to: (1) meet most of the Project objectives; (2) have the potential to reduce impacts when compared to the Proposed Project; and/or (3) be potentially feasible. These four alternatives are carried forward for analysis in this Draft EIR/EIS and are described below.

Chapter 4, Alternatives Comparison, compares each of the alternatives, including the No Project, against the Proposed Project, and identifies the environmentally superior alternative as required by CEQA. As required by NEPA, the alternatives are evaluated at an equal level of detail in each of the resource sections in Chapter 3. Chapter 4 also includes a summary of the alternatives that were considered but eliminated from further consideration. As stated above, these eliminated alternatives are also discussed in detail in the Alternatives Analysis Report, which is included in this Draft EIR/EIS as Appendix D.

2.3.2 Description of Alternatives

This section presents the alternatives to the Proposed Project, including the HCP, that are assessed in this Draft EIR/EIS.

2.3.2.1 Alternative 1: No Project

The No Project alternative is the scenario under which the Proposed Project and HCP are not constructed, permitted, or implemented. The No Project alternative is not the environmental status quo. Rather, it is defined as "existing environmental conditions" (see Chapter 3), as well as what would reasonably be expected to occur in the foreseeable future if the Proposed Project were not approved, based on current plans and consistent with available infrastructure (CEQA Guidelines, §15126.6[e][2]). Under the No Project alternative, the IID/SDCWA Transfer Agreement would not be implemented, the QSA would not be finalized and implemented, and the HCP would not be finalized and implemented. Additional, assumed, and future conditions through 2077 under the No Project alternative are described below. Additional information on the No Project alternative in relation to the HCP can be found in Section 6.1 of the HCP (see Appendix C). Additional information on the No Project alternative in relation to the hydrology and water quality of the LCR and Salton Sea can be found in Section 3.1, Hydrology and Water Quality.

Succeeding sections describe the conditions in each geographic subregion that were assumed to be in effect under the No Project alternative for purposes of the assessment contained in this Draft EIR/EIS.

Conditions Affecting the LCR, IID Water Service Area, and Salton Sea

- Major components of the California Plan would not be implemented.
- The IA would not be implemented, nor would the IOP or the biological conservation measures for the LCR that are described in the Draft IA EIS.
- The Secretary would continue to make deliveries of Colorado River water subject to existing legal requirements, including the Law of the River and the existing priority system. The Secretary would continue to complete annual review and approval of water orders from users of Colorado River water in the Lower Division States. This process would be completed pursuant to Title 43 CFR Part 417, to ensure that water orders are limited to amounts required for reasonable and beneficial use. Under the No Project alternative, it is likely that during normal years these reviews would be more detailed and involve greater scrutiny from Reclamation and interest by other Colorado River water users than in surplus years. In the absence of unused apportionment in the states of Arizona and Nevada, California would be required to reduce its use of 4.4 MAFY in a normal year. Past legal threats and challenges among California Colorado River water users related to reasonable and beneficial use would likely occur again in normal years under the No Project alternative.
- The Interim Surplus Guidelines would be suspended and surplus determinations would be based upon the 70R Strategy until such time as California completes all actions and complies with reductions in water use identified in Section 5(c) of the Interim Surplus Guidelines Record of Decision. Section 5(c) establishes benchmark quantities and dates for reductions in California agricultural usage, and states that in the event California has not reduced its use to meet the benchmark quantities, the Interim Surplus Guidelines will be suspended and determinations will be based on the 70R Strategy. Section 5(c) also provides conditions regarding reinstatement of the Interim Surplus Guidelines if the missed benchmark quantities are later met.
- IID would continue to divert Colorado River water in accordance with its legal entitlement. However, the diversion of Colorado River water in addition to the quantities historically diverted by IID would be necessary for leaching salt as a result of increasing levels of salinity in the Colorado River.
- Aquifer depletion in the CVWD service area would continue through year 2077.
- The 1988 IID/MWD Agreement, which provides for the conservation and transfer by IID to MWD of 106 KAFY, would continue in accordance with the agreement but without exercise of either party's early termination rights after 35 years. In addition, the 1989 IID/MWD/Palo Verde Irrigation District (PVID)/CVWD Approval Agreement and MWD/CVWD 1989 Agreement to Supplement Approval Agreement, which have been implemented, would continue to be implemented.
- The construction projects embodied in the QSA that would help conserve Colorado River water, such as lining the AAC and the Coachella Canal, would lose $200 million in state funding and would likely not be implemented; therefore, water would not be made available from canal lining projects to facilitate implementation of the San Luis Rey Indian Water Rights Settlement Act.

- Existing cropping and water delivery patterns would substantially continue through year 2077.
- As described in Section 3.1, inflows to the Salton Sea are expected to decrease and the water quality of the Sea is expected to decline as a result of natural processes. In addition, salinity loads will naturally increase over time compared to historic loads.

Conditions Affecting the SDCWA Service Area

- SDCWA would rely on MWD to meet SDCWA's long-term water supply objectives and to meet the requirements of local general plans and system demands in future years. In addition, no increase in the reliability of water supplies available to SDCWA in water shortage years would occur.
- Within the area served by MWD, water rationing could occur during dry years unless additional supplies are secured and delivered through the MWD system.
- The MWD-SDCWA Exchange Agreement, which provides for the conveyance via the CRA of water transferred from IID to SDCWA, would be terminated.
- Water users served by SDCWA could bear significantly higher costs to support development of new MWD water supplies because other supply sources in the SDCWA service area are extremely limited and the availability of other imported supplies is unknown (see Appendix D, Alternatives Screening Analysis).

Conditions Affecting QSA Objectives

- Major components of the California Plan (i.e., the water transfers and quantified diversion caps included in the Proposed Project) would not be implemented, and the key enforceable and binding provisions of the QSA would not be implemented (CRB 2000). As a result, California would need to use other methods to achieve its goal to live within its legal, normal-year allocation of Colorado River water.
- The reliability of Colorado River water supplies to SDCWA, CVWD, and MWD, which is an integral part of the QSA, would not increase. These water agencies would be required to develop other water supply options to meet demand based on existing approved general plans and local specific area plans. This could, in turn, result in continued dependence on overdrafted groundwater supplies in the CVWD service area. Reduced deliveries to MWD could result in the CRA carrying approximately half of its capacity.
- IID would not be obligated to limit its annual diversions of Priority 3 Colorado River water to 3.1 MAFY pursuant to the contractual forbearance set forth in the IID/SDCWA Transfer Agreement and the QSA.
- Water would likely not be available from the AAC lining to facilitate implementation of the San Luis Rey Indian Water Rights Settlement Act, and there would be no consensual agreement among IID, CVWD, and MWD to divide the responsibility of satisfying the demands of miscellaneous and Indian present perfected rights.

2.3.2.2 Alternative 2: Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements As Exclusive Conservation Measure)

Alternative 2 is a scaled back version of the Proposed Project/HCP and includes only the minimum amount of water that could be transferred under the terms of the IID/SDCWA Transfer Agreement, which is 130 KAFY. The 130 KAFY would be conserved exclusively by on-farm irrigation system improvements in the IID water service area. It is important to note that Alternative 2 would not comply with the QSA (if the QSA is finalized) because no water would be made available for transfer to either CVWD or MWD. Under Alternative 2, the water conveyance methods of the Proposed Project would also apply (i.e., water transferred from IID to SDCWA would be diverted at Parker Dam and conveyed via the CRA).

This alternative was developed to reduce the impacts of the Proposed Project by reducing the amount of water conserved. As described in Chapter 3, implementation of the water conservation and transfer components of the Proposed Project would result in reduced inflows to the Salton Sea. This reduction in flow to the Sea is directly related to the amount of water conserved under the Proposed Project as well as to the particular conservation measures that would be implemented under the Proposed Project. Under Alternative 2, less water would be conserved and transferred than under the Proposed Project.

Alternative 2 was also anticipated to have an incrementally lower level of take of listed species and their habitats and less impact when compared to the amount of water conserved under the Proposed Project. However, reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements for biological resources. Potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar to those under the Proposed Project. Habitat conditions along the AAC would remain relatively unchanged. IID's ongoing O&M activities would be the same as those outlined in the proposed HCP. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP. Additional information about this alternative is included in the HCP (see Appendix C).

2.3.2.3 Alternative 3: Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

Alternative 3 represents a middle level of conservation between the Proposed Project and Alternative 2 by providing for water conservation and transfer of up to 230 KAFY using any type of conservation measure, including on-farm irrigation system improvements, water delivery system improvements, and/or fallowing. The first 130 KAFY would be transferred to SDCWA, and the remaining 100 KAFY would be conserved and transferred either to SDCWA or to CVWD and/or MWD. Water transferred from IID to SDCWA or MWD would be diverted at Parker Dam and conveyed via the CRA. Water transferred to CVWD would remain in the LCR; diversion would occur at Imperial Dam and water would be conveyed to the CVWD service area via the Coachella Canal.

As described under Alternative 2, alternatives were developed to minimize Project-related impacts. Under Alternative 3, the reduced amount of conservation is intended to minimize the impact of reduced flows to the Sea, as well as to minimize related impacts that could occur in relation to reduced flows to the Sea when compared to the Proposed Project. Under this alternative, less water would be conserved and transferred than under the Proposed Project.

This alternative was also anticipated to have an incrementally lower level of take and less impact relative to the amount of water conserved under the Proposed Project. However, as described under Alternative 2, reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements for biological resources. Potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar to those under the Proposed Project. Habitat conditions along the AAC would remain relatively unchanged. IID's ongoing O&M activities would be the same as those outlined in the proposed HCP. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP. Additional information about this alternative is included in the HCP (see Appendix C).

2.3.2.4 Alternative 4: Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

Alternative 4 assumes that fallowing, rather than other conservation methods, would be the exclusive measure used to conserve water. Although fallowing is a potential component of the water conservation program anticipated by the Proposed Project, fallowing as the exclusive conservation measure under Alternative 4 has been isolated under a separate alternative to identify the effects of fallowing separately and to provide a comparison with the variability of conservation methods allowed under the Proposed Project's water conservation program.

Fallowing of farmland could be used to meet water conservation objectives because it could reduce the amount of irrigation water that IID would be required to deliver to its water service area. Fallowing is defined in Section 2.2.3.4 as the non-use of farmland for crop production to conserve irrigation water, on a short-term or long-term basis. As described in that section, there are a number of ways to implement fallowing to achieve water conservation.

As discussed in Section 2.2.3.4, to implement Alternative 4, restrictions on fallowing in the IID/SDCWA Transfer Agreement would need to be waived or modified to allow fallowing as an acceptable method of on-farm water conservation under landowner contracts. The IID Board would also have to rescind or modify its adopted policies that do not currently support fallowing by landowners for purposes of transferring water.

Fallowing could be undertaken by landowners on land they own, lease, or purchase; or, fallowing could be undertaken by IID on land it owns, leases, or purchases. The purpose of the analysis of Alternative 4 is to assess the potential environmental impacts of fallowing rather than to predict the exact method of fallowing or by whom it would be done.

In addition, as described under Alternatives 2 and 3, alternatives were developed to reduce Project-related impacts. Under Alternative 4, the use of fallowing as a conservation measure would minimize the impact of reduced flows to the Sea under the Proposed Project. However, as described under Alternatives 2 and 3, potential impacts along and within IID's canal and drainage system and in and around the Salton Sea would be substantially similar to those under the Proposed Project. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP. Additional information about this alternative is included in the HCP (see Appendix C).

3.0 Environmental Analysis

Introduction

Chapter 3, Environmental Analysis, which includes Sections 3.1 through 3.16, presents the existing environmental setting and analysis of impacts associated with the Proposed Project and alternatives, defines the standards for determining the significance of impacts, and where applicable, describes mitigation measures for potentially significant environmental impacts associated with the Proposed Projects and alternatives. The environmental analysis was prepared in accordance with NEPA and CEQA guidelines. This introductory section presents background information and assumptions that were used in the development of the environmental analysis. The following resource areas are discussed in this chapter:

- Hydrology and Water Quality
- Biological Resources
- Geology and Soils
- Land Use
- Agricultural Resources
- Recreation
- Air Quality
- Cultural Resources
- Indian Trust Assets
- Noise
- Aesthetics
- Public Services and Utilities
- Transportation
- Socioeconomics
- Environmental Justice
- Transboundary Impacts

No hazards and hazardous materials section is included in this Draft EIR/EIS because the Lead Agencies concluded that there are no potential impacts associated with hazards and hazardous materials that could result from implementation of the Proposed Project. Additionally, Indian Trust Assets, Socioeconomics, Environmental Justice and Transboundary Impacts are sections that are included for federal NEPA purposes only; thus, they are formatted differently then the other sections, and, in particular, they do not include significance criteria.

Organization of the Impact Analysis

The impact analysis for each resource area addresses the components of the Proposed Project (see Chapter 2, Description of the Proposed Project and Alternatives) that are applicable to each of the following geographic subregions, as shown below. The bulleted items are further described below.

Lower Colorado River

- Water Conservation and Transfer
- Inadvertent Overrun and Payback Policy (IOP)
- Biological Conservation Measures in USFWS' Biological Opinion

IID Water Service Area and AAC

- Water Conservation and Transfer
- Inadvertent Overrun and Payback Policy (IOP)
- HCP (IID Water Service Area Portion)
- HCP (Salton Sea Portion) Approach 1
- HCP (Salton Sea Portion) Approach 2

Salton Sea

- Water Conservation and Transfer
- HCP (Salton Sea Portion) Approach 1
- HCP (Salton Sea Portion) Approach 2

For the reasons described in Table 3-1 (see "Subregions Excluded From the Impact Analysis," below), there would be no impacts in the SDCWA service area geographic subregion; therefore, this geographic subregion is not carried forward into the impact analysis. The SDCWA subregion is discussed in Section 5.2 Growth-Inducing Impacts. In addition, impacts of the Proposed Project in the CVWD and MWD service areas are described in Table 3-3 (see "Impacts in the CVWD and MWD Service Areas," below) and are not carried forward into the impact analysis.

Water Conservation and Transfer

The impacts of the Proposed Project's water conservation and transfer components (see Chapter 2, Description of the Proposed Project and Alternatives), including the impacts of the federal action, are evaluated at a project level of detail for each relevant geographic subregion.

Inadvertent Overrun and Payback Policy (IOP)

IID's compliance with Reclamation's IOP (see Chapter 1, Section 1.5.3) is evaluated at a project level of detail for each relevant geographic subregion. Note that IID's compliance with the IOP is a CEQA action whereas Reclamation's adoption and *implementation* of the IOP is a NEPA action, which is analyzed in the IA EIS (Reclamation 2002).

Also note that IOP impacts are described for the Proposed Project only and are not repeated for each of the Project alternatives because the resultant impacts from compliance with the IOP would be the same for each alternative. The IOP would not be implemented under the No Project alternative.

Biological Conservation Measures in USFWS' Biological Opinion

The biological conservation measures were developed as part of the USFWS' Biological Opinion (see Section 1.5.3 in Chapter 1). These measures are evaluated at a programmatic level of detail under the LCR geographic subregion in this Draft EIR/EIS. If subsequent environmental review is necessary before these measures can be implemented, this review will be prepared by Reclamation. The impacts resulting from implementation of the biological conservation measures are described for the Proposed Project and are not repeated for each of the Project alternatives because the biological conservation measures and the resulting impacts would be the same for each alternative. Biological conservation measures would not be implemented under the No Project alternative.

Habitat Conservation Plan

The HCP is a component of the Project and is intended to address impacts in both the IID water service area and AAC right-of-way and the Salton Sea. The portion of the HCP that addresses impacts in the IID water service area is described in Chapter 2, Description of the Proposed Project and Alternatives, and is referred to as the "HCP (IID Water Service Area Portion)." The portion of the HCP that will address impacts to the Salton Sea is referred to as the "HCP (Salton Sea Portion)." These are further described below.

HCP (IID Water Service Area Portion). The HCP (IID Water Service Area Portion) was developed in consultation with USFWS and CDFG and is described in Chapter 2, Section 2.2.6, and in detail in Appendix C. This portion of the HCP is evaluated at a project level of detail in this Draft EIR/EIS.

HCP (Salton Sea Portion). The HCP (Salton Sea Portion) is also described in Chapter 2, Section 2.2.6, and in detail in Appendix C. It consists of two potential approaches:

- Approach 1: Hatchery and Habitat Replacement
- Approach 2: Use of Conserved Water as Mitigation

Because details of Approach 1 have not been developed to a sufficient level of detail to conduct a project-level analysis, this approach is evaluated at a programmatic level of detail in this Draft EIR/EIS. Approach 2 is evaluated at a project level of detail because sufficient information exists to assess its impacts. If Approach 1 is selected for implementation for the HCP (Salton Sea Portion), additional details will need to be developed and subsequent environmental documentation may be required to evaluate the potential impacts.

HCP Alternatives. The alternatives to the HCP are the same as the alternatives to the Proposed Project:

- Alternative 1: No Project
- Alternative 2: Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)
- Alternative 3: Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)
- Alternative 4: Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

As stated in Chapter 2, Description of the Proposed Project and Alternatives, Alternative 1 (No Project Alternative) is the scenario under which the HCP is not constructed, permitted, or implemented. Alternatives 2 and 3 consider varying lower levels of water conservation than those covered by the Proposed HCP. Alternative 4 considers the same level of water conservation as the Proposed Project; the difference between the Proposed Project and

Alternative 4 is that Alternative 4 considers the impacts of conserving water with fallowing as the exclusive conservation measure in the IID water service area.

The environmental impacts associated with implementation of these alternatives would be substantially similar to and within the range of the environmental impacts of the Proposed HCP because the amount of mitigation/restoration required under these alternatives is similar to the amount of mitigation/restoration in the Proposed HCP. Therefore, the description of HCP impacts associated with the Proposed HCP adequately covers the impacts of any of the HCP alternatives and no additional evaluation of the impacts of these alternatives, is conducted in this Draft EIR/EIS. Chapter 6 of the HCP (see Appendix C) and Chapter 4 of this Draft EIR/EIS provide additional discussion of why these alternatives would have the same effects as the Proposed HCP.

Impact Numbering System

Impacts are numbered consecutively within the Proposed Project and each alternative. In addition, each resource area and alternative has been assigned a code. For example, the code for biological resources is "BR." Impacts for the Proposed Project are numbered sequentially, e.g., Impact BR-1, etc. Biological Resources impacts for Alternatives 2, 3, and 4 are labeled A2-BR-1, A3-BR-1, A4-BR-1, respectively. Effects of Alternative 1, the No Project alternative, are not numbered because they are not impacts of the Project.

For impacts that are the same for all alternatives, such as the impacts of the Biological Conservation Measures in USFWS' Biological Opinion, IID's compliance with the IOP, and the HCP, impacts are numbered and listed under the Proposed Project only; therefore, although these impacts would also result from implementation of Alternatives 2, 3, and 4, they are not discussed under these alternatives.

Additionally, impacts associated with the HCP (IID Water Service Area Portion) and HCP (Salton Sea Portion) Approaches 1 and 2 are assigned codes of HCP, HCP1, and HCP2, respectively.

Subregions Excluded From the Environmental Impact Analysis

The region of influence for the Proposed Project includes six geographic subregions as described in Chapter 1, Section 1.3. The geographic subregions include the LCR, IID water service area and AAC, Salton Sea, SDCWA service area, CVWD service area (Improvement District No. 1), and MWD service area. Impacts within the CVWD and MWD service areas are also addressed in separate environmental documents (see "Impacts in the CVWD and MWD Service Areas," below and Section 1.5 in Chapter 1).

The Proposed Project and alternatives include construction primarily in the IID water service area and AAC and the Salton Sea geographic subregions only. Therefore, for many of the resource areas, impacts only result in those two subregions. Within each resource section in Chapter 3, the resource areas that may experience potential impacts in a particular subregion are discussed. Subregions that are not affected for a given resource area are omitted.

Table 3-1 shows which geographic subregions would/would not experience impacts for each resource area. This table serves as a guide for Chapter 3, showing which subregions are discussed in each section. Within the "Methodology" section of each resource area, the subregions that are excluded from the environmental impact analysis are also identified for the reader.

TABLE 3-1
Resource Areas With/Without Impacts Listed by Geographic Subregion

	Geographic Subregion			
	LCR	**IID Water Service Area and AAC**	**Salton Sea**	**SDCWA Service Area**
3.1 Hydrology and Water Quality	Potential impacts	Potential impacts	Potential impacts	No impacts because SDCWA would receive the same blend of water from MWD that it currently receives under existing agreements with MWD. No new facilities, operations, or maintenance practices would be required to convey, receive, or use the water resulting from the IID transfer.
3.2 Biological Resources	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.3 Geology and Soils	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.4 Land Use	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.5 Agricultural Resources	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.6 Recreation	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.7 Air Quality	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)

TABLE 3-1
Resource Areas With/Without Impacts Listed by Geographic Subregion

	Geographic Subregion			
	LCR	IID Water Service Area and AAC	Salton Sea	SDCWA Service Area
3.8 Cultural Resources	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.9 Indian Trust Assets	No impacts because the change in LCR flows falls within the normal range of fluctuations along the reach. Also, the biological conservation measures mitigate any biological resources impacts.	Potential impacts.	Potential impacts.	No impacts (see above under "3.1, Hydrology and Water Quality)
3.10 Noise	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.11 Aesthetics	No impacts because the change in LCR flows falls within the normal range of fluctuations that occur along the reach. Also, the biological conservation measures mitigate any aesthetics impacts.	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.12 Public Services and Utilities	Potential impacts	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)
3.13 Transportation	No impacts because a very limited amount of construction would take place under the USFWS Biological Opinion.	Potential impacts	Potential impacts	No impacts (see above under "3.1, Hydrology and Water Quality)

TABLE 3-1
Resource Areas With/Without Impacts Listed by Geographic Subregion

	Geographic Subregion			
	LCR	IID Water Service Area and AAC	Salton Sea	SDCWA Service Area
3.14 Socioeconomics	Potential impacts	Potential impacts	Potential impacts	No impacts would occur (see above under "3.1, Hydrology and Water Quality)
3.15 Environmental Justice	No impacts because River flows would change throughout the LCR, affecting each community in an approximately equal fashion. Although this is the case, this subregion is discussed in Section 3.15.	Potential impacts	Potential impacts	No environmental impacts in the SDCWA service area; therefore, no environmental justice impacts.
3.16 Transboundary Effects	No impacts because changing the point of diversion would not affect River flows to Mexico.	No impacts because construction of conservation measures would not affect environmental resources in Mexico.	No impacts because the impacts to the Salton Sea do not affect environmental resources in Mexico.	No environmental impacts in the SDCWA service area; therefore, no transboundary impacts would occur.

Impacts in the CVWD and MWD Service Areas

As described in Chapter 1, Section 1.5, impacts to the CVWD and MWD service areas as a result of implementing the Proposed Project and alternatives are fully analyzed in the following documents and summarized in Table 3-2:

- **MWD service area**: Draft QSA PEIR, Draft IA EIS
- **CVWD service area (Improvement District No. 1)**: Draft QSA PEIR, Draft IA EIS, and Coachella Valley Water Management Plan PEIR[1].

[1] The release of the Coachella Valley Water Management Plan PEIR is pending. Available information from that document is included in this Draft EIR/EIS.

TABLE 3-2
Impacts in the CVWD and MWD Service Areas

Resource Area	CVWD Service Area (Improvement District No. 1)	MWD Service Area
Hydrology and Water Quality	Implementation of the Proposed Project (second scenario – QSA Implementation) would result in a net increase in water flows in the Coachella Valley Stormwater Channel (CVSC) and drains to the Salton Sea. Increased water supplies would be used in place of local groundwater and would, therefore, reduce the need to use groundwater to meet demand. This increase of Colorado River water supplies for use in the CVWD service area is a beneficial impact and is not considered significant as it would not impact drainage patterns, runoff rates, or flood hazards, and would not cause inundation. The average overall TDS of the Coachella Valley drains is projected to decrease with implementation of the Project (second scenario – QSA Implementation). Increased use of Colorado River water for agriculture may increase the selenium concentration in the drains and the CVSC. However, the projected flow-weighted average concentration of selenium is below the established water quality standard; therefore, there would be no significant impact.	Implementation of the Proposed Project, and in the event that CVWD would forgo their use of the transfer water available under the Proposed Project, (second scenario – QSA Implementation) would result in an increase in Priority 3a Colorado River diversions at the CRA intake. Colorado River water diversions by MWD would replace a portion of the previously diverted surplus and unused apportionment water with Priority 3a water. This change in diversions is not considered a significant impact to water resources, and would not impact water quality, groundwater, drainage patterns and runoff, or flood hazard, and would not cause inundation.

TABLE 3-2
Impacts in the CVWD and MWD Service Areas

Resource Area	CVWD Service Area (Improvement District No. 1)	MWD Service Area
Biological Resources	Additional supplies of Colorado River water for CVWD would be put to beneficial use within CVWD's Improvement District No.1 (ID-1) in the Lower Coachella Valley. ID-1 is the only area that can receive Colorado River water transferred from IID as a result of the Proposed Project (second scenario – QSA Implementation). This is one element of the Coachella Valley Water Management Plan for which a Program EIR is in preparation (Section 1.5.4). The water transferred from IID would be conveyed via the Coachella Canal, the existing Canal water distribution system, expansion of this distribution system to supply unserved portions of ID-1, and construction of recharge basins on the west side of the Coachella Valley. As construction of piping and pumping facilities would be constructed primarily in roadways or in adjacent agricultural areas, temporary and permanent impacts on desert terrestrial habitat are expected to be less than significant. Recharge basins would be constructed in desert habitat. Focused surveys for listed species will be performed once facilities sites are selected. CVWD has been meeting with CDFG and USFWS to obtain incidental take authorization for activities resulting from the implementation of the Coachella Valley Water Management Plan, including receipt of water in accordance with the Proposed Project (second scenario – QSA Implementation). Due to time constraints inherent in the QSA, and the fact that any incidental take potentially resulting from the implementation of the Coachella Valley Water Management Plan will occur many years in the future, the resources agencies have conferred and agreed that it is appropriate for all of CVWD's activities under the Coachella Valley Water Management Plan to be analyzed and covered under the Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP), which is currently being prepared (see Chapter 5, Section 5.3). If the CVMSHCP does not proceed, CVWD and the resource agencies have agreed that an independent HCP shall be in place prior to CVWD receiving any transferred water from IID as contemplated under the Proposed Project (second scenario – QSA Implementation).	Implementation of the Proposed Project would not result in any physical changes within the MWD service area. There would be no construction associated with implementation of the QSA in the MWD service area or along the CRA. There would be no significant impact to biological resources.

TABLE 3-2
Impacts in the CVWD and MWD Service Areas

Resource Area	CVWD Service Area (Improvement District No. 1)	MWD Service Area
Geology and Soils	Implementation of the Proposed Project (second scenario – QSA Implementation) would result in increased groundwater levels, thereby reducing the potential for subsidence. This is a beneficial impact. In addition, the construction impacts that are described under Biological Resources would result in less than significant impacts to geology because they will not result in the covering, destruction, or modification, or any geologic or physical feature. The construction impacts would result in less than significant impacts to soils because they will affect a small land area, be limited in duration, and be mitigated by BMPs.	No impacts (see explanation under Biological Resources).
Land Use	The facilities that would be constructed as a result of the Project (see Biological Resources) would be compatible with existing and planned land uses because they would be constructed in vacant and/or open space areas.	No impacts (see explanation under Biological Resources).
Agricultural Resources	The additional Colorado River water that would be obtained by CVWD would be used to replace the current groundwater use or would be used for direct groundwater recharge. Colorado River water generally has a higher TDS concentration than Coachella Valley groundwater and would require the application of additional water to some lands irrigated with Colorado River water to leach salts from the soil; it is anticipated that the additional water necessary to leach salts would be minimal and the water supplies for agricultural uses would remain adequate. In addition, construction of new facilities would not occur on prime farmland nor would the construction activities conflict with Williamson Act contracts. Impacts would be less than significant.	No impacts (see explanation under Biological Resources).

TABLE 3-2
Impacts in the CVWD and MWD Service Areas

Resource Area	CVWD Service Area (Improvement District No. 1)	MWD Service Area
Recreation	<u>Coachella Valley Stormwater Channel</u> The projected increase in flows in the CVSC will have no significant effect on the ability of swimmers to use the channel with respect to water quality. With respect to fishing, fishes in the higher reaches may move farther upstream with higher drain flows. <u>Coachella Canal</u> Water levels in the canal are expected to increase, and no significant change in water quality is predicted as a result of the Project. Thus, there would be no impact on fish and fishing in the canal. <u>Trails/Scenic Corridors</u> Construction of the facilities mentioned under Biological Resources would result in temporary, localized effects. Site-specific impacts will be identified in subsequent environmental documentation.	No impacts (see explanation under Biological Resources).
Air Quality	There would be temporary impacts to air quality during construction of the facilities mentioned under Biological Resources. Such impacts are expected to be less than significant. The reduction in groundwater pumping would result in a beneficial impact. Air quality impact as a result of the vehicular travel associated with the maintenance of new facilities will be analyzed in subsequent documentation.	No impacts (see explanation under Biological Resources).
Cultural Resources	The potential impacts on specific cultural resources will be addressed in subsequent documentation once construction sites have been determined. However, if any cultural resources impact is determined, site-specific mitigation measures will be identified for implementation as appropriate.	No impacts (see explanation under Biological Resources).

TABLE 3-2
Impacts in the CVWD and MWD Service Areas

Resource Area	CVWD Service Area (Improvement District No. 1)	MWD Service Area
Indian Trust Assets	The direct ITA effects of the Proposed Project are limited to federal actions that would occur in the LCR subregion and the area covered by the HCP (IID water service area and AAC and Salton Sea). The indirect effects of this Project are related to local actions that would be generated by non-federal entities in California. For this reason, an evaluation of ITA effects was not conducted for the indirect Project effects that would occur within the CVWD service area.	The direct ITA effects of the Proposed Project are limited to federal actions that would occur in the LCR subregion and the area covered by the HCP (IID water service area and AAC and Salton Sea). The indirect effects of this Project are related to local actions that would be generated by non-federal entities in California. For this reason, an evaluation of ITA effects was not conducted for the indirect Project effects that would occur within the MWD service area.
Noise	Noise impacts would occur during the construction activities mentioned under Biological Resources. Such impacts will be less than significant because the impacts would be temporary and occur in primarily agricultural areas.	No impacts (see explanation under Biological Resources).
Aesthetics	Aesthetics impacts would occur during the construction activities mentioned under Biological Resources. Such impacts will be less than significant because the impacts would be temporary and occur in primarily agricultural areas. New facilities would be similar in visual character to the existing landscape and would be few in number and widely spaced. Aesthetics impacts will be less than significant.	No impacts (see explanation under Biological Resources).
Public Services and Utilities	The Proposed Project would not cause a change in population or otherwise impact public services. Service providers will be informed of construction schedule and location well in advance of construction commencement. The impact of the Project on water supplies is beneficial because supplies will increase. Overall impacts would be less than significant.	Implementation of the Proposed Project would reduce water flows along the LCR, resulting in lower energy production at Parker Dam. MWD could be economically impacted because the reduction in energy would mean less federal hydropower to pump Colorado River water through the CRA.
Transportation	Temporary transportation impacts, such as disruption of traffic patterns and increases in traffic hazards, or changes in availability of parking on local roadways, would occur during construction activities. Because of their temporary nature, impacts are expected to be less than significant.	No impacts (see explanation under Biological Resources).

18920

TABLE 3-2
Impacts in the CVWD and MWD Service Areas

Resource Area	CVWD Service Area (Improvement District No. 1)	MWD Service Area
Socioeconomics	The increased water supply would be used to offset the existing groundwater overdraft and would not change population trends or impact agriculture. Construction and operation of new facilities would be located in agricultural areas or along existing roadways, and this minor amount of construction would not adversely affect population or housing. No socioeconomic impacts would occur.	As stated above under Public Services and Utilities, MWD could be economically impacted as energy production is reduced at Parker Dam. Impacts would be less than significant.
Environmental Justice	The direct environmental justice effects of the Proposed Project are limited to federal actions that would occur in the LCR subregion and the area covered by the HCP (IID water service area and AAC and Salton Sea). The indirect effects of this project are related to local actions would be generated by non-Federal entities in California. For this reason, an evaluation of environmental justice effects was not conducted for the indirect Project effects that would occur within the CVWD service area.	The direct environmental justice effects of the Proposed Project are limited to federal actions that would occur in the LCR, subregion and the area covered by the HCP (IID water service area and AAC and Salton Sea). The indirect effects of this project are related to local actions that would be generated by non-Federal entities in California. For this reason, an evaluation of environmental justice effects was not conducted for the indirect Project effects that would occur within the MWD service area.
Transboundary Effects	The direct transboundary effects of the Proposed Project are limited to federal actions that would occur in the LCR geographic subregion. The indirect effects of this Project are related to local actions that would be generated by non-Federal entities in California. For this reason, an evaluation of transboundary effects was not conducted for the indirect Project effects within the CVWD service area.	The direct transboundary effects of the Proposed Project are limited to federal actions that would occur in the LCR geographic subregion. The indirect effects of this Project are related to local actions would be generated by non-Federal entities in California. For this reason, an evaluation of transboundary effects was not conducted for the indirect Project effects within the MWD service area.
Growth-Inducing Impacts	See Chapter 5 in this Draft EIR/EIS	See Chapter 5 in this Draft EIR/EIS

Sources: Reclamation 2002; CVWD, et al 2002; CVWD 2000

Development of the Baseline

A predictive water quantity/quality computer model (see Appendix E and Section 3.1.4.1), which is called the IIDSS, has been developed to determine the amount of water conservation that would result from implementation of the water conservation program, and the resultant impact of such conservation on water supply and quality in the Project's region of influence. Utilization of such a model requires the establishment of a "Baseline" against which to measure change. CEQA also requires that EIRs include a description of the conditions that existed at the time the NOP was published (September 28, 1999; see Appendix B) to also measure change and assess the significance of Project impacts (see CEQA Guidelines § 15125[a]).

To be meaningful, the Baseline must represent the expected variability of environmental resources that could reasonably be expected in the future, based on the present and historical state of such resources. It must also represent a sufficiently long record to allow assessment of long-term variability. For instance, hydrology and water quality will change over time and cannot be properly represented at a specific point in time.

Development of the Baseline involved the following major steps, which are further described below.

1) Adjustments to the available historical record to achieve accuracy and completeness.

2) Projection of the historic record to reflect existing trends carried into the future.

A 75-year predicted Baseline was developed using the IIDSS based on 12 years (1987 - 1998 model calibration period) of available historical data. These data were adjusted based on reasonable, anticipated future changes, such as an increase in Colorado River salinity and the effects of the conservation projects and water transfers implemented under the 1988 IID/MWD Agreement. Finally, the data were projected to 75 years using a correlation based on 75 years of historic weather data compared to the 12-year historical data period. The Baseline prediction also includes an adjustment to limit the diversion of Priorities 1, 2, and 3 for normal-year hydrology in the Colorado River to 3.85 MAFY.

Once Baseline conditions are established, impacts can be assessed by comparing Project impacts to the Baseline condition. Therefore, the Baseline for this Draft EIR/EIS represents the existing conditions at the time the NOP was published, based on historical data and reasonable, anticipated future changes in these conditions over the Project term. By including a future projection of existing conditions in the Baseline, effects caused by the Project can be differentiated from effects that are reasonably expected to result from existing conditions and trends. This description of existing and predicted future conditions is referred to as the "Baseline" throughout the environmental impact analysis in this chapter. Additional detail regarding the development of the Baseline and the IIDSS used to develop the Baseline is included in Appendix E and in Section 3.1 Hydrology and Water Quality.

Salton Sea Baseline

Because the impacts of the Proposed Project and alternatives would be realized over a 75-year period as described above, it is appropriate to measure them against both current and projected conditions to provide an accurate description of Project effects. The use of the projected condition of the Sea as the Baseline for determining the significance of Project-related impacts is particularly relevant for the water and biological resources of the Sea, as well as socioeconomics, local recreation, and aesthetics.

The three parameters primarily used to determine the impacts that would result from the reduction of flow to the Sea are elevation, salinity, and surface area. Table 3-3 shows the Baseline predictions for each of these three parameters, which are further described below. Additional information about the Salton Sea is presented in the existing setting sections of both 3.1 Hydrology and Water Quality and 3.2 Biological Resources.

Sea Elevation

The elevation of the Salton Sea is currently approximately -228 feet msl. Without implementation of the Project or alternatives, the Sea is projected to continue to decline 7 feet to a level of approximately -235 feet msl. This decline is considered the Baseline condition, and additional declines associated with the Proposed Project and alternatives are measured against this Baseline. Impacts associated with a decline in elevation are discussed in Sections 3.3 Geology and Soils, 3.6 Recreation, 3.7 Air Quality, and 3.11 Aesthetics.

Salinity

The existing salinity of the Sea is approximately 46 g/L. Without the project, salinity is expected to continue to increase to approximately 86 g/L by the year 2077. The initial impact resulting from increased salinity would likely be the inability of the fishery to reproduce, which would ultimately lead to its virtual disappearance from the Sea. The salinity level at which this impact occurs is approximately 60 g/L. Subsequently, piscivourous (fish eating) birds would be impacted as their food supply diminished and disappeared. In the Baseline condition, salinity of approximately 60 g/L is reached in year 2023 as shown on Table 3-3. Acceleration of salinity levels resulting from the Proposed Project and alternatives is measured against the Baseline reaching approximately 60 g/L in year 2023. Impacts associated with increasing salinity are discussed in Sections 3.1 Hydrology and Water Quality and 3.2 Biological Resources.

Surface Area

The existing surface area of the Sea is approximately 364 square miles. Without the Project, the surface area of the Sea is projected to decrease by 25 square miles to approximately 339 square miles. Impacts associated with a decreasing surface area are discussed in Sections 3.4 Land Use, 3.6 Recreation, 3.7 Air Quality, and 3.11 Aesthetics.

Figures 3.0-1, 3.0-2, and 3.0-3 show the predicted elevation, surface area, and salinity of the Salton Sea for the Baseline, the Proposed Project, and the alternatives.

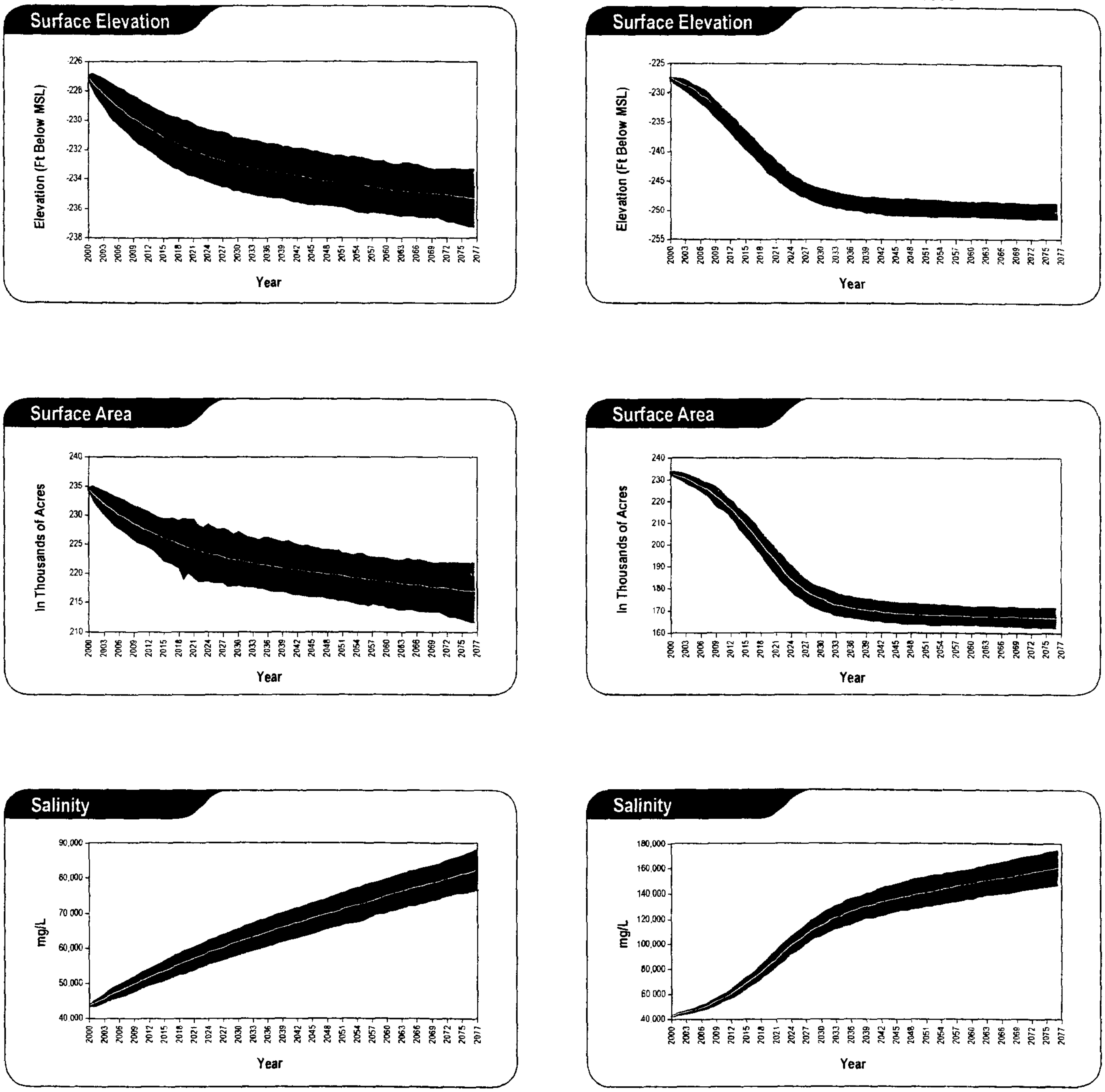
TABLE 3-3
Salton Sea Baseline

	Elevation (feet MSL)		Surface Area (square miles)		Salinity (mg/l)	
	Value	**Change**	**Value**	**Change**	**Value**	**Change**
2002	-228	N/A	364	N/A	46	N/A
2023	-232	-4	350	-14	60	+14
2077 (Baseline)	-235	-7	339	-25	86	+40

Notes: For Elevation and Surface Area parameters, the Baseline is the year 2077. However, for Salinity, the Baseline is the year, which is year when 60 g/L is reached. This is the salinity level at which the ability for fish to reproduce is compromised.

Figure 3.0-1
Predicted Effects at the Salton Sea: *Baseline and Proposed Project*

Project Baseline | **Proposed Project: 300 KAFY All Conservation Measures**



Legend:

Mean
+1 Standard Deviation, -1 Standard Deviation
+95 Percentile, -5 Percentile

Notes:
Mean: Mean of all traces
95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values
5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values
-1 Standard Deviation: Values representing one standard deviation below the mean
+1 Standard Deviation: Values representing one standard deviation above the mean

E012002004CVO (01/10/02)

Source: Reclamation 2001c.

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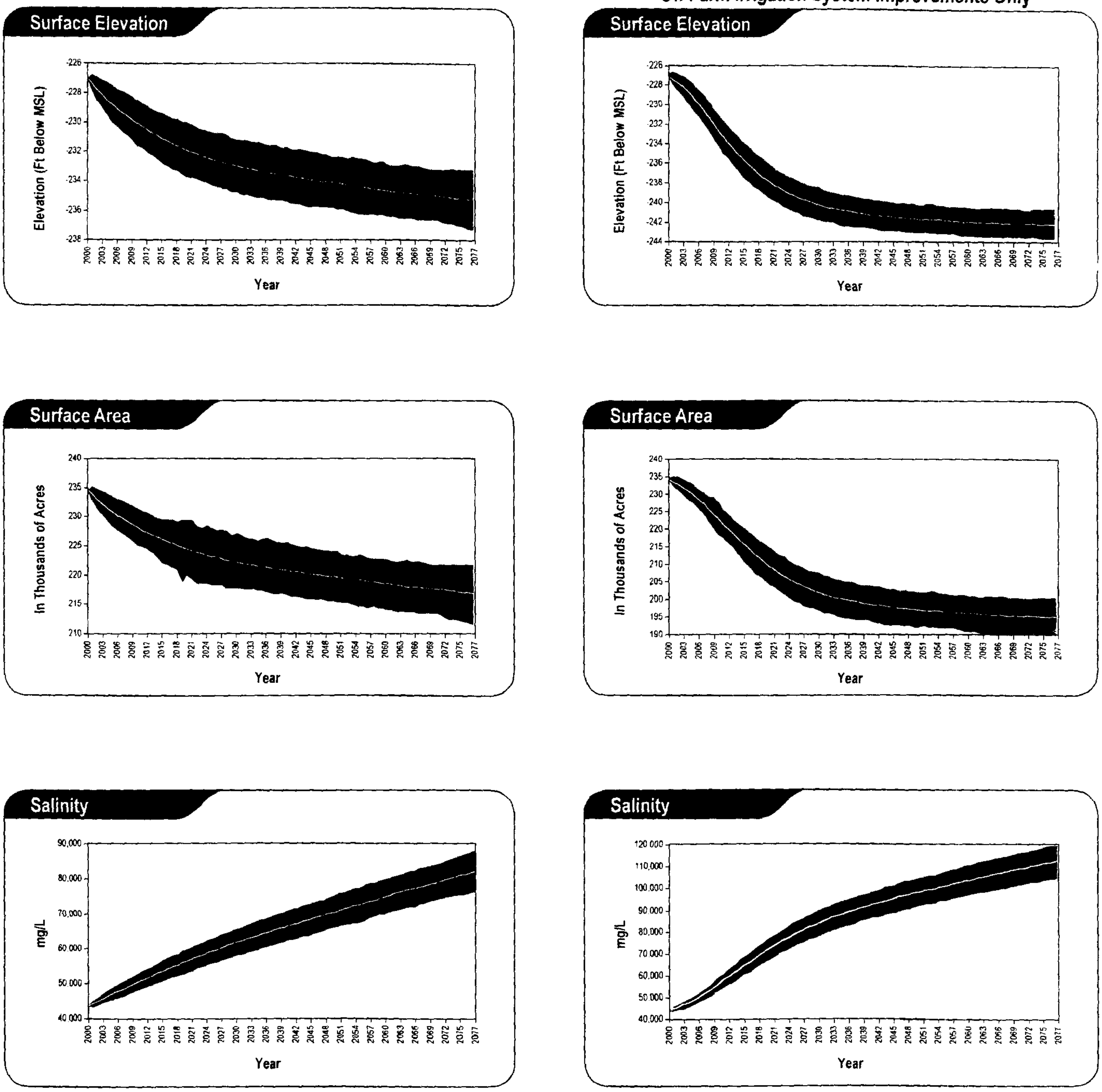
Figure 3.0-2
Predicted Effects at the Salton Sea: *Alternatives 1 and 2*

Alternative 1: No Project

Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only



Legend:

Mean

+1 Standard Deviation, -1 Standard Deviation

+95 Percentile, -5 Percentile

Notes:

Mean: Mean of all traces

95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values

5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values

-1 Standard Deviation: Values representing one standard deviation below the mean

+1 Standard Deviation: Values representing one standard deviation above the mean

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Source: Reclamation 2001c.

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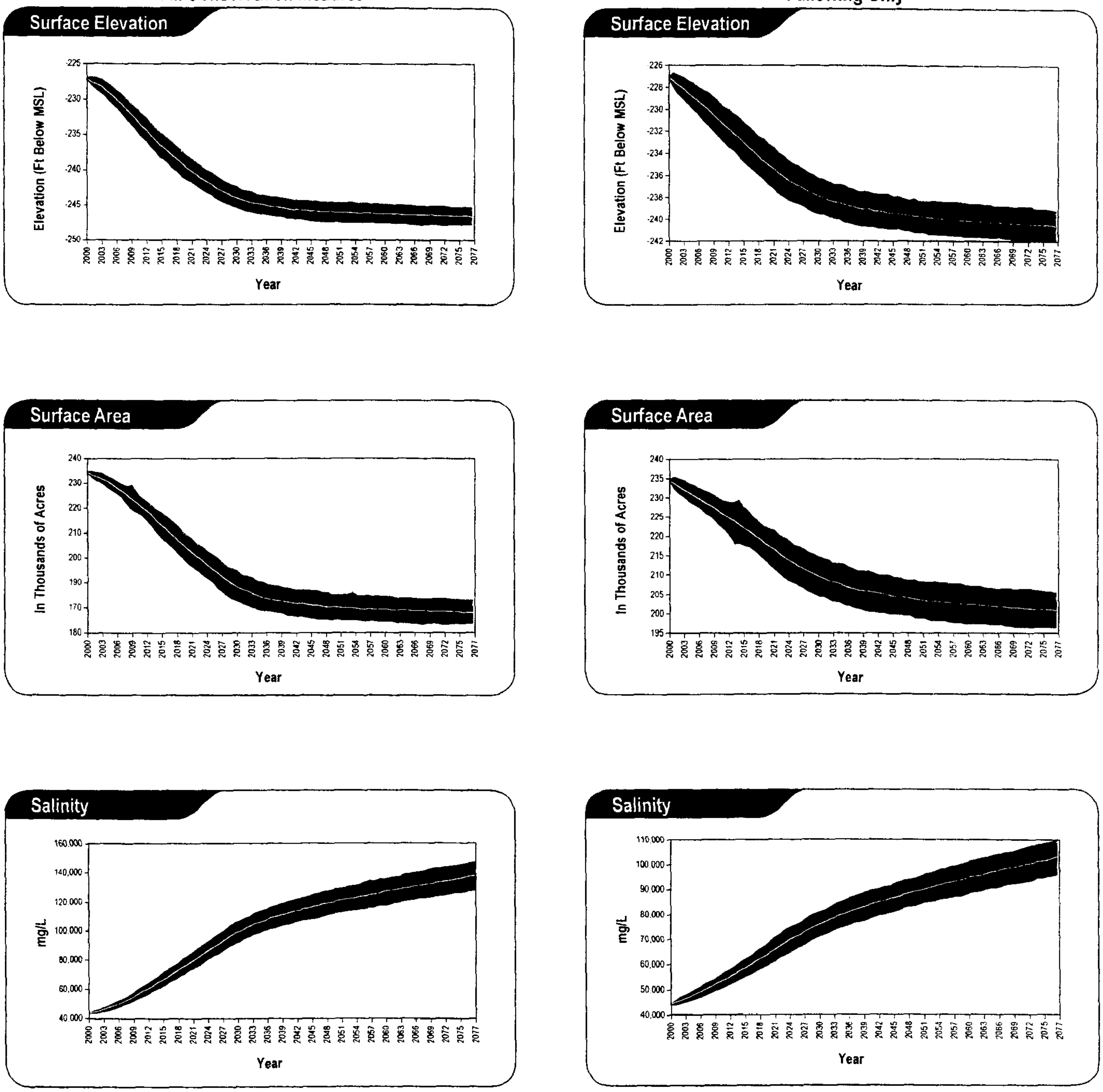
Figure 3.0-3
Predicted Effects at the Salton Sea: *Alternatives 3 and 4*

Alternative 3: 230 KAFY
All Conservation Meaures

Alternative 4: 300 KAFY
Fallowing Only



Legend:

Mean

+1 Standard Deviation, -1 Standard Deviation

+95 Percentile, -5 Percentile

Notes:

Mean: Mean of all traces
95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values
5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values
-1 Standard Deviation: Values representing one standard deviation below the mean
+1 Standard Deviation: Values representing one standard deviation above the mean

E012002004CVO (01/10/02)

Source: Reclamation 2001c.

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3.1 Hydrology and Water Quality

3.1.1 Introduction and Summary

This section describes the existing conditions (i.e., current hydrology and water quality characteristics) in the Project region of influence that have the potential to be affected by the various project alternatives as well as the predicted impacts of those alternatives. The geographic subregions in the region of influence that are addressed in this section include the LCR, IID Water Service Area and AAC, Salton Sea, and SDCWA service area. Surface waters in these areas consist of natural and engineered bodies of water and include permanent and ephemeral, and fresh and saline waters. Major water features described in this section include the Salton Sea; LCR; Alamo, New, and Whitewater Rivers; irrigation canals, such as the Coachella Canal, CRA, AAC, East Highline Canal, Central Main Canal, and Westside Canal; and the IID drainage system. Groundwater resources include fresh and saline waters beneath the geographic subregions listed above. A summary of the predicted impacts associated with the various alternatives is provided in Table 3.1-1 (below).

TABLE 3.1-1
Summary of Hydrology and Water Quality Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
WQ-1: Effects on groundwater, LCR flows, and LCR water quality: Less than significant impact.	Because LCR elevation is expected to remain within historic fluctuation there is no anticipated change in flows.	**A2-WQ-1: Effects on groundwater, LCR flows, and LCR water quality:** Less than significant impact.	**A3-WQ-1: Effects on groundwater, LCR flows, and LCR water quality:** Less than significant impact.	**A4-WQ-1: Effects on groundwater, LCR flows, and LCR water quality:** Less than significant impact.
IID WATER SERVICE AREA AND AAC				
WQ-2: Increased selenium concentration in IID surface drain discharges to the Alamo River: Significant and unavoidable impact.	Selenium concentrations are above significance criteria.	**A2-WQ-2: Increased selenium concentrations in IID surface drain discharges to the Alamo River:** Significant and unavoidable impact.	**A3-WQ-2: Increased selenium concentrations in IID surface drain discharges to the Alamo River:** Significant and unavoidable impact.	**A4-WQ-2: Decreased selenium concentrations in IID surface drain discharges to the Alamo River:** Beneficial impact.
WQ-3: Reduction in Total Suspended Solids concentrations in IID surface drains discharging to the Alamo River: Beneficial impact.	Continuation of existing conditions.	**A2-WQ-3: Reduction in Total Suspended Solids concentrations in IID surface drains discharging to the Alamo River:** Beneficial impact.	**A3-WQ-3: Reduction in Total Suspended Solids concentrations in IID surface drains discharging to the Alamo River:** Beneficial impact.	**A4-WQ-3: Reduction in Total Suspended Solids concentrations in IID surface drains discharging to the Alamo River:** Beneficial impact.

TABLE 3.1-1
Summary of Hydrology and Water Quality Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
WQ-4: Increase in selenium concentration in the Alamo River at the Outlet to the Salton Sea: Significant and unavoidable impact.	Selenium concentrations are above significance criteria.	**A2-WQ-4: Maintain selenium concentration in the Alamo River at the Outlet to the Salton Sea:** Less than significant.	**A3-WQ-4: Increased selenium concentration in the Alamo River at the Outlet to the Salton Sea:** Significant and unavoidable impact.	**A4-WQ-4: Decreased selenium concentration in the Alamo River at the Outlet to the Salton Sea:** Beneficial impact.
WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River: Significant and unavoidable impact.	Selenium concentrations are above significance criteria.	**A2-WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River:** Significant and unavoidable impact.	**A3-WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River:** Significant and unavoidable impact.	**A4-WQ-5: Maintain selenium concentration in the IID surface drain discharge to the New River:** Less than significant impact.
WQ-6: Change in COC concentrations in the New River at the Outlet to the Salton Sea: Less than significant impact.	Selenium concentrations are below the significance criteria.	**A2-WQ-6:Change in COC concentrations in the New River at the Outlet to the Salton Sea:** Less than significant impact.	**A3-WQ-6: Change in COC concentrations in the New River at the Outlet to the Salton Sea:** Less than significant impact.	**A4-WQ-6: Decrease in COC concentrations in the New River at the Outlet to the Salton Sea:** Beneficial impact.
WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea: Significant and unavoidable impact.	Selenium concentrations are below the significance criteria.	**A2-WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea:** Significant and unavoidable impact.	**A3-WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea:** Significant and unavoidable impact.	**A4-WQ-7: Decrease in selenium concentrations in the IID surface drains discharging directly to the Salton Sea:** Beneficial impact.
WQ-8: Potential effects to Imperial Valley groundwater hydrology: Less than significant impact.	Groundwater quality and storage will remain within historic ranges.	**A2-WQ-8: Potential effects to Imperial Valley groundwater hydrology:** Less than significant impact.	**A3-WQ-8: Potential effects to Imperial Valley groundwater hydrology:** Less than significant impact.	**A4-WQ-8: Potential effects to Imperial Valley groundwater hydrology:** Less than significant impact.
HCP-WQ-9: Wetland creation element of HCP provides additional high value water resource area: Beneficial impact.	The HCP will not be implemented under Alternative 1.	**Same as HCP-WQ-9:** Beneficial impact.	**Same as HCP-WQ-9:** Beneficial impact.	**Same as HCP-WQ-9:** Beneficial impact.

TABLE 3.1-1
Summary of Hydrology and Water Quality Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP2-WQ-10: Use of conserved water as mitigation avoids impacts to Salton Sea water quality: Beneficial impact.	The HCP will not be implemented under Alternative 1.	**Same as HCP2-WQ-10:** Beneficial Impact.	**Same as HCP2-WQ-10:** Beneficial Impact.	**Same as HCP2-WQ-10:** Beneficial Impact.
SALTON SEA				
WQ-11: Potential change in COC concentrations of Salton Sea water column: Less than significant impact.	Continuation of existing conditions.	**A2-WQ-9: Potential change in COC concentrations of Salton Sea water column:** Less than significant impact.	**A3-WQ-9: Potential change in COC concentrations of Salton Sea water column:** Less than significant impact.	**A4-WQ-9: Potential change in COC concentrations of Salton Sea water column:** Less than significant impact.
WQ-12: Potential change in COC deposition in Salton Sea sediments: Less than significant impact.	Continuation of existing conditions.	**A2-WQ-10: Potential change in COC deposition in Salton Sea sediments:** Less than significant impact.	**A3-WQ-10: Potential change in COC deposition in Salton Sea sediments:** Less than significant impact.	**A4-WQ-10: Potential change in COC deposition in Salton Sea sediments:** Less than significant impact.
HCP2-WQ-13: Reduced loading of COC to Salton Sea water and sediment: Less than significant impact.	The HCP will not be implemented under Alternative 1.	**Same as HCP2-WQ-13:** Less than significant impact.	**Same as HCP2-WQ-13:** Less than significant impact.	**Same as HCP2-WQ-13:** Less than significant impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.1.2 Regulatory Framework

3.1.2.1 Federal Regulations and Standards

LOWER COLORADO RIVER

Federal regulations and standards that apply to the LCR include the following:

National Recommended Water Quality Criteria. Section 304(a) of the Clean Water Act (CWA), 33 USC§1314(a)(1), requires EPA to publish and periodically update ambient water quality criteria. These criteria are to "...accurately reflect the latest scientific knowledge . . . on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life . . . which may be expected from the presence of pollutants in any body of water...." Water quality criteria developed under Section 304(a) are based solely on data and scientific judgments regarding the relationship between pollutant concentrations and environmental and human health effects. In accordance with this requirement, EPA has published a revised compilation of its ambient water quality criteria known as the National Recommended Water Quality Criteria—Correction (EPA 822-Z-99-001). The compilation contains criteria for the protection of aquatic life and human health for 157 pollutants. Federal and state water quality standards are typically based on the criteria presented in the National Recommended Water Quality Criteria—Correction (EPA 822-Z-99-001). These criteria provide guidance for states and tribes to use in adopting water quality standards under Section 303(c) of the CWA. Such standards are used in implementing a number of environmental programs (nationally and in the LCR geographic subregion), including setting discharge limits for National Pollutant Discharge Elimination System (NPDES) permits. Even though these water quality criteria can be applied as standards and/or used in setting permit limitations, they are not regulations, and do not impose legally binding requirements on EPA, states, tribes, or the public.

Colorado River Basin Salinity Control Act (PL 93-320). Section 303 of the CWA (33 USC §1313) sets forth EPA requirements for water quality standards and implementation plans. In 1973, Arizona, Colorado, California, New Mexico, Nevada, Utah, and Wyoming (the Basin States) established the Colorado River Basin Salinity Control Forum for interstate cooperation and to communicate information necessary to comply with Section 303(a) and (b) of the CWA. In June of 1974, Congress enacted the Colorado River Basin Salinity Control Act (PL 93-320) with the Forum's support. The Salinity Control Act authorized the construction, operation, and maintenance of works in the Basin to control the salinity of water in the United States and delivered to users in Mexico. Subsequent amendments to PL 93-320 (i.e., PL 98-569 in 1984, PL 104-20 in 1995, PL 104-127 in 1996 and PL 106-459 in 2000) further increased the scope of the act to include components such as voluntary on-farm salinity control programs and salinity control cost reduction measures. In 1996, the Federal Agriculture Improvement and Reform Act (FAIRA) of 1996 amended the US Department of Agriculture's (USDA) role in salinity control by creating a new conservation program known as the Environmental Quality Incentives Program (EQIP), which combined four conservation programs, including the USDA's Colorado River Salinity Control Program.

Water Quality Standards for Salinity Control—Colorado River System. In 1974, EPA regulations set forth a salinity control policy for the Basin. The Basin States, acting through the Forum, initially responded to this regulation by developing and submitting "Water Quality Standards for Salinity Including Numeric Criteria and Plan of Implementation for Salinity Control—Colorado River System" to the EPA in 1975. Since the Basin States' initial adoption, the water quality standards have been reviewed every three years as required by Section 303(c)(1) of the CWA.

IID WATER SERVICE AREA AND AAC

In addition to the national water quality criteria in Section 304(a) of the CWA, specific federal laws, regulations, and criteria that could apply to waters potentially affected by the Proposed Project and alternatives include the following:

Section 303(d) of the CWA, EPA Recommended Water Quality Criteria for TMDLs. Total Maximum Daily Loads (TMDLs) represent the greatest pollutant load that a water body can assimilate and still meet water quality standards and designated use criteria. Section 303(d)(1)(A) of the CWA requires states to identify waters that do not comply with applicable water quality standards. Impaired water bodies must be ranked, taking into account the severity of the pollution and the beneficial uses of such waters. Section 303(d)(1)(C) of the CWA requires states to establish TMDLs for those pollutants causing impairments to ensure that impaired waters attain their beneficial uses (see Section 3.1.2.2—State Regulations and Standards—for further details on proposed TMDL standards).

Section 402 of the CWA, NPDES (33 USC §1342). Section 402 of the CWA requires states to administer federal NPDES permit regulations for certain discharges into waters of the United States (such as the Alamo and New River). The NPDES permit program is intended to control and reduce pollutants to water bodies from point source discharges. As indicated in 40 CFR 122A, Section 122.1(b), the NPDES program requires permits for the discharge of pollutants from any "point source" into waters of the United States. "Point source" is defined in 40 CFR 122.2 as follows:

"Point source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff."

In accordance with the CWA, irrigation drainage as well as storm water runoff from agricultural fields is not within the definition of "point source." Therefore, IID is exempt from the requirement to obtain a NPDES permit for agricultural discharges to the Alamo River, New River, and irrigation drains.

Section 401 of the CWA, Water Quality Certification (33 USC §1341). Section 401 requires states to certify that any activity that potentially discharges into navigable waters meets state water quality standards. This gives states the authority to deny or impose conditions on any activity that would adversely impact water quality.

Section 404 of the CWA, Dredge and Fill Permits (33 USC §1344). Waters of the US (including wetlands) are subject to US Army Corps of Engineers (Corps) jurisdiction under Section 404 of the CWA enacted in 1972 (as amended). Section 404 regulates the filling and dredging of waters of the US.

SALTON SEA

Applicable federal laws that regulate water quality in the Salton Sea include Sections 303(d), 401, 402 and 404 of the CWA (see discussion above). The following laws are also relevant to the Salton Sea:

Salton Sea Reclamation Act of 1998 (PL 105-372). In passing PL 105-372, Congress directed the Secretary of the Interior, acting through Reclamation, to conduct a feasibility study to reclaim the Salton Sea. The act directed the Secretary to complete all studies, including, but not limited to, environmental and other reviews, of the feasibility and benefit-cost of various options that permit the continued use of the Salton Sea as a reservoir for irrigation drainage and to:

- Reduce and stabilize the overall salinity of the Salton Sea;
- Stabilize the surface elevation of the Salton Sea;
- Reclaim, in the long term, healthy fish and wildlife resources and their habitats; and
- Enhance the potential for recreational uses and economic development of the Salton Sea.

"The Secretary was specifically directed to not include any option that relies on the importation of any new or additional water from the Colorado River or is inconsistent with the Law of the River. The legislative history of PL 105-372 acknowledged that:

"The Salton Sea itself has no right or priority to receive water from any source. Drainage and seepage waters that sustain the Sea are simply the incidental result of beneficial uses of water which are governed by existing laws, including the Law of the River" (House Report 105 621; Committee on Resources; Ordered to be printed July 14, 1998).

"Accordingly, the Secretary was directed to apply assumptions regarding water inflows into the Salton Sea Basin that encourage water conservation, account for transfers of water out of the Salton Sea Basin, and are based on a maximum likely reduction in inflows into the Salton Sea Basin which could be 800,000 acre-feet or less per year."

The Secretary was directed to complete these studies by January 1, 2000. A Draft EIS/EIR was released by the Salton Sea Authority and Reclamation in January 2000 for the proposed Salton Sea Restoration Project; however, the Secretary has announced that a revised Draft EIS/EIR will be prepared."

National Toxics Rule, 1992 (40 CFR 131.36) and California Toxics Rule (40 CFR 131.37) Section 304(a) and Section 307 (33 USC §1317) of the CWA. The National Toxics Rule (NTR) and California Toxics Rule (CTR) contain established ambient water quality criteria for aquatic life and human health for California, as they apply to inland surface waters such as the Salton Sea. The EPA promulgated numeric water quality criteria for priority toxic pollutants, and other provisions for water quality standards to be applied to waters in the State of California. EPA promulgated this rule based on the Administrator's determination that the numeric criteria are necessary in the State of California to protect human health and the environment. The rule fills a gap in California water quality standards that was created in 1994 when a state court overturned the state's water quality control plans containing water quality criteria for priority toxic pollutants. Thus, the State of California has been without numeric water quality criteria for many priority toxic pollutants as required by the CWA, necessitating this action by EPA. These federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA. The text of the CTR is located at 40 CFR 131.37. The actual numeric criteria for priority toxic pollutants for the State of California are cited at 40 CFR 131.38. The CTR does not change or supersede any criteria promulgated for the State of California in the NTR, as amended.

3.1.2.2 State Regulations and Standards

The Porter-Cologne Act, which is contained in Division 7 of the Water Code, establishes the responsibilities and authorities of nine Regional Water Quality Control Boards (RWQCBs) and the SWRCB. The Porter-Cologne Act names these boards "... the principal state agencies with primary control of water quality" (§ 13001). SWRCB formulates and adopts state policy for water quality control. RWQCBs develop water quality objectives and control plans that identify beneficial uses of water; establish water quality objectives (limits or levels of water constituents based on both state and federal laws); and define an implementation program to meet water quality objectives.

LOWER COLORADO RIVER

The following laws, along with specific state standards for priority pollutants (recently established through EPA's promulgation of CTR standards), apply to LCR waters:

Phase 1 of the Inland Surface Waters Plan, Enclosed Bays Estuaries Plan (ISWP/EBEP). SWRCB approved Resolution 2000-015, thereby adopting the "Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California." This policy establishes implementation procedures for discharges of priority pollutants to non-ocean surface waters of California. The goal of the policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean waters. The policy will be used in conjunction, where appropriate, with the development of TMDLs to ensure achievement of water quality standards. The majority of the priority pollutant standards are established in the CTR.

RWQCB's Water Quality Control Plan (Basin Plan). The Basin Plan establishes water quality criteria and guidelines that protect human and aquatic life uses of the LCR geographic subregion. Specifically, the Basin Plan:

- Designates beneficial uses for surface water and groundwater;
- Sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and to conform to the state's anti-degradation policy;
- Describes implementation programs to protect the beneficial uses of all waters in the region; and
- Describes surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan.

Additionally, the Basin Plan incorporates, by reference, all applicable SWRCB and RWQCB plans and policies.

California Entitlements under the Law of the River. Over the years, common law (i.e., a group of federal and state laws, interstate compacts, an international treaty, court decisions, federal contracts, federal and state regulations, and multi-party agreements) has developed to collectively govern the use of Colorado River water. This body of law is commonly referenced as the "Law of the River." California's entitlements to Colorado River water are explained in detail in Chapter 1.

IID WATER SERVICE AREA AND AAC

California water quality regulations in the IID water service area are provided in the RWQCB Basin Plan. The Basin Plan also adopts water quality criteria provided by Minute No. 264 of the International Boundary and Water Commission. Minute No. 264 specifies qualitative and quantitative standards for the New River at the International Boundary. Other applicable regulations include:

ISWP/EBEP. See 3.1.2.2 discussion under State Regulations and Standards for the LCR.

Section 1601 of the California Fish and Game Code, Streambed Alteration Agreement. Authorization (known as a Lake or Streambed Alteration Agreement) is required from CDFG for projects prior to any action that will: (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. The authorization requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It could also apply to any work undertaken within the flood plain of a body of water.

Approved Basin Plan Amendment for TMDLs. The New and Alamo Rivers are on the state's 303(d) list of impaired waters, and Section 303(d)(1)(c) of the CWA requires RWQCB to establish TMDLs for those pollutants causing impairments to ensure that impaired waters attain their beneficial uses. Pursuant to Sections 303(d)(1)(A) and 303(d)(1)(C), RWQCB has identified both the New and Alamo Rivers as water bodies that do not comply with applicable water quality standards, and has approved TMDLs for both rivers (see discussion under LCR federal regulations and standards in Section 3.1.2.1). Specifically, RWQCB has approved an amendment to its Basin Plan that establishes a TMDL of 200 milligrams per liter (mg/L) for total suspended solids (TSS) for the entire length of the US reach of the Alamo River. For the New River, TMDLs (30-day averages) of 200 membrane filter count most probable number (MPN)/100 ml for fecal coliform; 126 MPN/100 ml for E.Coli.; and 33 MPN/100 ml for Enterococci have been approved. Based on the targets listed above, the TMDL proposal establishes corresponding waste load allocations and load allocations for point and non-point sources of pollution, respectively (RWQCB 2001).

SALTON SEA

The Salton Sea is within the jurisdiction of RWQCB and, as such, would be subject to the ISWP/EBEP and the additional following state regulations:

Section 303(d) of the CWA. As discussed above, Section 303(d)(1)(C) of the CWA requires the RWQCB to establish TMDLs for impaired water bodies. The Salton Sea is on the state's 303(d) list of impaired water bodies. Therefore, TMDLs must be set for COCs in the Salton Sea. TMDLs to be established for the Salton Sea include salt (initiation date 1998; finish date 2001), selenium (initiation date 2002; finish date 2007), and nutrients (initiation date 2002; finish date 2010). Subsequent to development of TMDLs, the state must implement monitoring and management measures to reduce pollutant loading and improve water quality.

3.1.2.3 Local Regulations and Standards

Pertinent local standards and regulations that apply to the Proposed Project and alternatives are primarily those found in the IID Rules and Regulations Governing the Distribution and Use of Water, which are published in accordance with Water Code § 22257. Water Code § 22257 reads in part as follows: "Each District shall establish equitable rules for the distribution and use of water, which shall be printed in convenient form for distribution in the District...."

3.1.3 Existing Setting

3.1.3.1 Lower Colorado River

The Colorado River is the principal source of water for domestic, municipal, industrial, agricultural, recreational, and hydroelectric purposes in Arizona, southern California, and southern Nevada. For the purposes of the Project, the LCR geographic subregion is defined as the area from Lake Havasu, including its inundation area at maximum operating pool elevation, to Imperial Dam as shown in Figure 3.1-1.

Monitoring the use and distribution of Colorado River water is required by the Decree. The Decree dictates, in addition to its other requirements, that the Secretary provide detailed and accurate records of diversions, return flows, and consumptive use of water diverted from the mainstream, "stated separately as to each diverter from the mainstream, each point of diversion, and each of the States of Arizona, California, and Nevada." Reclamation provides the records annually in a report titled "Compilation of Records in Accordance with Article V of the Decree of the Supreme Court of the United States in *Arizona v. California*, Dated March 9, 1964" (Decree Accounting Report). The amount of water conserved under the Proposed Project would be measured as reduced consumptive use by IID in the Decree Accounting Report. Reclamation manages the water resources of the Colorado River on behalf of the Secretary (Reclamation 1999a).

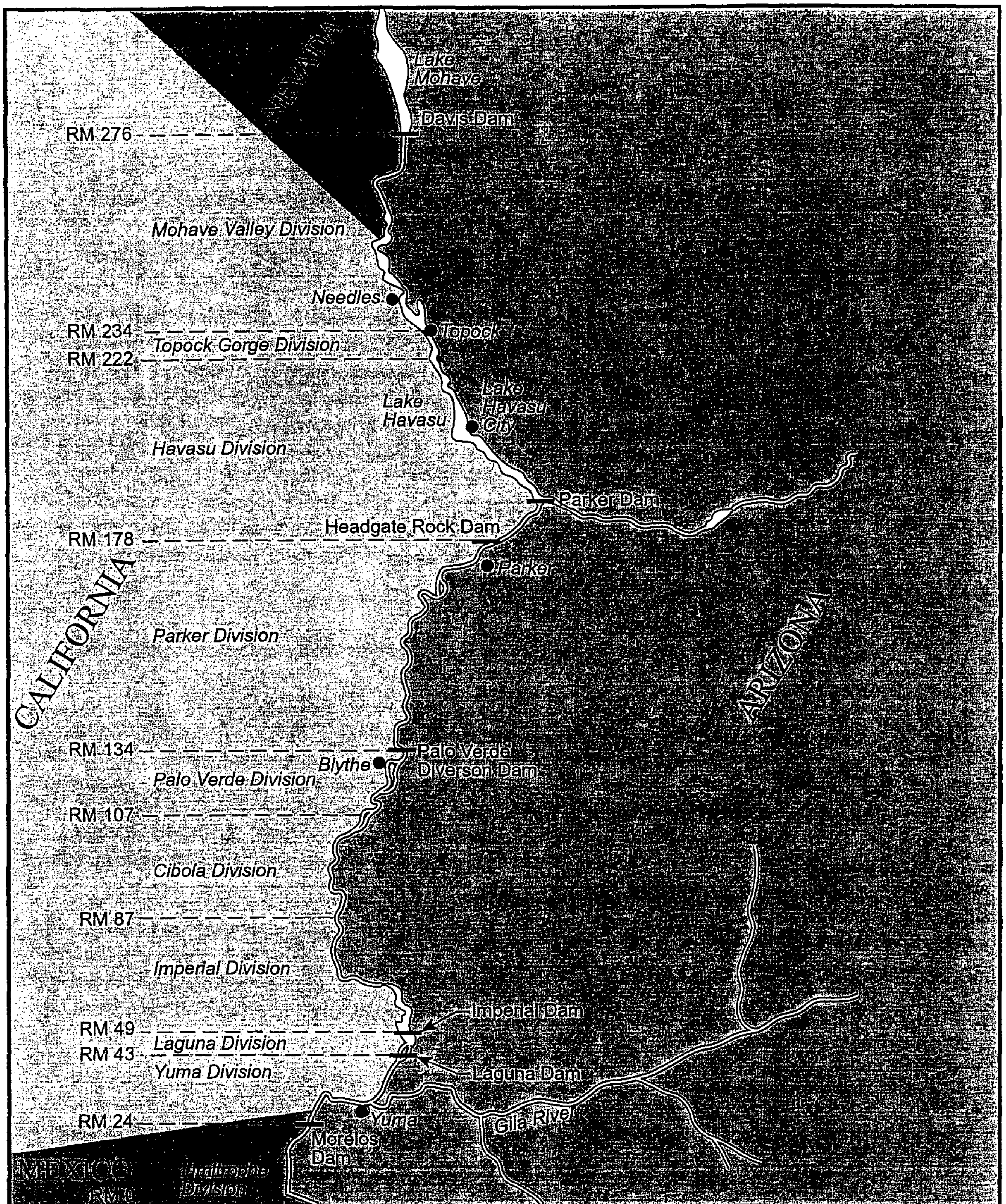
SURFACE WATER AND DAMS

Dams are critical to controlling the flow of the Colorado River and are the most influential structures on the LCR (see Figure 1-2 in Chapter 1). In-river dams retain all flow with the exception of water that is either diverted for irrigation or public supply; subject to infiltration, evaporation, or other elements of the hydrologic cycle; or released through the gates and spillways (Reclamation 2000a). Major dams within the LCR geographic subregion (and their years of completion) include, from north to south: Parker Dam (1938), Headgate Rock Dam (1944), Palo Verde Diversion Dam (1958), and Imperial Dam (1938). Reclamation operates Parker Dam, the Bureau of Indian Affairs operates Headgate Rock Dam, the Palo Verde Irrigation District operates Palo Verde Diversion Dam, and IID operates Imperial Dam (see Figure 3.1-1) (Reclamation 1999b).

The reach of the LCR from Parker Dam to Imperial Dam is approximately 143 miles long. For approximately 10 miles below Parker Dam to the Headgate Rock Diversion Dam, the Colorado River channel is confined within a steep valley. The water level is relatively stable over this short reach of the Colorado River because the reach is controlled at both ends (Reclamation 1999b).

Below Headgate Rock Dam the LCR flows through a 100 mile-long valley, which has been cut into the Parker, Palo Verde, and Cibola valleys. The Colorado River becomes more confined approximately 40 miles below Cibola Valley at Imperial Dam (Reclamation 1999b).

In addition to the control function played by dams along the LCR, the LCR is also confined within a system of stabilized riverbanks and levees (Reclamation 1999b). Channelization and stabilization activities have taken place for more than a century along the LCR.



RM River Mile

N W E S

0 20000 40000 Meters

0 10 20 30 Miles

SOURCE: RECLAMATION

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Figure 3.1-1
Facilities and Divisions
Lower Colorado River Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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Prior to construction of dams along the LCR, backwater lakes and wetland areas were maintained by frequent flood flows that flushed sediment downstream and sustained aerobic habitats important to native fish, wildlife, and vegetative species (DOI 1999). Today, many backwater lakes have filled with sediment and are no longer hydrologically connected to the river (Radtke et al. 1988). In the area just above the Imperial Dam, the Colorado River includes a diversion pool and backwaters (Figure 3.1-1). For the past 30 years, periodic dredging for silt removal has occurred within the diversion pool and backwater area above the Imperial Dam.

Descriptions of LCR surface water quantity and quality at Parker and Imperial Dams are provided below.

LCR at Parker Dam. Seventeen miles northeast of Parker, Arizona, Parker Dam spans the LCR between Arizona and California. Completed in 1938 by Reclamation, Parker Dam's primary purpose is to provide regulating storage capacity for the Colorado River in Lake Havasu while maintaining the reservoir pool above a minimum elevation from which water can be pumped into the CRA to the west and into the CAP to the east. Lake Havasu is approximately 45 miles long and spans 20,390 acres. It has a storage capacity of 648 KAF.

Water Quantity at Parker Dam. The discussion below regarding Parker Dam water quantity includes water diverted from Lake Havasu, releases from the dam, and LCR elevation below the dam.

Diversion at CRA. MWD's Whitsett Pumping Plant, located 2 miles upstream from Parker Dam, lifts water from Lake Havasu into the CRA. Pumping by MWD began in 1939. During 1985 through 1997, annual CRA diversions at Parker Dam have ranged from a minimum of approximately 994 KAFY in 1995 to a maximum of approximately 1.3 MAFY in 1994, with an average annual CRA diversion of approximately 1.22 MAFY (Figure 3.1-2).

Diversion at CAP. Approximately 1.4 MAFY of water are currently diverted to the CAP from Lake Havasu (DOI 1999).

Releases at Parker Dam. Figure 3.1-3 presents recently (1985 through 1999) measured yearly releases below Parker Dam, ranging from a minimum of approximately 5.54 MAFY in 1993 to a maximum of approximately 16.3 MAFY in 1985, with an average annual release of approximately 8.66 MAFY.

Average monthly releases during 1985 through 1999 varied seasonally, from a minimum of approximately 478 KAFY in November to a maximum of approximately 924 KAFY in July, with an average monthly release of approximately 721 KAFY.

Lake Havasu. Lake Havasu, the reservoir pool behind Parker Dam, has a maximum elevation of 450.54 feet above sea level. The reservoir was constructed by Reclamation with 100 percent funding from MWD as a component of its system to deliver Colorado River water to the coastal plain of southern California. The contractual arrangement between MWD and the United States includes a minimum reservoir pool elevation of 440.54 feet above sea level in order to provide for operation of MWD's intake from the Colorado River. Since then, the CAP intake was constructed on the Arizona shore of Lake Havasu. In general, however, recreational considerations keep the reservoir above 445 feet above sea level.

Elevation of the Colorado River from Parker Dam to Imperial Dam. DOI calculated the average depth and width of water in the Colorado River at median and reduced flows (calculated at 18 percent below average to simulate low flow conditions in the Colorado River) and are presented in Table 3.1-2 (DOI 1999). At 11,000 cubic feet per second (cfs), average water depth between Parker and Imperial Dams ranges from 7.3 feet to 13.5 feet; and at 9,000 cfs, average water depth ranges from 6.7 feet to 13.4 feet. Reclamation has developed additional modeling of the LCR at additional flow levels; this modeling is described in the Draft IA EIS (Reclamation 2002).

TABLE 3.1-2
Effect of Flow on Average Width and Depth of the LCR between Parker and Imperial Dams

Flow	Median Flow – 11,000 CFS		Lower Flow - 9,000 CFS[1]	
	Average Width (feet)	Average Depth (feet)	Average Width (feet)	Average Depth (feet)
Parker Dam to Headgate Rock Dam	611.7	13.5	606.6	13.4
Headgate Rock Dam to Palo Verde Diversion Dam	640.4	7.3	625.7	6.7
Palo Verde Diversion Dam to Imperial Dam	614.2	7.8	599.6	7.1

Source: DOI 1999

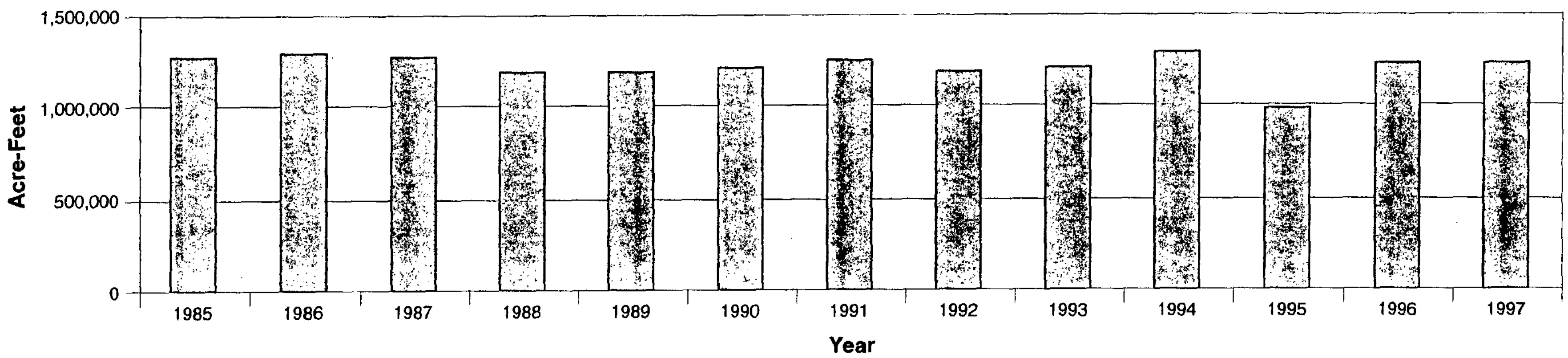
[1] 18% below average.

Water Quality at Parker Dam. According to the Basin Plan, water quality COCs in the LCR geographic subregion include TDS, selenium, TSS, organochlorine pesticides, water temperature, and other organic compounds and chemical constituents (Radtke et al. 1988, DOI 1999, and Reclamation 2000b and 2000c). A general description of TDS, selenium, and sediments is presented below.

Colorado River from Parker Dam to Imperial Dam.

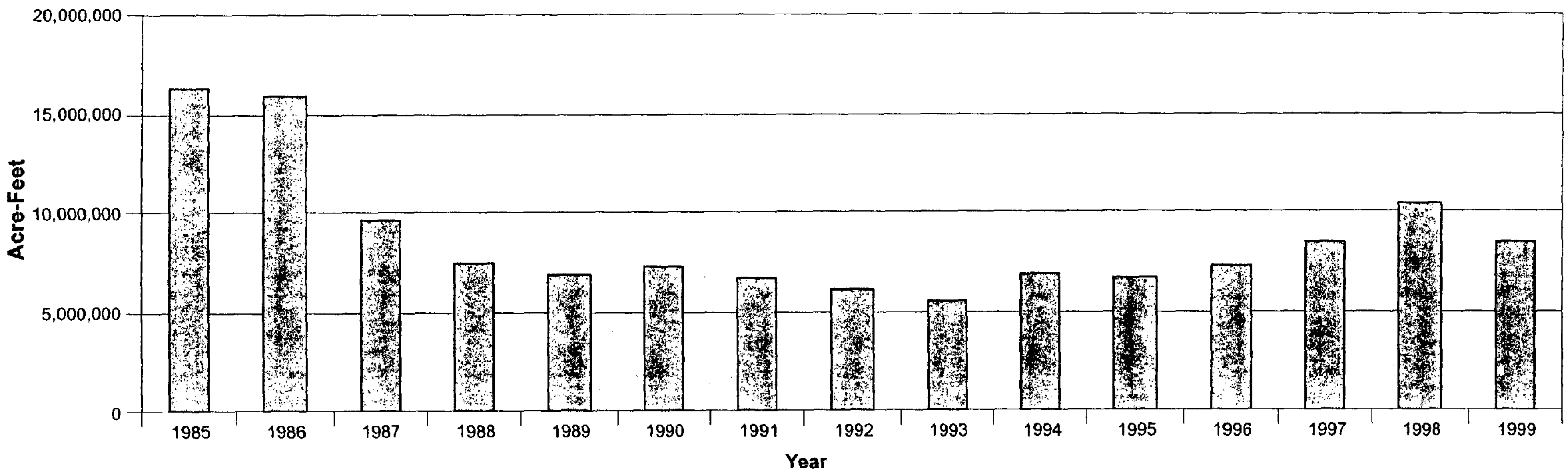
TDS: The natural salinity regimen of the LCR is unknown but was likely similar to that observed during earlier years of sampling. Water composition and dissolved solids concentrations varied substantially daily, seasonally, and annually before the closure of Hoover Dam. Concentrations also varied substantially spatially (increasing with distance downstream) (Radtke et al. 1988).

Salinity results primarily from geologic sources, saline springs, and agricultural sources. Natural sources account for nearly half of the total salt load, and irrigation return flows add more than one-third; a minor part of the salt load is from industrial and municipal sources. At the Colorado River's source in the Rocky Mountains, the TDS concentration is typically 50 mg/L or lower. Large amounts of salts are picked up as the river flows downstream; at Hoover Dam, the river delivers about 9 million tons of salt in 10 MAF of water.



Source: DOI, 1999

Figure 3.1-2
Recent Amounts of Water Pumped by MWD from Lake Havasu into the Colorado River Aqueduct, 1985-1997 (AF)
IID Water Conservation and Transfer Project Draft EIR/EIS



Source: CRB CA, 2000

Figure 3.1-3
Measured Yearly Flow, Colorado River Below Parker Dam, at Gage 09427520,1985-1999 (AF)
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Figure 3.1-4 presents 1980-1997 TDS concentrations on the LCR between Lee's Ferry (north of Hoover Dam) and Morelos Dam (at the Northerly International Boundary [NIB]). The maximum value reported for TDS at Parker Dam was 811 mg/L, the minimum was 384 mg/L, with an average TDS value of 682 mg/L. The maximum value reported for TDS at Imperial Dam was 982 mg/L, the minimum was 568 mg/L, with an average TDS value of 768 mg/L.

Selenium: Dissolved selenium in the LCR from Parker Dam to Imperial Dam appears to be derived from sources in the Upper Basin above Lee's Ferry and exists in small dissolved concentrations (less than 1 to 2 micrograms per liter [μg/L]). Figure 3.1-5 presents United States Geological Survey (USGS) data regarding dissolved selenium concentrations on the LCR between Lee's Ferry and Morelos Dam, including concentrations at Parker Dam during 1991 to 1997. Figure 3.1-5 shows that selenium concentrations are reduced downstream. Concentrations reported at Parker Dam ranged from a minimum of 1.0 micrograms per liter (μg/L) to a maximum of 3.0 μg/L, with an average concentration of 2.0 μg/L (Reclamation 2000c).

Selenium in bottom sediments of the LCR between Parker and Imperial Dam was also reported. The concentrations of selenium between Parker and Imperial Dam in bottom sediment (1985 and 1986) ranged from a minimum of 0.03 micrograms per gram (μg/g) at Palo Verde Diversion Dam to a maximum of 7.1 μg at Imperial Dam. Mainstream Colorado River sediment, less than 63 μg in diameter, appeared to act as a sink for selenium, especially in backwater areas with higher concentrations of organic matter (Radtke et al. 1988).

Sediments: Historically, the Colorado River was known for its ability to transport enormous sediment volumes. Following the completion of Hoover Dam, the annual cycle of high and low flows was replaced with regulated flow discharges, as required to meet the needs of water users. Sediment now accretes in reservoirs and desilting basins and is mechanically removed from the river (Reclamation 1999b). Annual historical sediment loads for Parker Dam, Imperial Dam, and near the City of Yuma, Arizona, are presented in Figure 3.1-6. Although estimates of pre-dam sediment loading were not established for Parker and Imperial Dams, data from the Yuma site shows a very significant decrease in sediment load corresponding to the period of dam closure (Reclamation 1999b).

Additional TSS data are available from USGS for two stations on the LCR between Parker and Imperial Dams: USGS 09427520—Colorado River Below Parker Dam, CA-AZ; and USGS 09429490—Colorado River Above Imperial Dam, CA-AZ. Because the sampling at both locations was sporadic and nonexistent in some years, and because turbidity can vary seasonally and with flow, the data were deemed incomplete/inconclusive but are included for disclosure purposes in Appendix F. The TSS concentrations at Parker Dam ranged from 0.9 mg/L (1989) to 37 mg/L (1979), with the average annual concentration varying from 1.55 mg/L (1991) to 8.2 mg/L (1979).

LCR at Imperial Dam. Imperial Dam is located approximately 18 miles northeast of Yuma, Arizona. Construction of the dam and desilting works was completed in 1938. The dam diverts LCR water via the AAC on the west to the Imperial and Coachella valleys, Yuma Project Reservation Division, and Yuma Valley; and via the Gila Gravity Main Canal on the east. In California, the AAC serves the Yuma Project Reservation Division in the Bard Valley in addition to the Imperial and Coachella valleys. In Arizona, the AAC serves the City of Yuma, the Yuma Project Valley Division in the Yuma Valley, and the Cocopah Indian Reservation. Additional areas in Arizona served by the Gila Gravity Main Canal consist of portions of the lower Gila Valley served by the North Gila Valley Irrigation and Drainage District and the Yuma Irrigation District, portions of the Yuma Mesa served by the Yuma Mesa Irrigation and Drainage District and the Unit "B" Irrigation and Drainage District, and portions of the Gila River Valley upstream of Dome served by the Wellton-Mohawk Irrigation and Drainage District.

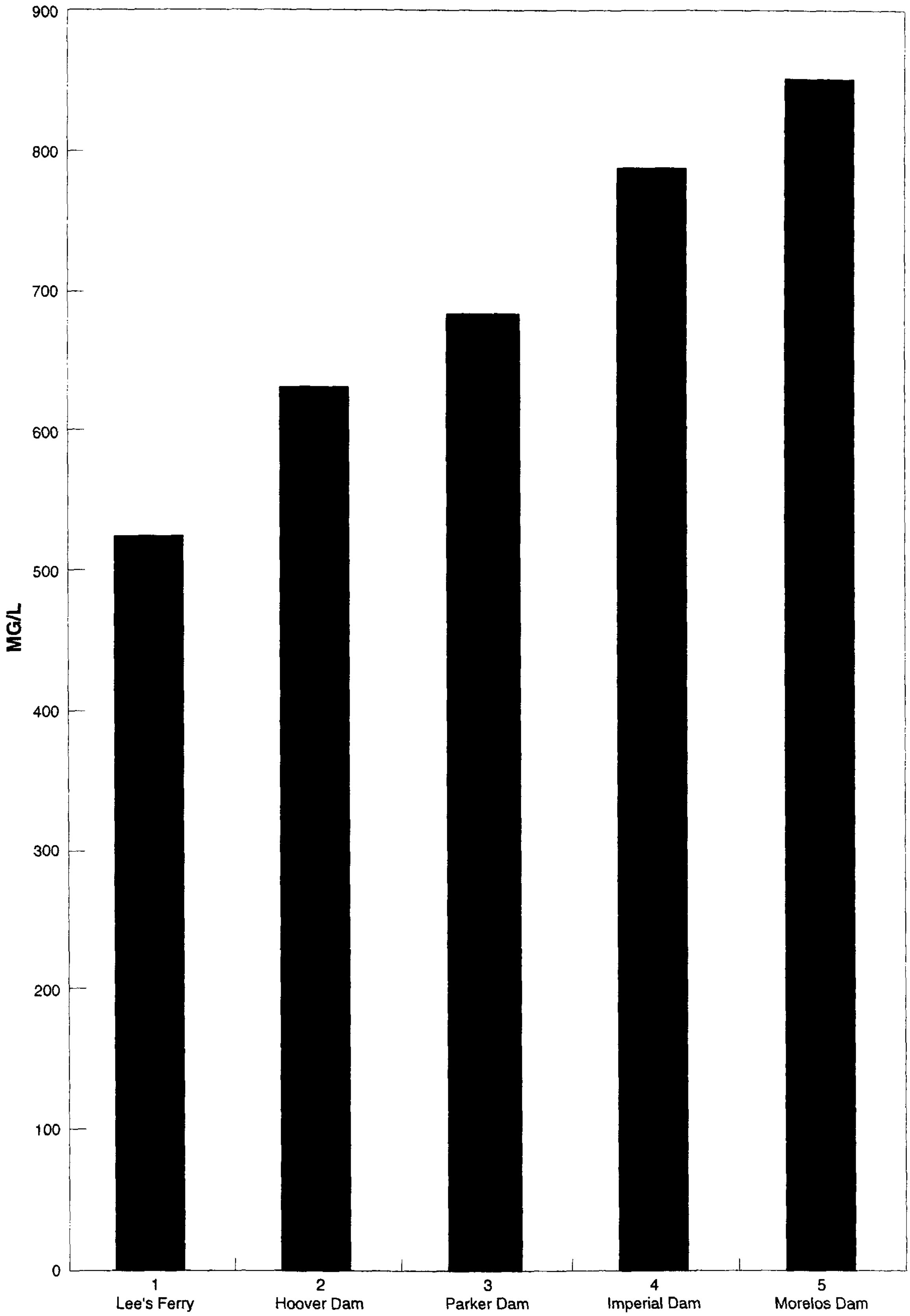
Closure of Imperial Dam raised the water surface level to 181 feet above mean sea level (msl), or 23 feet higher than the original river's level. The dam was designed to provide a maximum diversion of 15,155 cfs to the AAC and 2,200 cfs to the Gila Gravity Main Canal, and to pass a maximum flood of 180,000 cfs (DOI 1999).

Water Quantity at Imperial Dam. The discussion below regarding Imperial Dam water quantity includes water diverted upstream of the dam, releases from the dam, and LCR elevation at the dam.

Diversion at Headgate River Diversion Dam. The Colorado River Indian Reservation holds present perfected rights with a priority dating from the late 19th century. From 1986 to 2000, average diversions into the Parker Valley of Arizona, where the bulk of the Colorado River Indian Reservation's present perfected rights are held, amounted to approximately 626 KAFY. Of this amount, an average of approximately 248 KAFY was returned to the river by surface flow (Howard F. McCormack. USGS-WRD, Personal communication with Elizabeth Cutler, CH2M HILL, December 14, 2001).

Diversion at Palo Verde Diversion. Palo Verde Irrigation District holds the earliest formal district appropriation of LCR water. From 1986 to 1999, the Palo Verde Irrigation District diverted an average of 874,000 acre-feet of water from the Colorado River to approximately 100,000 acres of land growing primarily alfalfa, cotton, melons, lettuce, and wheat. Of this amount, an average of approximately 454 KAFY was returned to the river by surface flow.

Diversion at AAC. Table 3.1-3 shows the annual average gross diversion from the Colorado River into the AAC and the distribution of that flow for the 12-year period 1987 to 1998.



Source: USGS, 2000

Figure 3.1-4
Average Total Dissolved Solids from Lee's Ferry to Morelos Dam, 1980-1997
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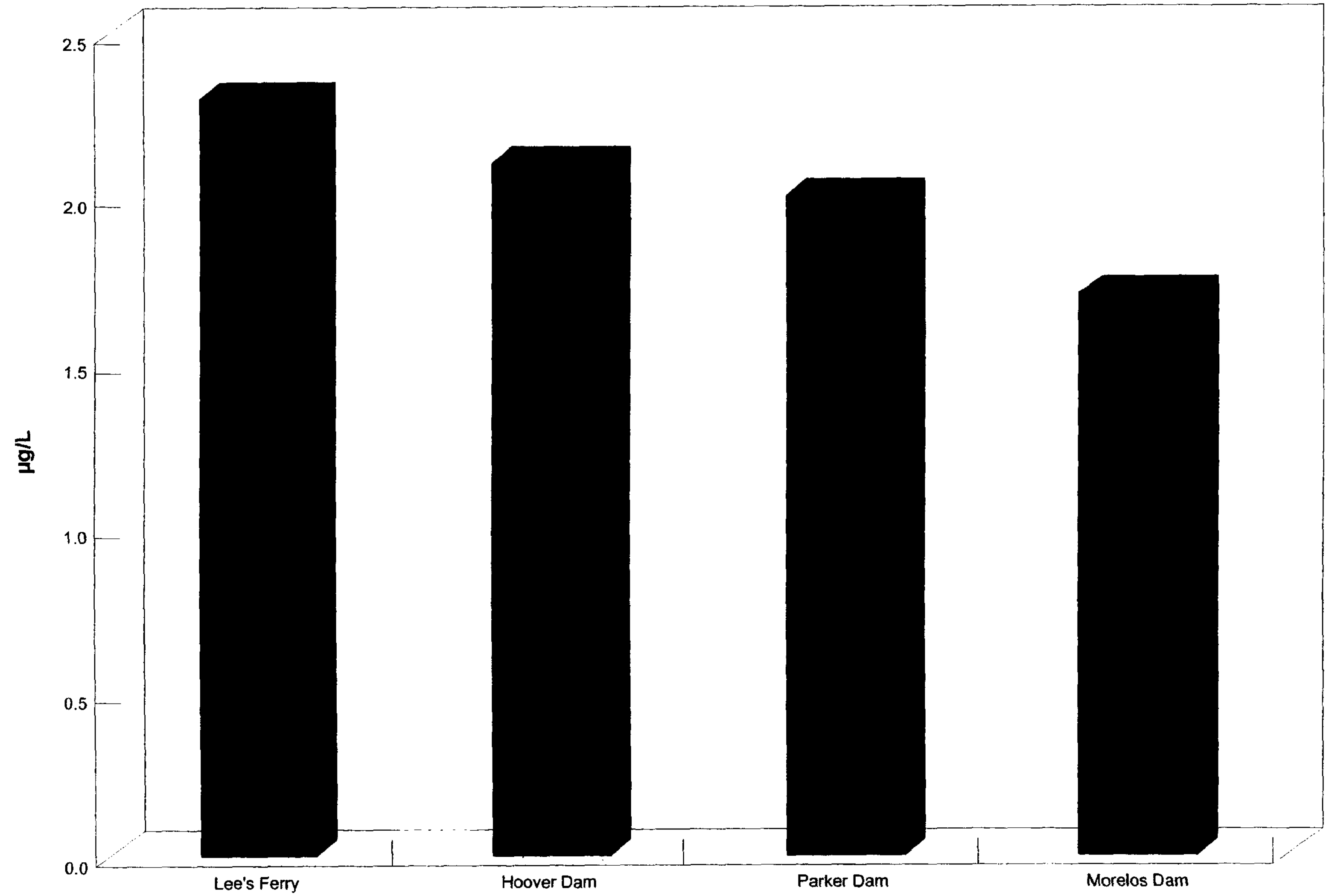

Source: USGS 1991-Present

Figure 3.1-5
Dissolved Selenium,
Lee's Ferry to Morelos Dam, 1991-1997
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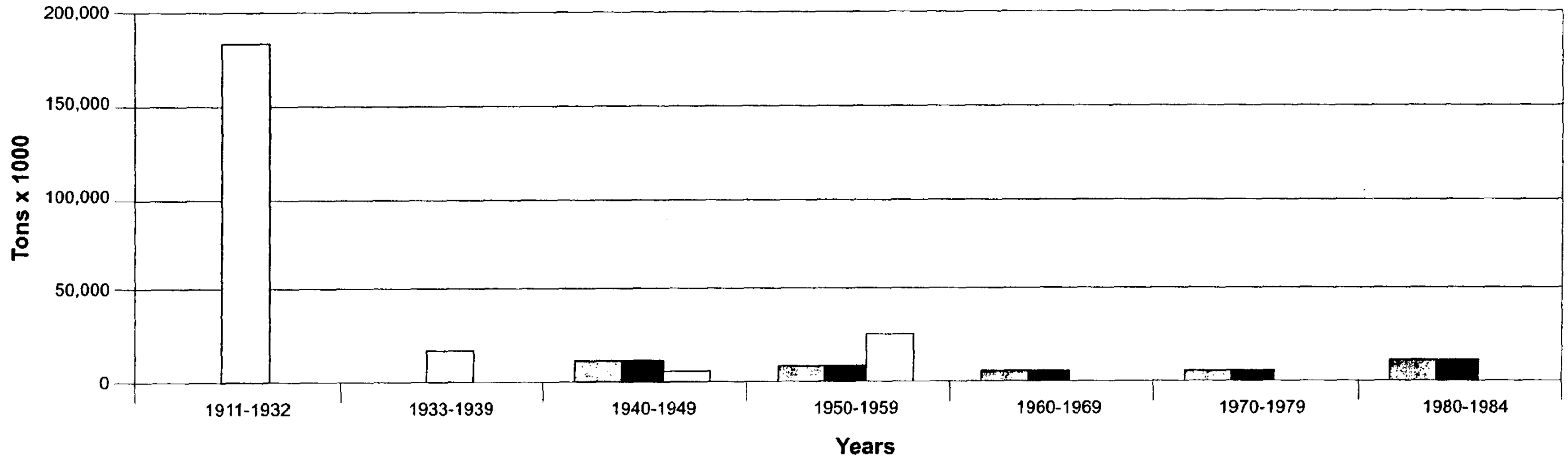

Source: Reclamation, 1999

LEGEND

- Parker Dam
- Imperial Dam
- Yuma, AZ

Figure 3.1-6
Annual Historic Sediment Loads for Parker Dam, Imperial Dam, and Yuma, AZ Lower Colorado River (1911-1984)
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TABLE 3.1-3
Annual Average Gross Diversion from Colorado River into AAC (1987-1998)

Diversion	Flow (AFY)	Percent of Gross Diversion
AAC Gross Diversion	5,092,884	---
Yuma Main Canal turnout to the City of Yuma, Arizona, the Cocopah Indian Reservation, and the Yuma Project in Arizona and California; and for additional hydroelectric power generation through the Syphon Drop Power Plant[1]	596,067	12
Sum of Small turnouts to Yuma Project Reservation Division in California	83,531	2
Releases for hydroelectric power generation through the Pilot Knob Power Plant and Wasteway[1]	981,965	19
AAC below Pilot Knob Check to IID and CVWD	3,292,366	64
Conveyance loss from Imperial Dam to Pilot Knob Check	138,955	3

[1]Water diverted for the sole purpose of hydroelectric generation at Syphon Drop Power Plant and Pilot Knob Power Plant is returned to the Colorado River above the NIB.

Source: US Geological Survey streamflow records

Thus, water delivered for use in the Imperial and Coachella valleys accounts for approximately 64 percent of the gross amount of Colorado River water diverted into the AAC. From 1986 through 1998, an average of 2.87 MAFY of Colorado River water was delivered to the Imperial Valley via the AAC (see Figure 3.1-7). As measured at AAC Drop No. 1, the minimum quantity was approximately 2.48 MAF in 1992; the maximum was approximately 3.12 MAF in 1996. The flow quantity and water quality of the AAC is discussed in Section 3.2.2.2, IID Water Service Area and AAC.

Flow at Imperial Dam. Measured annual flow at Imperial Dam during 1985 to 1999 ranged from approximately 4.76 MAF in 1993 to approximately 15.0 MAF in 1985, with an average flow of approximately 7.59 MAFY (see Figure 3.1-8).

The average monthly flow at Imperial Dam varied seasonally during 1985 to 1999. Monthly average flow at Imperial Dam has varied from a minimum of approximately 460 KAF in November, to a maximum of approximately 750 KAF in July, with an average monthly flow of approximately 632 KAF.

Elevation at Imperial Dam. The surface elevation of the pool behind Imperial Dam is maintained at an elevation necessary to provide for diversion into the AAC and the Gila Gravity Main Canal, typically within a range of 180.80 feet to 180.00 feet above sea level, and occasionally ranges as low as 178.3 feet (Personal communication, Bobby Moore/IID to Elizabeth Cutler/CH2M HILL, December 13, 2001).

Water Quality at Imperial Dam. Individual water quality COCs in the LCR geographic subregion include: TDS, selenium, sediments, organochlorine pesticides, water temperature, and other organic compounds and chemical constituents (Radtke et al. 1988, DOI 1999, and Reclamation 2000b and 2000c). A general description of TDS, selenium, and sediments are presented below.

TDS. TDS concentrations in the LCR vary from year to year, depending on the amount of runoff from the Colorado River Basin. TDS in the LCR at Imperial Dam are discussed previously in this section, under the following headings: LCR at Parker Dam- Water Quality; Parker Dam- TDS, and are presented in Figure 3.1-4.

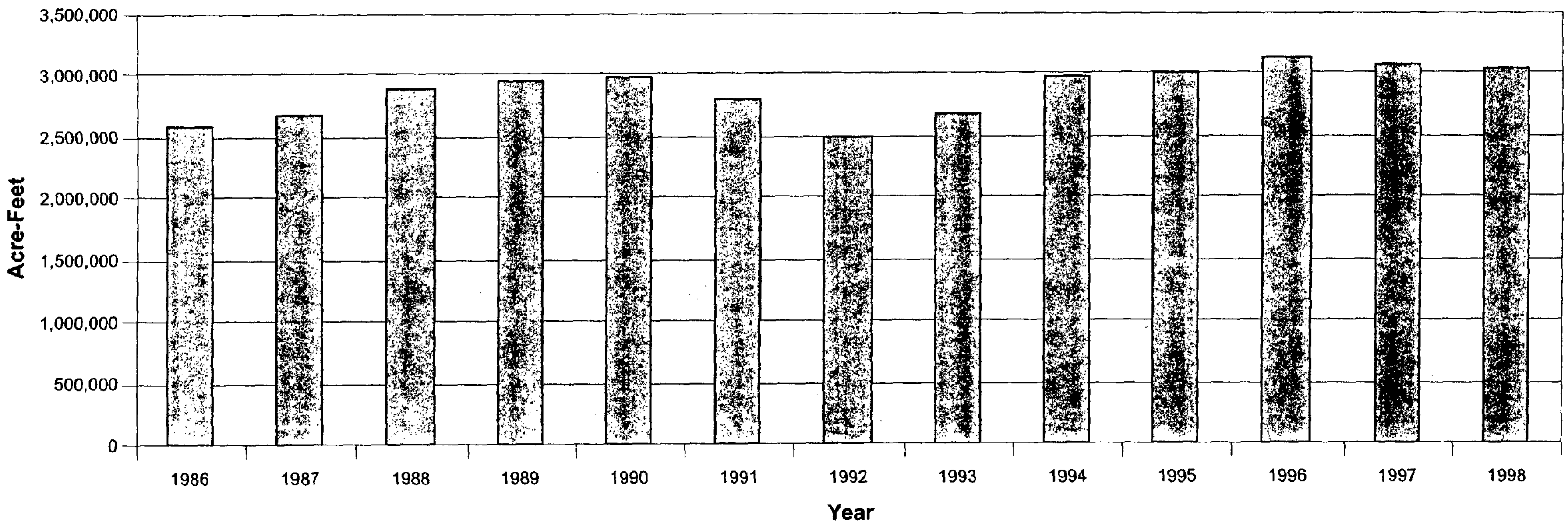
Selenium. Dissolved selenium and selenium in bottom sediments of the LCR at Imperial Dam are discussed previously in this section, under the headings: LCR at Parker Dam- Water Quality; Parker Dam- Selenium, and are presented in Figure 3.1-5.

Sediments. LCR sediments at Imperial Dam are discussed in the Parker Dam water quality section and are presented in Figure 3.1-6. Additional TSS data are available from USGS for two stations on the LCR between Parker and Imperial Dams: USGS 09427520 – Colorado River Below Parker Dam, CA-AZ and USGS 09429490 – Colorado River Above Imperial Dam, CA-AZ. Because the sampling at both locations was sporadic and nonexistent in some years, and because turbidity can vary seasonally and with flow, the data were deemed incomplete and inconclusive; however, the data are included for disclosure purposes as Appendix F. The maximum reported TSS concentration at Imperial Dam ranged from 5 mg/L (1996) to 559 mg/L (1998), with the average annual concentration varying from 9 mg/L (2000) to 206.4 mg/L (1998).

GROUNDWATER

Groundwater Quantity. The flood plain and adjacent alluvial slopes in the LCR geographic subregion are underlain by the Colorado River aquifer, which ranges in thickness from zero to over 5,000 feet (Owens-Joyce and Raymond 1996). The aquifer consists of four hydrologic units composed of partly saturated younger alluvia and older alluviums. The alluvium includes the Chemehuevi Formation, Bouse Formation, fanglomerate, and Muddy Creek Formation. These overlie nearly impermeable bedrock, and are hydraulically connected to the LCR. The amount of water that flows between the Colorado River and the aquifer varies in response to fluctuations in their individual water level elevations. Generally, groundwater is unconfined in all four hydrologic units along the LCR; however, confined zones are likely to be present as well (RWQCB and SWRCB 1994, Robertson 1987).

From Lake Havasu to Imperial Dam, water moves between the river and the aquifer in response to differences in water level elevations between the river and the aquifer. Withdrawals through wells located within the Colorado River flood plain are replaced by water from the river. In the uplands extending from the flood plain, the USGS has identified the extent of an "accounting surface" from which groundwater wells have the potential to withdraw water that would be replaced by water from the Colorado River (USGS 1994). Significant amounts of water diverted for irrigation within the flood plain or the accounting surface percolates back to the Colorado River through subsurface drainage. Subsurface tributary inflow occurs beneath the Bill Williams River and some desert washes. However,



Source: IID, 1999

Figure 3.1-7
Flow in the All American Canal at Drop No. 1, 1986-1998 (AF)
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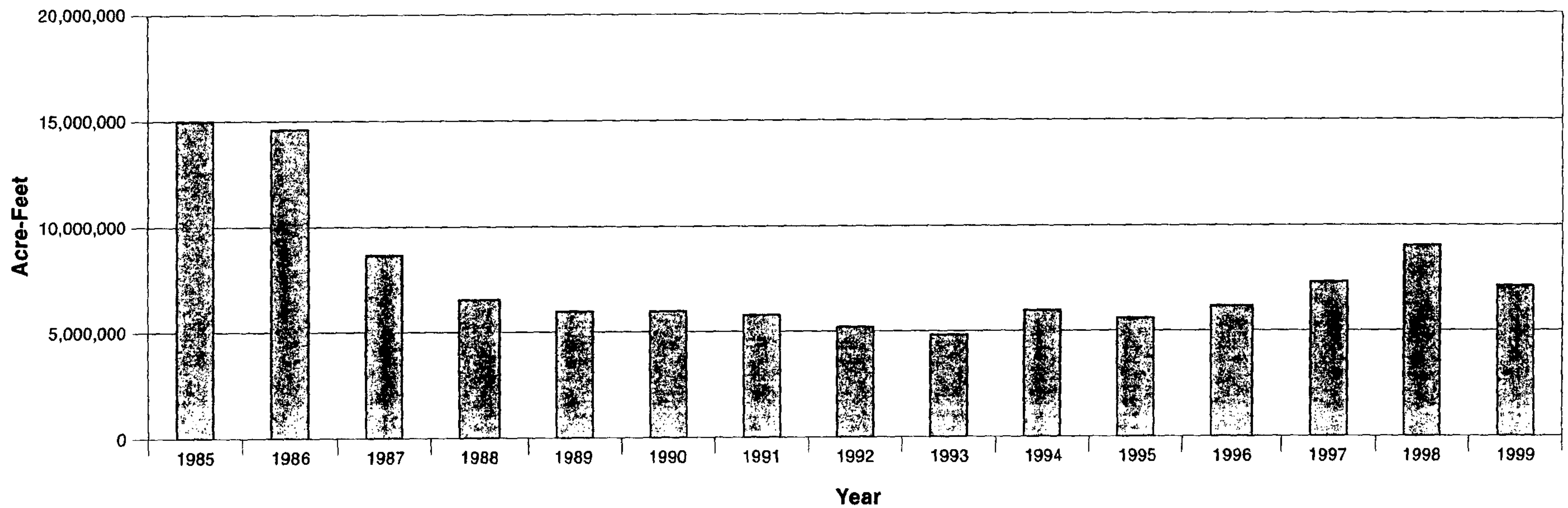

Source: CRB CA, 2000

Figure 3.1-8
Measured Yearly Flow, Colorado River
Above Imperial Dam, at Gage 09429490,1985-1999 (AF)
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the combination of groundwater withdrawals and phreatophytes result in a net loss of water from the Colorado River aquifer in the LCR area that is replaced by water from the Colorado River (USGS 1994).

Within the East Colorado River Basin Planning Area, about 10 KAFY of precipitation deep percolates into the groundwater. The combined groundwater storage capacity of all hydrologic units in the planning area is approximately 35 MAF within a 200-foot zone, above the deepest well in each hydrologic unit. Wells are more than 300 feet deep in three of the hydrologic units (RWQCB and SWRCB 1994).

Tributary groundwater inflow to the LCR between Parker and Imperial Dams is extremely low; therefore, the surface elevation of the LCR typically directly affects the elevation of the water table within the river aquifer. Additionally, near-river groundwater levels can be directly affected by irrigation wells adjacent to the LCR, which pump several cubic feet of water per second (DOI 1999).

Groundwater elevations in the Yuma area are influenced by the following factors:

- Recharge from the Colorado River between Laguna Dam and Morelos Dam;
- Recharge from the Colorado River below Morelos Dam;
- Recharge from facilities that convey water from the Colorado River to irrigate lands in the Bard, Imperial, and Coachella valleys in California, the Yuma Valley in Arizona, and the Mexicali Valley in Mexico;
- Recharge from the application of water to agricultural lands in the Bard Valley in California, the Yuma Valley in Arizona, and the Mexicali Valley in Mexico; and
- Groundwater withdrawals from the Mexicali Valley and Yuma Valley.

Of these factors, recharge from the Colorado River below Morelos Dam is the most variable. Typically, there is little or no flow in the Colorado River below Morelos Dam unless there are significant excess deliveries to Mexico resulting from flood control releases at Hoover Dam or high tributary flows below Hoover Dam (MWD 2000).

Sedimentation in the Colorado River is a factor in groundwater levels in the Yuma area. The Gila River flood of 1993 deposited approximately 10 million cubic yards of sediment in the Colorado River bed from its confluence with the Gila River to Morelos Dam. This sedimentation raised the bed of the river by approximately 5 feet and has resulted in higher groundwater levels beneath the Yuma and Gila valleys (Reclamation 1999c).

Groundwater Quality. Adequate historical water quality data are unavailable, which has limited RWQCB's ability to establish specific groundwater quality objectives. In most cases, groundwater that is pumped generally returns to the LCR with increased mineral concentrations, including TDS, nitrate, and other COCs. (RWQCB and SWRCB 1994).

3.1.3.2 IID Water Service Area and AAC

SURFACE WATER

Surface water within the IID water service area comes primarily from two sources: the Colorado River, and inflow across the International Boundary from Mexico (via the New

River). However, agriculture served by IID is entirely dependent on its diversions from the Colorado River into the AAC at Imperial Dam. The following sections describe IID's irrigation and drainage systems and provide details on surface water quantity and quality within the IID water service area.

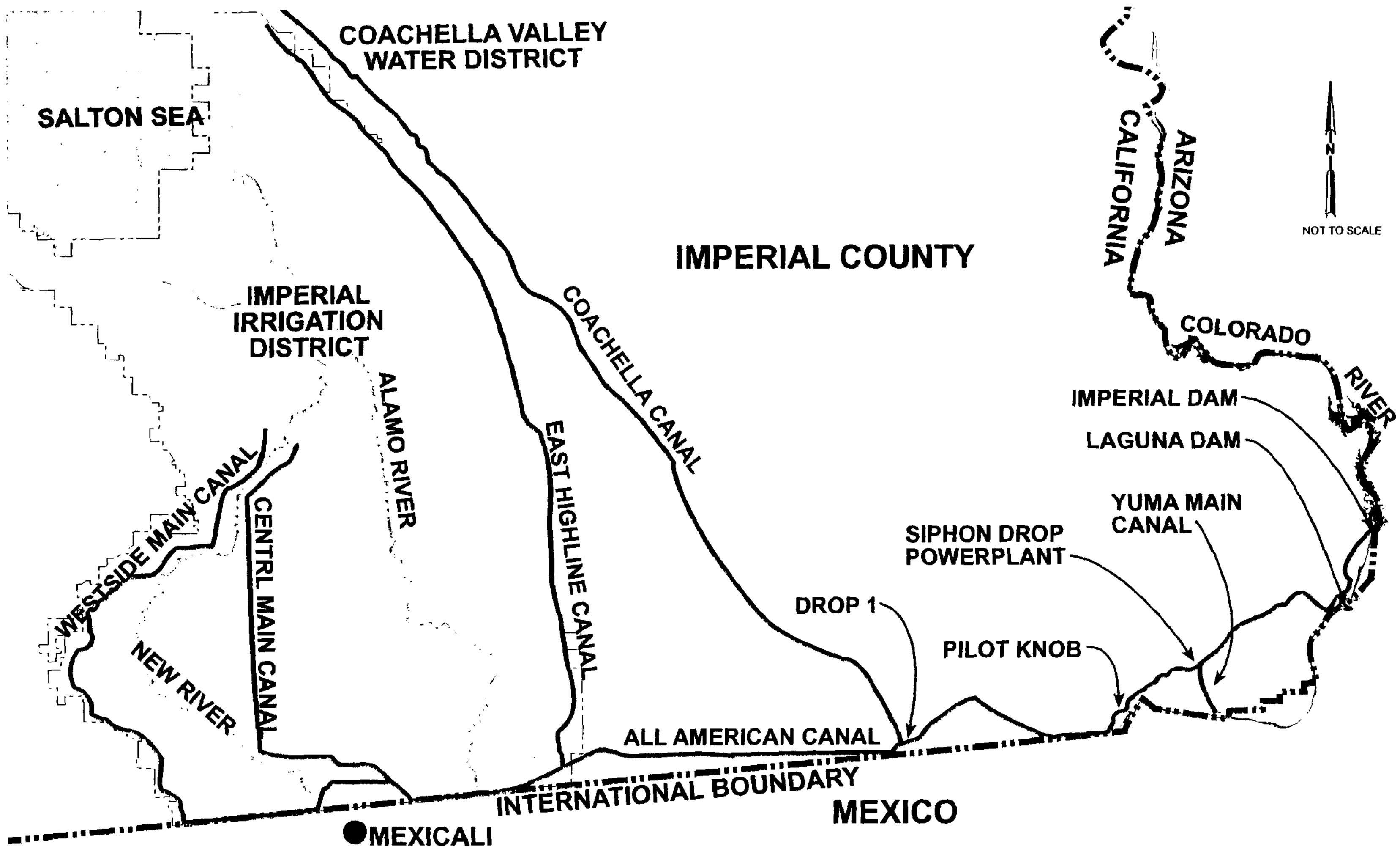
IID Irrigation System. IID's irrigation system delivers water to more than 7,000 farms on about 460,000 acres of irrigated land. IID's irrigation system serves two primary purposes: (1) to replenish moisture in the crop root zone; and (2) to leach accumulated salts from the soils. Approximately 16 percent of irrigation water delivered to fields is discharged through tilewater and contributes to leaching of salts accumulated in the soils.

Approximately 69 percent of the water that is delivered for on-farm use is used consumptively (i.e., 66 percent is used by crops and roughly 3 percent is lost to evaporation from soil or water surfaces). The remaining 31 percent discharges into IID's drainage system as tailwater and tilewater (29 percent), which is described below, or is lost to shallow groundwater (2 percent) (IID 1994).

IID's irrigation system begins at the point where Colorado River water is diverted at Imperial Dam. After being desilted, the water is then conveyed by gravity from Imperial Dam through the 82 mile AAC. The AAC discharges water to several turnouts—the Yuma Main Canal and several smaller turnouts for the Yuma Project Reservation Division, Pilot Knob Power Plant, and the Coachella Canal—before it reaches the IID water service area and branches off to three primary main canals: East Highline, Central Main, and Westside Main. The East Highline Canal, an unlined 49-mile canal, serves the eastern part and a portion of the central part of the IID water service area. The canal follows the eastern boundary of the irrigated portion of the IID water service area and conveys irrigation water to agricultural fields via a series of east-to-west laterals. The second primary main canal, the Central Main Canal, connects to the AAC just north of Calexico and serves most of the central part of the IID water service area. The Central Main Canal is about 27 miles long and is also unlined. The Westside Main Canal joins the AAC near the western edge of the IID water service area and serves the western portion of the IID water service area. It is nearly 45 miles long and is unlined, except for 5.5 miles at its northern end. These three primary main canals serve as the main arteries of an irrigation system consisting of approximately 1,667 miles of canals and laterals that distribute irrigation water to individual farm fields within the IID water service area (see Figure 3.1-9).

Flow measurements (collected from 1986 to 1999 at Drop No. 1, just before the AAC enters the IID water service area) show that Colorado River irrigation deliveries generally range from approximately 2.4 MAFY to more than 3.1 MAFY. The average annual delivery of irrigation water during the same period is approximately 2.8 MAFY (see Figure 3.1-10). The remaining balance of diverted water is discharged into the Yuma Main Canal, smaller canals serving the Yuma Project Reservation Division, Pilot Knob Power Plant and Wasteway, or the Coachella Canal, or is lost to spillage, evaporation, or seepage along the length of the AAC.

Colorado River diversions account for approximately 90.5 percent of all water flowing through the IID water service area. The remaining sources include: flow from the New River across the International Boundary (5.2 percent), rainfall (3.6 percent), net groundwater discharge into the irrigation system (less than 1.0 percent), and flow from the Alamo River



Note: Other canals with turnouts from the AAC that are not shown on this digram include Reservation Main Canal, Titsink Canal, Yaqui Canal, Pontiac Canal, Ypsilanti Canal and the Pilot Knob Power Plant and Wasteway.

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Figure 3.1-9
Project Site Features
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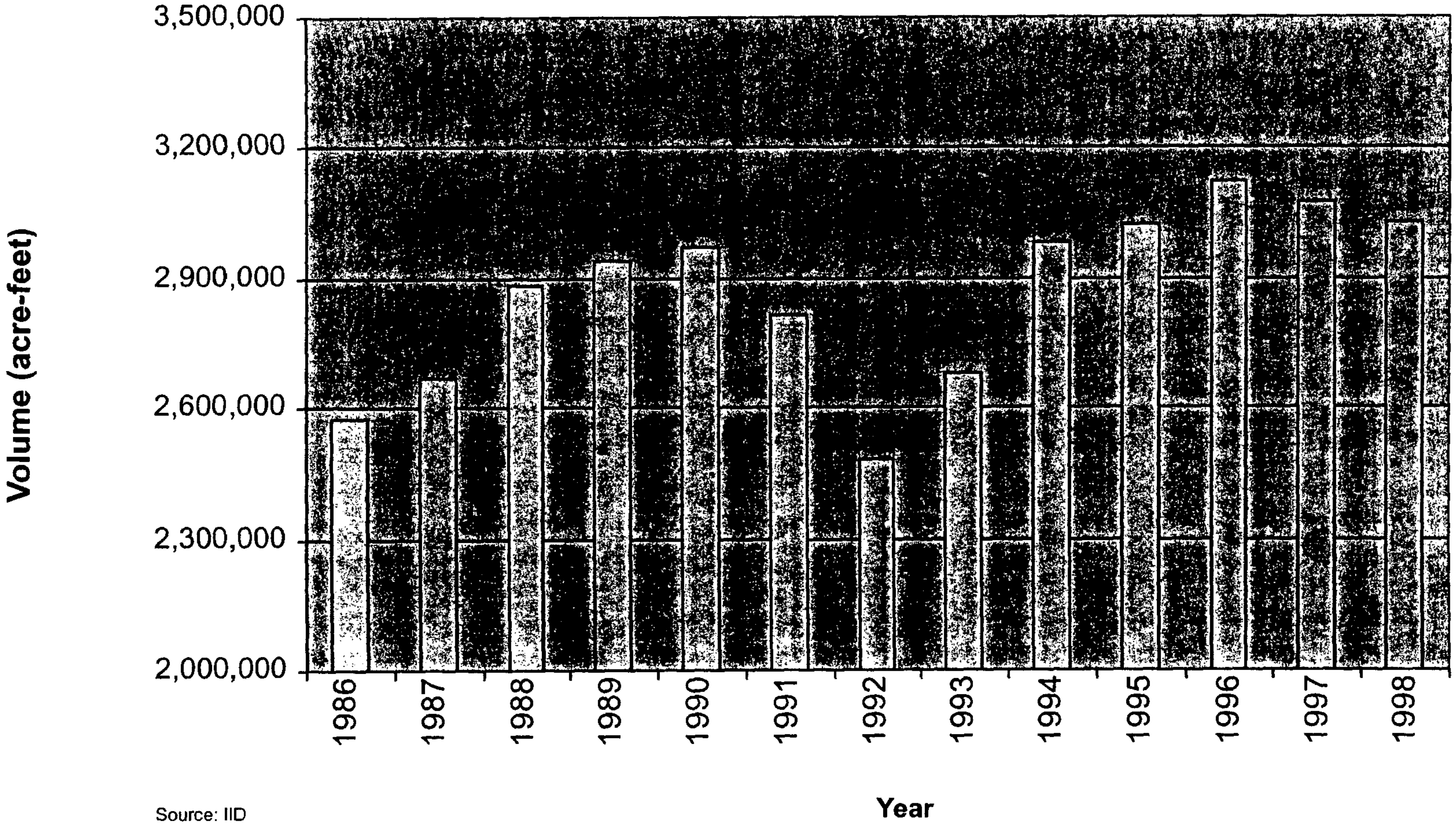

Source: IID

Figure 3.1-10
Colorado River Water Delivered to IID (1986-1998)
Measured at All American Canal Drop No.1
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across the International Boundary (less than 0.1 percent). A summary of the average overall water input to the IID water service area for the period 1987 to 1998 is presented in Figure 3.1-11.

Water delivered for agricultural use accounts for approximately 85 percent of IID's diversion from the Colorado River, as measured at Pilot Knob. Approximately 2 percent of IID's diversion is delivered to municipal, industrial, and other uses. Approximately 3 percent of IID's diversion is lost as seepage from the AAC. The remaining 10 percent is lost to seepage and evaporation within the IID delivery system, or discharged to the drainage system as operational discharge.

Delivery of Colorado River water to farms in the IID water service area is driven by user demand. This demand is not constant throughout the year but varies in response to a combination of influences, such as changes in climate and local rainfall conditions, crop cycles, crop prices and government crop programs. Demand is typically highest in April and remains fairly high until August, at which time it starts to decline. This period of time is also the driest and hottest of the year in the Imperial Valley.

IID Drainage System. IID's drainage system includes a network of 1,456 miles of open and closed (pipeline) drains, 750 surface and subsurface drainage pumps, thousands of miles of subsurface drains (tile) and associated collection pipelines and water recovery systems. Water entering the drainage system can originate from the following sources (see Figure 3.1-12):

- Delivery system losses include canal seepage and operational discharge. Operational discharge is water that has traveled through portions of the distribution system to ensure full farm deliveries and is ultimately discharged to the drains from the surface canals and laterals of the system. Canal seepage is water lost to shallow groundwater and intercepted by the drains;
- On-farm tailwater runoff (i.e., surface water runoff occurring at the end of an irrigated field when total water applied exceeds the soil infiltration rate);
- On-farm tilewater (i.e., water passing the crop root zone which normally enters a tile drain, also referred to as tilewater or leach water);
- Stormwater runoff; and
- Groundwater (i.e., intercepted groundwater that has moved up into the drains from the deeper aquifer near the east boundary of the irrigated area (Loeltz et al. 1975).

Approximately 15 percent of the water applied to fields runs off as tailwater. Except in fields with tailwater recovery systems (TRSs), this water is no longer available for on-farm use and is discharged into either the drainage system or rivers within the IID water service area. Irrigation water that percolates through the soil into the drainage system is collected by subsurface tile drains and, to a lesser extent, by surface drains. The open drains (mostly the lateral drains) collect tailwater and tilewater from farms as well as operational discharge and canal seepage water emanating from IID's delivery system.

Collectively, tilewater and tailwater drainage accounts for roughly 67 percent (34 and 33 percent, respectively) of all of the drainage discharged either directly to the Salton Sea or via the New and Alamo Rivers. The Alamo and New River drainage water and the surface drains that discharge directly to the Salton Sea represent significantly different water regimes and are affected by different segments of the IID water service area. The Alamo River receives approximately 61 percent of the discharge from the drainage system, and the New River receives roughly 29 percent of the drainage. The remaining 10 percent is discharged to surface drains that flow directly to the Salton Sea (see Figure 3.1-13).

Drainage to the Salton Sea. With the exception of drainage water that is returned to the fields as irrigation water or flow lost to shallow and deep groundwater aquifers (through percolation that is not captured by the tile drains), essentially all flow collected by the drainage system is ultimately conveyed to the Salton Sea. Total discharge to the Salton Sea from the IID water service area averaged approximately 0.98 MAF (1.16 MAF with inflow from Mexico) during the period 1986 to 1999. Figure 3.1-14 shows the annual variability of the IID water service area's total surface discharge to the Salton Sea during the same time period.

A diagram showing the distribution of surface water outputs from the IID water service area sources (i.e., on-farm drainage, and operational, and municipal and industrial discharge) and other sources (i.e., surface flows from Mexico, groundwater, rainfall) to the Salton Sea is presented in Figure 3.1-15. A schematic depicting each of the actual component's discharge from IID for the period 1987 to 1998 is presented in Figure 3.1-16.

Drainage Through the Alamo River. As shown in Figure 3.1-17, the annual river flows into the IID water service area have varied over time, recently ranging from a low of about 1.7 KAF in 1996 to a high of about 4.2 KAF in 1987. The Alamo River receives drainage from about 58 percent of the IID water service area and accounts for about 61 percent of IID's drainage discharge. Based on an IID surface drainage balance (see Appendix F), measured flow from the Alamo River at its outlet to the Salton Sea is approximately 604 KAF, with approximately 168 KAF from rainfall, municipal and industrial and operational discharge and seepage, 216 KAF from tailwater, and 228 KAF from on-farm tile water (see the Average Overall Water Balance in Figure 3.1-16 and Appendix F).

Drainage through the New River. The New River also enters IID from Mexico, but, unlike the Alamo, the New River serves as an open conduit for untreated municipal sewage, heavy metals, and agricultural drainage waters high in pesticide residues from northern Mexico. The average annual flow volume of the New River at the International Boundary during the period 1987 to 1998 was about 165 KAFY, which comprised approximately one-third of the total flow of the New River at its discharge to the Salton Sea. Therefore, the New River is a significant source of pollutant loading into the Salton Sea. Water demand and discharges in Mexico might affect annual flows, and flow volumes at the boundary have changed dramatically during the period of record. Gage data shows flow in the New River at an average annual low of 41 KAFY from the period 1950 to 1957, increasing to an average of 110 KAFY during the period 1958 to 1978. Flows across the boundary increased again to an annual average of 150 KAFY during the period 1979 to 1982, and then again from 1983 to 1988 to values higher than 250 KAFY. The discharge from Mexico leveled back to approximately 100 KAFY for the period 1987 to 1999 (see Figure 3.1-17).

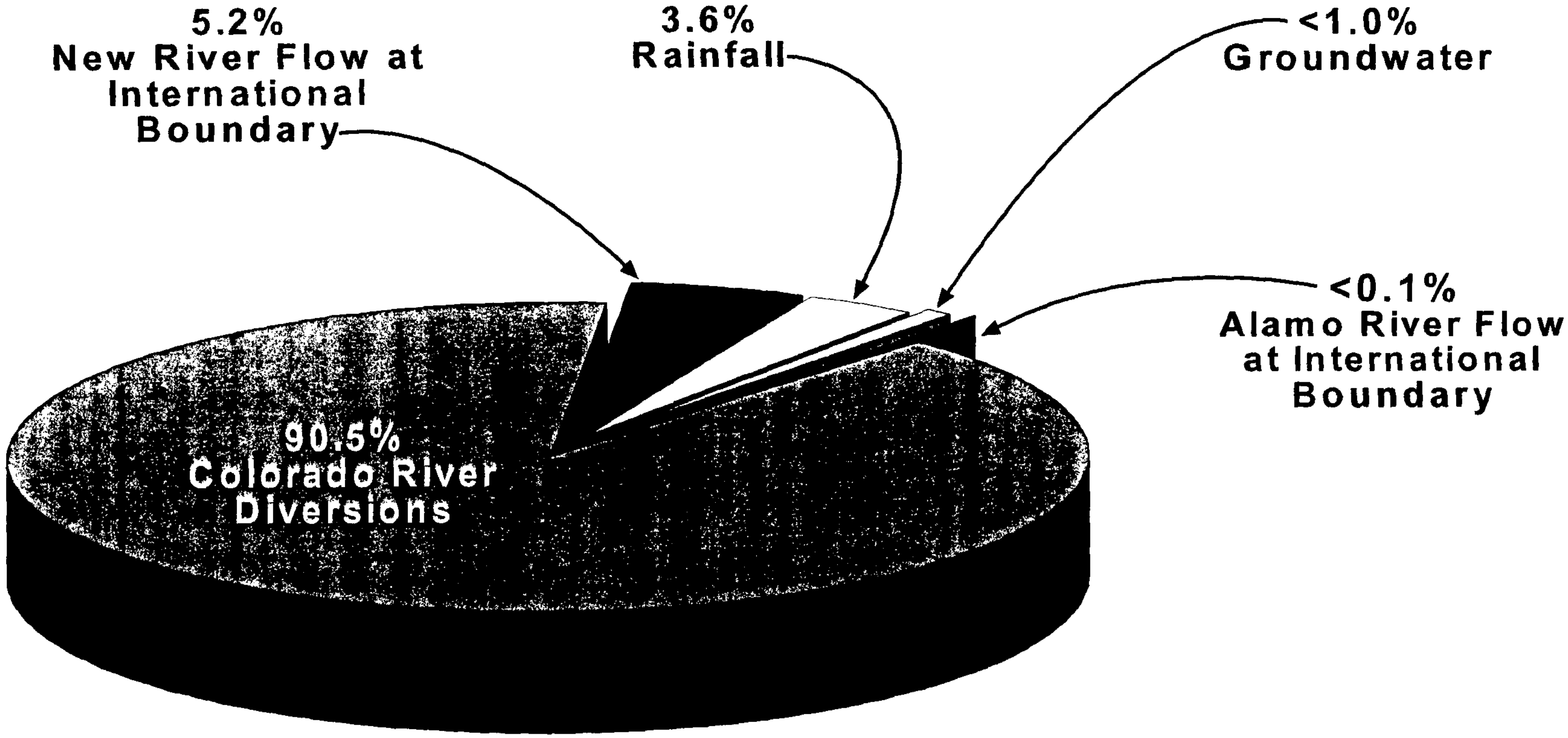

Figure 3.1-11
Percent of Surface Water Inputs
to the IID Water Service Area
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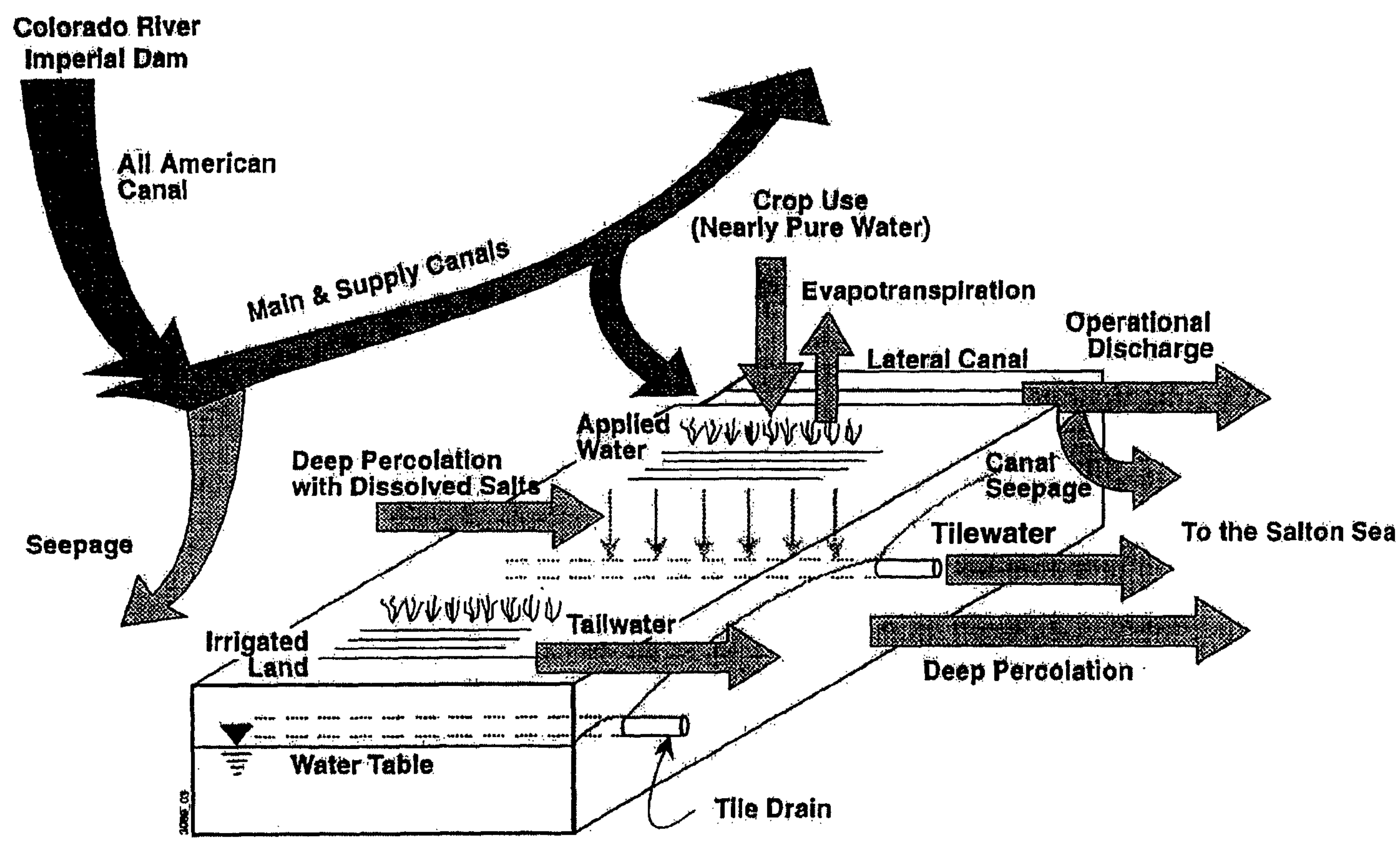

Figure 3.1-12
Water Schematic
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The New River receives approximately 29 percent of the drainage from IID, and including input from Mexico, accounts for about 39 percent of the total discharge from the IID water service area to the Salton Sea. The average annual flow from the New River to the Salton Sea is made up of approximately 81 KAFY from rainfall, municipal and industrial effluent, IID operational discharge, and canal seepage; 102 KAFY from tailwater; and 108 KAFY from on-farm tile drainage, for a total of 291 KAFY, with the remainder of the flow coming from Mexico and net river losses (see the Average Overall Water Balance in Figure 3.1-16 and Appendix F).

Surface Drains Discharging Directly to the Salton Sea. Surface drains that flow directly to the Salton Sea account for roughly 10 percent of the total discharge from the IID water service area to the Sea. The direct drain discharge to the Salton Sea is estimated at approximately 96 KAF. Rainfall, IID operational discharge, and canal seepage account for approximately 27 KAF of the total flow, 33 KAF originates from tailwater, and 36 KAF originates from on-farm tile drainage (see the Average Overall Water Balance in Figure 3.1-16 and Appendix F).

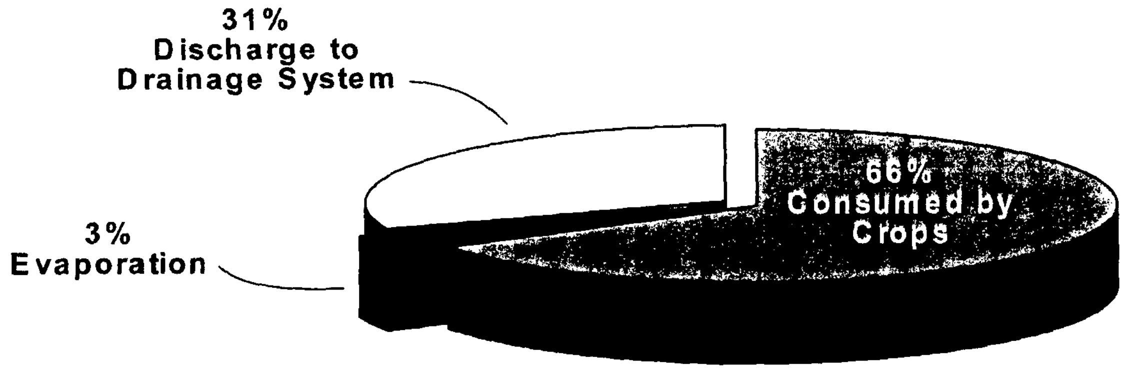
Drainage Water Quality. The following provides an evaluation of the influence of agricultural operations within the IID water service area on New and Alamo River water quality and describes the quality of drainage discharged directly from the IID water service area to the Salton Sea. The COCs in the New and Alamo Rivers at the International Boundary are compared with those at the outlets to Salton Sea, and with those in drainage water discharged to the New and Alamo Rivers and the Salton Sea. Other than changes resulting from evaporation, the difference between the constituent concentrations in the New and Alamo Rivers at the International Boundary and at the outlets to the Salton Sea can be largely attributed to drainage water discharges from fields within the IID water service area.

COC concentration values for the collective drains that discharge directly to the Salton Sea could not be determined because of the lack of reliable flow data for these drains. As a result, this information is not provided in this Draft EIR/EIS.

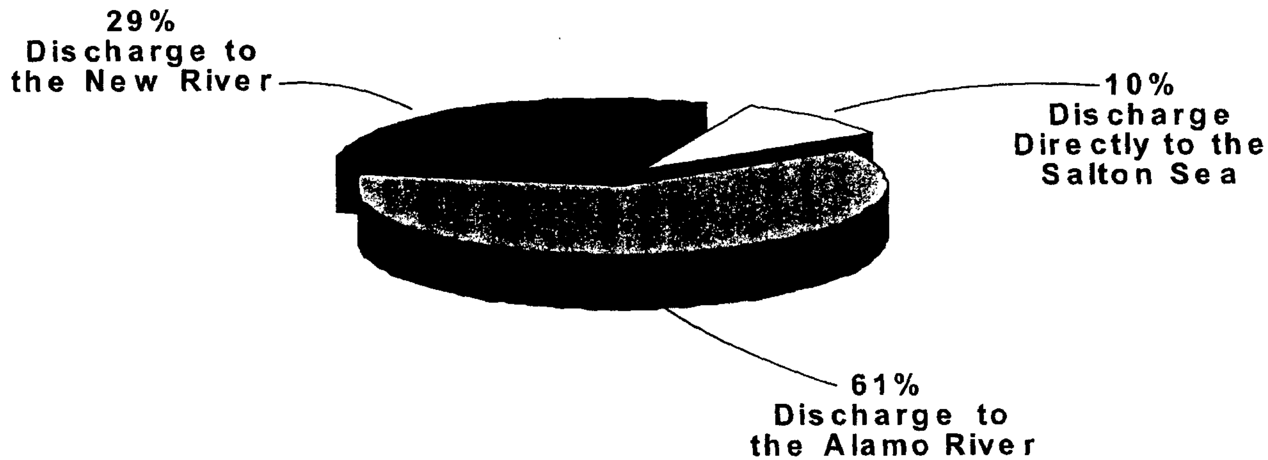
Constituents of Concern. Various studies in the IID water service area have identified a number of COCs in IID drainage water. The rationale for identifying these constituents is presented in Section 3.1.4.2, Significance Criteria. The COCs identified in irrigation and drainage water include the following:

- Salinity (also referred to as TDS)
- Selenium
- Total suspended solids (also referred to as TSS)
- Nitrogen and phosphorus
- Organochlorine insecticides (DDT and its metabolites DDE and DDD, and toxaphene)
- Organophosphorus insecticides (diazinon and chlorpyrifos (Lorsban, Dursban))
- Organochlorine herbicides (Dacthal)
- Boron

A brief discussion of the COCs is provided below. For information on the effects that these constituents might have on biological resources, see Section 3.2, Biological Resources.



**Water Delivery for
On-Farm Water Use**



**Distribution of IID Drainage to the New
and Alamo Rivers and the Salton Sea**

Figure 3.1-13
**On-Farm Water Use and Distribution
of IID Farm Drainage**
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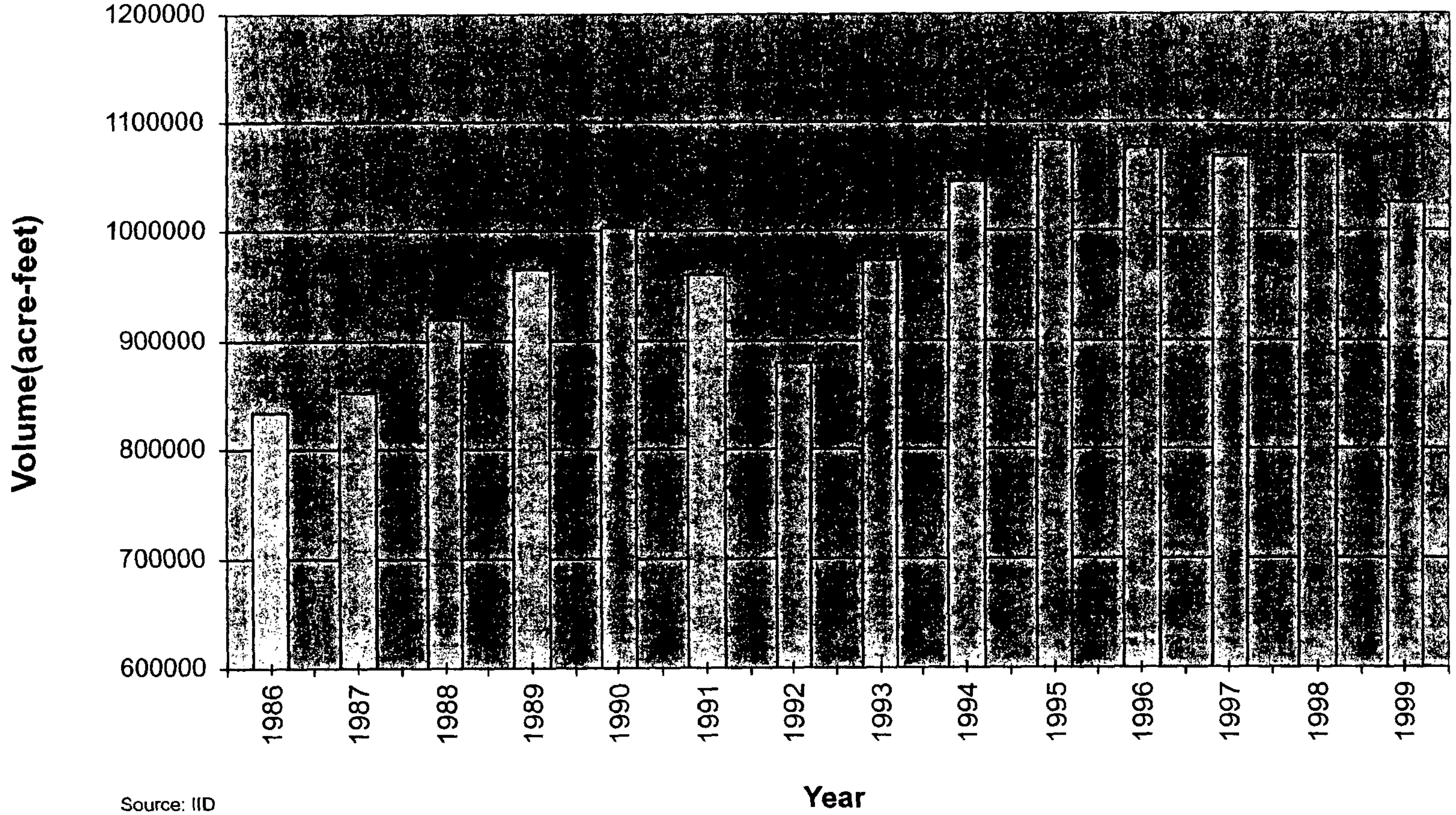

Figure 3.1-14
Total IID Discharge to the Salton Sea (1986-1999)
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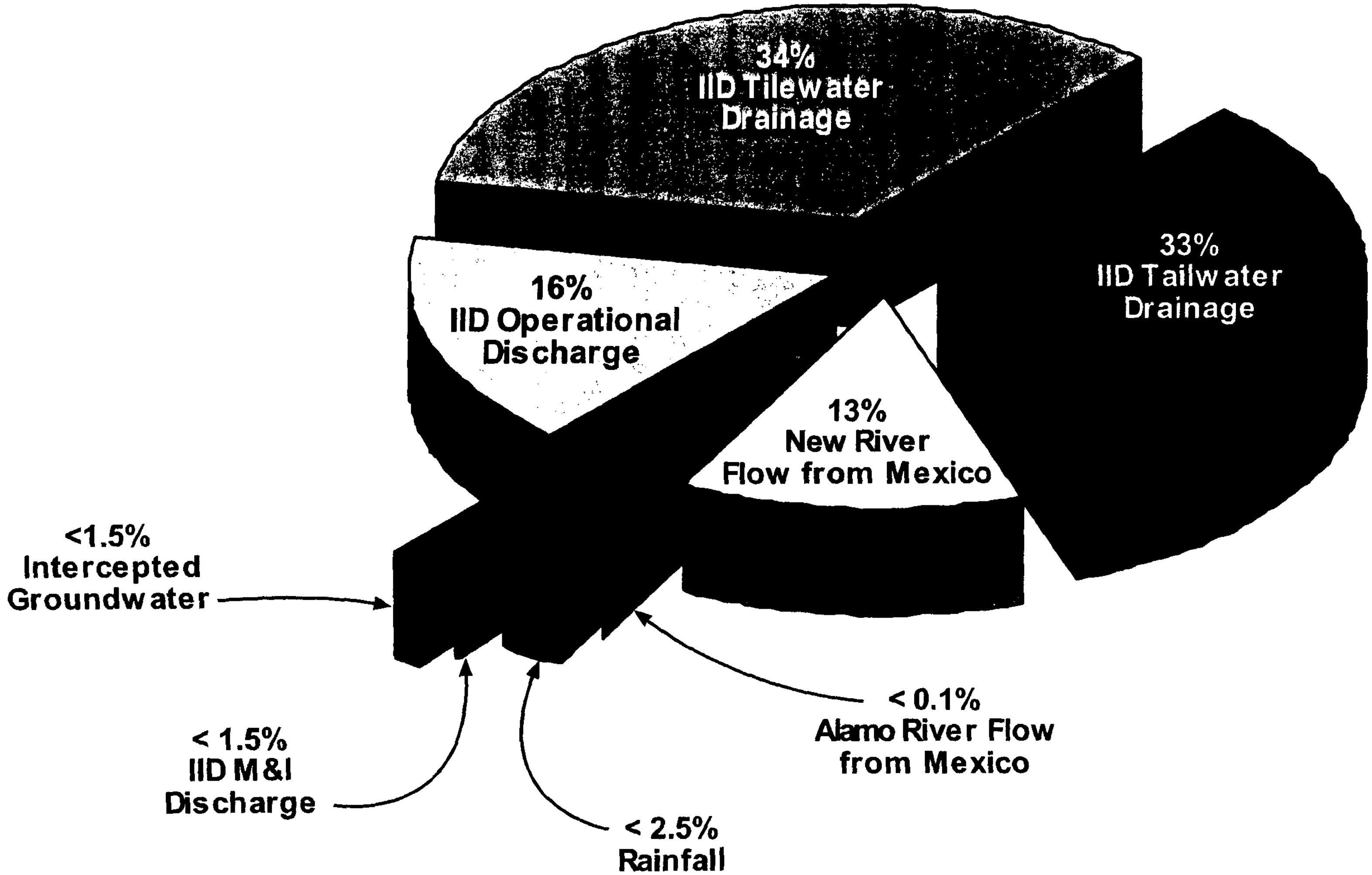

Note:
Flow numbers are approximate.

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Figure 3.1-15
Distribution of Surface Water Outputs to the Salton Sea from IID Farm Drainage and Other IID Waters
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NOTES:
1. DOES NOT INCLUDE APPROXIMATELY 300,000 ac-ft/yr DELIVERY TO COACHELLA CANAL.

2. INCLUDES APPROXIMATELY 3,400 ac-ft/yr DELIVERY TO IID USERS VIA THE AAC UPSTREAM OF THE MESA LATERAL 5 AND 4,100 ac-ft/yr DELIVERY TO IID USERS VIA THE COACHELLA CANAL.

SIMULATED MEAN ANNUAL FLOWS FOR TIME PERIOD 1987-1998 IN THOUSANDS OF ACRE FEET.

WATER BALANCE DATA ARE APPROXIMATE AND MINOR VARIATIONS IN THE MODELED FLOW DATA ARE EXPECTED.

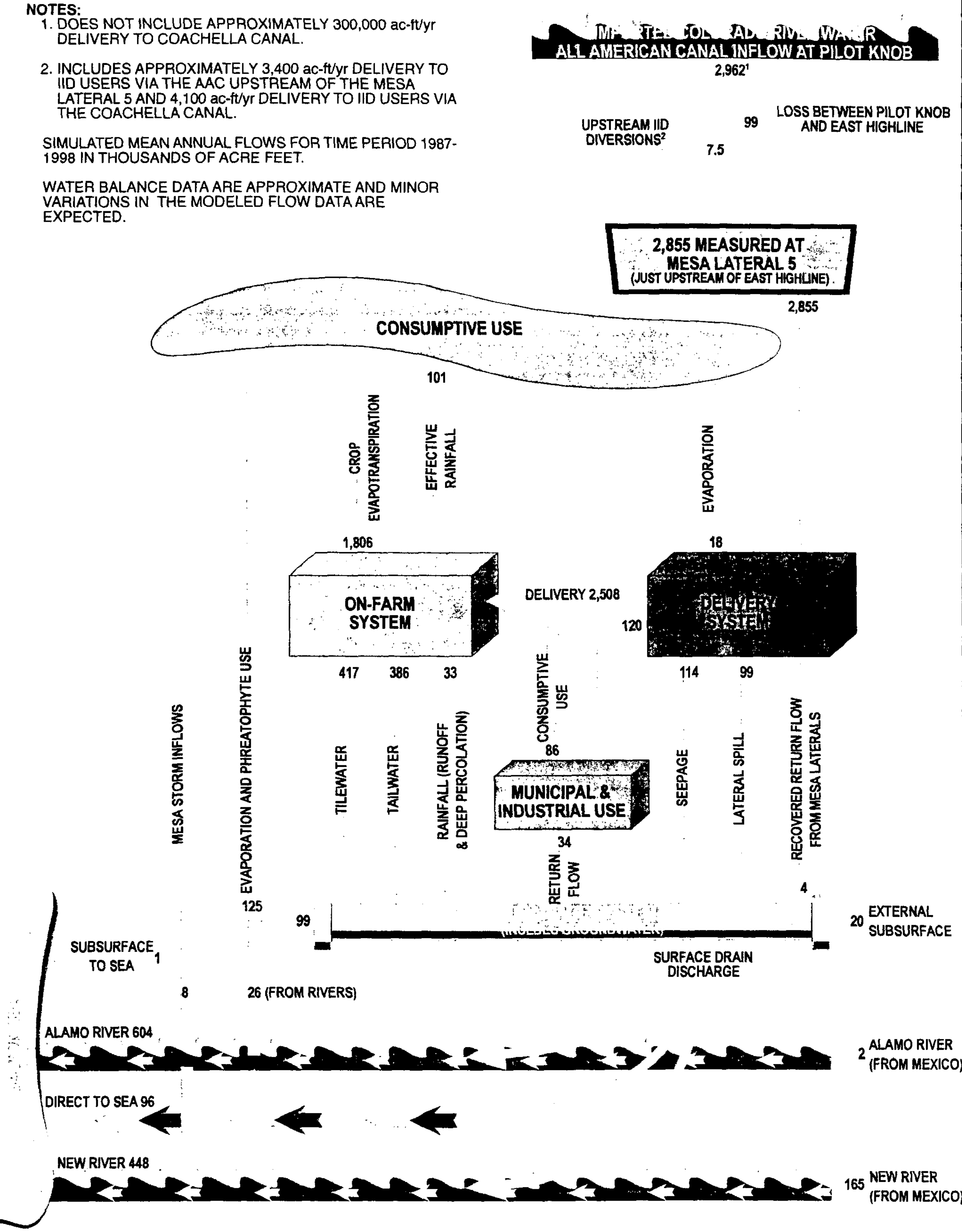

Figure 3.1-16
Existing Setting
Average Overall Water Balance
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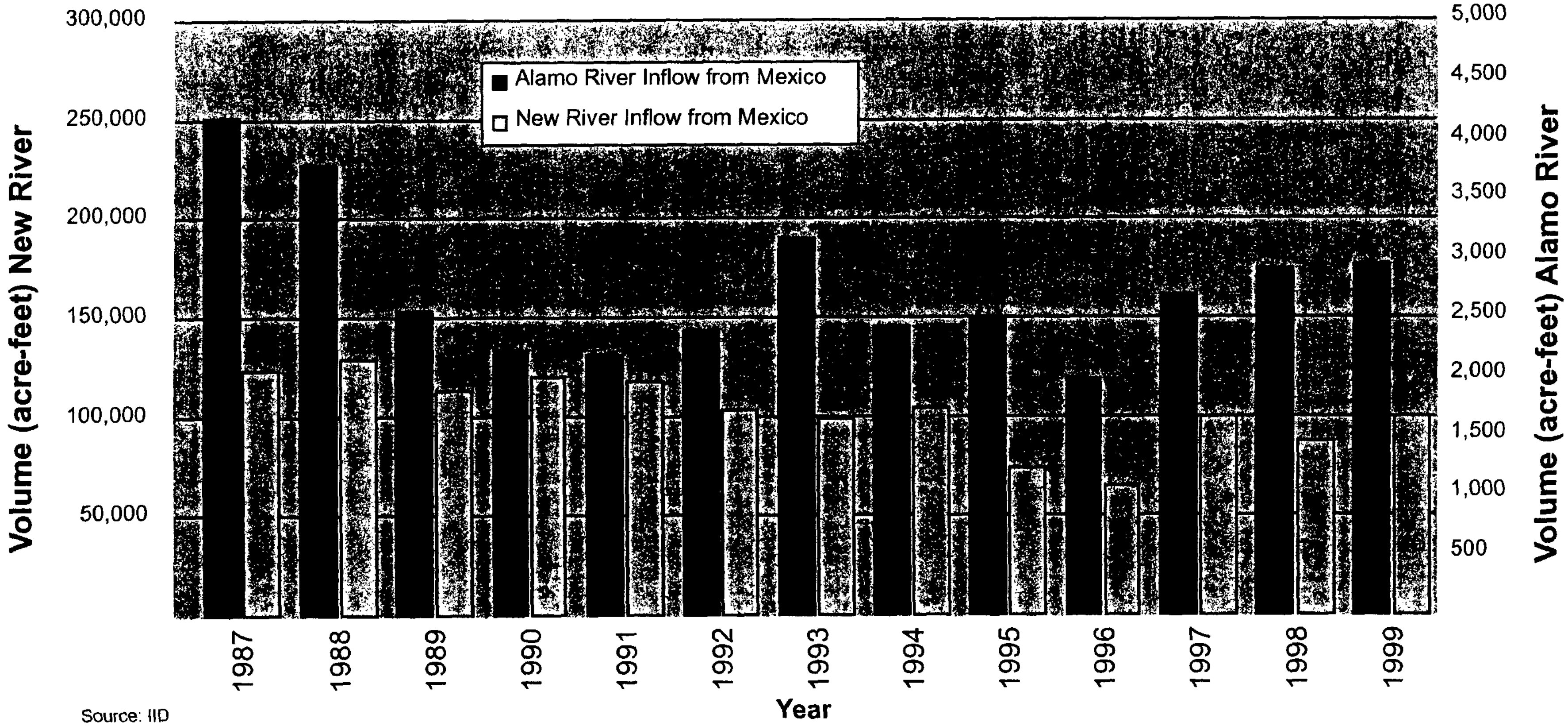

Source: IID

Figure 3.1-17
Annual Alamo and New Rivers Flow Volumes at the International Boundary (1987-1999)
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Salinity: Salinity (also referred to as TDS – these terms are interchangeable throughout this document) is one of the most prevalent COCs in the IID water service area. Chlorides and other dissolved solids all contribute to soil and water salinity. At high concentrations, soil salinity can be detrimental to seed germination and crop yields. Salt compounds include elements, such as selenium, that can also be toxic to humans, fish, and wildlife if the elements are biologically available in high enough concentrations.

The primary source of salts in the IID water service area soils is imported Colorado River water. These salts are applied to fields with irrigation water and are carried off by tailwater or tilewater drainage into surface drains. Evapotranspiration removes only water; therefore salts are concentrated in or below the root zone. Additional irrigation water is used to leach the salts out of the root zone and into the tile drainage system. As noted previously, the IID drainage system discharges to the Salton Sea either directly or via the New and Alamo Rivers. Thus, the Salton Sea ultimately serves as a sink for salts.

Selenium: Selenium is the constituent of greatest concern for toxic risk in the IID water service area and Salton Sea system (Setmire and Schroeder 1998). Selenium, in trace concentrations, is an essential element for both plants and animals but can be toxic at higher concentrations (Rosenfeld and Beath 1946). Selenium enters IID's soils, groundwater, and surface waters through imported Colorado River irrigation water. As described in the salinity discussion above, selenium is also concentrated in irrigated lands through evapotranspiration and flushed into water sources through irrigation practices.

Sediment: Surface runoff carries suspended sediment (also referred to as TSS when measured in solution) to agricultural drains and to the New and Alamo Rivers. These sediments might be deposited in slow-moving portions of drains, such as the mouths and vegetated areas of the drains, and/or transported into rivers where deposition can occur in vegetated areas, slow-moving backwaters, and at the New and Alamo River deltas at the Salton Sea. Sediment can carry DDT, its metabolites, and other insoluble pesticides, including toxaphene.

Nitrogen and Phosphorus: The IID water service area has a long history of agricultural use of fertilizers. Therefore, high concentrations of nitrogen and phosphorous are present in soils and drainage waters as these elements are primary components of fertilizers.

Organochlorine Insecticides: Organochlorine insecticides have been measured in drainage water, and in some sediments. Although banned in 1972, DDT and its metabolites are still present in the environment. In addition, organochlorine insecticides can be mobilized from soils and carried into the drainage system by irrigation water.

Organophosphorus Insecticides: Like the organochlorine insecticide DDT, the organophosphorus insecticides diazinon and chlorpyrifos were first introduced into the IID water service area as agricultural insecticides. The main concern about these chemicals relates to their toxicity to aquatic organisms. Because of their molecular weight and density, organophosphate compounds, such as chlorpyrifos, typically settle in sediments and persist in soil. Even though they are less persistent than organochlorines, organophosphates can also be transported into surface waters through irrigation and drainage practices.

Organochlorine Herbicides: As in the case of insecticides, irrigation systems mobilize organochlorine herbicides, depositing them in surface drainage systems throughout the IID water service area. It is likely that organochlorine herbicides have been introduced into the Salton Sea via runoff and irrigation drains.

Boron: Boron exists in several forms in soil in the IID water service area and appears to be leaching from its irrigated soils. Though beneficial in small quantities, elevated concentrations of boron can lead to adverse effects in organisms. In aquatic environments, sediments often absorb boron.

Laboratory analysis of water discharging to the IID drainage system indicates the following:

- Operational discharges are considered to have the best water quality because they are not applied to the land. Operational discharges have a water quality similar to that entering the IID water service area directly from the LCR.
- Tailwater is considered to have the next best water quality, relative to operational discharge. However, tailwater accumulates sediment and solutes (including potentially significant concentrations of agricultural fertilizers and pesticides) from the soil as it flows across cultivated fields.
- Tilewater is generally considered to have the poorest water quality because dissolved salts and other constituents tend to concentrate in the water as it percolates through the root zone and is collected in subsurface drainage.

Data Collection Parameters. The data presented below provide an average concentration of the COCs in IID drains and rivers under existing conditions.

Historical Water Quality Data: Historical water quality data include data collected during numerous monitoring events from sites located throughout the IID water service area. This database was compiled for modeling purposes and was obtained from various sources, including EPA's Storage and Retrieval Environmental Data System, USGS' Water Quality Network, RWQCB, and published papers and documents. These sources contained water quality data collected within the IID water service area over many years. However, for this Draft EIR/EIS, the data were limited to those collected for the period between 1970 to 1999.

Although the water quality data set contained many samples, the data tended to be collected sporadically over time and favored readily accessible sites. For example, even though the time period for sample collection ranged from 1970 to 1999, samples were not collected on a regular (e.g., monthly, annual, etc.) basis or at a uniform group of sites. Furthermore, the numbers of analyses of any one COC ranged from very few to several hundred. Because of the lack of good temporal coverage, the data were grouped by month throughout the entire study period. The data were then grouped spatially and assigned to distinct geographic locations to quantify flow and COC concentrations from each of the various sources that flow into and discharge out of the IID water service area. As a result, the data are reported as mean concentrations of COCs, which represent cumulative flows at the following geographic locations:

- IID irrigation delivery water
  - AAC
- Alamo River drainage basin
  - Alamo River at the International Boundary
  - IID surface drain discharge to the Alamo River (South Central and Holtville drains)
  - Alamo River at the outlet to the Salton Sea
- New River drainage basin
  - New River at the International Boundary (Greeson and Trifolium 12 drains)
  - IID surface drain discharge to the New River
  - New River at the outlet to the Salton Sea

A summary of the historical water quality data associated with each of the individual drains and the cumulative drainage is provided below. Following these summaries, a list of the mean flows and COC concentrations according to particular drains and geographic sources is presented in Table 3.1-4. The table also shows state and federal water quality criteria.

- It should be noted that the water quality data shown in the following figures do not include water quality values for the entire list of COCs. Rather, the graphs only show concentration trends for TDS, selenium, and TSS. The graphs are limited to TDS, selenium, and TSS because the sample population base for the organophosphorus insecticides and organochlorine insecticides and herbicides is not large enough to show trends in the data, analytical data indicate that boron does not exceed state or federal water quality standards, and water quality standards are not available for nitrogen and phosphorous (see Section 3.1.4.2).

IID Irrigation Delivery Water. With the exception of rainfall and minor contributions from groundwater sources, surface water that is diverted from the Colorado River is the only water available to IID for agricultural use.

AAC: Other than concentration by evaporation, TDS concentrations in water entering the IID water service area through the AAC change little between the input at the Imperial Dam and the outlet of the AAC to the IID water service area (EPA STORET database).

Annual average TDS concentrations in Colorado River delivery water to IID for the period 1973 to 1998 are shown on the graph presented in Figure 3.1-18.

Alamo River Drainage Basin. This section provides a summary of the water quality in the Alamo River drainage basin and includes water quality data for the Alamo River at the International Boundary, the Alamo River surface drains (including the South Central Drain and the Holtville Main Drain), and the outlet of the Alamo River to the Salton Sea (see Figure 3.1-19).

TABLE 3.1-4
Historical Mean Flows and Concentrations for Water Quality Parameters in the IID Water Service Area

Parameter	Historical WQ Data (1970-1999)							Fresh Water Quality Criteria[4]
	Colorado River Irrigation Delivery	New River			Alamo River			
	AAC	International Boundary	Surface Drains[2]	Outlet to Salton Sea	International Boundary	Surface Drains[2]	Outlet to Salton Sea	
Daily mean flow (cfs)	3,934	250	—	622	—	—	843	NA
Instantaneous flow (cfs)	—	193	—	—	2	—	—	NA
TDS (mg/L)	771	3,894	2,116	2,997	3,191	2,375	2,458	4,000
TSS (mg/L)	86	117	193	313	360	318	479	200 or NA[5]
Se (μg/L)	2.5	3.0	7.4	7.1	5.9	7.9	7.7	5.0
NO3 (mg/L)	0.28	0.84	7.49	4.37	1.87	8.14	7.81	NA
Total phosphorus (mg/L)	0.05	1.42	0.78	0.81	0.47	0.84	0.63	NA
Total P in sediment (mg/kg)	—	535	1,300	1,600	—	—	1,100	NA
DDT (μg/L)	0.001	0.088	0.013	0.016	0.011	0.020	0.016	1.1/0.001
DDT in sediment (μg/kg)	—	0.1	2.6	11.0	0.1	14.6	0.1	NA
DDD (μg/L)	0.001	0.046	0.010	0.017	0.011	0.017	0.011	0.00083
DDD in sediment (μg/kg)	—	—	5.4	—	—	6.3	—	NA
DDE (μg/L)	—	—	—	—	—	—	—	0.00059
DDE in sediment (μg/kg)	—	9.8	44.1	9.8	18.0	15.7	30.0	NA
Toxaphene (μg/L)	0.001	0.272	0.946	0.013	0.100	0.995	0.014	0.73/0.0002
Toxaphene in sediment (μg/kg)	—	10.0	9.5	18.3	5.0	26.6	2.5	NA
Diazinon (μg/L)	—	—	0.025	—	—	—	0.025	0.025
Chlorpyrifos (μg/L)	—	—	0.025	—	—	—	0.025	0.041
Dacthal (μg/L)	0.007	—	—	—	—	—	—	NA
Boron (μg/L)	170	1,600	804	1,172	1,798	683	695	5,000

[1]Includes the Greeson Drain and the Trifolium 12 Drain.

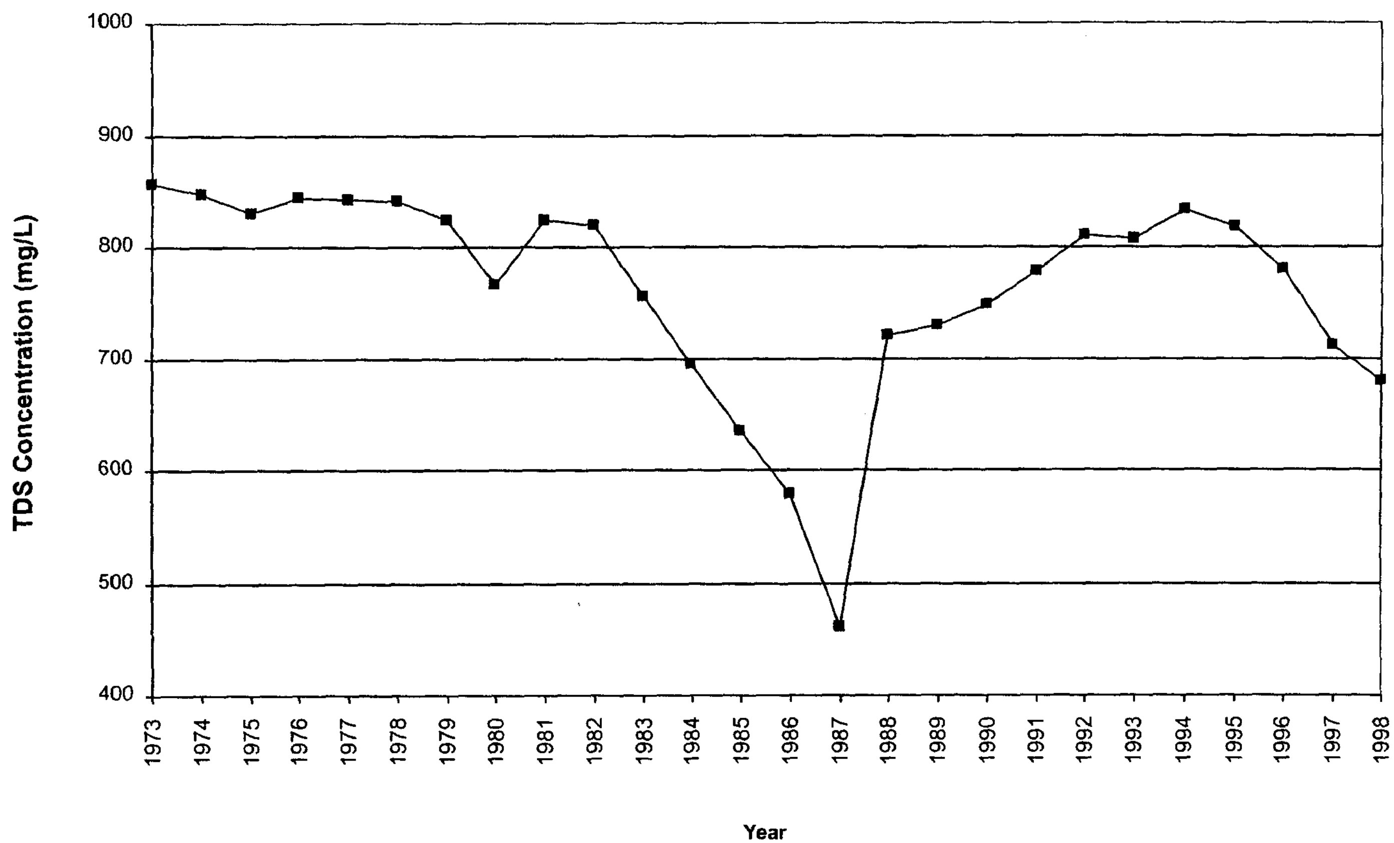
[2]Includes the Holtville Main Drain and the South Central Drain.

[3]Multiple significance criteria may apply (i.e., Aquatic Life criteria for chronic and acute exposure, or Human Health Criteria for consumption of fish (see Significance Criteria in Section 3.1.4.2). NA indicates

[4]Multiple significance criteria may apply (i.e., Aquatic Life criteria for chronic and acute exposure, or Human Health Criteria for consumption of fish (see Significance Criteria in Section 3.1.4.2). NA indicates no significance criteria available.

[5]200 mg/L based on proposed Phase 4 TMDL criteria for the Alamo River (see Significance Criteria in Section 3.1.4.2). TSS TMDLs are not yet available for the New River or IID surface drains.

— = Data Not Available.



Note:
TDS concentration data collected in the Colorado River below Imperial Dam

Figure 3.1-18
Annual Average TDS Concentrations in Colorado River Water Delivered to IID (1973-1998)
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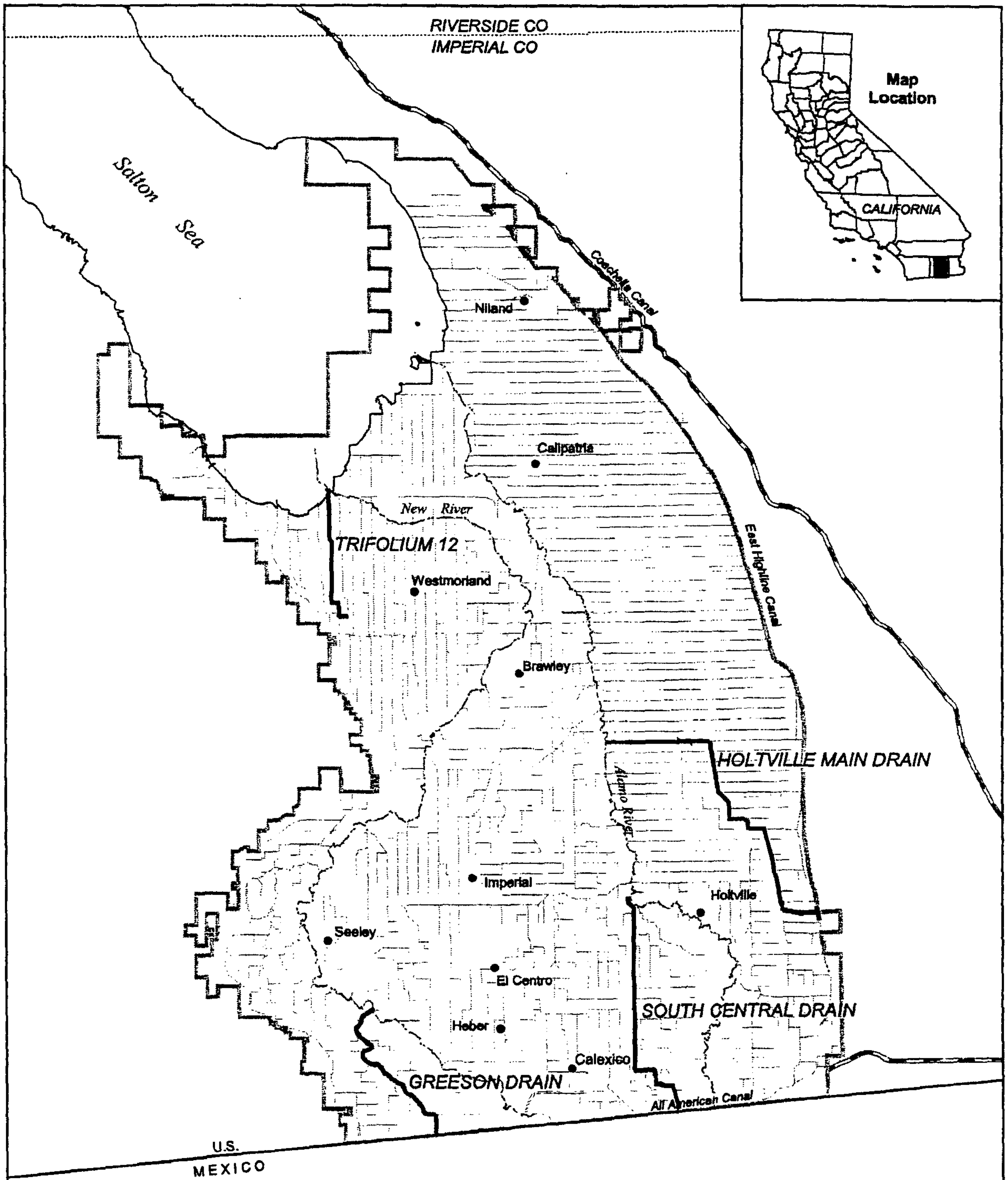

DRAINS
AQUEDUCT/CANAL
COUNTY LINE
INTERNATIONAL BORDER
RIVER
IID WATER SERVICE AREA
CITIES

N

Sources:
University of Redlands, 1999; DOI, 1999; Reclamation, 1999

5 0 5 Miles
SCALE IS APPROXIMATE

Figure 3.1-19
Locations of the South Central, Holtville Main, Greeson, and Trifolium 12 Drains in IID
IID Water Conservation and Transfer Project Draft EIR/EIS

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Alamo River at the International Boundary: Except for approximately 2 KAF of inflow across the International Boundary, virtually all of the flow in the Alamo River originates as discharge from the IID water service area. Water quality data collected at the International Boundary is included to provide historical data at this location. The historical (1970 to 1999) data set indicates that concentrations of selenium, boron, and TDS were significantly higher at this site than in IID irrigation delivery water. In addition to selenium, boron, and TDS, the mean and range of concentrations for nitrate as nitrogen, phosphorus, DDT, DDD, and toxaphene were also higher than the concentrations in irrigation delivery water. Concentration values for DDE, Dacthal, chloropyrifos, and diazinon in irrigation delivery water were unavailable for comparison with values observed in the Alamo River at the International Border (see Table 3.1-4).

IID Surface Drain Discharge to the Alamo River: Water quality data for COC concentrations in irrigation discharge from the Alamo River surface drains show concentration values for selenium, boron, and TDS that were higher than the concentrations in irrigation delivery water (see Table 3.1-4). In addition, the mean selenium concentrations for the surface drains are above state and federal water quality standards of 5 µg/L (see Section 3.1.4.2—Significance Criteria).

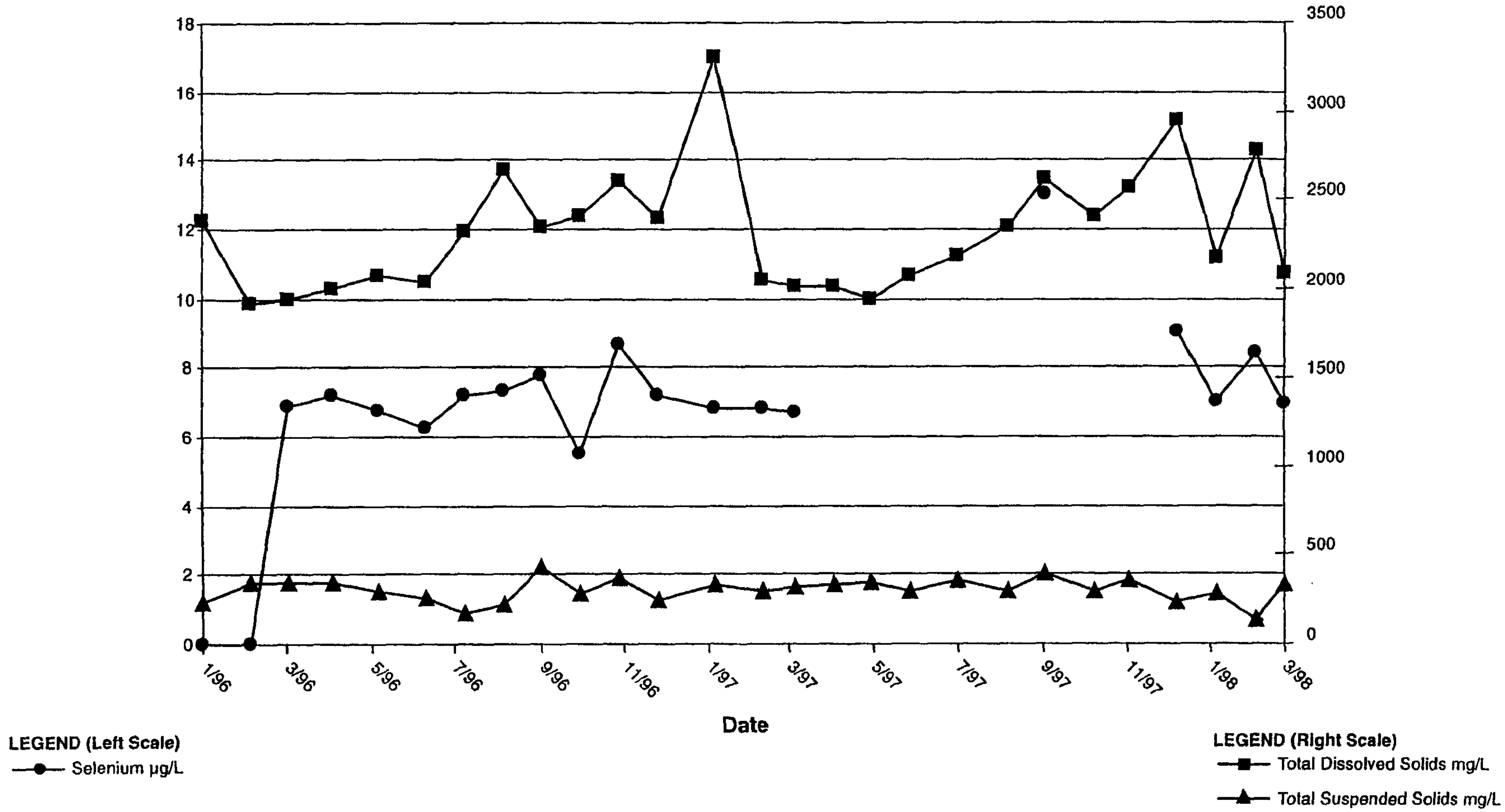
Alamo River at the Outlet to the Salton Sea. Concentration values for the COCs in Alamo River water at the outlet to the Salton Sea (see Figure 3.1-20) show that selenium concentration values are above the significance criteria of 5 µg/L established by the Basin Plan. However, TDS concentrations at the outlet to the Salton Sea fall below both the historical concentration in the Alamo River at the International Boundary and the significance criteria of 4,000 mg/L established by the Basin Plan.

TDS values at the outlet to the Salton Sea are substantially similar to the TDS values detected in historical samples collected from IID surface drains.

New River Drainage Basin. This section provides a summary of the water quality in the New River drainage basin and includes water quality data for the New River at the International Boundary, the New River surface drains (including the Greeson Drain, the Trifolium 12 Drain)_, and the outlet of the New River to the Salton Sea.

New River at the International Boundary: The New River also enters the IID water service area from Mexico but, unlike the Alamo, the New River serves as an open conduit for untreated municipal sewage, heavy metals, and agricultural drainage waters high in pesticide residues from northern Mexico. Phosphorus has elevated concentrations relative to water in the New River drains or at the New River outlet to the Salton Sea. The historical water quality data also show that both boron and TDS values were significantly elevated in comparison to AAC irrigation delivery water and water in surface drains that discharge to the New River.

IID Surface Drain Discharge to the New River: Historical water quality data for COC concentrations in irrigation discharge from the New River surface drains showed concentration values for selenium, boron, and TDS that were higher than those found in IID irrigation delivery water, and the mean selenium concentration values were above the significance criteria of 5 µg/L established by the Basin Plan.



Note:
"0" indicates concentration was below detection limits.

Figure 3.1-20
COC Concentrations in the Alamo River at the Outlet to the Salton Sea
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New River at the Outlet to the Salton Sea: The mean selenium concentration value for the New River at the outlet to the Salton Sea fell below the significance criterion of 5 µg/L established by the Basin Plan (see Figure 3.1-21). The historical water quality data showed concentrations of DDT, DDD, and toxaphene that were lower in the New River at the outlet to the Salton Sea than at the International Boundary.

COC CONCENTRATIONS IN SEDIMENTS

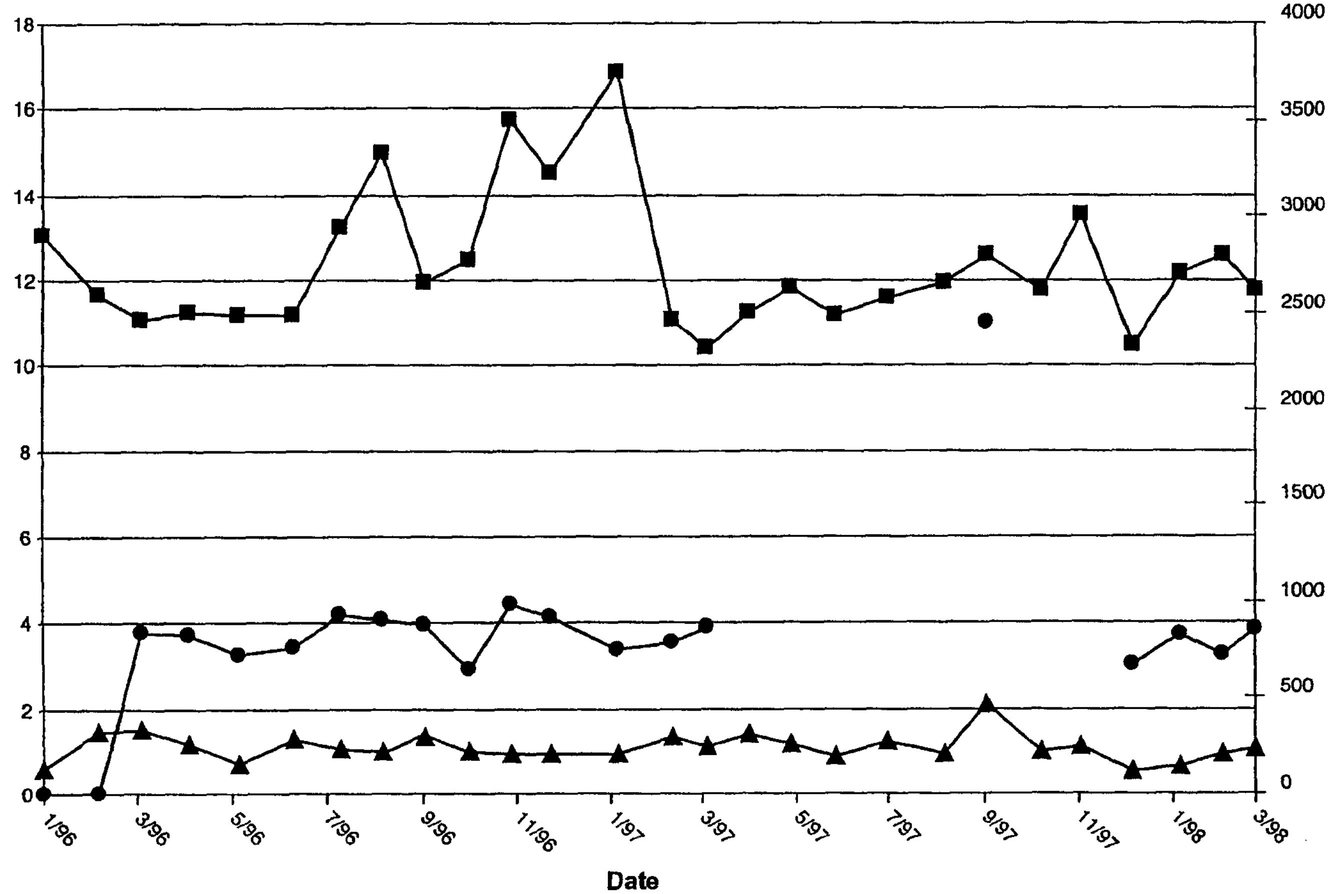
Irrigation Delivery: Information regarding COC concentrations in sediments within the IID irrigation delivery canal system is unavailable. However, historical data from the LCR show a median selenium concentration in sediments of 0.180 mg/kg (Radtke et al. 1988). In USGS samples taken in the vicinity of Imperial Dam, the reported selenium ranged from 6.2 to 7.1 mg/kg. This work demonstrated that mainstream Colorado River sediment less than 63 microns in diameter appeared to be acting as a sink for selenium, especially in backwater areas with higher concentrations of organic matter. Boron also was reported in one sample at a concentration of 1.4 mg/kg. DDT was not found but DDD was reported at 0.3 µg/kg and DDE at a concentration of 4.1 µg/kg

Alamo River Drains: Mean concentrations of DDT (14.6 µg/kg), DDD (6.3 µg/kg), DDE (15.7 µg/kg), and toxaphene (26.6 µg/kg) were detected in sediments found in surface drains discharging to the Alamo River. The data for pesticides (including DDT and its metabolites) suggest that some residual organochlorines are being collected from agricultural drainages (Eccles 1979). However, most of these pesticides have low solubilities and might be expected to remain associated with particulates and sediments. Organochlorine residues are mobilized off agricultural fields in particle-rich tailwater runoff and/or by sediment resuspension in the rivers or drains (Setmire et al. 1993).

Alamo River at the Outlet to the Salton Sea: Mean concentrations of DDE (30.0 µg/kg) and toxaphene (2.5 µg/kg) were detected in sediments collected from the Alamo River at the outlet to the Salton Sea.

New River Drains: Mean concentrations of DDT (2.6 µg/kg), DDD (5.4 µg/kg), DDE (44.1 µg/kg), and toxaphene (9.5 µg/kg) were detected in sediments found in surface drains discharging to the New River. Mean concentrations of total phosphorus at 1,300 mg/kg were detected in sediments collected from IID surface drains which discharge to the New River.

New River from the International Boundary to the Outlet of the Salton Sea: The mean concentration of total phosphorus in sediments in the New River increased from 535 mg/kg at the International Boundary to 1,600 mg/kg at the outlet to the Salton Sea. DDT and toxaphene also increased in concentration from 0.1 µg/kg and 10.0 µg/kg at the International Boundary to 11.0 µg/kg and 18.3 µg/kg at the outlet to the Salton Sea. However, the mean concentration for DDE remained the same at 9.8 µg/kg at the International Boundary and at the outlet to the Salton Sea.



LEGEND (Left Scale)
Selenium µg/L

LEGEND (Right Scale)
Total Dissolved Solids mg/L
Total Suspended Solids mg/L

Note:
"0" indicates concentration was below detection limits.

Figure 3.1-21
COC Concentrations in the New River at the Outlet to the Salton Sea
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GROUNDWATER

The IID water service area is located within the Imperial Valley Basin, a 1,870 square-mile regional groundwater basin located within the Colorado Desert Hydrologic Area (DWR 1975, 1980). The entire Imperial Valley Basin lies within the Salton Basin Region of the Salton Trough, a large, sediment-filled topographical depression that is approximately 130 miles long and as much as 70 miles wide. The Salton Basin Region includes sub-basins and portions of sub-basins (i.e., Imperial Valley and other nearby sub-basins) within the Salton Trough which drain directly into the Salton Sea (Norris and Webb 1976). The Salton Basin is bordered on the north by the Salton Sea, on the northeast by the Chocolate Mountains, on the southeast by the Sand Hills and Cargo Muchacho Mountains, on the west by the Vallecito and Jacumba Mountains, and on the south by the northern Mexicali Valley and the Mexican-American international border (the International Boundary) (see Figure 3.1-22).

Imperial Valley Basin water-bearing units that underlie IID are made up of older and younger alluvium with a storage capacity estimated to range from approximately 7 MAF (County of Imperial 1997a) to 14 MAF (DWR 1975). Deep exploration holes drilled to find oil or water have shown that most of the IID water service area is underlain by thick, water-saturated lacustrine and playa deposits overlying older sediments

(Loeltz et al. 1975). As a result of surface application of irrigation water and the low permeability of much of the IID soil, a perched water table exists throughout much of the Imperial Valley (IID 1994). The fine-grained deposits that are characteristic of the IID water service area have transmissivities of only 1,000 to 10,000 gallons per day per foot to depths of 500 feet. At greater depths, transmissivities are likely to be even less for a similar thickness of deposits. Thus, the potential for development of groundwater beneath the IID water service area to meet irrigation and domestic demands is severely limited. Except for withdrawals currently made for geothermal energy production, the aquifer at depths greater than several thousand feet is too saline for irrigation and most other uses. It is believed that the hydraulic connection between the water within the deeper deposits and that within the upper part of the groundwater reservoir is poor (Loeltz et al. 1975).

The Imperial Valley Basin is hydraulically connected to other adjacent and nearby sub-basins within the Salton Basin Region. However, imported Colorado River irrigation water, discharged as seepage or spillage from the IID canal system, and/or percolation that bypasses the tilewater system constitute the primary sources of groundwater inflow into the aquifer(s) underlying the IID water service area. In comparison to imported water, groundwater inflow into the IID water service area is small, with the total inflow estimated at approximately 22 KAFY, consisting of 15 KAFY originating from the East Mesa area and 7 KAFY from the West Mesa area and Mexican territory (CH2M HILL 1994).

Regionally, groundwater generally mimics surface flow, moving toward the center of the IID water service area and then northwest toward the Salton Sea. On a smaller scale, groundwater follows the regional pattern, with groundwater moving from the eastern and western sides of the IID water service area toward the New and Alamo Rivers, and then northwest toward the Salton Sea (see Figure 3.1-23).

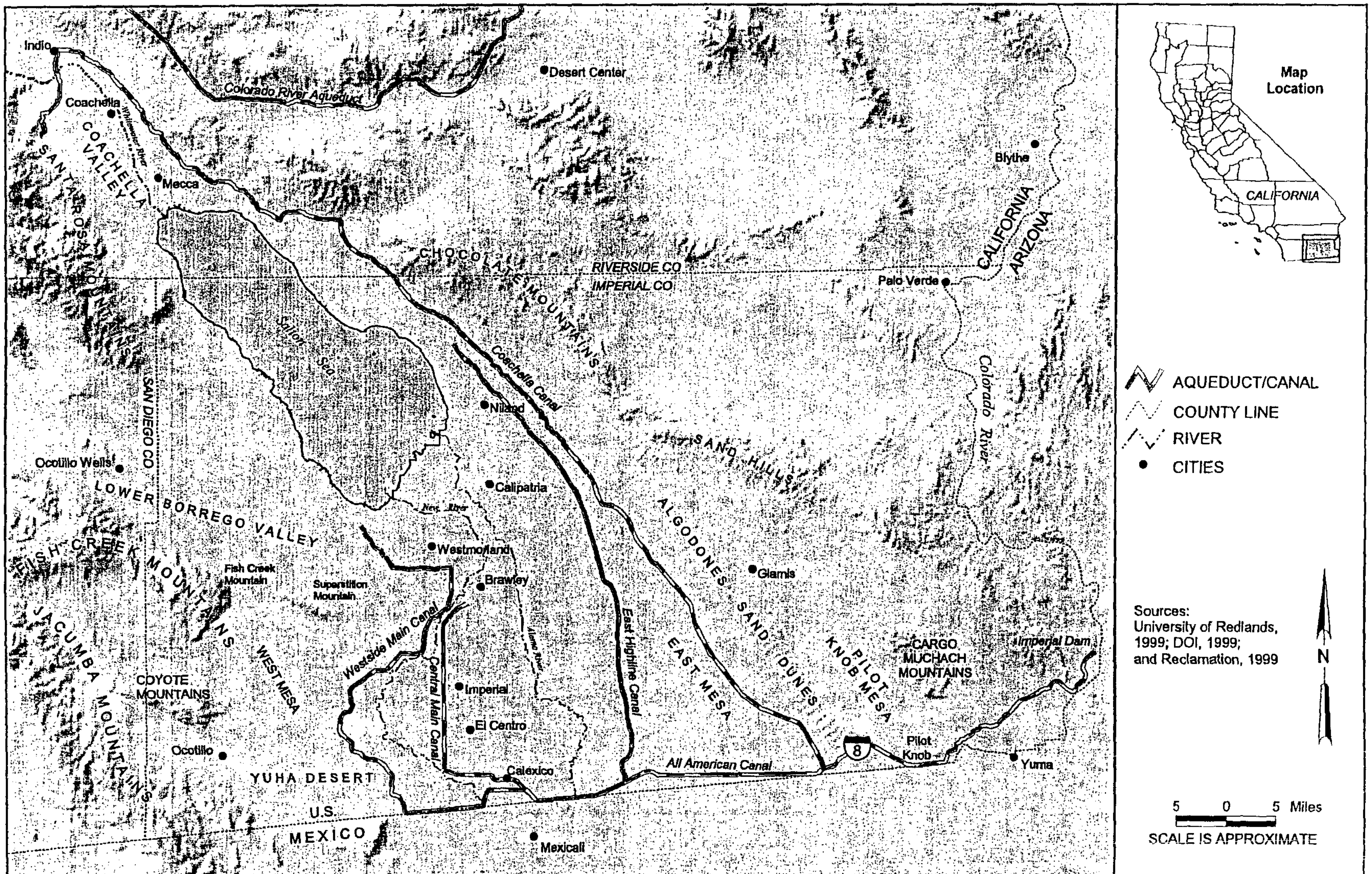

Figure 3.1-22
Topographic Features
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Principal areas of groundwater discharge include: groundwater discharge directly into the New and Alamo Rivers, subsurface discharge into the Salton Sea, shallow groundwater intercepted by IID's open drainage collection system, and evapotranspiration. In comparison with surface waters, groundwater recharge to the Salton Sea is a small component of the total inflow to the Salton Sea. The IID water service area's contribution of groundwater to the Salton Sea amounts to about 2 KAFY.

While the amount of groundwater stored in the Imperial Valley Basin is large, few wells have been drilled for production purposes because the yield is low and the water is of poor quality (Montgomery Watson 1995). The chemical quality of groundwater within the Imperial Valley Basin varies greatly. For example, TDS concentrations range from a few hundred to more than 10,000 mg/L. Concentrations of fluoride above the MCL of 4.0 mg/L for drinking water are common (Tetra Tech 1999).

3.1.3.3 Salton Sea

The environmental setting discussion for surface water resources of the Salton Sea includes discussions of the Sea's:

- Watershed
- Water balance
- Inflow trends
- Physical characteristics
- In-Sea circulation patterns
- Water quality
- Sediment quality

The Salton Sea is a terminal lake with no surface water discharges. It is located approximately 35 miles north of the US/Mexico border and 90 miles east of San Diego. The Salton Sea Basin comprises the western arm of the LCR delta system. At one time, the Salton Sea represented the northernmost tip of the Gulf of California. As the Colorado River deposited huge volumes of sediment in the delta system, the sediment collected onto a broad fan that formed uplands and physically isolated the Salton Sea Basin from the Gulf of California. The Colorado River occasionally flowed into the Salton Sea Basin, forming a prehistoric water body known as Lake Cahuilla named after the local Native Americans. The lake fluctuated greatly in size over time and is thought to have at one time occupied an area more than 20 times as large as the current Salton Sea. When the river meandered from the Salton Sea basin toward the Gulf of California, the lake began to evaporate and become more saline. The repeated periods of evaporation resulted in the deposition of thick salty sediments and layers of marine fossil shells (Setmire et al. 1990). Lake Cahuilla is thought to have existed in its most recent form until about 300 to 500 years ago (Ogden 1996).

During the 1800s, shallow ephemeral lakes periodically formed in the Salton Sea Basin as the Colorado River rose and fell prior to its damming. Reported episodes of inundation occurred in 1828, 1840, 1849, 1852, 1859, 1862, 1867, and 1897 (Littlefield 1966). The flood of 1891 spawned a water body of approximately the same surface area as the current Salton Sea.

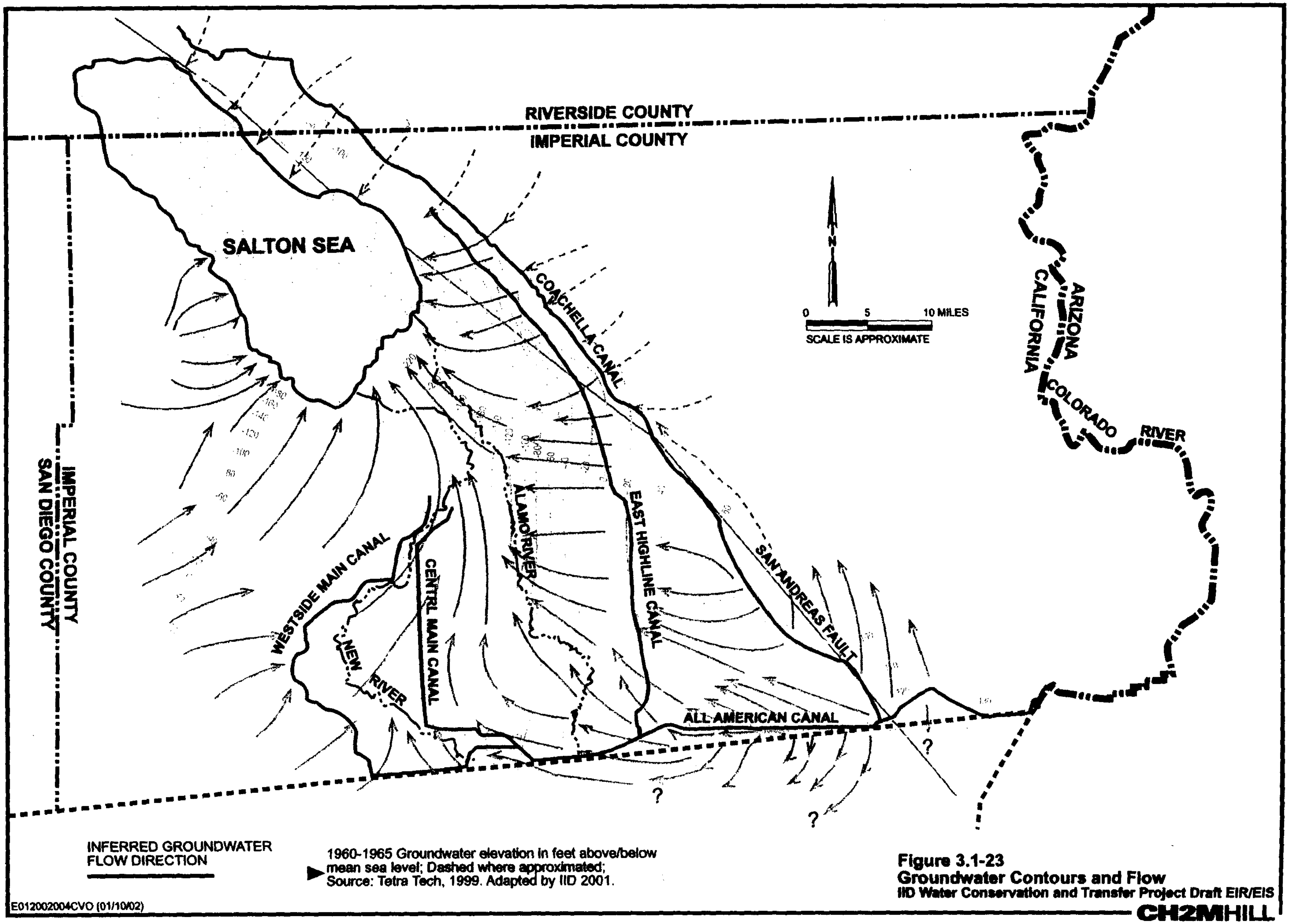

Figure 3.1-23
Groundwater Contours and Flow
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The Salton Sea reached its present form in 1905 when Colorado River floodwaters breached a temporary diversion that had been designed to bypass a silted-up section of the Imperial Canal. On October 11, 1905, a dike failed, and nearly the entire flow of the Colorado River ran uncontrolled into the Salton Sea Basin for the next 18 months. When the breach was finally repaired in 1907, the elevation of the Salton Sea had reached -195 feet msl and had a surface area of 520 square miles. The Sea has existed continuously from that 1905 event to the present.

The water level in the Salton Sea fell to almost 250 feet below msl during the decade following the 1905 flood, rose slowly through the mid-1980s, and has been relatively constant since then. The water level fell rapidly after the initial flood and then gradually rose from elevation -250 feet msl to its current level of approximately -228 feet msl (Weghorst 2001). The water surface elevation has been fairly constant during the past decade, ranging from -228.7 feet msl to -226.6 feet msl, indicating that the sum of the inflows approximately equals the rate of evaporation on an average annual basis.

Data provided by Reclamation indicate that at its current elevation of approximately -228 feet, the Salton Sea surface area is approximately 233,253 acres and its volume is approximately 7.53 MAF. The very shallow slopes of the near-shore areas result in large changes in water surface area given small changes in water level elevation. For example, a drop of elevation of one foot from the current elevation reduces the surface area by 2,127 acres. At the current elevation, the depth of the Sea at its deepest point is approximately 50 feet (Weghorst 2001).

The Sea currently receives some inflow from precipitation and groundwater seepage, but the majority of inflows are from agricultural and municipal drainage. The source of most of the agricultural inflow is water imported to the region from the Colorado River. It should be noted that although the average groundwater inflow from CVWD for 1950 to 1999 is 1539 AFY, currently the Sea is losing water to Coachella Valley (366 AFY in 1999) groundwater overdraft and the trend is continuing to increase as a result of increasing groundwater overdraft.

In the Salton Sea watershed, some of the surface water used to irrigate crops infiltrates into the groundwater system. Some of the seepage might be intercepted by agricultural drainage tile systems and some infiltrates to greater depths. Flow from the tile drains discharges into open channel drains and, eventually, to the Salton Sea. Similarly, the water that percolates to greater depths in the Imperial Valley eventually flows to the Salton Sea through the subsurface. Thus, both surface water and groundwater contribute to the volume and thus the elevation of the Salton Sea, as described below.

Water Balance. The Salton Sea watershed comprises approximately 8,360 square miles, draining a small portion of San Bernardino County that is tributary to the Whitewater River, the southern area of Riverside County, most of Imperial County, the eastern portion of San Diego County, and part of the State of Baja California in the Republic of Mexico. The main natural tributaries to the Salton Sea are the Whitewater River, which flows into the north end of the Sea, and the Alamo and New Rivers, which flow into the Sea from the south, as shown in Figure 3.1-24.

The total average annual inflow to the Salton Sea for the period 1950 to 1999 is estimated at approximately 1.34 MAFY. By far, the largest component of this inflow originates as agricultural drainage. And, agricultural drainage from the IID water service area is the single largest contributor of inflow to the Sea (Table 3.1-5). Other components of inflow include precipitation and groundwater discharge. Surface flow from Salt Creek and San Felipe Creek also discharge to the Sea, but these flows are estimated to contribute less than 1 percent of the total inflow.

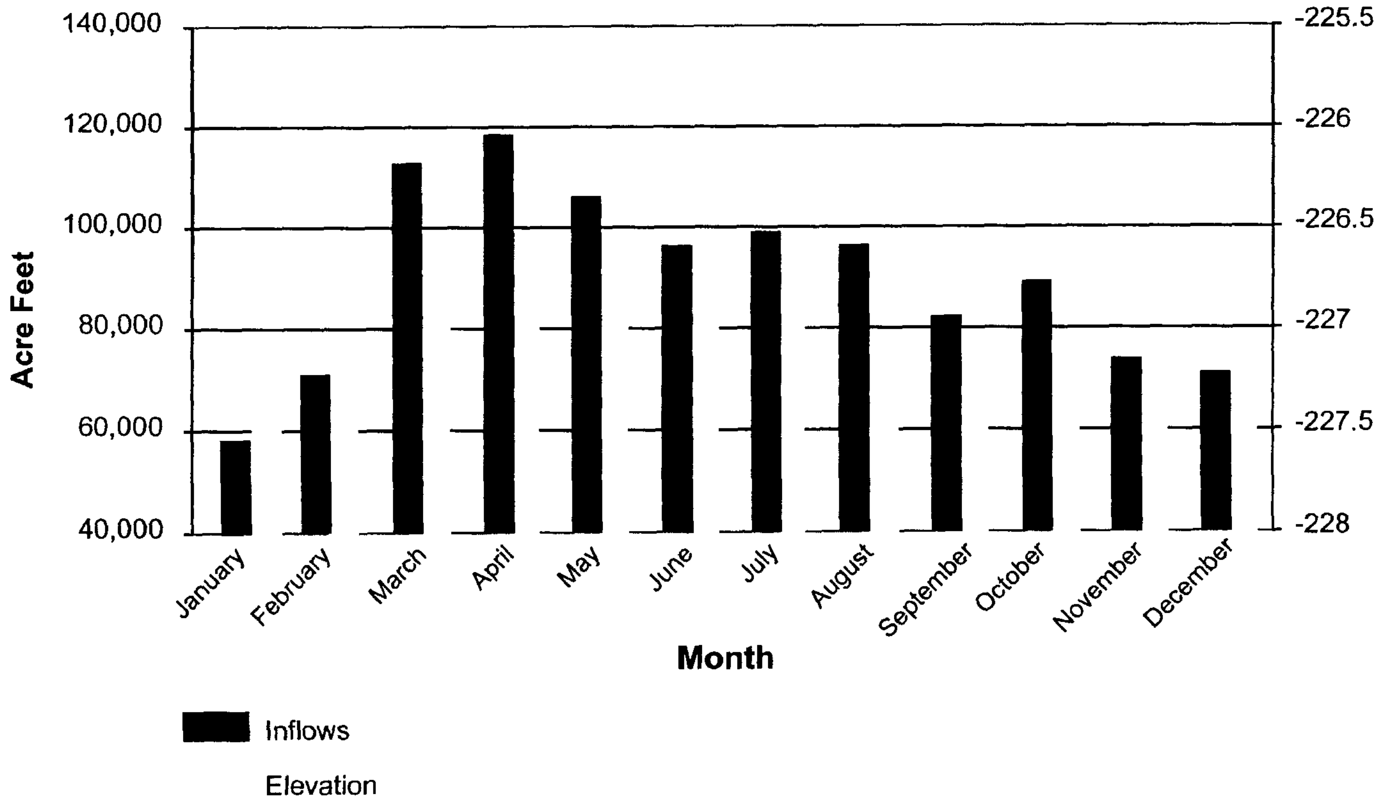
With the exception of the average subsurface flows from CVWD, the data provided by Reclamation in Table 3.1-5 do not specify the relative contribution from groundwater included in the Unmeasured Inflows and precipitation (included in net evaporation). However, Reclamation's Salton Sea Accounting Model does provide a description of how components of the water balance, such as precipitation and evaporation, were derived (see Section 3.1.4.1 and Appendix F). In addition, historical data provide some indication of the volume of inflow that is contributed by precipitation and groundwater inflow. For example, it is estimated that only about 3 percent of the water that flows into the Salton Sea comes from rainfall within the watershed. The Imperial and Coachella Valleys receive an average of about 2.3 and 2.8 inches of rainfall per year, respectively (MacGilhivray 1980, 1981). Direct annual precipitation on the Salton Sea is estimated to be about 48.3 KAFY (Hely et al. 1966). However, this varies depending on the surface area of the Sea and the actual precipitation. It should also be noted that the Coyote Mountains east of the Salton Sea receive about 8 inches per year (in/yr). In contrast, the upper San Jacinto and San Bernardino Mountains west of the Salton Sea receive as much as 30 to 40 in/yr (RWQCB 1994). Although most of the precipitation and runoff occurs from November through April, with the exception of San Felipe Creek, flows rarely reach the Salton Sea. During the summer, most of the rainfall is from short, intense thunderstorms.

TABLE 3.1-5
Annual Average Historical Water Balance for Salton Sea (Period 1950 - 1999)

Source of Inflow	Total Average Annual Inflow (AF)	Percent of Contribution to Total Inflow
Alamo River	623,678	46.4
New River	441,475	32.9
IID Drains Direct to the Salton Sea	93,250	6.9
Surface Water Flows From CVWD (Includes Whitewater R.)	115,053	8.6
Subsurface Flows From CVWD	1,539	0.1
Unmeasured Inflows[1]	68,400	5.1
Total Inflow	1,343,395	100.0

[1]Unaccounted-for direct runoff, unmeasured inflows from IID and CVWD, as well as errors and/or omissions resulting from the development of this historical water balance

Source: Salton Sea Accounting Model (Weghorst 2001)



Sources:
Reclamation, Salton Sea Accounting Model December 2001

E012002004CVO (01/10/02)

Figure 3.1-24
Estimated Average Monthly Elevations and Inflows to the Salton Sea, 1950-1999
IID Water Conservation and Transfer Project Draft EIR/EIS

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Inflow Trends. Table 3.1-5 illustrates the relative contributions of the different sources of inflow for an average annual water budget for the years 1950 to 1999. However, flow rates from the various sources change over time. For example, variations in Colorado River diversions by IID and CVWD and rainfall affect the rate of surface water inflows, and variations in ambient air temperature, wind, and humidity result in changes to the evaporation rate between years.

Inflows to the Salton Sea vary among years and also within any given year. Estimated annual inflows were greatest (estimated at over 15 MAFY [Cohen et al. 1999]) during the uncontrolled flooding that occurred during 1905 -1907, which created the Sea in its current form (Setmire et al. 1993). For several decades after the initial flooding, annual inflows averaged under 1 MAFY. Estimated annual inflows have remained relatively constant during the past 50 years at approximately 1.35 MAFY (Cohen et al. 1999). Variations that do occur in inflows are mainly a result of changes in agricultural usage in the Imperial, Coachella, and Mexicali valleys. Various crops consume different amounts of water. In the Imperial Valley, evapotranspiration from alfalfa was estimated to be about 81 inches of water (6.7 FY), while citrus crops consumed only about 3.84 FY (MacGillivray 1980). Similar values apply to the Coachella Valley. As with inflow trends between years, trends in flow within a given year are also determined primarily by agricultural practices and schedules for crop irrigation. Inflows are generally higher in the spring and lower in the fall and winter. This variation is shown on Figure 3.1-24 which depicts the average monthly variation of inflows and corresponding elevations for the period 1950-1999.

In-Sea Circulation Patterns. Circulation patterns within the Salton Sea affect the distribution of nutrients and other contaminants, dissolved oxygen, mixing of freshwater, and temperature gradients. Energy regimes generated by circulation also have an effect on shoreline erosion and sediment deposition patterns. Studies of Salton Sea circulation have been conducted by the Water Resources and Environmental Modeling Group of the Department of Civil and Environmental Engineering at the University of California at Davis (Modeling Group), under contract to the SSA. A three-dimensional model (RMA-10) was used to simulate current velocities that may vary with depth or that may be affected by differences in water density resulting from suspended sediment, temperature, and salinity (Cook et al. 1998). The model is capable of accounting for many variables, but it has been demonstrated that wind velocity and direction are the dominant factors in creating the observed pattern of currents in the Salton Sea (Cook et al. 1998) The model was configured to account for the effects of major tributary inflows from the Alamo, New, and Whitewater rivers, and to simulate changes in salinity and temperature.

The model consists of a finite element network designed to represent the physical boundaries of the system based on a detailed bathymetric survey conducted by Reclamation (Ferrari and Weghorst 1997). The motion of water in the Sea results from the transfer of energy from wind, freshwater inflows, and solar heat at model boundaries. The model solves equations describing the energy flow through the system. Physical properties of the system that affect simulated circulation include the roughness of the bottom, wind stress, and inflow rates. The model was also used to predict changes in current patterns, salinity, and temperature that would occur if the elevation or shoreline geometry of the Sea were altered.

The model found that a north-to-south wind pattern results in a system of currents dominated by two large gyres, rotating in opposite directions in each of the Sea's two basins. In the northern basin the currents rotate clockwise, and in the southern basin the currents rotate counterclockwise. The speed of rotation is typically much higher in the southern basin. Evidence of this pattern of currents has been observed in satellite photos of the Salton Sea. The model simulations, confirmed by field observations, suggest that the current velocity pattern near the surface of the Sea is much the same as near the bottom, suggesting a well-mixed system, at least under the influence of prevailing winds.

Freshwater is less dense than saltwater, and when freshwater flows into a more saline environment, the freshwater will "float" for a time over saltier water, creating a salt wedge at the point of inflow. However, in the Salton Sea, freshwater inflows from tributaries generally mix rapidly with the ambient saltwater due to the prevailing wind action, forming a fairly abrupt transition from freshwater to saltwater. This rapid mixing suggests that inflows attain the physiochemical characteristics of the Sea's water within a short distance from the mouths of tributaries, although a delta area of less saline water exists near the river inflows.

Water Quality. The Salton Sea is mainly a receiving body for agricultural and municipal wastewater. In 1998, the Salton Sea was listed by RWQCB as an impaired surface water body in accordance with Section 303(d) of the CWA. Four of the tributaries to the Salton Sea were also listed as impaired: the New River, the Alamo River, the Coachella Valley Stormwater Channel, and the Imperial Valley Drains (RWQCB 1998).

During the 1960s and 1970s, water contact recreation (including, but not limited to, swimming and water-skiing) was an important, beneficial use of the Sea. Water contact recreation remains one of the beneficial uses of the Salton Sea to be protected, as established by the Basin Plan. That, and other identified beneficial uses of the Salton Sea, include the following:

- Non-contact water recreation
- Aquaculture
- Warm freshwater habitat
- Wildlife habitat
- Protection of threatened and endangered species

Sustaining the beneficial uses of the Salton Sea depends on maintaining water quality constituents at appropriate concentrations. The concentration of chemicals in the Salton Sea depends on both external loads and internal processes, such as sediment resuspension and chemical cycling. Dissolved or suspended constituents in inflows to the Sea constitute an external pollutant loading. The loading rate depends on both the constituent concentration and the rate of flow. A small flow containing a high concentration can result in the same loading as a high flow containing a lower concentration.

Under the CWA, state regulatory agencies are defining TMDLs for constituents believed to adversely affect receiving waters that have been identified as having impaired water quality. The RWQCB is in the process of defining TMDLs for certain COCs flowing into the Salton Sea (see Section 3.1.2.2, State Regulations and Standards).

COCs. Several COCs have been identified for the Salton Sea. The Salton Sea COCs are similar, but not identical, to COCs listed for the LCR and other water bodies discussed in this report. The following list includes constituents most likely to be associated with impacts to beneficial uses of the Salton Sea:

- Salinity
- Selenium
- Boron
- Nitrogen
- Phosphorus

The following COCs are also discussed in this section of the Draft EIR/EIS:

- Salinity
- Pesticides and herbicides
- Metals
- Nutrients and other organic parameters

In Section 3.1.4, Impacts and Mitigation Measures, water quality criteria are compared to possible impacts to determine the potential for threats to these beneficial uses. Although freshwater criteria apply to the rivers and canals discussed elsewhere in this report, saltwater criteria are more appropriate for the Salton Sea. A brief introduction to each COC, and a summary of existing data describing temporal and spatial characteristics of each COC are presented below.

Background and Historical Studies. Inflows to the Sea consist mainly of agricultural and municipal wastewater, with only a small component of natural storm drainage. Water used in irrigation comes into contact with various agricultural chemicals and fertilizers, as well as the native mineral and organic substances contained in soils. Municipal wastewater, depending on the degree of treatment it receives, contains varying amounts of dissolved and suspended organic material, nutrients, metals, hydrocarbons, and other compounds that originate from domestic, industrial, and urban runoff sources. The water also carries with it sediment derived from soil erosion. Therefore, while most of the salts discussed above originate from the Colorado River and are simply concentrated because of evaporation, other constituents are added to the water from sources both external to and inside the basin.

The earliest detailed water quality study for constituents other than salts was conducted by Carpelan based on sampling that occurred between July 1954 and July 1956 (Carpelan 1958). Historical data on the major ionic composition of the Sea were reviewed, and depth profiles of temperature, dissolved oxygen, and pH were developed. Nutrient concentrations (ammonia, nitrate, and phosphate) were measured in samples from depths near the surface and near the bottom at four locations in the Sea. The nutrient analyses indicated that significant spatial trends in concentrations occurred both vertically and horizontally. Water samples from near the bottom contained much higher concentrations of ammonia and phosphate than surface samples, and samples taken at near-shore locations contained higher nutrient concentrations than samples from mid-Sea locations.

During 1963 to 1969, the Federal Water Quality Administration (FWQA) and DWR conducted a study of nutrient loading and its effects on the Sea (FWQA 1970). The Sea was described as eutrophic, with over-enrichment through high nutrient concentrations leading to high rates of algal growth. High photosynthesis and respiration by algae were thought to result in high concentrations of dissolved oxygen in near-surface waters, while oxygen depletion at depth resulted from the oxygen-demanding processes associated with decaying algae and other organic matter.

Salinity. Salt loads and loads of other constituents entering the Salton Sea tend to accumulate in the Sea by virtue of lack of an outlet. With an evaporation rate of nearly 6 FY and minimal precipitation, the entire volume of the Salton Sea would evaporate within about 10 years if all inflows were stopped.

Salinity of the Sea will continue to increase as long as dissolved salt loadings continue to be concentrated by evaporation. However, the proportions of ionic constituents in the inflows differ from ambient conditions in the receiving water, and some of the constituents are precipitated from the water by biological and chemical processes. Thus, the relative proportions of dissolved constituents that contribute to the salinity of the Sea will likely not remain constant over time or space. For example, calcium carbonate is removed from the water column during the formation of shells and skeletons of organisms or through chemical precipitation enhanced by certain algae. Similarly, calcium and magnesium sulfates are chemically precipitated as the concentrations of these compounds reach their solubility limits in the Sea's water.

The proportions of major salt constituents in the inflows to the Sea vary by source. Sodium and chloride are the principal constituents of inflow from the New River, while sodium and sulfate are the principal constituents of Whitewater and Alamo River inflows. Overall, these four constituents, along with bicarbonate (which is replenished from atmospheric carbon dioxide), represent the bulk of the dissolved material entering the Sea (Hely et al. 1966).

In 1966, USGS published a detailed study of the historical hydrologic regime of the Salton Sea. Included was an estimated water budget, time series of water level changes, an evaluation of the major dissolved constituents, and temperature profiles (Hely et al. 1966). The data showed that salinity increased significantly between 1907 and about 1925 as the pre-existing salt pan on the basin floor dissolved into the Sea, and the salts were subsequently concentrated in the decreasing water volume. By 1923, the elevation of the Sea had declined to about 255 feet below msl, and the salinity had reached a peak of about 37,600 mg/L. In later years, inflows and the volume of the Sea varied, and salinity fluctuated between about 31,000 and 39,000 mg/L during the next 40 years. The average concentrations of major ionic constituents measured by USGS in four sampling events between September 1962 and May 1964 are shown in Table 3.1-6.

TABLE 3.1-6
Average Concentrations of Major Ions (mg/L) in the Salton Sea

Year(s)	Calcium	Magnesium	Sodium	Bicarbonate	Sulfate	Chloride	TDS
1962 to 1964[1]	786	972	9,743	176	7,130	13,825	32,525
1999[2]	942	1,398	12,340	249	11,515	17,470	43,918

Sources:
[1]Hely et al. 1966
[2]Holdren and Montano, in preparation.

Between 1980 and 1993, RWQCB conducted sampling of tributaries, drains, and a single location in the approximate middle of the Salton Sea. For most parameters, 30 to 40 samples were collected from the Sea. The sampling program focused on parameters other than major ions. However, sulfate was included among the analytical parameters. The sulfate concentration in nine samples ranged from about 9,000 to 12,000 mg/L during the sampling period. The sulfate concentration steadily increased until 1990, when it reached its peak value. From 1990 to 1993, the concentration fluctuated between 10,000 and 12,000 mg/L. The fluctuation in concentration might have been related to changes in inflow rather than to precipitation of gypsum (Schroeder et al. 1993).

The composition of Salton Sea water is being monitored at three locations in the Sea and at the mouths of the three major tributaries in a reconnaissance study currently being conducted for the Salton Sea Science Subcommittee (Holdren and Montano, in preparation). The summary results of this program for major ionic constituents are presented in Table 3.1-6. Although samples were taken near the surfaces and at depths at each sampling site, the data presented are depth-averaged. The relatively stable sulfate concentration since 1992 might provide further evidence that the sulfate concentration in the Sea is limited by the solubility of gypsum. Table 3.1-6 shows all reported constituents increasing between 1962 to 1964 and 1999. Causes of the reported differences might be real increases in concentrations, changes in sampling and analytical techniques, or variation in sampling locations.

Pesticides and Herbicides. USGS conducted a study of pesticide and herbicide inputs to the Salton Sea during the period August 1969 to June 1970 (Irwin 1971). Samples were collected from the New and Alamo Rivers and the AAC and East Highline Canal. The results showed that a number of pesticides were present in the inflows to the Salton Sea. DDT and its degradation products—dieldrin, methyl parathion, 2,4-D, and silvex—were reported in most of the samples collected from near the outlets of the New and Alamo Rivers. Other pesticides and herbicides were also reported, but with less frequency.

Metals. USGS initiated a series of studies in 1985 as part of the National Irrigation Water Quality Program. In 1985, RWQCB concluded that tile drains were the main source of selenium in the Imperial Valley, although concentrations of selenium as high as 0.029 mg/L were also found in San Felipe Creek (Setmire and Schroeder 1998). Subsequent sampling of drain water by USGS in 1986 confirmed that selenium concentrations were highest in tilewater but were generally below the drinking water standard in collector drains; they were less than 0.002 mg/L in both the Colorado River and in the Salton Sea. USGS studies continued until 1995 (Setmire et al. 1990, 1993, and Setmire and Schroeder 1998).

Although the principal objective of these studies was to investigate sources of selenium in agricultural drain water, other constituents, including trace elements, major ions, nutrients, pesticides, and herbicides, were also assessed. The focus of the assessments was to identify sources, rather than to evaluate the water quality of the Salton Sea itself. The studies concluded that the selenium found in drain water originates from the water imported from the Colorado River, but is concentrated, along with other salts, by evapotranspiration. Thus, the loading to the Sea was said to be a function of the amount of Colorado River water imported, rather than of the leaching of selenium from minerals in the soil.

Arsenic, boron, mercury and other parameters were also investigated in the USGS studies. Results of sampling at stations in the National Stream Quality Accounting Network in the Imperial Valley have shown that arsenic occasionally exceeds the EPA's water quality criterion of 0.005 mg/L for protection of aquatic life in the New River. Further studies by Setmire suggest that the arsenic might originate from groundwater sources within the Basin (Setmire et al. 1993).

In addition to the studies described above, various agencies have collected, or continue to collect, data that are not widely disseminated. CVWD has collected data on major ions and heavy metals in drain water since the 1960s, IID has collected major ion data at selected drain locations, and RWQCB collected data for various contaminants and water quality indicators from tributaries, drains, and from the center of the Sea from 1980 to 1990, as noted previously.

Studies indicate that the concentration of selenium in the Salton Sea is significantly lower (typically by one to two orders of magnitude) than the concentrations in drains and tributaries. In contrast, analyses of sediment samples reveal that the concentration of selenium is generally two or three times greater in bottom sediments from the Salton Sea than in sediments from upstream locations. This suggests that selenium is transferred from the water column to the sediments by physical, chemical, and/or biological processes (Setmire et al. 1993). For example, selenium may be taken up by bacteria and chemically reduced. The reduced forms of selenium (i.e., selinite, elemental selenium, and hydrogen selenide) are less soluble in water than selenate. Also, selenium may be incorporated by biological reactions in organic molecules capable of volatilizing to the atmosphere. Alternatively, some of the selenium may precipitate with dead plant material, or it might chemically precipitate under the low oxygen conditions found at the bottom of the Sea.

Nutrients and Other Organic Parameters. Table 3.1-7 presents a summary of RWQCB data on selected analytes. The results of their evaluation indicate that the New and Alamo Rivers are major sources of nitrogen loads into the Sea. Phosphate concentrations in the Sea are similar to those in the tributaries. By contrast, chemical and biological oxygen demand (COD and BOD, respectively) are higher in the Sea than in the tributaries. COD and BOD are measures of the amount of biological and nonbiological matter capable of depleting dissolved oxygen in the water column. The range of dissolved oxygen concentrations in the Sea tends to be greater than in the tributaries. However, other studies have indicated that dissolved oxygen in the Sea decreases rapidly with depth, and concentrations are often close to zero at depths of 10 feet or more.

In addition to the parameters shown herein, RWQCB samples were analyzed for suspended and settleable solids, pH, and other parameters. A few samples were analyzed for selected metals, including two samples that were analyzed for selenium. The selenium concentrations in the two samples were 0.002 and 0.005 mg/L (2 to 5 parts per billion [ppb], respectively).

Table 3.1-7 also shows that the New and Alamo Rivers contain large concentrations of fecal coliform bacteria. Fecal coliform bacteria are generally an indicator of human waste but may not survive in the highly saline conditions found in the Sea. In addition to the data gathered by RWQCB, IID has sampled coliform bacteria at a number of near-shore stations around the Sea.

TABLE 3.1-7
Comparison of Selected Water Quality Results (mg/L) in Tributaries and the Salton Sea, 1980 to 1993

	Ammonia	Nitrate	Phosphate	BOD	Dissolved Oxygen	Fecal Coliform[1]	COD
Salton Sea near Midpoint							
N	37	36	38	39	35	40	36
Average	0.83	0.19	0.34	13	10.8	3	401
Maximum	3.00	1.00	1.42	51	20.0	20	2,192
Minimum	0.01	0.005	0.03	2	0.1	2	65
New River at Discharge to Salton Sea							
N	38	38	38	39	35	40	39
Average	1.50	4.96	0.89	9	6.2	15,640	43
Maximum	3.50	17.0	1.86	17	9.3	160,000	143
Minimum	0.22	1.50	0.01	3	3.6	500	12
Alamo River at Discharge to Salton Sea							
N	39	38	37	39	35	40	39
Average	1.04	8.05	0.68	6	7.7	16,102	38
Maximum	2.86	24.0	2.04	26	10.2	240,000	143
Minimum	0.28	3.90	0.12	2	5.2	170	10
Whitewater River at Discharge to Salton Sea							
N	39	38	38	39	37	39	39
Average	0.23	0.50	0.24	2	9.7	87	8
Maximum	1.20	1.90	2.00	11	15.3	540	39
Minimum	0.01	0.06	0.02	1	7.1	2	1

Source: RWQCB 1999
[1]Fecal coliform reported in units of mpn/100 mL

As described above, a reconnaissance water quality study of the Salton Sea (Holdren and Montano, in preparation) is being conducted for the SSA science subcommittee. Preliminary results of that study, with monthly sampling completed for the period January to December 1999, are summarized in Table 3.1-8. The results are generally consistent with the results of monitoring by RWQCB from 1980 to 1993.

TABLE 3.1-8
Average Concentrations of Nutrients and Selenium (mg/L) in Salton Sea, January to December 1999 (n=12)

Total Alkalinity	Ammonia Nitrogen	Nitrate/Nitrite Nitrite	Total Phosphorous	TSS	Selenium (total)[1]
244	1.29	0.134	0.07	34	0.74

Source: Holdren 1999
[1]Selenium is reported in µg/L.

Summary. Based on the data presented above and on other information, the following generalizations regarding Salton Sea COCs can be made (SSA and Reclamation 2000):

- With the exception of TSS, concentrations of conservatively measured components are lower and more variable in the three tributary rivers than in the Sea.
- The Alamo and New Rivers carry heavy sediment loads, with TSS concentrations often greater than 200 mg/L. TSS levels in the Whitewater River are lower than in the other two rivers, but are still often greater than 100 mg/L.
- Thermal stratification occurs in the Salton Sea, with observed differences between surface and bottom temperatures of up to 8 °C. The stratification is not stable, however, and both depth of stratification and temperature differences between surface and bottom waters vary depending on season and inflow rates.
- Dissolved oxygen levels near the surface are usually above saturation concentrations as a result of primary production. In contrast, dissolved oxygen levels near the bottom are frequently less than 1 mg/L.
- The oxidation-reduction potential is negative in areas with low dissolved oxygen.
- Phosphorus appears to be the nutrient limiting algal growth in the Salton Sea. Dissolved ortho-phosphate concentrations have been observed below the detection limit of 0.005 mg/L on several occasions, and the maximum observed value was only 0.035 mg/L.
- High nitrate-N concentrations occur in the New, Whitewater, and Alamo River samples. Nitrate concentrations in the New and Alamo Rivers are often between 3 and 7 mg/L, while concentrations in the Whitewater River generally range from 12 to 15 mg/L. The latter concentrations exceed the drinking water standard of 10 mg/L.
- In contrast to the high nitrate levels in the New, Whitewater, and Alamo River samples, most nitrate concentrations observed in the Sea have been lower than 0.2 mg/L. Denitrification in the bottom waters of the lake and algal uptake from the surface waters are the most likely explanations for the observed results.
- Ammonia-N concentrations in the New, Whitewater, and Alamo River and receiving water samples are relatively high for surface waters. High ammonia concentrations in the Sea, which are frequently greater than 1 mg/L, coupled with typical pH levels near 8.3 at the surface, are of potential concern to the Sea's fishery. Although un-ionized ammonia concentrations do not appear to be reaching toxic levels, un-ionized ammonia

may combine with other stressors, such as low dissolved oxygen concentration and high temperatures, to contribute to fish kills in the Sea.

- Dissolved organic carbon and dissolved silica levels in the Salton Sea are relatively stable. Dissolved organic carbon is typically in the range of 45 mg/L, while most dissolved silica concentrations are between 5 and 7 mg/L.
- Sodium is the dominant cation in the Salton Sea. It is likely that calcium and magnesium concentrations are being at least partially controlled through precipitation reactions.
- Chloride and sulfate are the dominant anions in the system. Carbonate is present at relatively low concentrations and is probably being limited through precipitation as $CaCO_3$. Some sulfate salts are also relatively insoluble, and the precipitation of sulfates may help slow future increases in salinity if water inputs are reduced. Fluorides may also be precipitating, but available fluoride concentration values are not reliable and are being reevaluated.
- Trace metal concentrations do not appear to be of major concern in the Sea; however, most metal values are being reevaluated. Dissolved selenium concentrations ranged from 2.55 µg/L in the Whitewater River to 7.7 µg/L in the Alamo River and are high enough to be of concern. Concentrations were lower in the Sea samples; however, they were often less than 1 µg/L. Selenium concentrations were similar in dissolved and total fractions, indicating that most of that COC is present in dissolved forms.
- Concentrations of semivolatile organics and chlorinated pesticides/polychlorinated biphenyls (PCBs) were below analytical detection limits for the New, Whitewater, and Alamo rivers and in-Sea samples.

Sediment. This section summarizes sediment quality in the Salton Sea. Particulate and dissolved contaminants enter the Salton Sea via surface water, and groundwater inflows transport dissolved constituents, as discussed above. Much of the dissolved material stays within the water column, but suspended particulate matter and precipitated chemicals settle to the bottom of the Sea and may accumulate. The distribution of contaminants in sediments depends on the location of the inflow points, the concentration of contaminants in the inflows, physical characteristics of the suspended material (i.e., size, chemical composition), and the depositional environment. The depositional environment relates to the physical characteristics of the Sea body and is influenced by water depth, energy regime, in-Sea currents, and wind-driven resuspension.

Extensive research has been undertaken in and around the Salton Sea to evaluate biological impacts from contaminants, and to characterize water quality. Data on the bottom sediment characteristics and contaminants of the Salton Sea are limited, however.

Background and Historical Studies. Previous studies regarding various constituents in sediment of the Salton Sea have identified the presence of a number of inorganic and organic chemicals, including organochlorine pesticide residues of DDT and its derivatives, DDD, and DDE in the sediments. DDT, DDD, DDE, dichloromethane (DCA), PCBs, polynuclear aromatic hydrocarbons (PAHs), pesticides, selenium, and boron have been measured in river sediments feeding into the Salton Sea (Bechtel 1997, Eccles 1979, Hogg 1973, Setmire et al. 1993, and Setmire et al. 1990).

Sediment Source, Size, and Characteristics. Historically, distribution of heavy residues and mineralogical composition suggest local sources of the some sediments; however, about 75 percent of the sediment was transported by the LCR into the Salton Sea (Arnal 1961). The Colorado River carried eroded debris from the Colorado Plateau, depositing sand and mud in the southern part of the Basin. Sediment deposits from sources at the Basin margins were deposited on the Sea bottom, barrier beaches, braided streams, and alluvial fans (Van de Kamp 1973).

Sediment samples on the bottom of the Sea consisted of silt, clay, and finer-grained sands, with higher sand percentages near the mouths of the New and Alamo Rivers, near Salton City along the western shore, and extending into the central, deeper parts of the Sea. The lower velocity Whitewater River Delta was predominantly silt (Vogl et al. 1999). Sands were present predominantly to depths greater than 3 feet within 500 feet offshore; clay predominantly to depths of greater than 3 feet, between 500 and 12,000 feet offshore; and clay predominantly to a depth of 2.75 feet, underlain by sand, beyond 12,000 feet offshore (Bechtel 1997).

A variety of physical and chemical properties and reactions regulated the pH of the sediments (e.g., carbonates, organic matter, carbon dioxide, and organic acids from the decomposition of plant and animal matter). The distribution of organic content was influenced by texture of the sediments, currents, and phytoplankton. Low organic content (less than 1 percent) was found along the shore, higher values (4 to 6 percent) were found in the central part of the Sea, and a maximum content (greater than 6 percent) was sampled near Fish Spring, 3 miles offshore (Arnal 1961).

Chemical Data. There is a lack of routine sediment monitoring data for the Salton Sea (Holdren 1999). The following is a discussion of chemical data found in the limited published material on Salton Sea sediments. Summarized available sediment data are presented in Tables 3.1-9 and 3.1-10 (Vogl et al. 1999).

Spatial Distribution of Constituent Concentrations: For general purposes, it should be noted that concentrations of inorganic chemicals in the sediments were generally higher in the northern part of the Salton Sea and in the upper 1 foot of sediment (Vogl et al. 1999). Conversely, organic chemical concentrations were high, in general, in samples collected in the southern part of the Salton Sea; in particular, some of the highest concentrations of DDT metabolites were found in the bottom sediments at the outlets of the Alamo River, New River, and Trifolium Drain 1 (Levine-Fricke 1999b, Setmire et al. 1993).

Inorganic Constituents: Detailed analyses of selenium and boron in water, sediment, and biota samples were presented by Setmire et al. (1990 and 1993). Setmire and Schroeder (1998) presented a more detailed analysis of selenium results, including data from 1994 through 1995, presented in Table 3.1-9. The presence of various inorganic constituents in the Salton Sea, offshore of the Salton Sea Test Base was also reported (Bechtel 1997). The Salton Sea Test Base is located along the west shore of the Sea, south of Salton City. The military site was historically an aeroballistic marine target area used to test inert atomic weapons. Approximately 3,750 nonexploding test units were dropped into the Sea. Most units weighed between 5,000 and 40,000 pounds, and consisted of stainless steel casings; arming,

TABLE 3.1-9
Concentrations of Inorganic Chemicals in Sediment from the Salton Sea and Surrounding Tributaries Determined to be of Concern

Location	Chemical (concentrations in mg/kg)													
	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Molybdenum	Nickel	Selenium	Thallium	Thorium	Uranium	Vanadium	Zinc
Maximum Baseline Value mg/kg[a]	—	22	1,700	—	200	90	4	66	1.4	—	20	5.3	270	180
Salton Sea median concentration (mg/kg)[b]	—	5.6	550	—	58	28	—	25	0.7	—	10.6	4.9	77	78
Whitewater River Upstream from Hwy. 111[b]	—	2.4	690	<2	81	34	<2	30	0.1	—	56	14.6	140	110
Whitewater River at Outlet[b]	—	5	710	<2	210	64	3	170	0.5	—	18.9	5.5	130	510
Alamo River at International Boundary[b]	—	6.3	510	<2	58	26	<2	26	1.6	—	12.2	4.8	77	97
Trifolium Drain 1[b]	—	5.8	550	<2	53	28	<2	24	1.9	—	9	4.4	72	78
Ave. 64 Evacuation Channel at Hwy. 195[b]	—	4.4	620	<2	75	61	2	2	0.4	—	21.3	5.1	120	130
New River at Midpoint (08/11/86 and 08/14/86)[b]	—	5.4, 11.0	580, 780	<2, <2	63, 73	30, 27	<2, 2	25, 35	0.6, 1.3	—	10.6, 12.0	6.1, 7.5	77, 96	75, 120
New River at Outlet[b]	—	4.7	720	<2	70	23	<2	22	0.6	—	19.2	7.7	82	71
East Highline Canal[b]	—	4.5	690	<2	50	23	<2	22	0.9	—	12.7	5.9	60	70
Alamo River Delta[c]	—	—	—	—	—	—	—	—	0.2	—	—	—	—	—
Shoreline Disposal Area[d]	—	0.9	315		33.9	68.7				0.31	—	—	2.6	8.6
Offshore Aeroballistic Marine Target SSTB[d]	9.9	27.4	—	1.6	—	—	14.5		8.4	—	—	14.2	52.5	—
Imhoff Tank[d]	—	—	—	—	—	—	—	—	--	0.26	—	—	—	—

[a]Shacklette and Boerngen 1984
[b]Setmire et al. 1990
[c]Setmire et al. 1993
[d]Bechtel 1997 (maximum concentrations reported)

Source: Levine-Fricke (1999a)

TABLE 3.1-10
Concentrations of Organic Chemicals in Sediment from the Salton Sea and Surrounding Tributaries Determined to be of Concern

Location	Chemical (concentration in µg/kg)															
	Acetone	Carbon disulfide	Chlordane	DDT	DDD	DDE	Dieldrin	Ethyl-benzene	Gamma-Chlordane	Heptachlor	Meth-oxychlor	PAHs*	PCBs	Toluene	Toxaphene	Xylenes
Whitewater River Upstream from Hwy. 111[b]	—	—	<1.0	—	<0.1	0.6	—	—	—	—	<0.1	—	<1	—	10	—
Alamo River Outlet[b]	—	—	<1.0	—	20	64	—	—	—	—	<0.1	—	<1	—	<10	—
Alamo River at International Boundary[b]	—	—	<1.0	—	2.3	18	—	—	—	—	<0.1	—	9	—	<10	—
Trifolium Drain 1[b]	—	—	<1.0	—	3.7	41	—	—	—	—	<0.1	—	<1	—	<10	—
Trifolium Drain 1[e]	—	—	—	—		110	—	—	—	—		—	—	—	—	—
Trifolium Drain 4[b]	—	—	<1.0	—	12	56	—	—	—	—	<0.1	—	<1	—	40	—
Vail Drain 4[b]	—	—	<1.0	—	7.8	57	—	—	—	—	45	—	<1	—	<10	—
Ave 64 Evacuation Channel at Hwy. 195[b]	—	—	1	—	5.8	56	—	—	—	—	<0.1	—	<1	—	<10	—
Ave 64 Evacuation Channel at Hwy. 195[e]	—	—	—	—		67	—	—	—	—	—	—	—	—	—	—
New River at Midpoint (08/14/86)[b]	—	—	5	—	3.5	7.4	—	—	—	—	<0.1	—	4	—	<10	—
New River at International Boundary[b]	—	—	20	—	24	7.6	—	—	—	—	<0.1	—	24	—	<10	—
East Highline Canal[b]	—	—	<1.0	—	2.3	18	—	—	—	—	<0.1	—	9	—	<10	—
Shoreline Disposal Area[d]	23	2	—	3.1	4.9	6.6	3	2	3.4	3.5	14	85	—	15	—	11
Imhoff Tank[d]	—	—	—	—	—	3.2	0.6	—	190	290	—	—	—	—	—	—
1 Mile from Whitewater River Outlet[f]	0-11.5 cm 11.5-23 cm	—	—	<25 <25	5 <5	5 <5	<5 <5	—	—	—	—	—	—	—	—	—
2.5 Miles from Whitewater River Outlet[f]	0-11.5 cm 11.5-23 cm	—	—	<25 25	5 20	5 23	<5 <5	—	—	—	—	—	—	—	—	—
5 miles from Whitewater River[f]	0-11.5 cm 11.5-23 cm	—	—	<25 25	12 5	14 5	<5 5	—	—	—	—	—	—	—	—	—

TABLE 3.1-10
Concentrations of Organic Chemicals in Sediment from the Salton Sea and Surrounding Tributaries Determined to be of Concern

		Chemical (concentration in μg/kg)															
Location		Acetone	Carbon disulfide	Chlordane	DDT	DDD	DDE	Dieldrin	Ethyl-benzene	Gamma-Chlordane	Heptachlor	Meth-oxychlor	PAHs*	PCBs	Toluene	Toxaphene	Xylenes
1 mile from Alamo River Outlet[f]	0-11.5 cm 11.5-23 cm		—	—	25 25	5 5	5 5	92 100	—	—	—	—	—	—	—	—	—
2.5 miles from Alamo River Outlet[f]	0-11.5 cm 11.5-23 cm		—	—	25 82	5 5	16 18	49 880	—	—	—	—	—	—	—	—	—
5 miles from Alamo River outlet[f]	0-11.5 cm 11.5-23 cm		—	—	25 25	5 5	5 5	60 43	—	—	—	—	—	—	—	—	—

* Polycyclic Aromatic Hydrocarbon (PAHs) values are for Benzo(a)anthracene and Chrysene
[a]Shacklette and Boerngen 1984
[b]Setmire et al. 1990
[c]Setmire et al. 1993
[d]Bechtel 1997 (maximum data reported)
[e]Eccles 1979
[f]Hogg 1973

Source: Levine-Fricke 1999a

fuse, and firing components; batteries; and metal or concrete ballast. Approximately 10,000 pounds of material has been recovered, but the majority of the test units remain on the Sea floor (Levine-Fricke 1999b).

Inorganic chemicals, organochlorine pesticides, and, to a limited extent, organophosphorous pesticides were analyzed. Chemicals were identified as being of concern if detected above the maximum "baseline value" for soils of the western US. The following chemicals were identified (with median concentrations) as being of concern: chromium [less than 2 milligrams per kilogram (mg/kg)], nickel (25 mg/kg), selenium (0.7 mg/kg), thorium (10.6 mg/kg), uranium (4.9 mg/kg), and zinc (78 mg/kg). Other chemicals detected included arsenic (5.6 mg/kg), silver (less than 2 mg/kg), barium (less than 2 mg/kg), cadmium (less than 2 mg/kg), copper (28 mg/kg), lead (21 mg/kg), molybdenum (less than 2 mg/kg), and vanadium (77 mg/kg) (Setmire et al. 1990).

A naturally occurring selenium removal process at the mouth of the Alamo River was investigated. Selenium concentrations were reported to vary without any discernable pattern of distribution (e.g., 0.2 and 0.3 mg/kg in the river sediment samples, 0.2 to 2.5 mg/kg throughout the Alamo River Delta, and 1.3 to 2.5 mg/kg in the embayments) (Setmire et al. 1993).

Setmire has since reported a potentially discernable relationship between grain size and selenium concentration (Setmire 2000a and b). In bottom sediment sampled at 11 sites in the Salton Sea, a median concentration for selenium of 2.7 parts per million (ppm), with a range of 0.58 to 11 ppm, was detected. When comparing particle size distribution with a plot of Salton Sea contours, very fine sediment [less than 0.002 millimeters (mm)] in the deepest parts of the Salton Sea correlated to the highest selenium concentrations.

Setmire and Schroeder reported selenium concentrations in bottom sediments of the Alamo River Delta that ranged from 0.2 to 2.5 mg/kg, with no readily apparent spatial pattern in their distribution (Setmire and Schroeder 1998). A composite sample of Alamo River Delta sediment collected in 1986 contained a selenium concentration of 3.3 mg/kg, with a dissolved organic content of 1 percent (Levine-Fricke 1999b). A sediment sample collected near the south buoy (deepest location in the Salton Sea) in 1996 had a selenium concentration of 9.3 mg/kg, with a corresponding dissolved organic carbon content of 9.2 percent. The core was composed of very low-density material. Setmire and Schroeder concluded that the high selenium concentration and the high dissolved organic carbon content of this sample show that selenium is likely incorporated into biomass, which degrades and concentrates in the deepest parts of the Salton Sea.

A variety of inorganic constituents in the sediment at the shoreline disposal area, offshore target area, and Imhoff Tank area (sanitary waste treatment) of the Salton Sea Test Base were detected (Bechtel 1997). From the sediment of the offshore marine target area, elevated maximum concentrations were reported of cadmium (1.6 mg/kg), arsenic (27.4 mg/kg), antimony (9.9 mg/kg), molybdenum (14.5 mg/kg), selenium (8.4 mg/kg), and vanadium (52.5 mg/kg). One localized area of elevated uranium (maximum 14.2 mg/kg) was reported. In the sediment samples from the Imhoff Tank area, thallium (maximum 0.26 mg/kg) was detected.

Organic Constituents: Chlorinated hydrocarbon pesticides in water, sediment, and tissue samples from the Salton Sea were examined in 1970 and 1971 (Hogg 1973). DDT and its metabolites were found in 146 out of 159 samples, and dieldrin and its metabolites were found in 66 of 159 samples (see Table 3.1-10).

Additionally, Setmire presented results of organochlorine pesticide analyses from sediment and biota samples. Although the use of DDT was banned in the US in 1972 and in Mexico in 1983, DDT metabolites were detected in most samples. The highest DDE concentration (64 µg/kg) was detected in the Alamo River at the outlet to the Salton Sea, immediately upstream of the Alamo River Delta. The sample from the Alamo River at the outlet had a DDD concentration of 20 µg/kg. The lowest concentrations of DDD and DDE were detected at the Whitewater River, upstream of Highway 111, outside the limits of the Salton Sea (Setmire 1990 and Setmire et al. 1990 and 1993).

A variety of organic constituents were present in the sediment at the shoreline disposal area, offshore marine target area, and Imhoff Tank area of the Salton Sea Test Base. From the shoreline disposal area, the presence of organochlorine pesticides, PAHs, and volatile organic compounds (VOCs) (acetone, carbon disulfide, ethylbenzene, toluene, and xylenes) was reported in sediment samples. From the Imhoff Tank area, organopesticides (DDE, dieldrin, gamma-chlordane, and/or heptachlor) and phenol (one sample) were detected in the sediment samples (Bechtel 1997).

A volume of 10,400 pounds of total DDT and its metabolites was calculated in the upper 3.5 inches of sediment over the entire Sea (Hogg 1972). Mean values for residues of the pesticides dieldrin, DDT, DDD, and DDE are presented in Table 3.1-10.

Nutrients: Samples were collected for selected nutrients in sediments. In the Salton Sea composite, organic-nitrogen was detected at a concentration of 1,500 mg/kg, and organic-carbon was detected at a concentration of 10 mg/kg. The highest concentration of total phosphorous detected was in the New River at the outlet to the Salton Sea (1,600 mg/kg), and the lowest detected concentration was in the Whitewater River outlet (320 mg/kg) (Setmire et al. 1990).

Sediment Inflow Volume. Sediment inflow volume (measured in AFY) is important both hydraulically, as a means of altering inflow and in-Sea circulation patterns, and biologically, playing an important role in providing suitable habitat to support ecological functions for fish and benthos. Section 3.2 of this Draft EIR/EIS discusses the potential for biological impacts from sediment inflows.

The following sediment inflow data were computed using IIDSS, the IID Water Conservation Model, and are based on flow-weighted average TSS concentrations recorded at the mouths of the New and Alamo Rivers (outlets to the Salton Sea). Data used by the IIDSS to compute the sediment inflow values spanned from 1969 to 1998, and are based on information available through EPA's STORET database. Between 1969 and 1998, the average flow in the New River was calculated at 622 cfs, and 843 cfs for the Alamo River. An analysis of TSS data for the same period gives a flow-weighted average sediment concentration in the New River at 313 mg/L, and 479 mg/L in the Alamo River. With respect to actual sediment inflow volumes, these discharge rates translate to an estimated annual suspended sediment load in the New River of approximately 192,000 tons per year, while the average annual sediment load for the Alamo River is estimated at 398,000 tons per year. At an estimated bulk density of 70 pounds per cubic foot (Chow 1964), this translates to an annual sediment contribution to the Salton Sea from the New River of 126 AFY, and 261 AFY from the Alamo River.

Stephen, Arnal, and DOI have completed estimates of sediment load. The suspended sediment load carried within the New River was estimated by Stephan to be approximately 551,000 tons per year (Stephen 1972). This translates to a deposited volume of 361 AFY (at 70 pounds per cubic foot).Arnal estimated the average annual sediment contribution from the Alamo River and New River to be 340 and 370 AFY, respectively (based on an average flow rate and a 10 percent bedload pickup) (Arnal 1961). Finally DOI estimated a suspended sediment load of approximately 476,000 tons per year for the Alamo River, for an average discharge of approximately 1,000 cfs, and a calculated sediment concentration of 0.0475 percent was estimated. The annual suspended sediment volume for the Alamo River would be 310 AFY (DOI 1970). DOI also estimated a suspended sediment load of 519,000 tons, or 340 AFY, for the New River, at an average annual discharge of 660 cfs, an average measured sediment concentration of 0.0795 percent, and a unit weight of 70 pounds per cubic foot. Adding 10 percent bedload pickup, the average annual sediment contribution from the New River would be 370 AFY.

For the Alamo River, the sediment concentrations used in calibrating the model's sediment algorithm are identical to that reported by DOI. Therefore, the modeled results closely parallel findings reported by DOI. The difference in sediment loading is explained by differences in flow data used for the river (1000 cfs for the DOI data vs. 843 cfs for the flow derived from the STORET database). However, for the New River, there is a significant discrepancy between the TSS concentrations computed from the STORET database and the concentrations reported by Stephen and DOI. Given the relatively low sediment concentrations reported in the New River at the International Boundary, it stands to reason that TSS values reported at the mouth of the New River would be lower than those observed at the mouth of the Alamo River. This is the case when analyzing the data provided in the STORET database. It is not understood why the reverse is purported by the Stephen/DOI values.

Regardless, even when using the larger sediment discharge volumes reported in the earlier findings, the sediment accumulation rate for the Alamo River and New River deltas in the Salton Sea was estimated to be 2 in/yr, as opposed to a sedimentation rate for the central part of the Salton Sea of 0.02 in/yr (Arnal 1961). Further, sediment volume inflow to the Salton Sea is reported not to be a problem on the scale of reservoir sedimentation. The estimated sediment inflow volume to the Salton Sea is small compared to total storage volume of the Sea. The future, long-term average sediment inflow volume to the Salton Sea is estimated to be 4 KAF. The 50-year estimated sediment volume of 200 KAF would represent less than 4 percent of the gross water storage volume of the Salton Sea, at a water surface elevation of -232 feet msl (DOI 1970).

Recent and Current Studies. Levine-Fricke (1999b) recently reported their findings from a study that evaluated the overall distribution of sediment types and contaminants throughout the Salton Sea and its three major tributaries: the Whitewater River, the New River, and the Alamo River (Levine-Fricke 1999b). Vogl presented the data from the Levine-Fricke report to the Wetlands and Remediation International Conference in November 1999, as discussed below (Vogl et al. 1999). Beginning in the winter of 1998 to 1999, 57 grab-sample sites and 16 core sites were analyzed for 17 inorganic chemicals (including metals and metalloids), organic chemicals [including VOCs, semivolatile organic compounds (SVOCs) and PCBs], and agricultural pesticides, herbicides, and their major breakdown products.

Inorganic Constituents: Within the Salton Sea, cadmium, copper, molybdenum, nickel, zinc, and selenium were determined to be elevated inorganic constituents of potential concern, with the most elevated being selenium (see Table 3.1-11). A determination of the forms of the contaminants, especially selenium, would be valuable in evaluating potential mobility and bioavailability (Levine-Fricke 1999b, Vogl et al. 1999).

TABLE 3.1-11
Reported Values for Inorganic Constituents of Potential Concern in Salton Sea Sediments

Constituent	Low mg/kg	High mg/kg	Location of Highest Concentrations
Cadmium	0.67	5.8	North-central part of the Salton Sea
Copper	8.1	53	Near mouth of Whitewater River
Molybdenum	11	194	North and central part of the Salton Sea
Nickel	3.3	33	Mouth of the Whitewater River and deeper portion of the Sea
Zinc	5.4	190	Mouth of Whitewater River and Salt Creek
Selenium	0.086	8.5	Just offshore of Desert Shores

Source: Levine-Fricke 1999b, Vogl et al. 1999

Organic Constituents: Elevated concentrations of organic chemicals detected in sediment were limited to predominantly VOCs. Out of 118 sediment samples analyzed for VOCs, 114 samples contained detectable amounts of acetone, carbon disulfide, and/or 2-butanone (see Table 3.1-12). Detectable amounts of o-xylenes, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, naphthalene, and n-propylbenzene were reported in only a few other sediment samples. SVOCs, chlorinated pesticides, PCBs, organophosphate and nitrogen pesticides, and chlorinated herbicides were not detected in any sediment samples (Levine-Fricke 1999b, Vogl et al. 1999).

TABLE 3.1-12
Measured Organic Constituents of Potential Concern in Salton Sea Sediments

Constituent	Low µg/kg	High µg/kg	Location of Highest Concentrations
Acetone	32	840	Near the mouth of the New River
Carbon disulfide	15	1,800	Near the mouth of the Whitewater River
2-butanone	11	150	Offshore from Salton Sea State Park in the northern portion of the Sea

Source: Levine-Fricke 1999b, Vogl et al. 1999

3.1.4 Impacts and Mitigation Measures

This section provides a brief overview of how the impact assessment was conducted for the LCR, IID water service area and AAC, and Salton Sea subregions. In general, impacts to the hydrology and water quality of these areas were assessed using complex computer simulations. These modeling methods and their application are discussed below. Impacts to hydrology and water quality in the SDCWA subregion are not addressed because no impacts are anticipated in that subregion as described in the Methodology section below.

It should be noted that, even though there will be a "ramp-up" period between initiation of the water conservation and transfer measures, the impacts analysis discussion in the following sections describes the effects that implementation of the Proposed Project and alternatives could have on water quality in IID drains and rivers at the transfer volume indicated in the impacts analysis.

3.1.4.1 Methodology

LOWER COLORADO RIVER

Water Quantity

Flow in the Colorado River below Parker Dam can fluctuate on a seasonal, daily, and hourly basis. Baseline Colorado River System conditions and the conditions resulting from the action alternatives were simulated using Reclamation's Colorado River Simulation System (CRSS) as currently implemented in the computerized modeling framework called Riverware. River operation parameters modeled and analyzed include the water entering the river system, storage in the system, reservoir releases from storage, and the water demands of, and deliveries to, the Basin states and Mexico. The model uses the 85-year natural flow record from 1906 through 1990 to estimate future inflow trends. Future Colorado River water demands are based on demands and depletion projections supplied by the Basin states. The model simulates operation of Glen Canyon Dam, Hoover Dam, and other Colorado River System elements consistent with the LROC.

River Stage and Groundwater Elevation

Very detailed river stage and groundwater elevation modeling was done for specific reaches under various flow regimes for the Biological Assessment for the Proposed Interim Surplus Guidelines (see Appendix D of the Draft IA EIS [Reclamation 2002]). Specifically, river stage at seven points between Parker Dam and Imperial Dam were examined:

- River Mile 192.2, Parker Dam;
- River Mile 177.7, Headgate Rock Diversion Dam;
- River Mile 152.0, Waterwheel Gage;
- River Mile 133.8, Palo Verde Diversion Dam;
- River Mile 106.6, Taylor Ferry Gage;
- River Mile 87.3, Cibola Gage and
- River Mile 49.2, Imperial Dam.

Assuming reductions in flow in the Parker to Imperial river reach of 200 KAF, 300 KAF, 400 KAF, 500 KAF, 675 KAF, 948 KAF, 1,553 KAF, and 1,574 KAF, river elevations were calculated at these seven points. The river elevations were computed using the step-back water surface computations of the Corps of Engineers HEC-RAS computer program calibrated with cross-sectional survey data for 20 representative type areas distributed throughout the affected reach. In addition, water surface elevations were used to calculate the effect on groundwater levels in areas adjacent to, but not directly connected to, the river.

Water Quality. Salinity has long been recognized as one of the major problems of the Colorado River. The assessment of potential Project-related impacts to surface water quality in the area affected by the change in the point of diversion is based on data provided by Reclamation's model for salinity. This impact analysis uses the same salinity model as is used to create salinity reduction targets for the Colorado River Basin Salinity Control Program. To do this, the model simulates the effects of scheduled water development projects to predict future salinity levels. These data are then used to compute the amount of new salinity control projects required to reduce the river's salinity to meet the standards at some point in the future. The model itself does not include future salinity controls because implementation schedules for future salinity control projects are not fixed and will vary considerably. The salinity control standards are purposefully designed to be long-term (nondegradation) goals, rather than exceedance standards used for industry or drinking water.

IID WATER SERVICE AREA AND AAC

Impacts to water quality and hydrology resulting from the Proposed Project and alternatives, including the No Project alternative, were evaluated by using a predictive water quantity/quality computer model. To provide a common base of understanding for this Draft EIR/EIS, this section of the report describes strategies for achieving conservation, a brief summary of the logic design and operation of the water quantity/quality model referred to as the Imperial Irrigation Decision Support System (IIDSS), and a definition of key terms.

Key terms and strategies for achieving conservation. The following provides a definition of the key terms that are used in this section.

- A conservation program is an accumulation of conservation projects that achieve a target conservation volume. This conservation volume will be measured by the reduction in the amount of water diverted at Imperial Dam by the AAC. For the transfer and QSA, the conservation program implementation and operation details will be determined by the IID Board of Directors and adjusted from time to time based on the needs of the participants.

- Conservation projects are categorized as either an on-farm irrigation system improvements or water delivery system improvements to achieve water conservation.

  - Participation in **on-farm irrigation system improvements** would be voluntary, and farmers would choose their own conservation measures. The farmers would also decide how much water to conserve, with a possible maximum annual amount per acre set by IID. In addition, the length of time a farmer participated in the program would likely vary; participants might move into and out of the conservation program. On-farm conservation would be measured by the reduction in a quantified amount at each farm turnout based on historical water deliveries from 1988 to 1995. Because future water use/needs for crop requirements and salt leaching of soils would not be expected to change unless Colorado River water salinity changed, conservation will be derived primarily from reduced tailwater runoff to the drains. The exception to this would be land fallowing. Land fallowing may also be used to achieve on-farm conservation by reducing the overall demand for irrigation water in the Imperial Valley. Fallowing reduces both tailwater runoff and tilewater flows to the drains. In summary, the variables associated with defining an on-farm conservation program could be numerous, including spatial distribution, voluntary participation over given timeframes, the volume and efficiency of any conservation measure, and the total variability of irrigation demand and performance in space and time.

- **Water delivery system improvements** would also result in a reduction in drainage flow. At IID, system operational losses would be either canal seepage, canal operational spills, or water evaporation and transpiration. The system projects would be designed either to reduce or capture canal seepage or to capture canal operational spills. Projects to accomplish this could include canal lining, canal seepage collector systems, mid-lateral and operations reservoirs, and lateral interceptor systems. Conservation for these projects would be measured by the reduction of historical lateral spills, and the amount of seepage captured in a seepage collector.

Modeled data. The following provides a brief explanation of the key concepts and methods used to establish the database, and the strategy for generating model output.

- **Baseline Hydrology and Water Quality** represents the physical conditions at the time of the NOI and NOP and reasonable anticipated future changes in these conditions. Hydrology and water quality are resources that change over time and cannot be properly represented at a point in time. Therefore, a 75-year Baseline was developed [see Appendix E (IIDSS Summary Report)] using the IIDSS based on 12 years (1987 to 1998) of available data representing river diversions, canal flows, farm turnout flows, climatic information, crops irrigated, drain flows and water quality. These data were adjusted based on reasonable anticipated future changes, such as an increase in Colorado River salinity, and for the effects of the IID/MWD 1988 water transfer. Finally, the data were projected to 75 years using a correlation based on 75 years of historical weather data compared to the 12-year data period. The Baseline includes an adjustment to limit the diversion of Priorities 1, 2, and 3 for normal year hydrology in the Colorado River to 3.85 MAFY.

- **Existing Setting vs. Baseline.** Important distinctions exist between the water quality data presented in Section 3.1.3, Existing Setting, and the Baseline water quality results provided in Section 3.1.4, Impacts and Mitigation Measures. For the most part, the Existing Setting section presents water quality data based on COC concentrations that were directly calculated by averaging the analytical results obtained from grab samples collected over a period of time at selected geographic locations within IID.

- **Salinity Concentrations.** Salinity concentrations in the Colorado River change over time and vary from month to month and year to year based primarily on hydrology and diversions and uses. As a result, the salinity concentration (771 mg/L TDS) used for the Existing Setting represents the concentration at the time of the NOP was developed by averaging analytical results from the 12-year period of record from 1987 to 1999. This average was derived from actual grab samples collected from imported Colorado River water and delivered to IID through the AAC. In contrast, the salinity concentrations used for the Baseline for impacts and mitigation measures of the Proposed Project and alternatives was based on Reclamation's predictions that the salinity of the Colorado River at Imperial Dam would increase to a maximum average annual value of 879 mg/L. Thus, maximum TDS concentration values have been predicted over the life of the Proposed Project.

- **Pesticides and Herbicides.** The IID water quality database and modeling output included predicted concentrations of organochlorine insecticides (i.e., DDT and its metabolites DDE and DDD, and toxaphene), organophosphorus insecticides [diazinon and chlorpyrifos (Lorsban, Dursban)] and organochlorine herbicides (Dacthal) in water flowing through the IID drainage system. Furthermore, state and federal water quality standards are listed for some of these COCs (see significance criteria in Table 3.1-14). However, quantitative data for these COCs are not provided in this Draft EIR/EIS for the following reasons:
  - The small number of samples collected does not provide a database that adequately represents the water quality in the various geographic locations.
  - The water quality data are insufficient to determine if a regulatory standard has been exceeded (e.g., regulatory standards to determine acute and chronic concentrations require that samples be collected and results be conducted to determine 1-hour and/or 4-day average concentrations).

  However, the water quality discussion does provide qualitative assessments regarding predicted changes in pesticide and herbicide concentrations in IID surface waters and sediments. These predictions are based on the correlation between these parameters and the mobilization of TSS in IID's drainage water.

Imperial Irrigation Decision Support System. The IIDSS is designed to predict annual water conservation volumes required by the IID/SDCWA Transfer Agreement and simulate the resulting changes in the quality and quantity of drainage water that flows in IID's drains and rivers. The IIDSS consists of three major components: the database, configuration manager, and the computer model MODSIM. These three components are linked to facilitate data organization, processing, and retrieval. Results obtained from the IIDSS are saved in files that can then be accessed for processing into the desired data evaluation method; for example, graphs, spreadsheets, or Geographic Information System (GIS) (Figure 3.1-25).

The IIDSS provides water quantity and quality output data by simulating the physical input and output processes that occur in delivering water to a farm, irrigating a crop, and predicting the resultant drainage outflow. In addition, the IIDSS can track multiple conservation projects (system and on-farm) and account for temporal changes and spatial movement of those conservation projects around IID (i.e., the model can simulate all flows and changes in the delivery system, as well as changes in on-farm flow paths).

For the on-farm conservation program, participating farms are randomly selected by delivery gates. Even though the IIDSS has the capability to select farms around the district, a sensitivity analysis determined that because of the large number of gates participating in each of the conservation alternatives, the random process of locating farms participating in the conservation program has a very minor impact on spatial changes in water quality in IID's drains.

To develop the Baseline from which to measure changes in water quality and hydrology in IID, a set of anticipated future conditions were input into the IIDSS database. This set of conditions represents the variability in flow and water quality that could be reasonably expected in the future. The Baseline conditions are based on the present state of irrigation within IID, but without implementation of any new water conservation measures. The establishment of the Baseline hydrology for IID was founded on 12 years of available irrigation delivery data, provided in monthly increments. This information, collected from 1987 through 1998, was available in sufficient detail to include delivery data at the farm gate level.

The 12-year delivery and diversion record used to drive the IIDSS also covers a period of time when the conservation measures established to support the MWD water transfer were being implemented. These measures include canal lining, construction of reservoirs and lateral interceptors, implementation of 12-hour deliveries, and installation of some on-farm irrigation system improvements.

Analysis of the 12-year period indicates that it has a similar mean and represents sufficient variability compared to a long historical record to allow the prediction of long-term variability in water supply, climatic conditions and farming practices in the IID water service area. The model results presented in this section are for both the 12-year and the 75-year time periods.

To establish the set of input values to represent the variability in flow and water quality that could be reasonably expected in the future, the following assumptions were used for the development of the modeled Baseline:

- Crop mix represented during the 12-year period is a reasonable representation of what is likely to be grown in the future.
- Climatic variability is a reasonable proxy for the variability in diversion and delivery from year -to year that is independent of farming practices.
- Water supply is limited to the water rights of IID, and consistent with the QSA. It should be noted, however, that the Proposed Project and alternatives (based both on the IID/SDCWA Agreement and the QSA) include a consensual cap on IID's Priority 3 diversion of Colorado River water at 3.1 MAFY, subject to certain adjustments. In addition, under the conditions of the QSA, the IOP will be in effect, providing a payback provision that would be triggered when the annual diversion at Pilot Knob inadvertently exceeds IID's consensual cap.
- Changes in diversion and delivery as a result of conservation measures employed to-date is represented in the database.

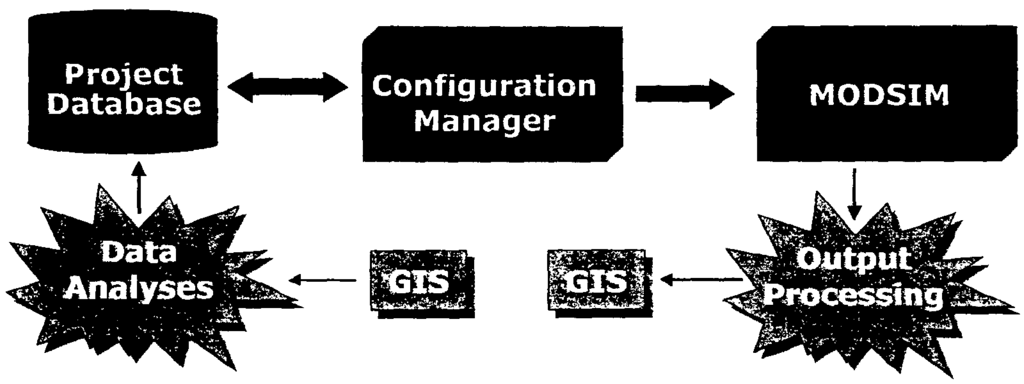

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Figure 3.1-25
Components of the Imperial Irrigation Decision Support System
IID Water Conservation andTransferProject Draft EIR/EIS

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To predict impacts to water quantity and quality from the implementation of a selected alternative, each model run begins by randomly selecting a delivery gate and computing the conservation achieved at that gate by comparison with historical (without conservation) deliveries to the gate. Subsequent gates are then randomly selected until the aggregate of the on-farm savings equals the alternative's on-farm conservation objective. System savings are modeled by introducing canal lining and lateral interceptor projects that achieve the targeted volume of system conservation. Total irrigation system demands are aggregated in an upstream fashion to determine total monthly demand in the AAC above the East Highline Canal turnout. In addition to farm deliveries at each headgate, the calculated total system demand would include all the irrigation system water losses, such as evaporation, seepage, and operational spills. The IIDSS intelligence would also account for conditions such as canal length and lining, size of canal, reservoir locations, and canal capacity.

In addition to the input and water system demand requirements, the IIDSS computes the "downstream" drainage volumes and downstream water quality in the IID surface drains and in the rivers that flow through the IID water service area. Like the delivery demand system, computation of drainage flows starts with the computation of on-farm water flows. Water delivered to the farm is used through evapotranspiration, with remaining waters leaching salt past the crop root zone (tilewater), or running off the end of the field (tailwater). These are primary contributors to the drains, both having a different water quality. In addition, the drains also intercept canal seepage flows, system operational spillage, and stormwater runoff. Thus, the New and Alamo River flows include the water from IID surface drains and other factors, such as flow in the New River across the International Boundary with Mexico, and the volume of water used by "wild" vegetation in the rivers.

To determine Baseline water quality conditions for IID, concentrations of water quality parameters (COCs) and flow were compiled for the modeling period from 1987 through 1998. These data were collected from locations throughout IID and were used to develop the water quality data set used to describe the modeling period. COC values at the mouths of the New and Alamo Rivers were used to calibrate the water quality functions contained in the model so that simulated values of mass loads and constituent concentrations matched observed values. For non-conservative constituents, decay functions were scripted into the model to simulate the impact of biological, chemical and physical activity on constituent concentrations. The IIDSS also used storage functions to compute the lag times associated with these constituents as they move through the delivery, farm, and drainage systems.

As previously noted, current salinity modeling efforts conducted by the Bureau of Reclamation predict that the average annual salinity levels at Imperial Dam would be maintained at 879 mg/L. This change represents an increase in salinity over the flow-weighted concentration values (using 771 mg/L as the TDS concentration in the Colorado River import water) that were compiled from the historical data set. Therefore, to remain consistent with Reclamation's values, the water quality data set was adjusted to compensate for the predicted increase in TDS in Colorado River import water.

Using the approach outlined above, the IIDSS predicted changes in water quantity and quality throughout IID for the Proposed Project and Project alternatives, including the No Project alternative. These predictions were used to assess the relative impacts among the alternatives, and to examine the long-term effect of those impacts.

Model Output. The following discussion applies to model output for the Proposed Project and Project alternatives.

- **COC Concentrations.** The predicted impacts to water quality in the IID water service area would be primarily related to changes in TDS, TSS, and selenium in the IID drainage water. In addition to being a direct result of implementation of the various Project alternatives, these impacts are also related to Reclamation's predicted increase in the salinity of Colorado River delivery water from the existing concentration of 771 mg/L TDS to 879 mg/L TDS. This predicted change in the TDS concentration in Colorado River irrigation delivery water would be common to the Proposed Project and to Project alternatives. In addition, the model used concentration values of 37 mg/L for TSS and 2.23 μg/L for selenium for irrigation delivery water in the AAC. These concentration values would be common to the Proposed Project and to Project alternatives.

  The following sections include tables comparing the Baseline to the quantity and quality of water flowing into and out of the IID water service area for the Proposed Project and alternatives. However, as previously noted in the Existing Setting section, this section does not include quantitative water quality values for the entire list of COCs. Rather, the tables contained herein only show those COCs (i.e., TDS, selenium, and TSS) that might exceed significance criteria that are based on state or federal water quality standards.

- **12-year and 75-year Model Runs.** As noted previously, the 12-year water data set was used to generate the 75-year water hydrology and water quality database. Review of the subsequent model output generated from this database indicates that the model results for the 12-year model runs would be substantially similar to the results generated by the 75-year runs. Therefore, only the 12-year model results are presented in the Impacts section.

SALTON SEA

Assessment of the future of the Salton Sea with and without the Proposed Project and alternatives is dependent on the ability to predict the hydrologic response of the Sea to changing conditions. Conservation programs would likely change inflows of both water and dissolved solids into the Sea. Predicting hydrologic response from these possible changes would require a computer model of the Salton Sea (described below).

Salton Sea Accounting Model. The Salton Sea Accounting Model was developed by Reclamation to predict hydrologic response to possible changes in the Sea (Weghorst 2001). It allows the effective evaluation of historical, present, and future conditions within the Sea. Specifically, the Salton Sea Accounting Model predicts changes in inflow, elevation, surface area, and salinity. Special operating requirements included the need to simulate:

- Future reductions in inflow
- Future changes in salt loads into the Sea
- Salt precipitation and/or biological reduction
- Imports of water
- Exports of water
- In-Sea ponds

The basics of the Salton Sea Accounting Model involve conservation of mass for both water and dissolved solids (salt). The Salton Sea Accounting Model maintains separate accounting of each, and corresponding calculations of salinity. The Salton Sea Accounting Model follows the following equations for mass calculations:

Water in Storage = Previous Water in Storage + Inflow - Evaporation + Rain
Salt Content = Previous Salt Content + Salt Load - Precipitation (or Reduction)

The Salton Sea Accounting Model incorporates the ability to perform stochastic and deterministic simulations of Salton Sea conditions. The Salton Sea Accounting Model operates on an annual time step. Deterministic simulations of the Salton Sea Accounting Model assume that the hydrologic and salt load variability of the Sea would repeat in the future exactly in the same pattern each time the Salton Sea is simulated. Stochastic implies that different hydrologic conditions are sampled and used in each simulation.

Salton Sea Accounting Model results presented in this report would be the result of stochastic simulations and represent "mean futures for the Salton Sea. The term "mean future" is used to represent the averaging of results from one thousand Salton Sea Accounting Model simulations. Therefore, any point taken from one of the simulation charts presented would represent an average of hundreds of simulations. Graphs showing elevation, surface area, and salinity concentrations in the Sea have been presented using a 77-year timeframe. Documentation for the Salton Sea Accounting Model is provided in Appendix F.

Salton Sea Accounting Model Output. The following discussion applies to Salton Sea Accounting Model output for the Proposed Project and Project alternatives.

- COCs. As noted above, the Salton Sea Accounting Model is able to predict salinity concentrations in the Sea over time. However, modeling methods for simulating future selenium concentrations in the Salton Sea are currently unavailable. Therefore, quantitative predictions regarding the impact(s) of selenium to water quality in the Sea are not discussed in this Draft EIR/EIS. In addition, there are no specific water quality criteria for TSS in the Salton Sea. Therefore, an analysis of the impacts of TSS concentrations is not provided in this Draft EIR/EIS. However, a qualitative analysis of the effects that TSS concentrations will have on sediment quality in the Salton Sea is provided below.

IIDSS AND SALTON SEA ACCOUNTING MODELING RUNS FOR THE QSA AND SDCWA SERVICE AREA TRANSFERS

A number of modeling runs, using both the IIDSS and Reclamation's Salton Sea Accounting Model, were conducted to determine how the SDCWA and QSA water transfers would affect hydrology and water quality in IID drains and rivers and the Salton Sea. The model runs were conducted to simulate each transfer alternative's maximum impact to water quantity and quality in the IID and the Sea. Two model runs (i.e., 12-year and 75-year) from the IIDSS, and a 75-year stochastic analysis for the Salton Sea Accounting Model were required to simulate water quality and hydrology impacts associated with the various levels of water conservation (No Project, 130 KAFY, 230 KAFY, and 300 KAFY) included in the Proposed Project and alternatives.

Table 3.1-13 includes a list of the IIDSS and Salton Sea Accounting Model runs that were conducted for each alternative. The model runs were conducted to simulate the maximum impacts from the Proposed Project and Project alternatives to water quality and hydrology conditions in the IID and the Salton Sea. Therefore, the model runs assume that the QSA would not be implemented and all water would be transferred out of the basin. In this scenario, CVWD would not receive the up to 100 KAFY from IID or the additional 55 KAFY from other QSA projects.

TABLE 3.1-13
IIDSS and Salton Sea Modeling Runs for the QSA and SDCWA Service Area Transfers

Proposed Project and Alternatives	Corresponding Model Runs	
	IIDSS	Salton Sea Model[1]
Proposed Project	Model Run 2: 12-year 200 On-farm and 100 WDS[2] Model Run 3: 75-year 200 On-farm and 100 WDS	Total transfer of 300 KAFY to SDCWA/MWD (out of basin) via On-farm and WDS
Baseline	Model Run 1c: 12-year baseline Model Run 1d : 75-year baseline	Baseline Conditions
Alternative 1: No Project	Model Run 1c: 12-year baseline Model Run 1d: 75-year baseline	Baseline Conditions
Alternative 2: 130 KAFY	Model Run 10: 12-year 130 On-farm Model Run 11: 75-year 130 On-farm	130 KAFY to SDCWA/MWD via On-farm
Alternative 3: 230 KAFY	Model Run 13: 12-year130 On-Farm and 100 WDS Model Run 14: 75-year130 On-Farm and 100 WDS	230 KAFY to SDCWA/MWD via On-farm and WDS
Alternative 4: 300 KAFY[3]	Model Run 6: 12-year 300 Fallow Model Run 12: 75-year 300 Fallow	Total transfer of 300 KAFY to SDCWA/MWD (out of basin)

Notes:

[1] The Salton Sea Accounting Model runs only provide data for water surface elevation, surface area, and salinity.
[2] WDS – Water delivery system improvements.
[3] This alternative would require waiver of existing restrictions on fallowing included in the IID/SDCWA Water Transfer Agreement.

SALTON SEA MODELING RUNS AND RETURN FLOW FROM THE CVWD SERVICE AREA

Under the first implementation scenario for the Proposed Project (IID/SDCWA Transfer Agreement Implementation Only) up to 300 KAFY would be transferred by IID to SDCWA. The IID/SDCWA Transfer Agreement makes no provision for the transfer of 100 KAFY to CVWD. In addition, there are no provisions in the IID/SDCWA Transfer Agreement for the 20 KAFY and 35 KAFY transfers to CVWD which are provided for in the QSA.

The Salton Sea Accounting Model runs used for analysis in this Draft EIR/EIS assess a worst case scenario by assuming that CVWD would not receive the sources of water which are defined in the QSA and described below:

- 20 KAFY from MWD per the 1989 Approval Agreement
- 35 KAFY from MWD per the SWP Exchange Project
- Up to 100 KAFY from IID (the first 50 and second 50 KAFY)

Without the QSA CVWD will continue using groundwater including 155 KAFY required to meet demands unless other water sources are identified. Since these alternative water sources are currently unknown, and in order to assure that a worst- case scenario is evaluated in this Draft EIR/EIS, the Baseline for the Salton Sea and the analysis of impacts for the Proposed Project and alternatives assumes that CVWD will not receive water from the QSA projects or other sources which would result in return flows to the Salton Sea. Thus, only return flows from CVWD extracting and using 155 KAFY from its groundwater aquifers are included in the modeling to the Salton Sea. This is considered a worst-case scenario.

SUBREGIONS EXCLUDED FROM IMPACT ANALYSIS

The SDCWA/MWD Exchange Agreement specifies that the amount of water conserved by IID would be diverted at MWD's Whitsett Intake at Lake Havasu for delivery through the CRA to SDCWA. The conveyance and distribution of water from MWD's facilities to the SDCWA service area would not change as a result of implementing the Proposed Project. No new facilities, operations, or maintenance practices would be required in the SDCWA service area or by member utilities to receive or deliver the water transferred from IID. Therefore, no impacts in the SDCWA service area subregion are anticipated from the Proposed Project and SDCWA is not discussed in the impact analysis below.

3.1.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant impact on hydrology and water quality if they:

- Violate any water quality standards or waste discharge requirements (see the Water Quality Standards/Significance Criteria listed in Table 3.1-14).
- Substantially deplete groundwater supplies or cause substantial interference with groundwater recharge, such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter an existing drainage pattern of the site or area, including alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or a substantial increase in the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
- Create or contribute to runoff water exceeding the capacity of existing or planned stormwater drainage systems or provision of substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality (see Table 3.1-14).
- Cause inundation by seiche, tsunami, or mudflow.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

TABLE 3.1-14
Water Quality Standards/Significance Criteria

Constituent of Concern	CMC[A] (mg/L)	CMC[A] (µg/L)	CCC[B] (µg/L)	Human Health[C] (µg/L)	TMDL[D] (mg/L)
TDS and Salinity	4,000[E]	--	--	250,000	--
Selenium	--	--	5.0	--	--
Boron	--	--	--	--	--
TSS	--	--	--	--	200
Organophosphorus Insecticides					
– Chloropyrifos		0.083	0.041	--	--
– Diazinon	--	--	--	--	--
Organochlorine Insecticides					
– 4,4'-DDT		1.1	0.001	0.00059	--
– 4,4'-DDE	--	--	--	0.00059	--
– 4,4'-DDD	--	--	--	0.00083	--
– Toxaphene	--	0.73	0.0002	--	--
Organochlorine Herbicides	--		--	--	--

Note: The values listed for the COCs in this table were derived from present and proposed regulations in the California Toxics Rule (ISWB/EBEP), and EPA National Recommended Water Quality Criteria. The criteria listed in this table are based on the most conservative value derived from a published final water quality rule for Aquatic Life Criteria. In cases where the value is not published in a final Aquatic Life Criteria water quality rule, the screening value for significance criteria was derived from Human Health Criteria for consumption of fish.

With the exception of selenium, the values in this table are for freshwater significance criteria only. Specific water quality standards for TDS, and TSS and selenium have not been established for the Salton Sea. However, the Colorado River Basin RWQCB Basin Plan establishes a goal for reducing salinity concentrations in the Sea from current levels to 35,000 mg/L. The Basin Plan states that "[w]hen salinity increases above 45,000 mg/L TDS, it is very questionable if a viable fishery will continue to exist in the Sea." However the Basin Plan also states that "the achievement of this water quality objective shall be accomplished without adversely affecting the primary purpose of the Sea, which is to receive and store agricultural drainage, seepage, and storm waters."

-- No appropriate or relevant requirement or criteria.

[A] Value derived from EPA Aquatic Life Criteria. Criterion maximum concentration (CMC) - a 1-hour average concentration designed to protect against unacceptable effects from acute (refers to short-term exposure to pollutants) exposures to higher concentrations.

[B] Value is derived from EPA Aquatic Life Criteria. Criterion continuous concentration (CCC) - a 4-day average concentration designed to protect against unacceptable effects from chronic (refers to long-term exposure to pollutants) exposures to lower concentrations.

[C] Value is derived from EPA Human Health Criteria. Based on the chemical's toxicity (noncancer or cancer) and exposure to that chemical from the consumption of fish. Exposure to the chemical of concern from air, drinking water (MCL) or from food other than fish is not included in the criterion.

[D] Value is derived from the Sediment/Siltation Total Maximum Daily Load for the Alamo River. The TMDL is an amendment to Colorado River Basin RWQCB Basin Plan (CRB RWQCB, 2001). The 200 mg/L TSS TMDL is established as a final (Phase 4) "Numeric Target" for Alamo River only. Interim numeric TMDL target goals and target dates for the Alamo River are as follows:

Phase	Time Period	Interim Target
Phase 1	2001 - 2003 (Years 1 - 3)	320 mg/L
Phase 2	2004 - 2007 (Years 4 - 7)	240 mg/L
Phase 3	2008 - 2010 (Years 8 – 10)	216 mg/L
Phase 4	2011 – 2013 (Years 11 - 13)	200 mg/L

Specific measures and Best Management Practices designed to achieve the Draft TMDL requirements stipulated by the RWQCB Basin Plan are included in the IID Revised Drain Water Quality Improvement Plan (DWQIP).

- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

3.1.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

The Proposed Project would include the diversion of up to 300 KAFY at Parker Dam to the Colorado River Aqueduct (CRA), and the transfer through the CRA of up to 200 KAFY to the SDCWA service area, with an optional transfer of up to 100 KAFY to SDCWA, CVWD, and/or MWD over the course of up to 75 years. The reduction in flow in the reach between Parker and Imperial dams of up to 300 KAFY has the potential to result in beneficial and less than significant impacts on LCR water quality, as described below. The Proposed Project would not include construction or operation of new or improved facilities in the LCR; therefore, no impacts to hydrology and water quality resulting from changes in construction and operations would occur in the LCR.

There are no significance criteria that stipulate a specific federal or state standard for the actual quantity of water in the LCR. However, predicted (Reclamation's CRSS) changes in the quantity of water in the LCR will affect river surface elevations and are expected to potentially impact other resource areas such as groundwater, water quality, biology, air quality and recreation. The following discussion is presented to provide a better understanding of how the predicted reduction in the quantity of water in the LCR affects surface elevation and water quality. Discussions of potential secondary impacts on other resource areas are provided in the various resource sections.

Water Quantity. The proposed water transfers and exchanges between the California agricultural water agencies and MWD/SDCWA would change the point of diversion from Imperial Dam to Parker Dam, thus reducing flows and average river stage in the intervening river. The IOP adds a second "layer" of actions that could potentially change river flows. Inadvertent overruns would result in an increase in flows. This is because water is being released from Lake Mead to meet these inadvertent overruns. Conversely, during a payback, water orders would be lowered and less water would be released from Lake Mead.

Reclamation analyzed the effects of a 100 KAFY to 1,574 KAFY reduction in flow (including a flow reduction of 400 KAFY) from Parker Dam releases as part of the BA for the Interim Surplus Guidelines, Secretarial Implementation Agreements, Water Administration, and Conservation Measures on the Lower Colorado River - Lake Mead to the Southerly International Boundary (Reclamation 2000a). At both Headgate Rock Dam (between Parker and Palo Verde Diversion dams) and Palo Verde Diversion Dam, flows under higher flow conditions (90th percentile) under the IA and Baseline are extremely similar. For the 50th and 10th percentile values, flows under the IA and Baseline are also extremely similar, with flows slightly lower under the IA. This lower flow has two causes. Under the IA, California water use is less and therefore less water is released from Hoover Dam to the LCR; and, per IA transfer agreements, some of California's water is diverted at Parker Dam rather than left to flow in the river for diversion at Imperial Dam. Historically, in the period 1980 to 2000, average annual flow in this reach ranged from 20.5 MAF to 5.5 MAF, a variation of 14.5 KAFY. The potential change from combined IOP and IA affects is anticipated to be within the future normal fluctuation of the river.

Impact WQ-1: Effects to groundwater, LCR flows, and LCR water quality.

The Colorado River is in hydraulic continuity with the groundwater in the underlying alluvium in the reach from Parker to Imperial Dams. Depending on river stage and groundwater elevations, the river can receive inflows from the aquifer, or can provide recharge to the aquifer. The hydraulic connection results in groundwater levels that, at least in part, reflect the stage in the Colorado River. Groundwater level impacts were evaluated by considering changes in river stage. The BA prepared by Reclamation (2000a, Appendix D) shows that changing the point of diversion from Imperial to Parker Dam for 400 KAFY could lower the annual median river stage relative to Baseline by as much as 4.4 inches. The decline in median river stage could result in similar declines in groundwater levels, again as much as 4.4 inches, relative to the Baseline. Reduction in groundwater elevation would be greatest in non-irrigated areas and less severe in irrigated areas.

Relative to the Baseline, reduction of flow volume during a given season in the reach of the LCR between Parker and Imperial dams could beneficially impact sediment load in the LCR. The slower the flow rate, the lower the volume of suspended sediment. It is assumed that this general trend would also hold for the LCR between Parker and Imperial Dams; a lack of sufficient data, however, prevented the development of a relationship for this reach of the LCR. At lower flow rates, the water has less energy and thus picks up and transports less sediment. Reduced flow rate in the LCR could reduce sediment load and, therefore, provide a beneficial impact.

Under the Proposed Project, projected salinity is similar to that of the Baseline. Modeling of potential changes in salinity for the IA (which includes the water transfers under the Proposed Project) indicated that annual reductions in releases from Parker Dam could result in an increase in salinity concentration of up to 8 mg/L at Imperial Dam. This would be an approximately 1.5 percent increase in salinity at Imperial Dam and would be within the fluctuation observed from month to month. Below Hoover Dam and Parker Dam, projected salinity under the IA is no more than 1 mg/L higher than would be expected under Baseline.

Relative to Baseline, salinity concentrations are anticipated to continue to meet mandated objectives through salinity control projects; therefore, no impact to salinity in the LCR is anticipated. Relative to Baseline, no additional changes in water quality would be anticipated from the Proposed Project because no additional chemical constituents that could affect water quality conditions would be introduced to the reach by the Proposed Project. Impacts to water quality in the LCR are anticipated to be less than significant. (Less than significant impact.)

Biological Conservation Measures in USFWS' Biological Opinion

The potential effects to hydrology, water quality, and water supply resulting from the biological conservation measures are uncertain. Creation of 44 acres backwater, Tier 1 conservation measures including soil moisture maintenance, and Tier 2 conservation measures including restoration, revegetation, and maintenance of habitat are all planned along the LCR. These actions could result in the removal of some water from the mainstem of the Colorado River, as well as some dredging and construction activities. All biological conservation measures would be subject to site-specific review. Anticipated impacts include reduced flow in the mainstem of the LCR, and water quality impacts during construction (Reclamation 2002).

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

This section describes the potential effects that implementation of the Proposed Project could have on water quantity and water quality in the IID water service area. IIDSS model results indicate that variations in water quantity and flow could potentially impact water and sediment quality in IID's drains and rivers. To illustrate this correlation, the impacts in this Draft EIR/EIS include both water balance and water quality data for the Proposed Project and alternatives.

There are no significance criteria that stipulate a specific federal or state standard for the quantity of water in the canals, drains, and rivers in the IID water service area. However, changes in quantity of water predicted by the IIDSS (Appendix E) have the potential to result in impacts to other resource areas, such as water quality and groundwater. The following discussion is presented to provide a better understanding of how the predicted reduction in water quantity potentially affects water quality and groundwater in the IID water service area.

<u>IID Irrigation Water Delivered Through the AAC.</u> The Proposed Project would reduce water delivery to IID through the AAC by up to 300 KAFY plus adjustments for the IOP. A flow diagram showing a water balance for IID under the Proposed Project is presented in Figure 3.1-26. The amount of water delivered (as measured at Mesa Lateral 5) would be reduced approximately 11 percent from the mean annual volume of 2.8 MAFY under the Baseline to approximately 2.5 MAFY. However, there would be little change in water levels in the AAC and main irrigation delivery canal system. Current water levels in the AAC, East Highline Canal, and Westside Main Canal are maintained as high as possible (i.e., within 0.1 ft of current levels) to maximize power generation from the hydropower facilities on these canals and to ensure efficient water delivery operations.

<u>Collective Drains Discharging to the New and Alamo Rivers.</u> Under the Proposed Project, the amount of drain (tile, tail, seepage, and spillage) water that is collected by and discharged from the IID drainage system to the New and Alamo Rivers would be reduced approximately 33 percent and 30 percent, respectively, from the mean annual volumes predicted for the Baseline. The primary impacts associated with the reduction of flow in the IID drains that discharge to the New and Alamo Rivers are associated with water quality in the drains. No other impacts to these drains are anticipated. Figure 3.1-27 shows the drainage basins within the IID water service area of the New and Alamo Rivers.

<u>Alamo River.</u> The amount of water discharged from the Alamo River to the Salton Sea would be reduced by approximately 30 percent from a mean annual volume of 576 KAFY

predicted under the Baseline, to approximately 401 KAFY. As previously noted, the volume of water within the Alamo River would mainly consist of IID drainage. The primary impacts resulting from the reduction of flow in the Alamo River are related to water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

New River. The average annual flow volume of the New River at the International Boundary is estimated at approximately 165 KAFY. This flow volume may be affected by water demand and discharges in Mexico, and has changed dramatically over the period of record. Future changes in flow volume across the International Boundary could occur; however, this flow would not be affected under the Proposed Project. Model results for IID drainage indicate that when combined with the current flow from Mexico, the mean annual flow in the New River at the outlet to the Salton Sea would be approximately 335 KAFY. This represents a reduction of approximately 22 percent from the predicted flow of 431 KAFY under the Baseline. The primary impacts related to the reduction of flow in the New River are associated with water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

Surface Drain Discharge Directly to the Salton Sea. Similar to the reductions to New and Alamo Rivers, implementation of the Proposed Project would reduce the amount of water discharged directly from IID drains to the Salton Sea by approximately 39 percent from 92 KAFY, predicted under the Baseline, to approximately 56 KAFY. The primary impacts from the reduction of flow in the surface drains are related to water quality in the drains and impacts to water quality and quantity in the Salton Sea.

Water Quality of New River at the International Boundary. Under the Proposed Project, the average concentrations of TDS and selenium in the New River at the International Boundary are below their respective significance criteria. The average monthly concentration values of input data used to characterize flow at the International Boundary have an average TDS concentration of 2,719 mg/L and a selenium concentration of 2.3 µg/L. The TSS concentration at this location is 50 mg/L.

Although flow from Mexico ultimately contributes to the mass load that is discharged to the Salton Sea, the concentrations of these COCs in the flow from Mexico is not affected by the Proposed Project or alternatives described in this EIR/EIS (see Table 3.1-16). Therefore, no impact from the Proposed Project on water quality is expected in the New River at the International Boundary.

Surface Water Quality

Impact WQ-2: Increased selenium concentration in IID surface drain discharges to the Alamo River. Model results indicate that the average TDS, TSS, and selenium concentrations in the collective surface drain discharge to the Alamo River are 3,645 mg/L, 194 mg/L, and 9.25 µg/L, respectively. Both TDS and selenium concentrations are above the Baseline concentrations for these COCs while the concentration of TSS is lower than the Baseline. The predicted TDS and TSS concentrations are below their respective significance criteria of 4,000 mg/L and 200 mg/L. At 9.25 µg/L, the predicted selenium concentration is above its significance criterion of 5.0 µg/L. However, it should be noted that the Baseline selenium concentration (6.32 µg/L) is also over the significance criterion (see Table 3.1-15).

NOTES:

1. DOES NOT INCLUDE APPROXIMATELY 300,000 ac-ft/yr DELIVERY TO COACHELLA CANAL.
2. INCLUDES APPROXIMATELY 3,400 ac-ft/yr DELIVERY TO IID USERS VIA THE AAC UPSTREAM OF THE MESA LATERAL 5 AND 4,100 ac-ft/yr DELIVERY TO IID USERS VIA THE COACHELLA CANAL.

SIMULATED MEAN ANNUAL FLOWS FOR TIME PERIOD 1987-1998 IN THOUSANDS OF ACRE FEET.

WATER BALANCE DATA ARE APPROXIMATE AND MINOR VARIATIONS IN THE MODELED FLOW DATA ARE EXPECTED.

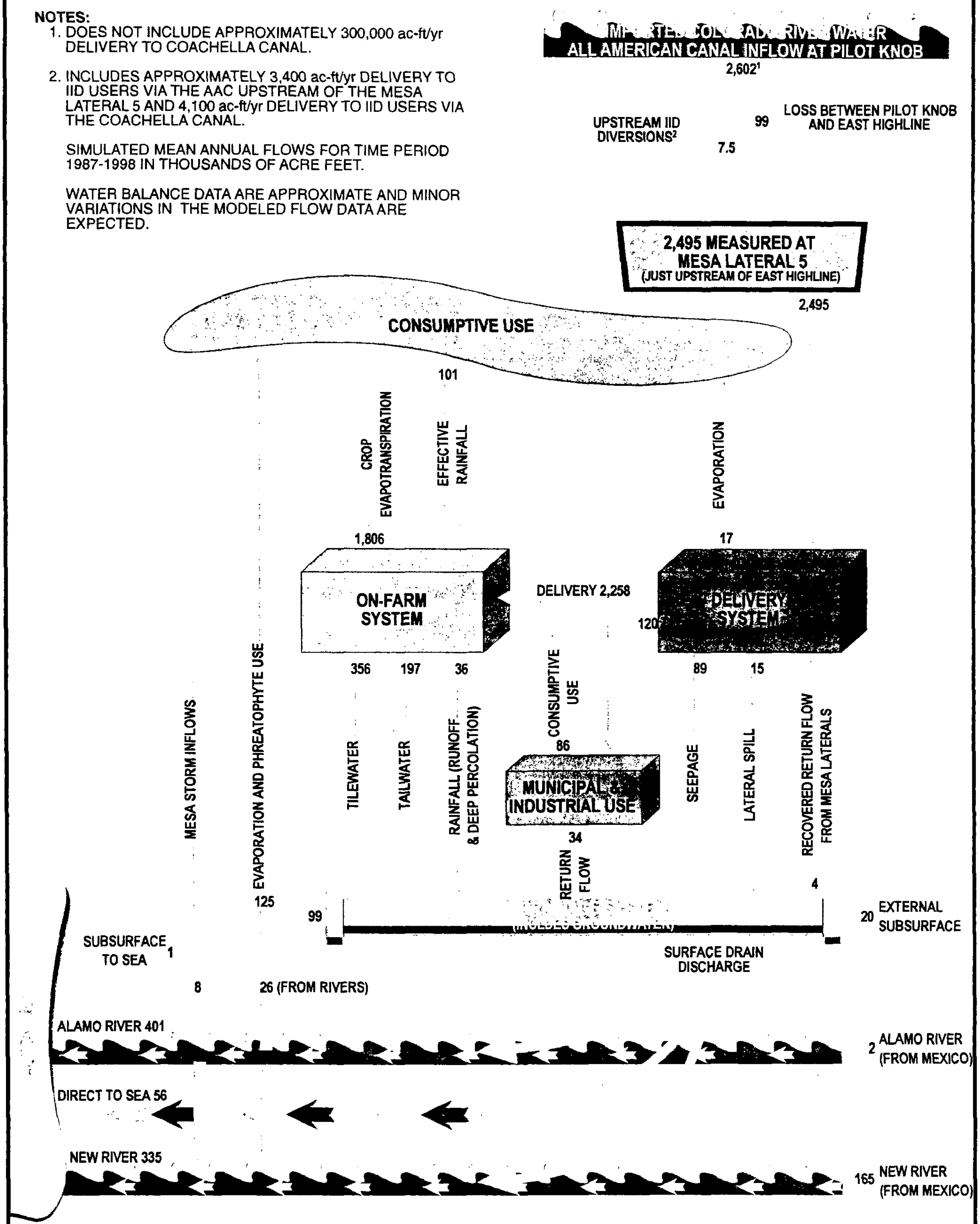

Figure 3.1-26
Proposed Project
Average Overall Water Balance
IID Water Conservation and Transfer Project Draft EIR/EIS

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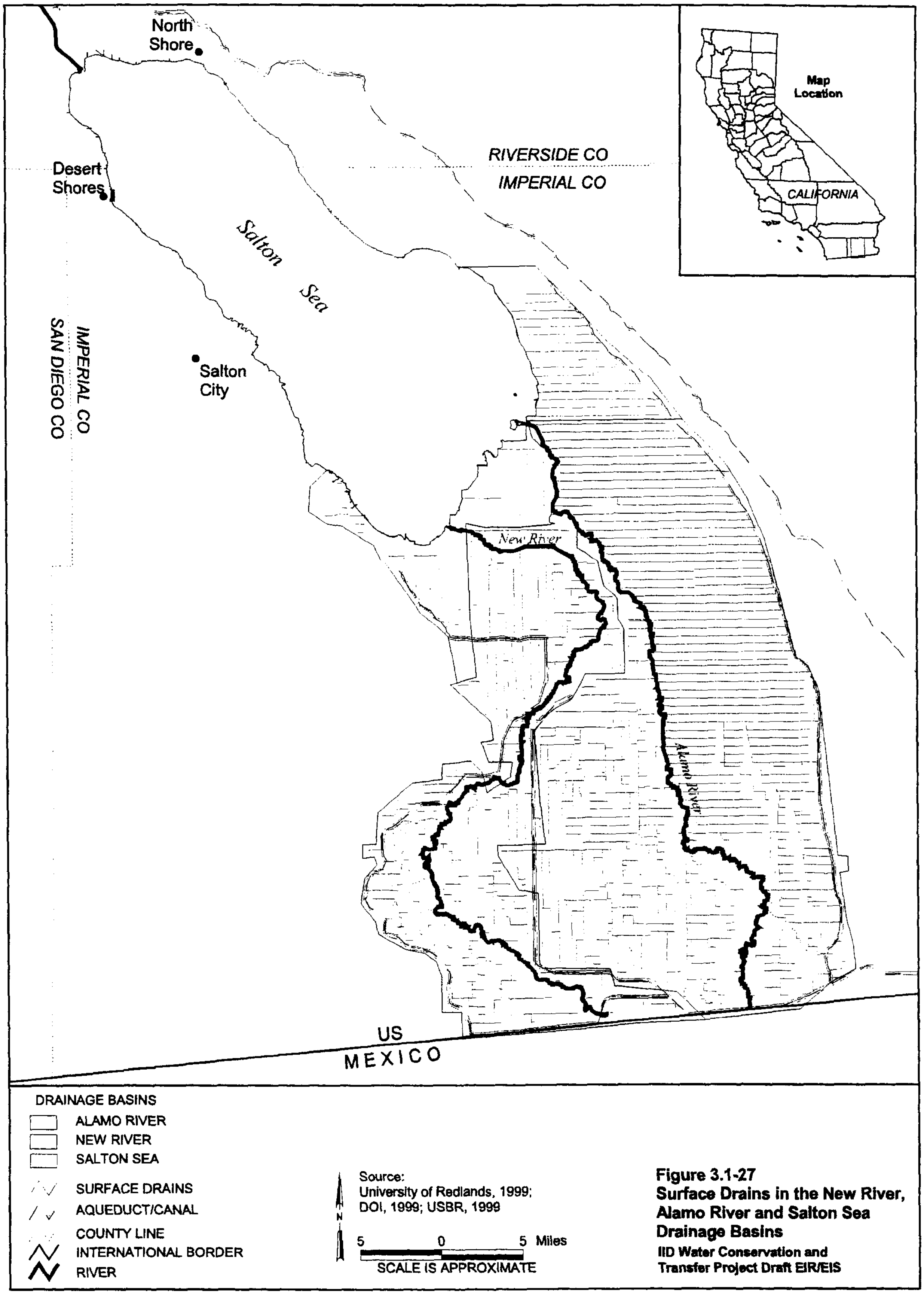

Figure 3.1-27
Surface Drains in the New River, Alamo River and Salton Sea Drainage Basins
IID Water Conservation and Transfer Project Draft EIR/EIS

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Model results indicate that, over time, average selenium concentrations in the surface drains that discharge to the Alamo River would remain above the water quality standard of 5.0 µg/L (see Table 3.1-14). As discussed in the Existing Setting section (Section 3.1.3), selenium and salts that are carried into IID from imported Colorado River irrigation water tend to build up in soils and root zones as crops are irrigated. Periodically, farmers leach their fields, and the excess salts and selenium dissolve out of the root zone and discharge into the tilewater system. Ultimately, concentrations of dissolved salt and selenium form in the water that is discharged into the IID surface drains. As a result, selenium would exceed its water quality criteria at the surface drain discharge to the Alamo River. This impact cannot be mitigated and is considered significant and unavoidable. (Significant and unavoidable impact.)

Mitigation WQ-2: No reasonable mitigation is available to reduce the concentration of selenium in the drains. The HCP IID Water Service Area Portion includes habitat replacement to mitigate the biological impacts resulting from the increased selenium; however, the selenium concentration itself would not be reduced by the HCP. (Significant and unavoidable impact.)

Impact WQ-3: Reduction in Total Suspended Solids concentration in IID surface drains discharging to the Alamo River. As noted above and shown in Table 3-1-15, the predicted average annual TSS concentrations for the Proposed Project are lower than the concentrations modeled under the Baseline. The lower TSS concentrations are expected to reduce the sediment load that would discharge to the Alamo River, resulting in a beneficial impact to river water quality. (Beneficial impact.)

Impact WQ-4: Increase in selenium concentration in Alamo River at the Outlet to the Salton Sea. With the Proposed Project, model results indicate that the average annual concentration of TDS in the Alamo River at the outlet to the Salton Sea would be 3,101 mg/L, which is below the significance criterion of 4,000 mg/L. However, the modeled selenium concentration is 7.86 µg/L, which is above the significance criteria of 5.0 µg/L.

The TDS and selenium concentrations for the Proposed Project are higher than the levels shown under the Baseline (see Table 3.1-15). However, the TSS concentration under the Proposed Project is lower than the levels predicted under the Baseline.

The impacts of elevated selenium levels in the Alamo River are similar to those described under WQ-1 above; that is, they exceed water quality criteria and could not be mitigated, and they are considered significant and unavoidable. (Significant and unavoidable impact.)

Mitigation WQ-4: None available. (Significant and unavoidable impact.)

Impact WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River. Under the Proposed Project, the average concentration of TDS, 3,294 mg/L, in the collective surface drain discharge to the New River is below the significance criterion. However, model results indicate that average selenium concentration, 8.30 µg/L, in the IID surface drains to the New River is above the significance criterion. The average concentration of TSS in the New River is 232 mg/L (see Table 3.1-16).

In comparison to Baseline concentrations, both TDS and selenium concentrations are greater under the Proposed Project. However, TSS concentrations are lower under the Proposed Project than the concentrations modeled under the Baseline.

Impacts of selenium concentrations in the IID surface drains that discharge to the New River are significant and unavoidable. (Significant and unavoidable impact.)

Mitigation WQ-5: See mitigation WQ-2. (Significant and unavoidable impact.)

Impact WQ-6: Change in COC concentration in the New River at the Outlet to the Salton Sea. The average concentrations of TDS (3,075 mg/L) and selenium (3.77 µg/L) in the New River at the outlet to the Salton Sea are below their respective significance criteria see Table 3.1-16). In comparison to Baseline concentrations, modeled concentrations of TDS and selenium under the Proposed Project are higher , while TSS concentrations are lower. Because TDS and selenium are predicted to remain below their water quality significance criteria, the changes in the concentrations of these COCs are considered less than significant impacts. (Less than significant impact.)

Impact WQ-7: Increase in selenium concentration in the IID surface drains discharging directly to the Salton Sea. Model results indicate that, under the Proposed Project, the average concentrations of TDS and TSS in IID drains that discharge directly to the Salton Sea are 2,637 mg/L and 132 mg/L, respectively. However, the average selenium concentration at this location is 6.7 µg/L, which is above the significance criterion (see Table 3.1-17). In comparison to the Baseline, TSS concentrations are lower under the Proposed Project, but both selenium and TDS concentrations are increased.

Impacts from selenium concentrations in surface drain discharge to the Salton Sea are significant and unavoidable. (Significant and unavoidable impact.)

Mitigation WQ-7: See mitigation WQ-2. (Significant and unavoidable impact.)

Impact WQ-8: Potential effects to Imperial Valley groundwater hydrology. The groundwater storage capacity of the Imperial Basin is estimated to range from approximately 7 MAF (County of Imperial 1977) to 14 MAF (DWR 1975). Therefore, conservation along with reduction in surface water deliveries by 300 KAFY are expected to have a minimal effect on the volume of groundwater stored in the basin. In addition, the beneficial use of groundwater in IID is limited, and few wells are used for groundwater production (none for irrigation) because yield is low and the water is of poor quality; TDS concentrations range from a few hundred to more than 10,000 mg/L (Montgomery Watson 1995). Therefore, impacts from the Proposed Project on groundwater quality and beneficial use in the IID water service area are expected to be less than significant. (Less than significant impact.)

Inadvertent Overrun and Payback Policy

Conservation of 59 KAFY for the IOP can be accomplished through fallowing or other conservation measures. This conservation would be in addition to the up to 300 KAFY for the Proposed Project, and is now part of the Proposed Project. If fallowing is selected, about 9,800 additional acres would be required.

	ALAMO RIVER DRAINAGE BASIN									
	Proposed Project		**Alternative1/ Baseline**		**Alternative 2**		**Alternative 3**		**Alternative 4**	
	Surface Drains	***Outlet to Salton Sea***	***Surface Drains***	***Outlet to Salton Sea***	***Surface Drains***	***Outlet to Salton Sea***	***Surface Drains***	***Outlet to Salton Sea***	***Surface Drains***	***Outlet to Salton Sea***
TDS (mg/L)	3,645	3,101	2,492	2,465	2,723	2,676	3,501	2,917	2,403	2,418
TSS (mg/L)	194	209	252	264	211	222	225	242	247	259
Se (μg/L)	9.25	7.86	6.32	6.25	6.91	6.25	8.88	7.39	6.10	6.13

Water Quality Criteria
TDS......4,000 mg/L
TSS......200 mg/L
Se...........5μg/L

Notes:
All water quality data in the Project alternatives are flow weighted based on 12-year model runs

TABLE 3.1-15
Comparison of Average Annual COC Concentrations for the Alamo River Drainage Basin for the Proposed Project and Alternatives
IID Water Conservation and Transfer Project Draft EIR/EIS

	NEW RIVER DRAINAGE BASIN														
	Proposed Project			**Alternative1/ Baseline**			**Alternative 2**			**Alternative 3**			**Alternative 4**		
	Mexico Border	***Surface Drains***	***Outlet Salton Sea***	***Mexico Border***	***Surface Drains***	***Outlet Salton Sea***	***Mexico Border***	***Surface Drains***	***Outlet Salton Sea***	***Mexico Border***	***Surface Drains***	***Outlet Salton Sea***	***Mexico Border***	***Surface Drains***	***Outlet Salton Sea***
TDS (mg/L)	2,719	3,294	3,075	2,719	2,485	2,617	2,719	2,839	2,824	2,719	3,134	2,929	2,719	2,585	2,606
TSS (mg/L)	50	232	175	50	294	238	50	257	199	50	264	207	50	285	229
Se (μg/L)	2.25	8.30	3.77	2.25	6.51	3.30	2.25	7.15	3.50	2.25	7.90	3.62	2.25	6.50	3.18

Water Quality Criteria
TDS......4,000 mg/L
TSS......None applicable
Se...........5μg/L

Notes:

All water quality data in the Project alternatives are flow weighted based on 12-year model runs

TABLE 3.1-16
Comparison of Average Annual COC Concentrations for the New River Drainage Basin for the Proposed Project and Alternatives
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	SALTON SEA DRAINAGE BASIN [1]				
	Proposed Project	Alternative1/ Baseline	Alternative 2	Alternative 3	Alternative 4
TDS (mg/L)	2,637	1,892	2,004	2,525	1,815
TSS (mg/L)	132	136	121	148	136
Se (µg/L)	6.69	4.80	5.09	6.40	4.61

Water Quality Criteria
TDS......4,000 mg/L
TSS......None applicable
Se..........5µg/L

Notes:
All water quality data in the Project alternatives are flow weighted based on 12-year model runs
[1] Drains that discharge directly to the Salton Sea.

TABLE 3.1-17
Comparison of Average Annual COC Concentrations for IID Drains Discharging to the Salton Sea for the Proposed Project and Alternatives
IID Water Conservation and Transfer Project Draft EIR/EIS

Hydrologic impacts of the IOP have been modeled to reflect the worst case average condition over the period of the project. This assumption resulted in an average annual payback to the river of 59 KAFY. Comparing this average payback to the entitlement curtailment of approximately 59 KAF to the agriculture entitlements included in the Baseline resulted in no changes to flows in the Colorado River as a result of the IOP. The effect of the IOP compared to entitlement curtailment as a result of river administration result in a change of the payback shifting from CVWD to IID.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

Habitat Conservation Plan (IID Water Service Area Portion)

Impact HCP-WQ-9: Wetland creation element of HCP provides additional high value water resource area. The HCP includes the construction of new marsh in the IID water service area. This water would come from either the irrigation delivery water canal system or drain system and could be diverted through existing drains. The diversion of water through the drains could help dilute COC concentrations in those surface drains that are used to support the creation of additional marsh. As a result, the HCP is expected to have a beneficial impact to water quality in IID drains that are used to support the HCP. (Beneficial impact.)

HCP (Salton Sea Portion) Approach 1 (HCP1): Hatchery and Habitat Replacement

HCP Approach 1 would consist of the construction of 5,000 acres of ponds on farmland in the IID water service area along the southern portion of the Sea (as the worst case), and would use the irrigation water that was historically delivered to the farmland to accommodate the ET losses associated with maintenance of the ponds. In addition, supplemental water supplies would be necessary to maintain circulation in the ponds. The requirements for water circulation would not be defined until the specific pond locations were identified and the characteristics of the pond system design developed. Any impacts associated with obtaining water to maintain circulation in the ponds would be addressed in subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-WQ-10: Use of conserved water as mitigation avoids impacts to Salton Sea Water Quality. HCP Approach 2 is designed to avoid the impacts of Project-related reductions in flow to the Salton Sea by maintaining those flows at levels equivalent to the Baseline. Under this approach, additional water would be conserved to mitigate Salton Sea impacts using any combination of water conservation measures, including fallowing. The amount of water conserved for mitigation would depend on the amount of water conserved for transfer and the conservation method used.

Under HCP Approach 2, the quality of the water discharged to the Salton Sea through the drains that are selected to transfer the conserved water, and the river(s) used to convey the conserved water, would be similar to or improved relative to the water that is currently discharged to the Sea from these locations. Therefore, implementing this approach would potentially improve water quality in these locations, thus resulting in a beneficial impact. (Beneficial impact.)

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Water Quantity. There are no significance criteria that stipulate a specific federal or state standard for the elevation, area, and quantity of water in the Salton Sea. However, changes in elevation and surface area, predicted by Reclamation's Salton Sea Accounting Model (Reclamation 2001b) may have potential impacts to other resource areas, such as water quality, air quality, aesthetics and recreation. The following discussion is presented to provide a better understanding of how the predicted reduction in the elevation and surface area of the Sea affects water quality and other resource areas.

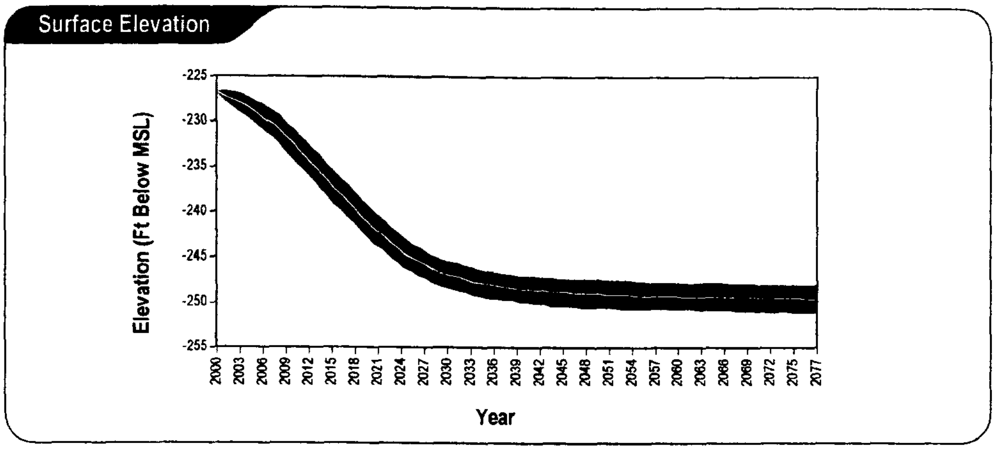
According to model results generated by the IIDSS (see Appendix E), the Proposed Project is expected to reduce IID's discharge to the Salton Sea by approximately 28 percent, from roughly 1.1 MAFY under the Baseline, to 793 KAFY (includes flow from Mexico). Over a 75-year period, modeling conducted by Reclamation indicates that the reduction in flow is expected to result in a drop in the surface level of the Sea of roughly 22 feet, from its Baseline elevation of approximately -227.8 feet msl to -249.8 feet msl (Salton Sea Accounting Model 2001 data, see Figure 3.1-28). In addition, Reclamation's model predicts that over the life of the Proposed Project, the reduction of flow will reduce the surface area of the Sea by 28 percent (approximately 103 square miles), from the present area of approximately 233,000 acres to 167,000 acres. By far, the greatest reductions are expected to occur between the time of the initiation of transfer and the year 2030, when the Sea is expected to drop to a mean elevation of -245 feet msl (see Figure 3.1-28). In comparison, under the Baseline, the mean elevation of the Sea is expected to drop approximately 7 feet to -235 feet msl over the same 75-year period.

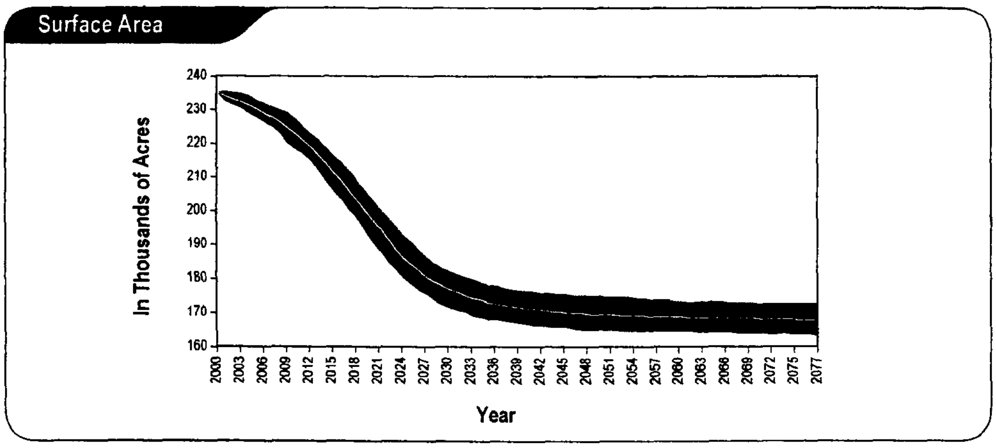
This change in elevation and area, in-turn, would result in the exposure of additional shoreline along the perimeter of the Sea, thus, potentially impacting other resources such as air quality, aesthetics, and recreation. Further analysis of impacts associated with the reduction of surface area and elevation of the Sea and the increased exposure of shoreline is included in Sections 3.6—Recreation, 3.7—Air Quality, and 3.11—Aesthetics.

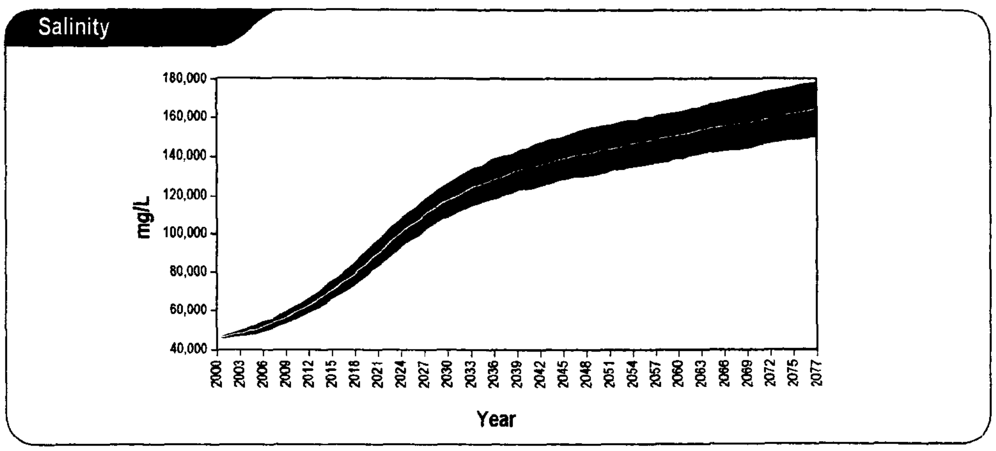
It is also important to note that the Salton Sea Restoration Project is evaluating actions to stabilize the elevation and reduce the salinity of the Salton Sea (see Section 1.6.2 in Chapter 1). Therefore, it is possible that changes to water quantity and elevation of the Sea could be improved if feasible restoration alternatives are identified and implemented. Additionally, HCP (Salton Sea Portion) Approach 2 would avoid water quantity impacts to the Sea [see discussion of HCP (Salton Sea Portion) Approach 2, below].

Water Quality. There are no significance criteria that stipulate a specific federal or state water quality standard for salinity and TSS concentrations in the Salton Sea. Therefore, a finding of significant impact to the Sea, based on a regulatory standard for TSS and salinity, cannot be made at this time. However, it is understood that elevated salinity concentrations can substantially degrade the water quality of the Sea. As salinity concentrations increase, this change in water quality could result in significant impacts to the habitat and biological resources of the Sea. To provide background for potential secondary impacts to biological resources in the Salton Sea, an understanding of the predicted change in salinity of the Sea is presented below. Further analysis of the impacts that elevated salinity levels could have on the biological resources of the Sea is included in Section 3.2—Biological Resources.

Figure 3.1-28
USBR Model Results: *Proposed Project Graphs of the Salton Sea*







Legend:

Mean
+1 Standard Deviation, -1 Standard Deviation
+95 Percentile, -5 Percentile

Notes:
Mean: Mean of all traces
95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values
5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values
-1 Standard Deviation: Values representing one standard deviation below the mean
+1 Standard Deviation: Values representing one standard deviation above the mean

E012002004CVO (01/10/02)

Source: U.S. Bureau of Reclamation Salton Sea Accounting Model, December 2001.

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Because Colorado River water is the source of most of the irrigation drainage that discharges into the Sea, the salt load carried by this water is eventually transferred to the Sea. However, Reclamation's Salton Sea Accounting Model predicts that the Sea will evaporate faster than it is being replaced by incoming flow, and the salinity of the Sea is expected to increase over time because dissolved salt loadings continue to be concentrated by evaporation.

Reclamation's Salton Sea Accounting Model predicts that the reduced inflows under the Proposed Project will ultimately result in the salinity of the Sea rising from its present concentration of approximately 45,000 mg/L TDS, to over 60,000 mg/L TDS by the year 2012. And, by the year 2077, the Salton Sea Accounting Model predicts that salinity of the Sea will be as high as 162,000 mg/L TDS. In comparison, the Salton Sea Accounting Model results indicate that under future Baseline conditions, the salinity of the Sea will reach 60,000 mg/L TDS by 2023, and ultimately will rise as high as 86,000 mg/L TDS by the year 2077 (see Figure 3.1-28). A bar chart comparing the future Baseline TDS concentration to predicted TDS concentrations for the Proposed Project and alternatives is presented in Figure 3.1-29.

Impact WQ-11: Potential change in COC concentrations of Salton Sea water column: Quantitative data on how the reductions in flow affect selenium concentrations in the Salton Sea are not available. However, based on data provided by Setmire and others (USGS 1993, Reclamation 1995), the ecosystem of the Salton Sea effectively removes selenium from the water column to concentrations of 1 µg/L or less. It is unlikely that the Proposed Project would result in an increase in selenium concentrations in the Sea to levels equal to or greater than the 5.0-µg/L level stipulated in the significance criteria. (Less than significant impact.)

Impact WQ-12: Potential change in pesticide/herbicide deposition in Salton Sea sediments. Quantitative data on how reductions in flow may affect concentrations of herbicides and pesticides sediment are not available. However, qualitative assumptions indicate that concentrations of herbicides and pesticides in sediment in the Salton Sea are expected to decrease under the Proposed Project.

As discussed in the Existing Setting section (Section 3.1.3.3), herbicides and pesticides tend to concentrate in sediment. Therefore, the amount of TSS in water can be used as a gross indicator for making comparative estimates about herbicide and pesticide concentrations in sediment. In this respect, a reduction in herbicide and pesticide concentrations in sediment is expected because the mass input of TSS to the Sea is expected to decrease relative to the Baseline, along with the total inflow of water. As a result, impacts to sediment quality from the Proposed Project are anticipated to be less than significant. (Less than significant impact.)

It should be noted that the Proposed Project has the potential to decrease selenium concentrations in sediment in the Salton Sea. Selenium concentrations in sediment do not constitute an impact to water quality based on the water quality significance criteria. However, changes in selenium concentrations have the potential to affect biological resources in the Salton Sea. Further details on these potential impacts are presented in Section 3.2—Biological Resources.

HCP (Salton Sea Portion) Approach 1 (HCP1): Hatchery and Habitat Replacement

HCP Approach 1 would consist of the construction of 5,000 acres of ponds on farmland in the IID water service area along the southern portion of the Sea, and would use the irrigation water that was historically delivered to the farmland to accommodate the ET losses associated with maintenance of the ponds. In addition, supplemental water supplies would be necessary to maintain circulation in the ponds. The requirements for water circulation would not be defined until the specific pond locations were identified and the characteristics of the pond system design developed. Any impacts associated with obtaining water to maintain circulation in the ponds would be addressed in subsequent environmental documentation. All water applied to the ponds (including flow used to meet the circulation needs within the ponds) in excess of that needed to offset ET losses would flow to the Salton Sea as surface flow, tilewater, or groundwater.

Because the quality of the water discharged from the ponds to the Salton Sea would be similar or improved relative to the Baseline, implementing this approach may impact water quality. Further detailed development of this HCP is needed to more accurately assess the impact on water quality. However, because this HCP measure is proposed to offset impacts to the Salton Sea fish population, it would be reasonable to expect that discharges from the fish ponds would meet water quality criteria for similar fish farming operations in the Imperial and Coachella valleys, therefore no adverse impact to the Salton Sea would be predicted.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-WQ-13: Reduced loading of COC to Salton Sea water and sediment. HCP Approach 2 is designed to avoid the impacts of Project-related reductions in flow to the Sea. Under this approach, water conserved to mitigate Salton Sea impacts (i.e., up to 100 KAFY, depending on the amount of water conserved and transferred) could be generated through any combination of water conservation measures, including fallowing.

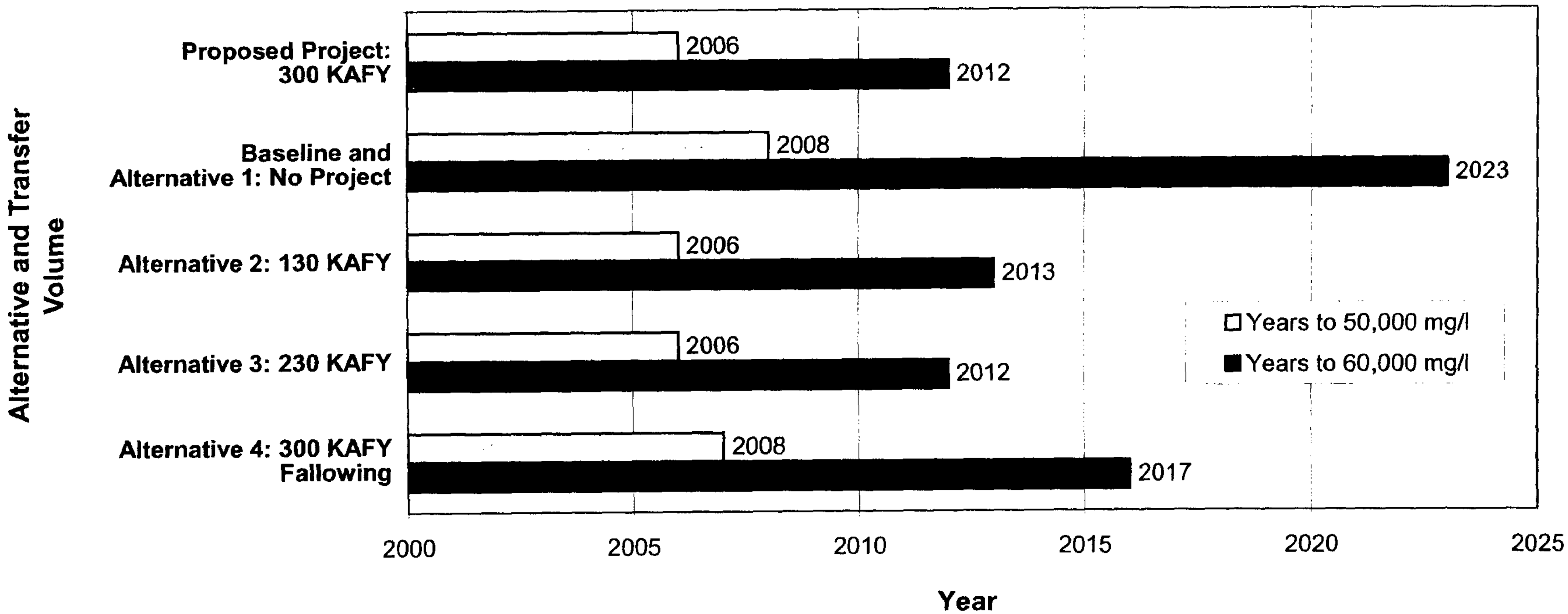
The quality of the water discharged to the Salton Sea under HCP Approach 2 would be similar to or improved relative to the water that is currently discharged to the Sea. Therefore, implementing this approach would not affect selenium concentrations in the Sea. Further, this approach would maintain Baseline salinity changes, thereby avoiding salinity increases that would result from the Proposed Project. The impacts from this approach would be less than significant. (Less than significant impact.)

3.1.4.4 Alternative 1: (No Project)

LOWER COLORADO RIVER

Water Quantity. Under the No Project alternative, the hydrology in the LCR would not change dramatically. Therefore, surface water quantities and river elevations in the LCR will be similar to those described in the Existing Setting section (Section 3.1.3.1).

Water Quality. Water quality conditions in the LCR would be similar to those described in the Existing Setting (Section 3.1.3.1), with the exception of Reclamation's predicted rise in TDS concentration to 879 mg/L.



Source: USBR Salton Sea Model - Mean Stochastic Simulation Results

Figure 3.1-29
USBR Model Results: Proposed Project U.S. Project Alternatives Comparison of TDS Concentrations in the Salton Sea
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E012002004CVO (01/10/02)

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Groundwater. Because river stages would not be substantially different from existing conditions, groundwater hydrology and chemistry in aquifers that are hydraulically connected to the LCR would remain relatively unchanged under Alternative 1.

IID WATER SERVICE AREA AND AAC

Surface Water Quantity

IID Irrigation Water Delivered Through the AAC. Under the No Project Alternative, the proposed diversion of 130 KAFY to 300 KAFY of IID irrigation water would not occur, and the diversion of Colorado River irrigation delivery water to the AAC at the Imperial Dam would be limited to approximately 3.43 MAFY (3.85 less Priorities 1 and 2- PVID/Yuma Project diversions). After accounting for upstream losses and diversions to CVWD, output from the IIDSS indicates that the predicted mean annual volume of water delivered to the IID water service area at Mesa Lateral 5 is 2,803 MAFY, which includes adjustments for river administration. A flow diagram showing a water balance for IID under No Project/Baseline conditions is presented in Figure 3.1-30.

Collective Drains Discharging to the New and Alamo Rivers. Under the No Project/Baseline, the quantity of water flowing through the surface drains that discharge to the New and Alamo Rivers is expected to be similar to present volumes (see Figure 3.1-30).

Alamo River. The quantity of water discharged from the Alamo River to the Salton Sea, under the No Project/Baseline, is predicted at a mean annual volume of 576 KAFY.

New River. The average annual flow volume of the New River at the International Boundary is estimated at approximately 165 KAFY. This flow volume may be affected by water demand and discharges in Mexico, and has changed dramatically over the period of record. Future changes in flow volume across the International Boundary could occur; however, these changes are not included in the predicted No Project/Baseline flow. Model results for IID drainage indicate that when combined with the current flow from Mexico, the predicted No Project/Baseline mean annual flow in the New River at the outlet to the Salton Sea would be approximately 431 KAFY.

Surface Drain Discharge Directly to the Salton Sea. Model results for IID drainage indicate that the predicted No Project/Baseline mean annual flow in the surface drains that discharge directly to the Salton Sea would be approximately 92 KAFY.

Surface Water Quality

Alamo River Drainage Basin – IID Surface Drain Discharge to the Alamo River. Model results for the No Project/Baseline indicate that the average concentration of TDS in the surface drain discharge to the Alamo River is 2,492 mg/L, which is below the significance criterion of 4,000 mg/L. However, at 6.32 µg/L, selenium is above its significance criteria of 5 µg/L. No Project/Baseline TSS concentrations are predicted at 252 mg/L (see Table 3.1-15).

Surface Water Quality – Alamo River Drainage Basin – Alamo River at the Outlet to the Salton Sea. Model results indicate that the predicted No Project/Baseline average concentration of TDS in the Alamo River at the outlet to the Salton Sea is 2,465 mg/L, which is below its significance criterion. However, selenium is above its significance criteria at 6.25 µg/L (see Table 3.1-15). No Project/Baseline TDS concentrations are predicted at 264 mg/L, above its significance criteria of 200 mg/L.

Surface Water Quality – New River Drainage Basin – New River at the International Boundary. As previously mentioned, model results indicate that the predicted No Project/Baseline average concentrations of TDS, selenium, and TSS at the International Boundary are 2,719 mg/L, 2.3 µg/L, and 50 mg/L, respectively (see Table 3.1-16). All three COCs at this location are below their respective significance criteria.

Surface Water Quality – New River Drainage Basin – IID Surface Drain Discharge to the New River. Model results for the No Project/Baseline indicate that the average concentrations of TSS and selenium in the New River at the outlet to the Salton Sea are 294 mg/L and 6.51 µg/L, respectively. Both are above their respective significance criteria. The predicted average No Project/Baseline TDS concentration is 2,485 mg/L (see Table 3.1-16).

Surface Water Quality – New River Drainage Basin – New River at the Outlet to the Salton Sea. The average concentrations of TDS and selenium in the New River at the outlet to the Salton Sea are 2,617 mg/L and 3.30 µg/L, respectively, which are below their respective significance criteria. The predicted average No Project/Baseline TSS concentration is 238 mg/L (see Table 3.1-16).

Surface Water Quality – IID Surface Drain Discharge to the Salton Sea. The predicted No Project/Baseline TDS, TSS and selenium concentrations in the surface drain discharge to the Salton Sea are 1,892 mg/L, 136 mg/L and 4.8 µg/L, respectively; all below their respective significance criteria. (See Table 3.1-17).

Groundwater Hydrology. Surface flow and seepage, groundwater recharge, and groundwater use in the IID water service area is not expected to be substantially different from existing conditions. Therefore, groundwater hydrology and water chemistry in aquifers that are hydraulically connected to the IID water service area would remain relatively unchanged under the predicted Baseline.

SALTON SEA

Water Quantity. Modeling conducted by Reclamation indicates that under the No Project/Baseline, the mean surface elevation of the Sea is expected to drop approximately 7 feet over the next 75 years, from its current elevation of approximately -228 feet msl to -235.3 feet msl (Figure 3.1-31). In addition, Reclamation's model predicts that over the life of the project, the surface area of the Sea is expected to decrease approximately 16,000 acres or roughly 25 square miles (see Figure 3.1-31).

Water Quality. The salinity of the Sea is expected to increase over time because dissolved salt loadings continue to be concentrated by evaporation. In addition, the TDS levels in imported Colorado River water are expected to rise to 879 mg/L from present concentrations. Reclamation's Salton Sea Accounting Model predicts that under future No Project/Baseline conditions, the concentration in the salinity of the Sea will reach approximately 60,000 mg/L TDS by 2023, and ultimately will rise as high as 86,000 mg/L TDS by the year 2077 (see Figure 3.1-31). A bar chart comparing TDS concentrations for the Proposed Project and alternatives is presented in Figure 3.1-29.

Selenium Concentrations. As previously mentioned, quantitative predictions on selenium concentrations in the Sea are not available. However, similar to the Proposed Project, it is predicted that under future No Project/Baseline conditions, selenium concentrations in the Sea would remain below the 5-µg/L water quality standard.

NOTES:
1. DOES NOT INCLUDE APPROXIMATELY 300,000 ac-ft/yr DELIVERY TO COACHELLA CANAL.
2. INCLUDES APPROXIMATELY 3,400 ac-ft/yr DELIVERY TO IID USERS VIA THE AAC UPSTREAM OF THE MESA LATERAL 5 AND 4,100 ac-ft/yr DELIVERY TO IID USERS VIA THE COACHELLA CANAL.

SIMULATED MEAN ANNUAL FLOWS FOR TIME PERIOD 1987-1998 IN THOUSANDS OF ACRE FEET.

WATER BALANCE DATA ARE APPROXIMATE AND MINOR VARIATIONS IN THE MODELED FLOW DATA ARE EXPECTED.

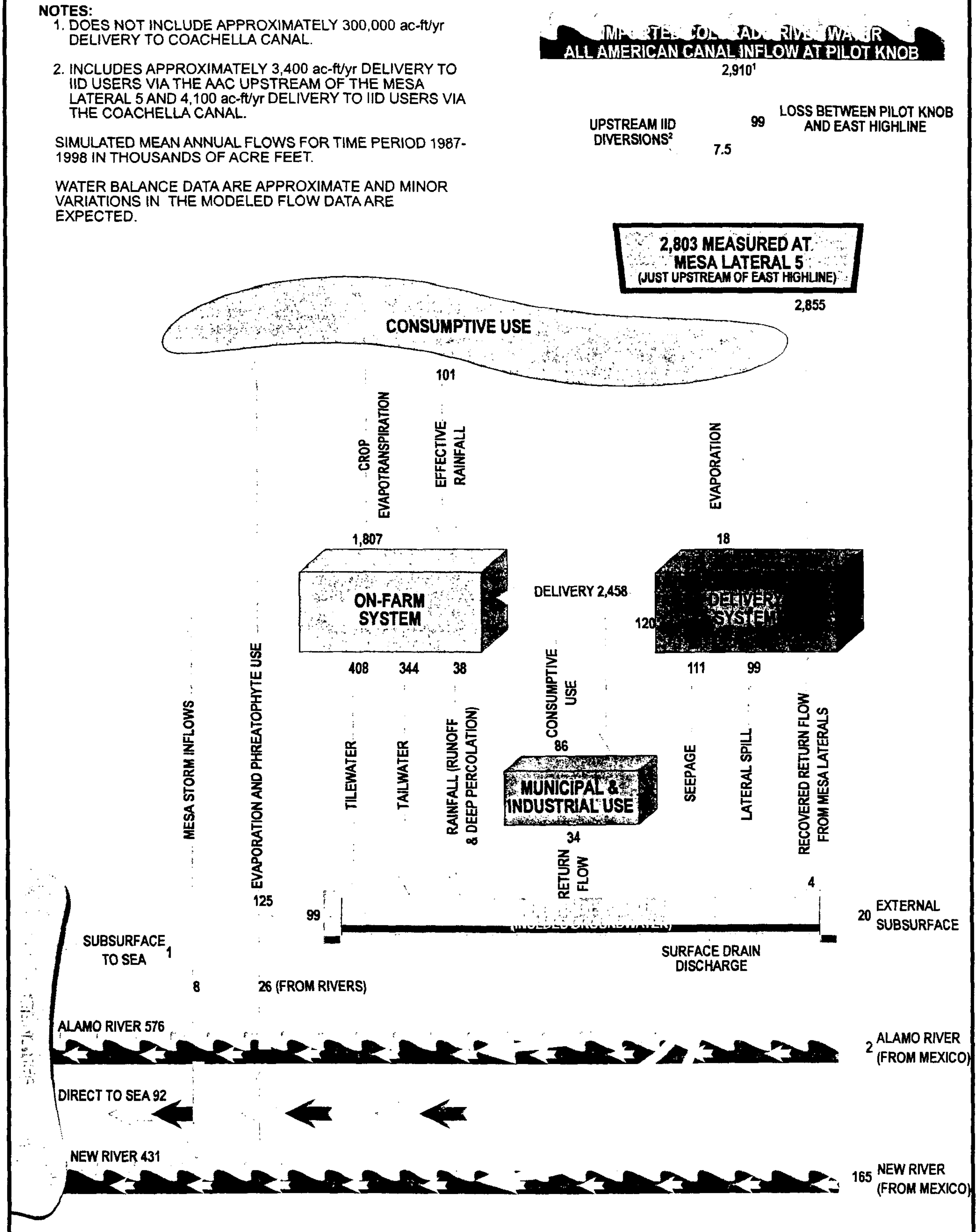

Figure 3.1-30
Baseline/No Project: Alternative 1
Average Overall Water Balance
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Sediment Quality. Because both TSS discharges and changes in selenium concentrations in IID water service area discharges to the Salton Sea are not expected to increase under future No Project/Baseline conditions, sediment quality in the Salton Sea is expected to remain constant relative to conditions discussed in the Existing Setting section (Section 3.1.3.3).

3.1.4.5 Alternative 2 (A2): Water Conservation and Transfer of up to 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure).

LOWER COLORADO RIVER

Water Conservation and Transfer

Alternative 2 includes the diversion of up to 130 KAFY per year at Parker Dam to the CRA, and the transfer of this water to the SDCWA service area. The reduction in flow in the reach between Parker and Imperial dams of up to 130 KAFY per year has the potential to result in beneficial and less than significant impacts on water quality, as described below.

Similar to the Proposed Project, Alternative 2 does not include construction and operation of new or improvement of existing facilities in the LCR study area; therefore, no impacts to hydrology and water quality due to changes in construction and operations would occur in the LCR.

Water Quantity. Although Reclamation has not conducted modeling for a 130 KAFY diversion, it is anticipated that impacts to surface water quantities in the LCR would be proportionally less than those resulting from the Proposed Project. A diversion of up to 130 KAFY is within the historical variation in volume on the LCR.

Impact A2-WQ-1: Effects on groundwater, LCR flows, and LCR water quality.

Although Reclamation has not conducted modeling for a 130 KAFY diversion, it is anticipated that impacts to river stages in the LCR would be proportionally less than those resulting from the Proposed Project. Under Alternative 2, changes in groundwater hydrology and chemistry in aquifers that are hydraulically connected to the LCR are anticipated to be proportionally less than predicted under the Proposed Project.

Similar to the Proposed Project, the reduction of flow volume during a given season in the reach of the LCR between Parker and Imperial dams could beneficially impact sediment load in the LCR. Relative to the Baseline, salinity concentrations are anticipated to continue to meet mandated objectives through salinity control projects; therefore, no impact to salinity in the LCR is anticipated. In addition, Alternative 2 is not expected to change water quality in the LCR because additional chemical constituents that could affect Baseline conditions are not being introduced to the reach. Therefore, impacts to water quality in the LCR are anticipated to be less than significant. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Surface Water Quantity

IID Irrigation Water Delivered Through the AAC. Alternative 2 would reduce water delivery to IID through the AAC by 130 KAFY. The amount of water delivered to IID (as measured at Mesa Lateral 5) would be reduced approximately 5 percent from 2.8 MAFY under the Baseline, to just under 2.67 MAFY (see Figure 3.1-32). Similar to the Proposed Project, there would be little change in water levels in the AAC and main irrigation delivery canal system because current water levels in the AAC, East Highline Canal, and Westside Main Canal are maintained as high as possible to maximize power generation from the hydropower facilities on these canals and to ensure efficient water delivery operations.

Collective Drains Discharging to the New and Alamo Rivers. Under Alternative 2, the amount of drain (tile, tail, seepage and spillage) water that is collected by and discharged from the IID drainage system to the New and Alamo Rivers would be reduced approximately 17 percent and 13 percent, respectively, from the mean annual volumes predicted for the Baseline. The primary impacts associated with the reduction of flow in the IID drains that discharge to the New and Alamo Rivers are associated with water quality in the drains. No other impacts to these drains are anticipated.

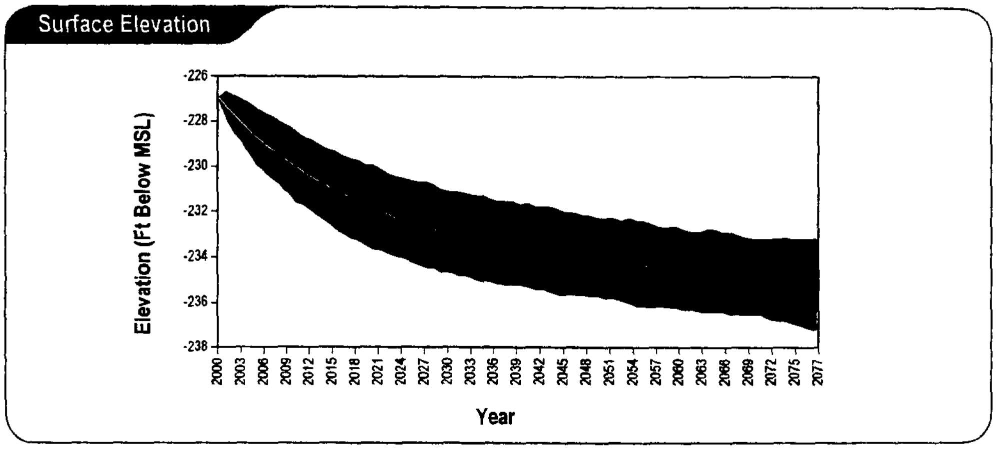
Alamo River. The amount of water discharged from the Alamo River to the Salton Sea would be reduced by approximately 12.7 percent, from a mean annual volume of 576 KAFY predicted under the Baseline, to approximately 503 KAFY. As previously noted, the volume of water within the Alamo River would mainly consist of IID drainage. The primary impacts resulting from the reduction of flow in the Alamo River are related to water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

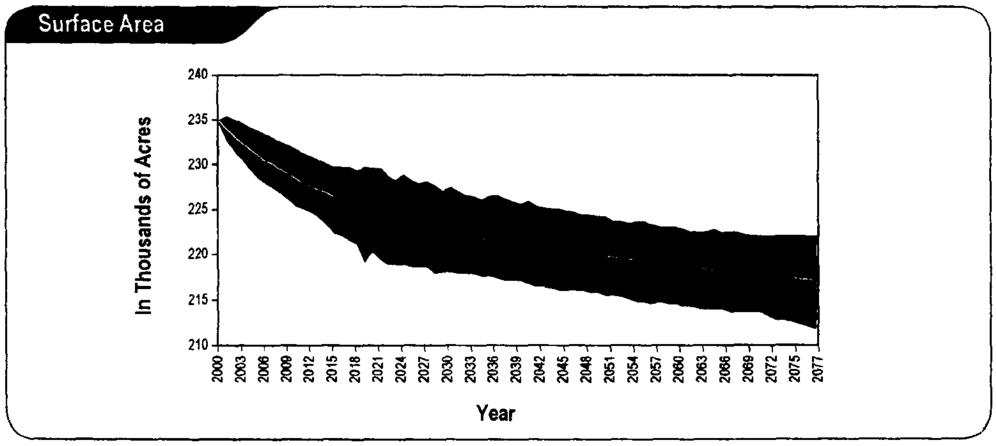
New River. As previously noted, the average annual flow volume of the New River at the International Boundary is estimated at approximately 165 KAFY. This flow volume may be affected by water demand and discharges in Mexico, which have changed dramatically over the period of record. Future changes in flow volume across the International Boundary could occur; however, this flow would not be affected under Alternative 2. Model results for IID drainage indicate that when combined with the current flow from Mexico, the mean annual flow in the New River at the outlet to the Salton Sea would be approximately 382 KAFY. This represents a reduction of approximately 11 percent from the predicted flow of 431 KAFY under the Baseline. The primary impacts related to the reduction of flow in the New River are associated with water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

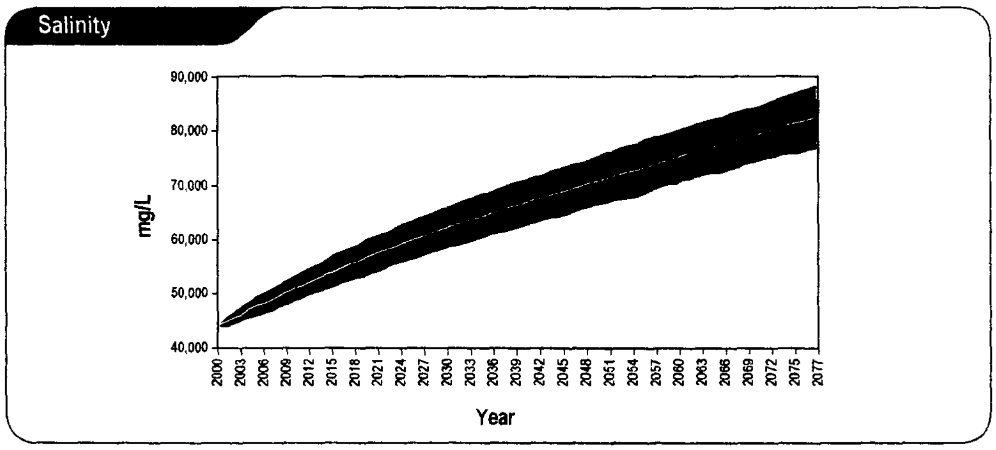
Surface Drain Discharge Directly to the Salton Sea. Similar to the reductions to the New and Alamo Rivers, implementation of the Proposed Project would reduce the amount of water discharged directly from IID drains to the Salton Sea approximately 13 percent, from 92 KAFY, predicted under the Baseline, to approximately 80 KAFY. The primary impacts from the reduction of flow in the surface drains are related to water quality in the drains and impacts to water quality and quantity in the Salton Sea.

Water Quality of New River at the International Boundary. Model results indicate that water quality in the New River at the International Boundary is unaffected by the Proposed Project and alternatives, and TDS, TSS, and selenium concentrations are the same for the Baseline, as well as for the Proposed Project and alternatives (see Table 3.1-16).

Figure 3.1-31
USBR Model Results: *Project Baseline Graphs of the Salton Sea*







Legend:

Mean

+1 Standard Deviation, -1 Standard Deviation

+95 Percentile, -5 Percentile

Notes:

Mean: Mean of all traces

95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values

5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values

-1 Standard Deviation: Values representing one standard deviation below the mean

+1 Standard Deviation: Values representing one standard deviation above the mean

Source: U.S. Bureau of Reclamation Salton Sea Accounting Model, December 2001.

NOTES:
1. DOES NOT INCLUDE APPROXIMATELY 300,000 ac-ft/yr DELIVERY TO COACHELLA CANAL.
2. INCLUDES APPROXIMATELY 3,400 ac-ft/yr DELIVERY TO IID USERS VIA THE AAC UPSTREAM OF THE MESA LATERAL 5 AND 4,100 ac-ft/yr DELIVERY TO IID USERS VIA THE COACHELLA CANAL.

SIMULATED MEAN ANNUAL FLOWS FOR TIME PERIOD 1987-1998 IN THOUSANDS OF ACRE FEET.

WATER BALANCE DATA ARE APPROXIMATE AND MINOR VARIATIONS IN THE MODELED FLOW DATA ARE EXPECTED.

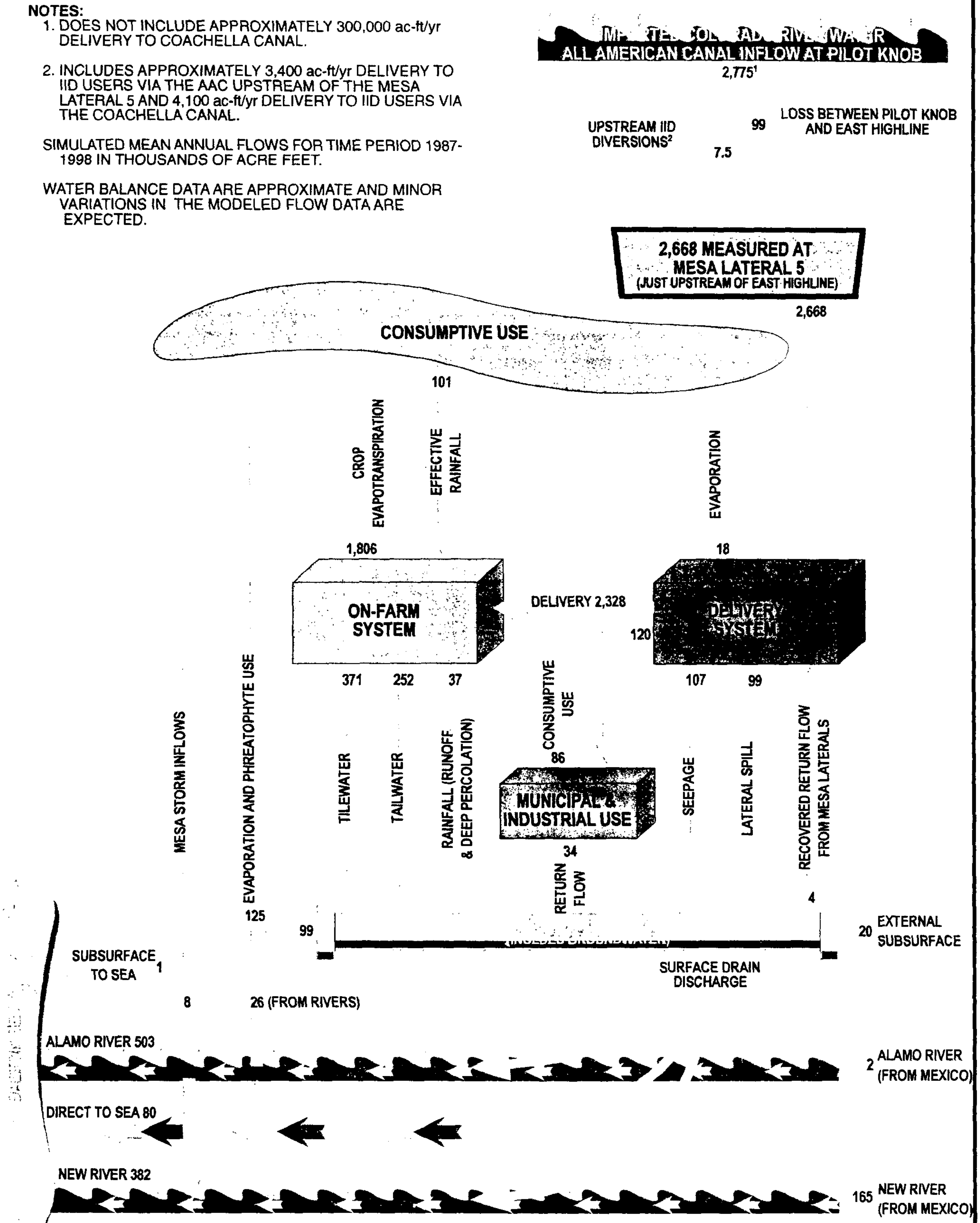


Figure 3.1-32
Alternative 2: Water Conservation and Transfer of Up To 130 KAFY On-farm
Average Overall Water Balance
IID Water Conservation and Transfer Project Draft EIR/EIS

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Surface Water Quality

Impact A2-WQ-2: Increased selenium concentrations in IID surface drain discharges to the Alamo River. Alternative 2 Model results indicate that the annual average concentration of selenium in the surface drain discharge to the Alamo River is 6.91 µg/L, which is an increase compared to the Baseline and is above the significance criterion. However, model results indicate that TDS concentrations under Alternative 2 are 2,723 mg/L, which is below the significance criterion. The average concentration of TSS is 211 mg/L. In comparison to the Baseline, TDS and selenium concentrations are higher under Alternative 2 while TSS concentrations are lower (see Table 3.1-15).

Impacts to the Alamo River associated with selenium under Alternative 2 are similar to those described under the Proposed Project; that is, selenium concentrations in surface drain water at the point of discharge to the Alamo River represent significant and unavoidable impacts on water quality. It should be noted that average Baseline selenium concentrations in the Alamo River drains are also above the significance criterion. (Significant and unavoidable impact.)

Mitigation A2-WQ-2: No reasonable mitigation is available to reduce the concentration of selenium in the drains. The HCP IID Water Service Area Portion includes habitat replacement to mitigate the biological impacts resulting from the increased selenium; however, the selenium concentration itself would not be reduced by the HCP. (Significant and unavoidable impact.)

Impact A2-WQ-3: Reduction in Total Suspended Solids concentrations in IID surface drains discharging to the Alamo River. Impacts associated with TSS concentrations in the surface drain discharge to the Alamo River are considered beneficial to river water quality because TSS concentrations are lower relative to the Baseline. (Beneficial impact).

Impact A2-WQ-4: Maintain selenium concentration in the Alamo River at the Outlet to the Salton Sea. Model results indicate that the average concentration of TDS in the Alamo River at the outlet to the Salton Sea is 2,676 mg/L, which is below the significance criterion. However, the Baseline concentration of selenium is 6.25 µg/L, which is above the significance criteria. Under Alternative 2, the average TSS concentration at this location is 222 mg/L, which is above the significance criterion. In comparison to the Baseline, TDS concentrations are higher, selenium concentrations are similar, and TSS concentrations are lower (see Table 3.1-15).

Although the selenium concentration in the Alamo River under Alternative 2 is above the significance criterion, it does not increase compared to the Baseline; therefore, it is a less than significant impact. (Less than significant impact.)

Impact A2-WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River. Model results indicate that the average concentrations of TDS, selenium, and TSS in the surface drain discharge to the New River are 2,839 mg/L, 7.15 µg/L, and 257 mg/L, respectively. The concentrations of TDS are below the significance criterion, and the concentration of selenium is above the significance criterion. In comparison to the Baseline, TDS and selenium concentrations are higher, and TSS concentrations are lower (see Table 3.1-16).

Impacts associated with TSS in surface drain discharge to the New River are considered beneficial to river water quality because TSS concentrations are lower than under the Baseline. Impacts to the New River associated with selenium are similar to those described under the Proposed Project; that is, selenium concentrations in surface drain discharge to the New River represent significant and unavoidable impacts to water quality. It should be noted that average Baseline selenium concentrations in the New River drains are also above the significance criterion. (Significant and unavoidable impact.)

Mitigation Measure A2-WQ-5: See Mitigation A2-WQ-2.

Impact A2-WQ-6: Change in COC concentrations in the New River at the Outlet to the Salton Sea. Alternative 2 model results indicate that TDS concentrations are 2,824 mg/L, TSS concentrations are 199 mg/L, and selenium concentrations are 3.50 µg/L. In comparison to the Baseline, TDS and selenium concentrations are higher, and concentrations of TSS are lower (see Table 3.1-16). However, all COC concentrations remain below their respective significance criteria. (Less than significant impact.)

Impact A2-WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea. Model results indicate that under Alternative 2 the average concentration of selenium in the surface drains that discharge directly to the Sea is 5.09 µg/L. This concentration is slightly above the selenium significance criterion of 5.0 µg/L. The average concentration of TDS is 2,004 mg/L. TSS concentrations are at 121 mg/L. In comparison to the Baseline, concentrations of TDS and selenium are higher, and concentrations of TSS are lower (see Table 3.1-17). (Significant and unavoidable impact.)

Mitigation A2-WQ-7: See mitigation A2-WQ-2.

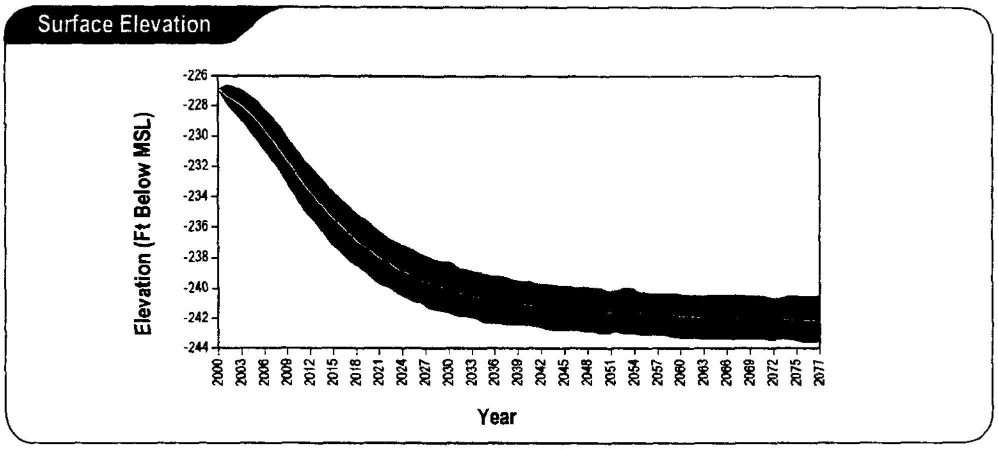
Impact A2-WQ-8: Potential effects to Imperial Valley groundwater hydrology. Similar to the Proposed Project, Alternative 2 is not expected to impact groundwater resources in the IID water service area. Therefore, impacts to groundwater resources and the beneficial use of groundwater in the IID water service area are expected to be less than significant. (Less than significant impact.)

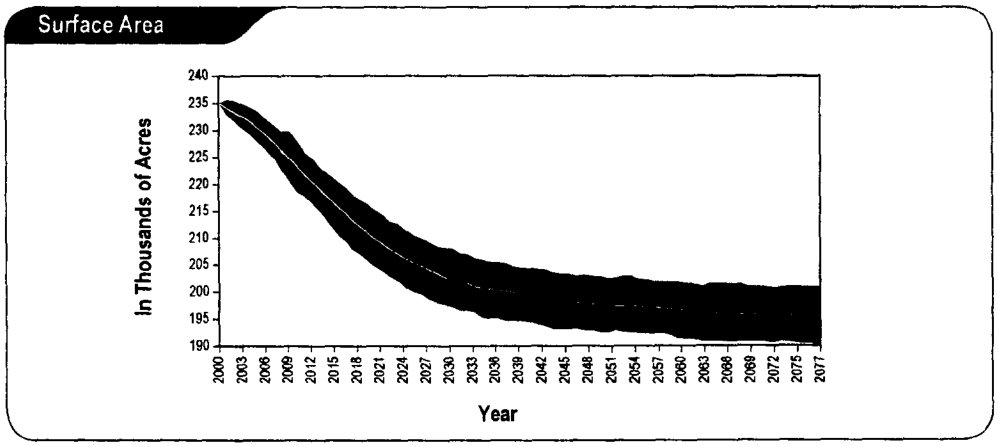
SALTON SEA

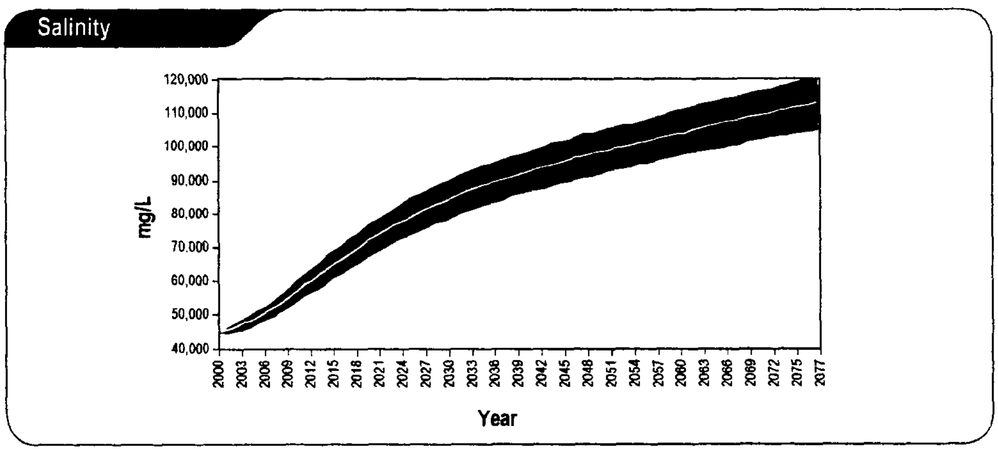
Water Conservation and Transfer

Water Quantity. According to model results generated by the IIDSS (see Appendix E), the Proposed Project is expected to reduce IID's discharge to the Salton Sea by approximately 12 percent, from roughly 1.1 MAFY under the Baseline to 966 KAFY (includes flow from Mexico). Modeling conducted by Reclamation indicates that, over a 75-year period, the reduction in flow is expected to result in a drop in the surface of the Sea of roughly 15.5 feet, from its Baseline elevation of approximately -227.8 feet msl to -242.3 feet msl (Salton Sea Accounting Model 2001 data, see Figure 3.1-33). In addition, Reclamation's model predicts that over the life of the Proposed Project, the reduction of flow will reduce the surface area of the Sea by 16 percent (approximately 39 square miles), from the present area of approximately 233,000 acres to 195,000 acres. By far, the greatest reductions are expected to occur between the time of the initiation of transfer and the year 2030 (see Figure 3.1-33). In comparison, under the Baseline the mean elevation of the Sea is expected to drop nearly 7 feet to -235.3 feet msl over the same 75-year period.

Figure 3.1-33
USBR Model Results: *Alternative 2 Graphs of the Salton Sea*







Legend:

Mean

+1 Standard Deviation, -1 Standard Deviation

+95 Percentile, -5 Percentile

Notes:

Mean: Mean of all traces

95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values

5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values

-1 Standard Deviation: Values representing one standard deviation below the mean

+1 Standard Deviation: Values representing one standard deviation above the mean

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Source: U.S. Bureau of Reclamation Salton Sea Accounting Model, December 2001.

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See also the additional notes under the Proposed Project impact to the Salton Sea regarding impacts to other resources and relationship to the Salton Sea Restoration Project. Implementation of HCP (Salton Sea Portion) Approach 2, as discussed under Section 3.1.4.3 would avoid the water quantity impact associated with this alternative.

Water Quality. As previously mentioned, a finding of significant impact to the Sea, based on a regulatory standard for TSS and salinity, cannot be made at this time. However, to provide background for potential secondary impacts to biological resources in the Salton Sea, a discussion of the predicted change in salinity of the Sea is presented below. Further analysis of the impacts that elevated salinity levels could have on the biological resources of the Sea is included in Section 3.2, Biological Resources.

Reclamation's Salton Sea Accounting Model predicts that the reduced inflows under Alternative 2 will ultimately result in the salinity of the Sea rising from its present concentration of approximately 45,000 mg/L TDS to over 60,000 mg/L TDS by the year 2013. And, by the year 2077, the Salton Sea Accounting Model predicts that salinity of the Sea will be as high as 113,000 mg/L TDS. In comparison, Salton Sea Accounting Model results indicate that under future Baseline conditions, the salinity of the Sea will reach 60,000 mg/L TDS by 2023, and ultimately will rise as high as 86,000 mg/L TDS by the year 2077 (see Figure 3.1-33). A bar chart comparing the future Baseline TDS concentration to predicted TDS concentrations for the Proposed Project and alternatives is presented in Figure 3.1-29.

Impact A2-WQ-9: Potential change in COC concentrations of the Salton Sea water column. Similar to the Proposed Project, it is unlikely that the Proposed Project would result in an increase in selenium concentrations in the Sea to levels equal to or greater than the 5.0 µg/L level stipulated in the significance criteria. (Less than significant impact.)

Impact A2-WQ-10: Potential change in COC deposition in Salton Sea sediments. Quantitative data on how reductions in flow affect concentrations of herbicides and pesticides in sediment are not available. However, qualitative assumptions indicate that concentrations of herbicides and pesticides in sediment in the Salton Sea are expected to decrease under Alternative 2.

As discussed in the Existing Setting section (Section 3.1.3.3), herbicides and pesticides tend to concentrate in sediment. Therefore, the amount of TSS in water can be used as a gross indicator for making comparative estimates about herbicide and pesticide concentrations in sediment. In this respect, a reduction in herbicide and pesticide concentrations in sediment under Alternative 2 is expected because the mass input of TSS to the Sea (along with the total inflow of water) is expected to decrease relative to the Baseline. As a result, impacts to sediment quality from Alternative 2 are anticipated to be less than significant. (Less than significant impact.)

As previously noted, the Proposed Project has the potential to affect selenium concentrations in sediment in the Salton Sea. Selenium concentrations in sediment do not constitute an impact to water quality based on the water quality significance criteria. However, changes in selenium concentrations have the potential to affect biological resources in the Salton Sea. Further details on these potential impacts are presented in Section 3.2, Biological Resources.

3.1.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

Water Conservation and Transfer

Alternative 3 includes the diversion of up to 230 KAFY at Parker Dam to the CRA, and the transfer of 130 KAFY to the SDCWA service area, with the remaining amount to be transferred to SDCWA, CVWD, or MWD. The reduction in flow in the reach between Parker and Imperial dams of up to 230 KAFY has the potential to result in beneficial and less than significant impacts, as described below. Similar to the Proposed Project, Alternative 3 does not include construction and operation of new or improvement of existing facilities in the LCR study area; therefore, no impacts to hydrology and water quality as a result of changes in construction and operations would occur in the LCR.

Water Quantity. Although Reclamation has not conducted Colorado River modeling for a 230 KAFY diversion, it is anticipated that impacts to surface water quantities in the LCR would be proportionally less than those resulting from the Proposed Project. A diversion of up to 230 KAFY is within the historical variation in volume on the LCR.

Impact A3-WQ-1: Effects on groundwater, LCR flows and LCR water quality. Although Reclamation has not conducted Colorado River modeling for the diversion of 230 KAFY, it is anticipated that impacts to the surface water elevation of the LCR would be proportionally less than those resulting from the Proposed Project. Under Alternative 3, changes in groundwater hydrology and chemistry in aquifers that are hydraulically connected to the LCR are anticipated to be proportionally less than those predicted under the Proposed Project.

Similar to the Proposed Project, the reduction of flow volume during a given season in the reach of the LCR between Parker and Imperial dams could beneficially impact sediment load in the LCR, thus, providing a beneficial impact.

Relative to Baseline, salinity concentrations are anticipated to continue to meet mandated objectives through salinity control projects; therefore, no impact to salinity in the LCR is anticipated. In addition, Alternative 3 is not expected to change water quality in the LCR because additional chemical constituents that could affect current Baseline conditions are not being introduced to the reach. Therefore, impacts to water quality in the LCR are anticipated to be less than significant. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Surface Water Quantity

<u>IID Irrigation Water Delivered Through the AAC.</u> Alternative 3 would reduce water delivery to IID through the AAC by up to 230 KAFY. The amount of water delivered to IID (as measured at Mesa Lateral 5) would be reduced approximately 8 percent from 2.8 MAFY under the Baseline, to just under 2.57 MAFY (see Figure 3.1-34). Similar to the Proposed Project, there would be little change in water levels in the AAC and main irrigation delivery canal system because current water levels in the AAC, East Highline Canal, and Westside Main Canal are maintained as high as possible to maximize power generation from the hydropower facilities on these canals and to ensure efficient water delivery operations.

NOTES:
1. DOES NOT INCLUDE APPROXIMATELY 300,000 ac-ft/yr DELIVERY TO COACHELLA CANAL.
2. INCLUDES APPROXIMATELY 3,400 ac-ft/yr DELIVERY TO IID USERS VIA THE AAC UPSTREAM OF THE MESA LATERAL 5 AND 4,100 ac-ft/yr DELIVERY TO IID USERS VIA THE COACHELLA CANAL.

SIMULATED MEAN ANNUAL FLOWS FOR TIME PERIOD 1987-1998 IN THOUSANDS OF ACRE FEET.

WATER BALANCE DATA ARE APPROXIMATE AND MINOR VARIATIONS IN THE MODELED FLOW DATA ARE EXPECTED.

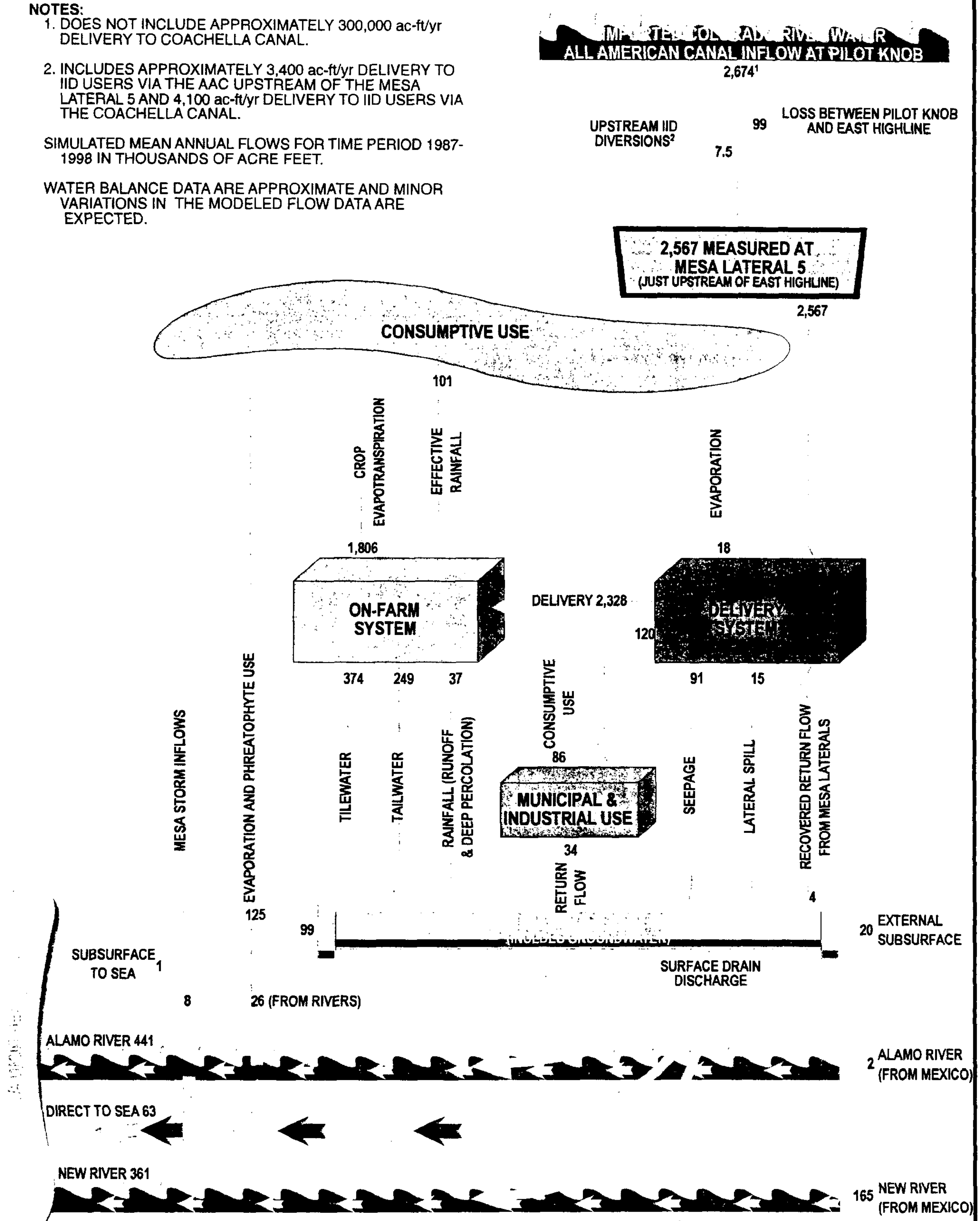

Figure 3.1-34
Alternative 3 Water Conservation and Transfer of up to 230 KAFY (130 KAFY On-farm, 100 KAFY System) Average Overall Water Balance
IID Water Conservation and Transfer Project Draft EIR/EIS

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Collective Drains Discharging to the New and Alamo Rivers. Under Alternative 3, the amount of drain (tile, tail, seepage, and spillage) water that is collected by and discharged from the IID drainage system to the New and Alamo Rivers would be reduced approximately 24 percent and 23 percent, respectively, from the mean annual volumes predicted for the Baseline. The primary impacts associated with the reduction of flow in the IID drains that discharge to the New and Alamo Rivers are associated with water quality in the drains. No other impacts to these drains are anticipated.

Alamo River. The amount of water discharged from the Alamo River to the Salton Sea would be reduced by approximately 25 percent, from a mean annual volume of 576 KAFY predicted under the Baseline to approximately 441 KAFY. As previously noted, the volume of water within the Alamo River would mainly consist of IID drainage. The primary impacts resulting from the reduction of flow in the Alamo River are related to water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

New River. As previously noted, the average annual flow volume of the New River at the International Boundary is estimated at approximately 165 KAFY. This flow volume may be affected by water demand and discharges in Mexico, and has changed dramatically over the period of record. Future changes in flow volume across the International Boundary could occur; however, this flow would not be affected under Alternative 3. Model results for IID drainage indicate that, when combined with the current flow from Mexico, the mean annual flow in the New River at the outlet to the Salton Sea would be approximately 361 KAFY. This represents a reduction of approximately 16 percent from the predicted flow of 431 KAFY under the Baseline. The primary impacts related to the reduction of flow in the New River are associated with water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

Surface Drain Discharge Directly to the Salton Sea. Similar to the reductions to New and Alamo Rivers, implementation of Alternative 3 would reduce the amount of water discharged directly from IID drains to the Salton Sea by approximately 31.5 percent, from 92 KAFY predicted under the Baseline to approximately 63 KAFY. The primary impacts from the reduction of flow in the surface drains are related to water quality in the drains and impacts to water quality and quantity in the Salton Sea.

Water Quality in New River at the International Boundary. Model results indicate that water quality in the New River at the International Boundary are unaffected by the Proposed Project and alternatives, and TDS, TSS, and selenium concentrations are the same for the Baseline, as well as for the Proposed Project and alternatives (see Table 3.1-16).

Surface Water Quality

Impact A3-WQ-2: Increased selenium concentration in IID surface drain discharges to the Alamo River. Alternative 3 model results indicate that the annual average concentration of selenium in the surface drain discharge to the Alamo River would increase to 8.88 μg/L, which is above the significance criterion. However, model results indicate that TDS concentrations are 3,501 mg/L, which is below the significance criterion. TSS concentrations are 225 mg/L, which is lower than the Baseline but still above the significance criterion. In summary, TSS and selenium concentrations increase compared to the Baseline, and TSS concentrations decrease (see Table 3.1-15).

Impacts to the Alamo River associated with selenium are similar to those described under the Proposed Project; that is, selenium concentrations in surface drain water discharge to the Alamo River represent significant and unavoidable impacts to water quality. It should be noted that average Baseline selenium concentrations in the Alamo River drains are also above the significance criterion. (Significant and unavoidable impact.)

Mitigation A3-WQ-2: No reasonable mitigation is available to reduce the concentration of selenium in the drains. The HCP IID Water Service Area Portion includes habitat replacement to mitigate for the biological impacts resulting from the increased selenium; however, the selenium concentration itself would not be reduced by the HCP. (Significant and unavoidable impact.)

Impact A3-WQ-3: Reduction in Total Suspended Solids concentrations in IID surface drains discharging to the Alamo River. Impacts associated with TSS in surface drain discharge to the Alamo River under Alternative 3 are considered beneficial to river water quality because TSS concentrations are lower relative to the Baseline. The impacts associated with TSS concentrations are similar to those described under the Proposed Project; that is, TSS levels decrease with this alternative, which is a beneficial impact. (Beneficial impact).

Impact A3-WQ-4: Increased selenium concentration in the Alamo River at the Outlet to the Salton Sea: Model results indicate that selenium concentrations increase to 7.39 µg/L under Alternative 3, which is above the significance criterion. However, average TDS concentrations, 2,917 mg/L, are below the significance criterion. TSS concentrations of 242 mg/L are lower than concentrations under the Baseline but remain above the significance criterion of 200 mg/L. In comparison to the Baseline, TDS and selenium concentrations increase, and TSS concentrations decrease (see Table 3.1-15).

Impacts associated with selenium are similar to those described under the Proposed Project; that is, selenium concentrations in the Alamo River that are above the significance criterion represent significant and unavoidable impacts to water quality. However, it should be noted that average Baseline selenium concentrations in the Alamo River are also above the significance criterion. (Significant and unavoidable impact.)

Mitigation A3-WQ-4: None available. (Significant and unavoidable impact.)

Impact A3-WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River. Model results indicate that the average concentration of TDS in the surface drain discharge to the New River is 3,134 mg/L, which is below the significance criterion. However, the average selenium concentration increases to 7.90 µg/L, which is above the significance criterion. In comparison to the Baseline, TDS and selenium concentrations are higher, and TSS concentrations (264 mg/L) are lower (see Table 3.1-16).

Impacts associated with selenium are similar to those described under the Proposed Project; that is, selenium concentrations in the New River that are above the significance criterion represent significant and unavoidable impacts to water quality. However, it should be noted that average Baseline selenium concentrations in the drains to the New River are also above the significance criteria. (Significant and unavoidable impact.)

Mitigation Measure A3-WQ-5: See Mitigation Measure A3-WQ-2.

Impact A3-WQ-6: Change in COC concentrations in the New River at the Outlet to the Salton Sea. COC concentrations remain below significance criteria in the New River at the outlet to the Salton Sea. Average concentrations of TDS and selenium in the New River at the outlet to the Salton Sea are below their respective significance criteria, with TDS at 2,929 mg/L and selenium at 3.62 μg/L. In comparison to the Baseline, TDS and selenium concentrations are higher, and concentrations of TSS (207 mg/L) are lower (see Table 3.1-16). (Less than significant impact.)

Impact A3-WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea. Model results indicate that under Alternative 3, the average concentration of selenium in the surface drains that discharge directly to the Salton Sea increases to 6.40 μg/L. This concentration is above the selenium significance criterion of 5.0 μg/L. The TDS concentration is 2,525 mg/L. TSS concentrations are 148 mg/L. In comparison, concentrations of TDS, TSS, and selenium are all higher than those modeled under the Baseline (see Table 3.1-17). The selenium concentrations in the IID surface drain discharge under Alternative 3 represent significant and unavoidable impacts to the Salton Sea. (Significant and unavoidable impact.)

Mitigation Measure A3-WQ-7: See Mitigation Measure A3-WQ-2.

Impact A3-WQ-8: Potential effects to Imperial Valley groundwater hydrology. Similar to the Proposed Project, Alternative 3 is not expected to impact groundwater resources in the IID. Therefore, impacts to groundwater resources and the beneficial use of groundwater in the IID water service area are expected to be less than significant. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Water Quantity. According to model results generated by the IIDSS (see Appendix E), Alternative 3 is expected to reduce IID's discharge to the Salton Sea by approximately 21 percent, from roughly 1.1 MAFY under the Baseline to 866 KAFY (includes flow from Mexico). Over a 75-year period, modeling conducted by Reclamation indicates that the reduction in flow is expected to result in a drop in the surface of the Sea of roughly 18.8 feet, from its Baseline elevation of approximately -227.8 feet msl to -246.6 feet msl (Salton Sea Accounting Model 2001 data, see Figure 3.1-35).

In addition, Reclamation's model predicts that over the life of the Proposed Project, the reduction of flow will reduce the surface area of the Sea by 4 percent (approximately 65.5 square miles), from the present area of approximately 233,000 acres to 178,000 acres. By far, the greatest reductions are expected to occur between the time of the initiation of transfer and the year 2030 (see Figure 3.1-35). In comparison, under the Baseline the mean elevation of the Sea is expected to drop nearly 8 feet to -235.3 feet msl over the same 75-year period.

See also the additional notes under the Proposed Project impact to the Salton Sea regarding impacts to other resources and relationship to the Salton Sea Restoration Project. Implementation of HCP (Salton Sea Portion) Approach 2, as discussed under Section 3.1.4.3 would avoid the water quantity impact associated with this alternative.

Water Quality. As previously mentioned, a finding of significant impact to the Sea, based on a regulatory standard for TSS and salinity, cannot be made at this time. However, to provide background for potential secondary impacts to biological resources in the Salton Sea, a discussion of the predicted change in salinity of the Sea is presented below. Further analysis of the impacts that elevated salinity levels could have on the biological resources of the Sea is included in Section 3.2, Biological Resources.

Reclamation's Salton Sea Accounting Model predicts that the reduced inflows under the Proposed Project will ultimately result in the salinity of the Sea rising from its present concentration of approximately 45,000 mg/L TDS to over 60,000 mg/L TDS by the year 2012. And, by the year 2077, the Salton Sea Accounting Model predicts that salinity of the Sea will be as high as 138,000 mg/L TDS. In comparison, the Salton Sea Accounting Model results indicate that under future Baseline conditions, the salinity of the Sea will reach 60,000 mg/L TDS by 2023, and ultimately will rise as high as 86,000 mg/L TDS by the year 2077 (see Figure 3.1-35). A bar chart comparing the future Baseline TDS concentration to predicted TDS concentrations for the Proposed Project and alternatives is presented in Figure 3.1-29.

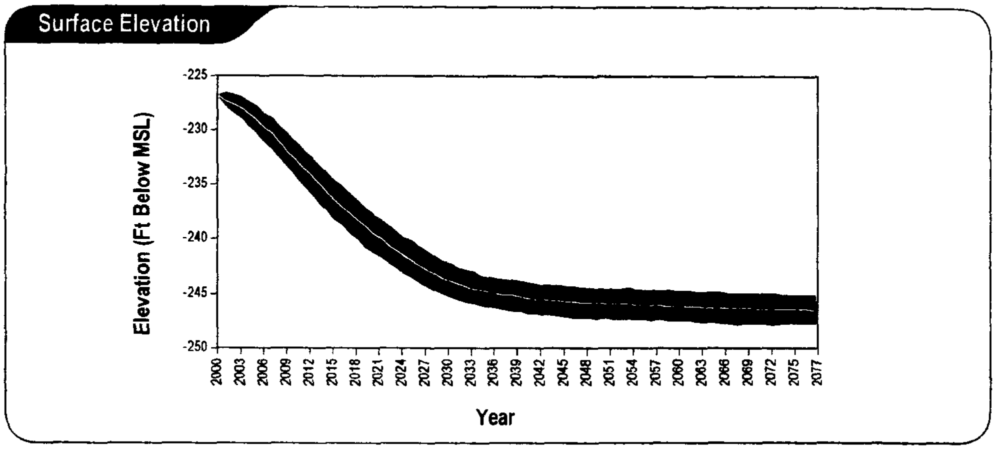
Impact A3-WQ-9: Potential change in COC concentrations of the Salton Sea water column. Similar to the Proposed Project, it is unlikely that Alternative 3 would result in an increase in selenium concentrations in the Sea to levels equal to or greater than the 5.0 µg/L level stipulated in the significance criteria. (Less than significant impact.)

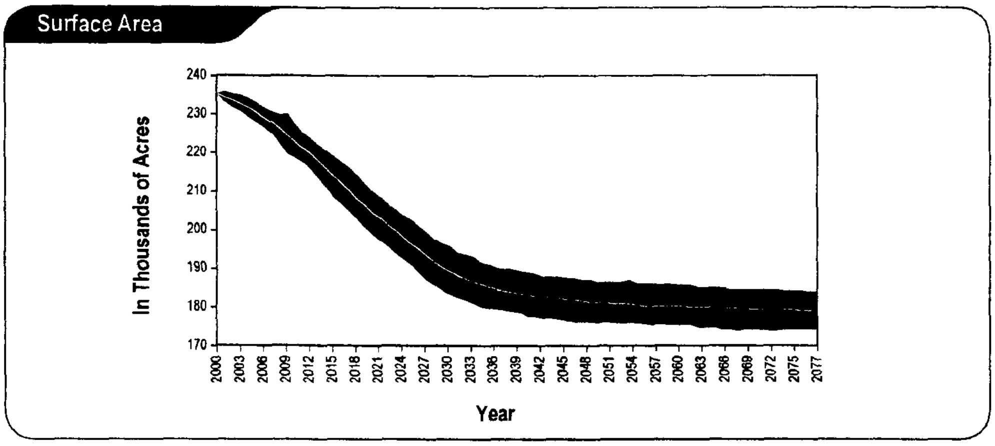
Impact A3-WQ-10: Potential change in COC deposition in Salton Sea sediments. Quantitative data on how reductions in flow affect concentrations of herbicides and pesticides in sediment are not available. However, qualitative assumptions indicate that concentrations of herbicides and pesticides in sediment in the Salton Sea are expected to decrease under Alternative 3.

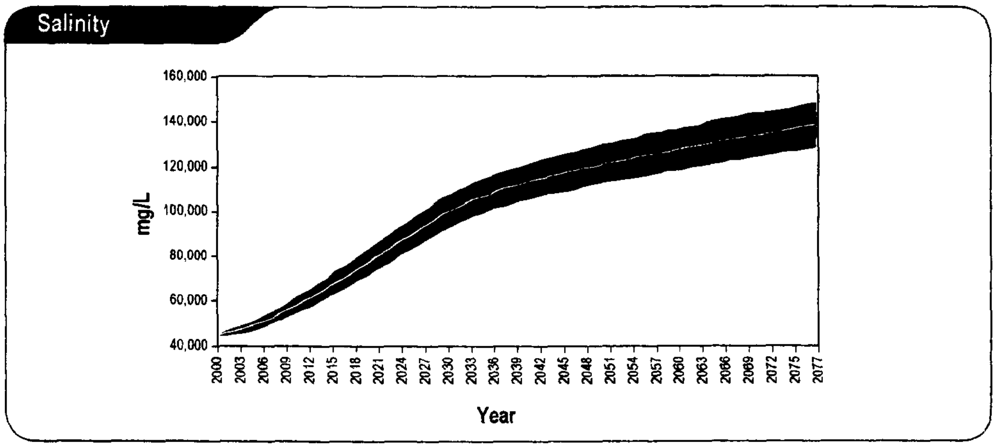
As discussed in the Existing Setting section (Section 3.1.3.3), herbicides and pesticides tend to concentrate in sediment. Therefore, the amount of TSS in water can be used as a gross indicator for making comparative estimates about herbicide and pesticide concentrations in sediment. In this respect, a reduction in herbicide and pesticide concentrations in sediment under Alternative 3 is expected because the mass input of TSS to the Sea (along with the total inflow of water) is expected to decrease relative to the Baseline. As a result, impacts to sediment quality from Alternative 3 are anticipated to be less than significant. (Less than significant impact.)

As previously noted, the Proposed Project has the potential to affect selenium concentrations in sediment in the Salton Sea. Selenium concentrations in sediment do not constitute an impact to water quality based on the water quality significance criteria. However, changes in selenium concentrations have the potential to affect biological resources in the Salton Sea. Further details on these potential impacts are presented in Section 3.2, Biological Resources.

Figure 3.1-35
USBR Model Results: *Alternative 3 Graphs of the Salton Sea*







Legend:

Mean

+1 Standard Deviation, -1 Standard Deviation

+95 Percentile, -5 Percentile

Notes:

Mean: Mean of all traces

95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values

5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values

-1 Standard Deviation: Values representing one standard deviation below the mean

+1 Standard Deviation. Values representing one standard deviation above the mean

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Source: U.S. Bureau of Reclamation Salton Sea Accounting Model, December 2001.

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3.1.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

Similar to the Proposed Project, Alternative 4 includes the diversion of up to 300 KAFY at Parker Dam to the CRA, and the transfer through the CRA of up to 200 KAFY to the SDCWA service area, with an optional transfer of up to 100 KAFY to SDCWA, CVWD, and/or MWD over the course of up to 75 years. Alternative 4 does not include construction and operation of new or improvement of existing facilities in the LCR study area; therefore, no impacts to hydrology and water quality as a result of changes in construction and operations would occur in the LCR. The reduction in flow in the reach between Parker and Imperial dams of up to 300 KAFY has the potential to result in beneficial and less than significant impacts, as described below.

Water Quantity. Under Alternative 4, the impacts to surface water quantities in the LCR will be the same as those described for the Proposed Project. The potential change under Alternative 4 is anticipated to be within the future normal fluctuation of the river.

Impact A4-WQ-1: Effects on groundwater, LCR flows, and LCR water quality. Under Alternative 4, the impacts on river stage associated with the change of the diversion point of 300 KAFY will be the same as those described for the Proposed Project. Under Alternative 4, changes in groundwater hydrology and chemistry in aquifers that are hydraulically connected to the LCR would be the same as those predicted under the Proposed Project, less than significant.

Similar to the Proposed Project, the reduction of flow volume during a given season in the reach of the LCR between Parker and Imperial dams could beneficially impact sediment load in the LCR. Relative to Baseline, salinity concentrations are anticipated to continue to meet mandated objectives through salinity control projects; therefore, no impact to salinity in the LCR is anticipated. In addition, Alternative 4 is not expected to change water quality in the LCR because additional chemical constituents that could affect Baseline conditions are not being introduced to the reach. Therefore, impacts to water quality in the LCR are anticipated to be less than significant. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Surface Water Quantity

<u>IID Irrigation Water Delivered Through the AAC.</u> Alternative 4 would reduce water delivery to IID through the AAC by 300 KAFY plus adjustment for the IOP. The amount of water delivered to IID (as measured at Mesa Lateral 5) would be reduced approximately 11 percent from 2.8 MAFY under the Baseline to just under 2.5 MAFY (see Figure 3.1-36). Similar to the Proposed Project, there would be little change in water levels in the AAC and main irrigation delivery canal system because current water levels in the AAC, East Highline Canal, and Westside Main Canal are maintained as high as possible to maximize power generation from the hydropower facilities on these canals and to ensure efficient water delivery operations.

<u>Collective Drains Discharging to the New and Alamo Rivers.</u> Under Alternative 4, the amount of drain (tile, tail, seepage, and spillage) water that is collected by and discharged from the IID

drainage system to the New and Alamo Rivers would be reduced approximately 11 percent and 10 percent, respectively, from the mean annual volumes predicted for the Baseline. The primary impacts associated with the reduction of flow in the IID drains that discharge to the New and Alamo Rivers are associated with water quality in the drains. No other impacts to these drains are anticipated.

Alamo River. The amount of water discharged from the Alamo River to the Salton Sea would be reduced by approximately 10 percent from a mean annual volume of 576 KAFY predicted under the Baseline, to approximately 517 KAFY. As previously noted, the volume of water within the Alamo River would mainly consist of IID drainage. The primary impacts resulting from the reduction of flow in the Alamo River are related to water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

New River. As previously noted, the average annual flow volume of the New River at the International Boundary is estimated at approximately 165 KAFY. This flow volume may be affected by water demand and discharges in Mexico, and has changed dramatically over the period of record. Future changes in flow volume across the International Boundary could occur; however, this flow would not be affected under Alternative 4. Model results for IID drainage indicate that, when combined with the current flow from Mexico, the mean annual flow in the New River at the outlet to the Salton Sea would be approximately 399 KAFY. This represents a reduction of approximately 7.4 percent from the predicted flow of 431 KAFY under the Baseline. The primary impacts related to the reduction of flow in the New River are associated with water quality in the river, and impacts to water quality and quantity in the Salton Sea. No other impacts associated with the decreased flow in the river are anticipated.

Surface Drain Discharge Directly to the Salton Sea. Similar to the reductions to the New and Alamo Rivers, implementation of Alternative 4 would reduce the amount of water discharged directly from IID drains to the Salton Sea. Specifically, the amount of water discharged from IID drains directly to the Salton Sea would be reduced approximately 6.5 percent, from 92 KAFY predicted under the Baseline to approximately 86 KAFY. The primary impacts from the reduction of flow in the surface drains are related to water quality in the drains and impacts to water quality and quantity in the Salton Sea (see Figure 3.1-36).

Water Quality in New River at the International Boundary. Model results indicate that water quality in the New River at the International Boundary is unaffected by the Proposed Project and alternatives, and TDS, TSS, and selenium concentrations are the same for the Baseline, as well as for the Proposed Project and alternatives (see Table 3.1-16).

Surface Water Quality

Impact A4-WQ-2: Decreased selenium concentration in IID surface drain discharges to the Alamo River. Alternative 4 model results indicate that the annual average concentration of selenium in the surface drain discharge to the Alamo River would decrease to

NOTES:
1. DOES NOT INCLUDE APPROXIMATELY 300,000 ac-ft/yr DELIVERY TO COACHELLA CANAL.
2. INCLUDES APPROXIMATELY 3,400 ac-ft/yr DELIVERY TO IID USERS VIA THE AAC UPSTREAM OF THE MESA LATERAL 5 AND 4,100 ac-ft/yr DELIVERY TO IID USERS VIA THE COACHELLA CANAL.

SIMULATED MEAN ANNUAL FLOWS FOR TIME PERIOD 1987-1998 IN THOUSANDS OF ACRE FEET.

WATER BALANCE DATA ARE APPROXIMATE AND MINOR VARIATIONS IN THE MODELED FLOW DATA ARE EXPECTED.

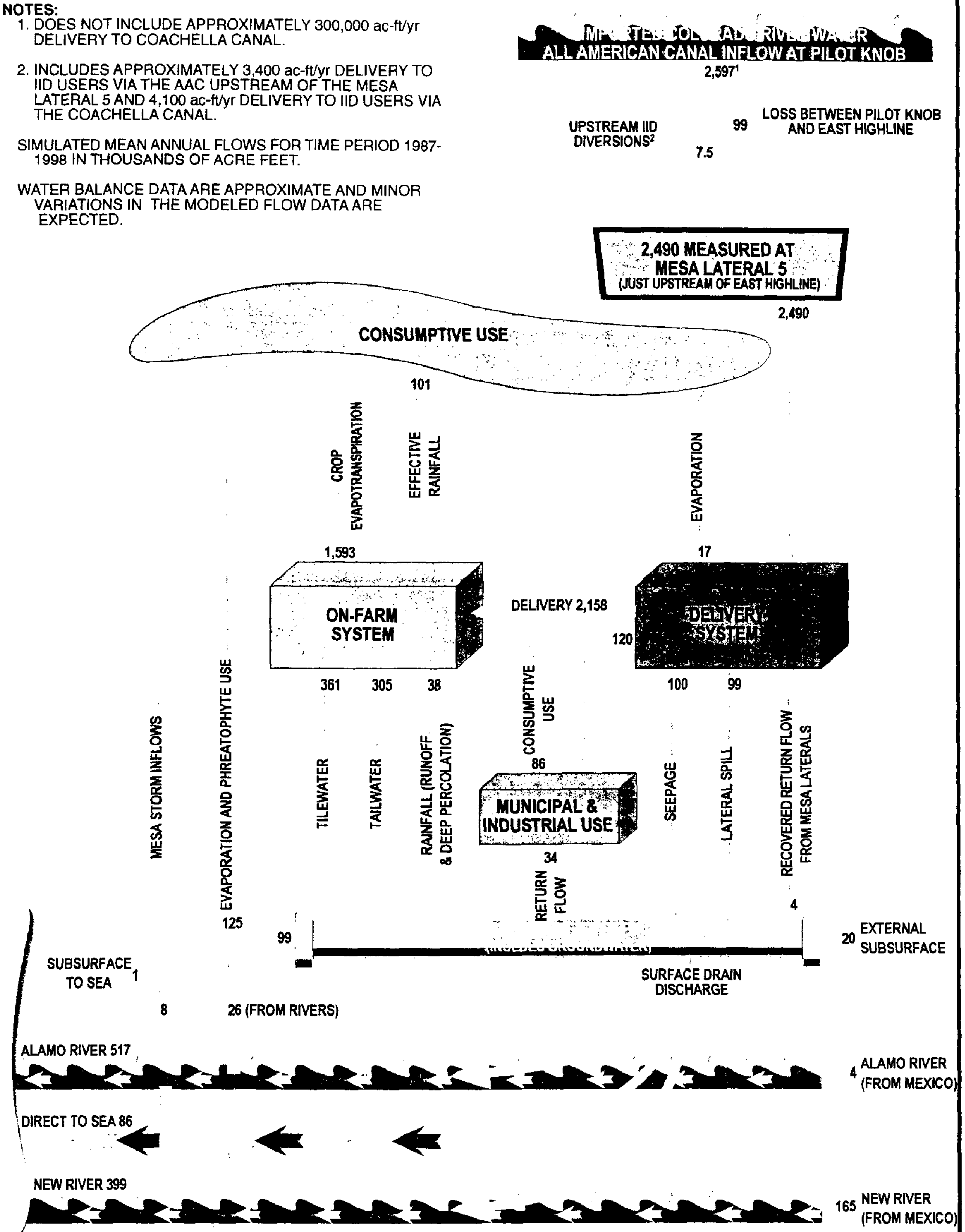

Figure 3.1-36
Alternative 4: Water Conservation and Transfer of Up To 300 KAFY (Fallowing as Exclusive Conservation Method) Average Overall Water Balance
IID Water Conservation and Transfer Project Draft EIR/EIS

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6.10 µg/L compared to 6.32 µg/L under the Baseline but would remain above the significance criterion. Model results indicate that TDS concentrations decrease to2,403 mg/L (below the significance criterion). TSS concentrations decrease to 247 mg/L but remain above the significance criterion. With Alternative 4, TDS, TSS, and selenium concentrations are all lower than those modeled under the Baseline (see Table 3.1-15).

Impacts to the Alamo River associated with selenium are reduced when compared to those described under the Proposed Project; that is, selenium concentrations in surface drain water at the point of discharge to the Alamo River represent an improvement in drain water quality, which would be considered a beneficial impact. It should be noted that average Alternative 4 selenium concentrations in the Alamo River drains would remain above the significance criterion although these concentrations are improved in comparison to - Baseline concentrations. (Beneficial impact.)

Impact A4-WQ-3: Reduction in Total Suspended Solids concentration in IID surface drains discharging to the Alamo River. Impacts from Alternative 4 associated with TSS at the point of discharge from the surface drains to the Alamo River are considered beneficial because TSS concentrations are lower relative to the Baseline. TDS concentrations also decrease, resulting in a beneficial impact. (Beneficial impact).

Impact A4-WQ-4: Decreased selenium concentration in the Alamo River at the Outlet to the Salton Sea. Alternative 4 model results indicate that selenium concentrations would decrease to 6.13 µg/L but would remain above the significance criterion for selenium. Additionally, TSS concentrations decrease to 259 mg/L compared to 264 mg/L under the Baseline but remain above the significance criterion. TDS concentrations decrease to 2,418 mg/L and remain below the significance criterion. In comparison to the Baseline, TDS, TSS and selenium concentrations are all lower (see Table 3.1-15).

The impacts associated with TSS concentrations are similar to those described under the Proposed Project; that is, they have a beneficial impact on water quality because TSS levels are lower relative to the Baseline. Impacts associated with selenium are similar to those described under the Proposed Project; that is, selenium concentrations in the Alamo River are above the significance criterion. However, because implementation of Alternative 4 would decrease selenium concentrations, this represents a beneficial impact. It should be noted that average Baseline selenium concentrations in the Alamo River are also above the significance criterion. (Beneficial impact.)

Impact A4-WQ-5: Maintain selenium concentration in the IID surface drain discharge to the New River. Alternative 4 model results indicate that concentrations of selenium in the IID surface drain discharge to the New River would decrease to 6.50 µg/L, compared to a Baseline of 6.51 µg/L, both of which are above the significance criterion. TDS concentrations in the surface drain discharge to the New River would remain the same at 2,585 mg/L, which is below the significance criterion. TSS concentrations would decrease to 285 mg/L (see Table 3.1-16).

Impacts associated with selenium are similar to those described under the Proposed Project; that is, selenium concentrations in the drains discharging to the New River are above the significance criterion. However, because selenium concentrations decrease minimally compared to the Baseline, the impact is considered to be less than significant. (Less than significant.)

Impact A4-WQ-6: Decrease in COC concentrations in the New River at the Outlet to the Salton Sea. Alternative 4 model results indicate that average concentrations of selenium, TDS, and TSS in the New River at the outlet to the Salton Sea all decrease compared to the Baseline. Selenium and TDS at 3.18 µg/L and 2,606 mg/L, respectively, remain below their respective significance criteria. TSS concentrations decrease to 229 mg/L, which is lower than the Baseline (see Table 3.1-16). (Beneficial impact.)

Impact A4-WQ-7: Decrease in selenium concentrations in the IID surface drains discharging directly to the Salton Sea. Model results indicate that under Alternative 4, selenium concentrations in IID surface drain discharge are 4.61 µg/L, which is below the significance criterion. TDS and TSS concentrations are 136 mg/L and 1,815 mg/L, respectively. In comparison to the Baseline, concentrations of TDS, selenium, and TSS are all lower. Because concentrations for all three COCs decline in comparison to the Baseline, the impacts associated with Alternative 4 are considered beneficial to water quality in the surface drains that discharge directly to the Sea (see Table 3.1-17). (Beneficial impact.)

Impact A4-WQ-8: Potential effects to Imperial Valley groundwater hydrology. Similar to the Proposed Project, Alternative 4 is not expected to impact groundwater resources in the IID. Therefore, impacts to groundwater resources and the beneficial use of groundwater in the IID water service area are expected to be less than significant. (Less than significant impact.)

SALTON SEA

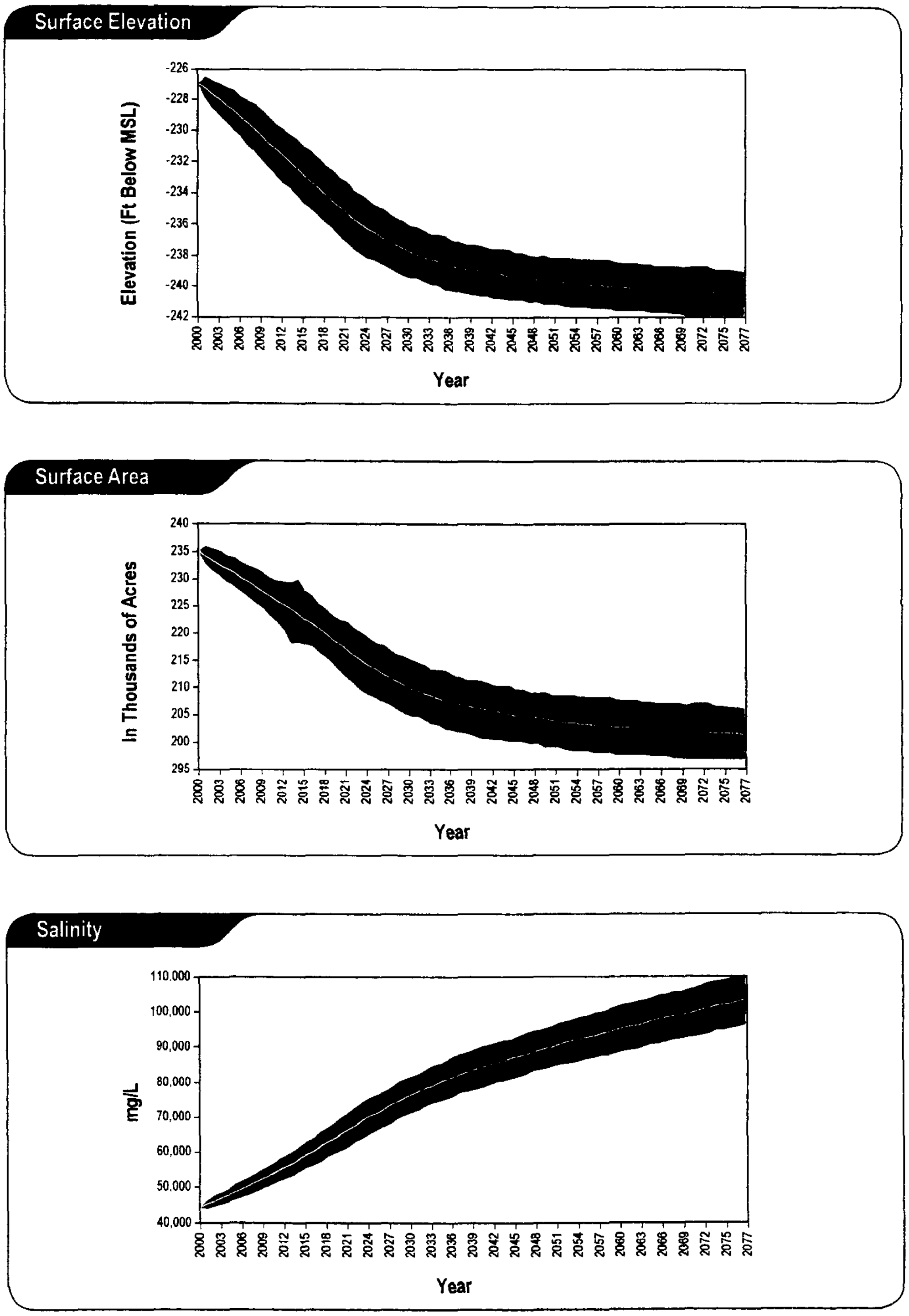
Water Conservation and Transfer

Water Quantity. According to model results generated by the IIDSS (see Appendix F), Alternative 4 is expected to reduce IID's discharge to the Salton Sea by approximately 9 percent, from roughly 1.1 MAFY under the Baseline to approximately 1000 KAFY (includes flow from Mexico). Modeling conducted by Reclamation indicates that, over a 75-ear period, the reduction in flow is expected to result in a drop in the surface of the Sea of roughly 12.8 feet, from its Baseline elevation of approximately -227.8 feet msl to -240.6 feet msl (Salton Sea Accounting Model 2001 data, see Figure 3.1-37).

In addition, Reclamation's model predicts that over the life of the Proposed Project, the reduction of flow will reduce the surface area of the Sea by 14 percent (approximately 65.5 square miles), from the present area of approximately 233,000 acres to 201,000 acres. By far, the greatest reductions are expected to occur between the time of the initiation of transfer and the year 2030 (see Figure 3.1-37). In comparison, under the Baseline the mean elevation of the Sea is expected to drop nearly 8 feet to -235.3 feet msl over the same 75-year period.

Water Quality. As previously mentioned, a finding of significant impact to the Sea, based on a regulatory standard for TSS and salinity, cannot be made at this time. However, to provide background for potential secondary impacts to biological resources in the Salton Sea, a discussion of the predicted change in salinity of the Sea is presented below.

Figure 3.1-37
USBR Model Results: *Alternative 4 Graphs of the Salton Sea*



Legend:

Mean
+1 Standard Deviation, -1 Standard Deviation
+95 Percentile, -5 Percentile

Notes:
Mean: Mean of all traces
95 Percentile: 95 percent of all model traces resulted in values less than or equal to the indicated values
5 Percentile: 5 percent of all model traces resulted in values less than or equal to the indicated values
-1 Standard Deviation: Values representing one standard deviation below the mean
+1 Standard Deviation: Values representing one standard deviation above the mean

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Source: U.S. Bureau of Reclamation Salton Sea Accounting Model, December 2001

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Further analysis of the impacts that elevated salinity levels could have on the biological resources of the Sea is included in Section 3.2, Biological Resources.

Reclamation's Salton Sea Accounting Model predicts that the reduced inflows under Alternative 4 will ultimately result in the salinity of the Sea rising from its present concentration of approximately 45,000 mg/L TDS to over 60,000 mg/L TDS by the year 2017. And, by the year 2077, the Salton Sea Accounting Model predicts that salinity of the Sea will be just over 103,000 mg/L TDS. In comparison, the Salton Sea Accounting Model results indicate that under future Baseline conditions, the salinity of the Sea will reach 60,000 mg/L TDS by 2023, and ultimately will rise as high as just over 86,000 mg/L TDS by the year 2077 (see Figure 3.1-37). A bar chart comparing the future Baseline TDS concentration to predicted TDS concentrations for the Proposed Project and alternatives is presented in Figure 3.1-29.

Impact A4-WQ-9: Potential change in COC concentrations of Salton Sea water column. Similar to the Proposed Project, it is unlikely that Alternative 4 would result in an increase in selenium concentrations in the Sea to levels equal to or greater than the 5.0 µg/L level stipulated in the significance criteria. Additionally, TDS and TSS concentrations would be expected to decrease as flows to the Sea decrease. (Less than significant impact.)

Impact A4-WQ-10: Potential change in COC deposition in Salton Sea sediments. Quantitative data on how reductions in flow affect concentrations of herbicides and pesticides in sediment are not available. However, qualitative assumptions indicate that concentrations of herbicides and pesticides in sediment in the Salton Sea are expected to slightly decrease under Alternative 4.

As discussed in the Existing Setting section (Section 3.1.3.3), herbicides and pesticides tend to concentrate in sediment. Therefore, the amount of TSS in water can be used as a gross indicator for making comparative estimates about herbicide and pesticide concentrations in sediment. In this respect, a reduction in herbicide and pesticide concentrations in sediment under Alternative 4 is expected because the mass input of TSS to the Sea (along with the total inflow of water) is expected to decrease relative to the Baseline. As a result, impacts to sediment quality from Alternative 4 are anticipated to be less than significant. (Less than significant.)

3.2 Biological Resources

3.2.1 Introduction and Summary

This section presents the environmental setting and potential impacts to biological resources associated with the Proposed Project and alternatives. It also presents mitigation measures for potential impacts to biological resources. Each discussion is arranged, according to four geographic subregions, and addresses biological resources associated with habitat types in each geographic subregion: LCR, IID water service area and AAC, Salton Sea, and SDCWA service area. Table 3.2-1 summarizes the impacts to biological resources that could result from implementation of the Proposed Project or alternatives.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
Lower Colorado River				
BR–1: Reduced flow levels in the LCR could reduce the acreage of cottonwood-willow communities: Less than significant impact with implementation of biological conservation measures.	Continuation of Baseline conditions.	**A2-BR–1: Reduced flow levels in the LCR could reduce the acreage of cottonwood-willow communities:** Less than significant impact with implementation of biological conservation measures.	**A3-BR–1: Reduced flow levels in the LCR could reduce the acreage of cottonwood-willow communities:** Less than significant impact.	Same as BR-1.
BR–2: Reduced flow levels in the LCR could reduce the acreage of honey mesquite bosque communities: Less than significant impact.	Continuation of Baseline conditions.	**A2-BR–2: Reduced flow levels in the LCR could reduce the acreage of honey mesquite bosque communities:** Less than significant impact.	**A3-BR–2: Reduced flow levels in the LCR could reduce the acreage of honey mesquite bosque communities:** Less than significant impact.	Same as BR-2.
BR–3: Reduced flow levels in the LCR could reduce the acreage of screwbean mesquite bosque communities: Less than significant impact.	Continuation of Baseline conditions.	**A2-BR–3: Reduced flow levels in the LCR could reduce the acreage of screwbean mesquite bosque communities:** Less than significant impact.	**A3-BR–3: Reduced flow levels in the LCR could reduce the acreage of screwbean mesquite bosque communities:** Less than significant impact.	Same as BR-3.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR–4: Reduced flow levels in the LCR could reduce the acreage of backwater habitat: Less than significant with implementation of biological conservation measures.	Continuation of Baseline conditions.	**A2-BR–4: Reduced flow levels in the LCR could reduce the acreage of backwater habitat:** Less than significant with implementation of biological conservation measures.	**A3-BR–4: Reduced flow levels in the LCR could reduce the acreage of backwater habitat:** Less than significant with implementation of biological conservation measures.	Same as BR-4.
BR–5: Reduced acreage of cottonwood-willow vegetation could affect special-status species: Less than significant with implementation of biological conservation measures.	Continuation of Baseline conditions.	**A2-BR–5: Reduced acreage of cottonwood-willow vegetation could affect special-status species:** Less than significant with implementation of biological conservation measures.	**A3-BR–5: Reduced acreage of cottonwood-willow vegetation could affect special-status species:** Less than significant with implementation of biological conservation measures.	Same as BR-5.
BR–6: Reduced acreage of open water in backwaters could affect special-status wildlife species: Less than significant with implementation of biological conservation measures.	Continuation of Baseline conditions.	**A2-BR–6: Reduced acreage of open water in backwaters could affect special-status wildlife species:** Less than significant with implementation of biological conservation measures.	**A3-BR–6: Reduced acreage of open water in backwaters could affect special-status wildlife species:** Less than significant with implementation of biological conservation measures.	Same as BR-6.
BR–7: Reduced acreage of emergent vegetation in backwaters could affect special-status species: Less than significant with implementation of biological conservation measures.	Continuation of Baseline conditions.	**A2-BR–7: Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species:** Less than significant with implementation of biological conservation measures.	**A3-BR–7: Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species:** Less than significant with implementation of biological conservation measures.	Same as BR-7

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 8: Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species: Less than significant with implementation of biological conservation measures.	Continuation of Baseline conditions.	**A2-BR – 8: Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species:** Less than significant with implementation of biological conservation measures.	**A3-BR – 8: Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species:** Less than significant with implementation of biological conservation measures.	Same as BR-8
Impact BR – 9: Reduced Diversions from the LCR Could Affect Special-Status Fish Species. Beneficial impact.	Continuation of Baseline conditions.	**Impact A2-BR – 9: Reduced Diversions from the LCR Could Affect Special-Status Fish Species.** Less than significant.	**Impact A3-BR – 9: Reduced Diversions from the LCR Could Affect Special-Status Fish Species.** Less than significant.	Same as BR-9
IID Water Service Area and AAC				
BR – 10: Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 10: Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife:** Less than significant.	**A3-BR – 10: Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife:** Less than significant.	**A4-BR – 1: Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife:** Less than significant.
BR – 11: Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife: Less than significant with implementation of the HCP.	Continuation of Baseline conditions.	**A2-BR – 11: Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife:** Less than significant with implementation of the HCP.	**A3-BR – 11: Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife:** Less than significant with implementation of the HCP.	**A4-BR – 2: No Change in Salinity in the Drains Would Occur:** No impact.
BR – 12: Changes in Water Quality in Drains Could Affect Wildlife: Less than significant with implementation of the HCP.	Continuation of Baseline conditions.	**A2-BR – 12: Changes in Water Quality in Drains Could Affect Wildlife:** Less than significant with implementation of the HCP.	**A3-BR – 12: Changes in Water Quality in Drains Could Affect Wildlife:** Less than significant with implementation of the HCP.	**A4-BR – 3: No Adverse Effects to Fish or Wildlife in the Drains and Rivers Would Occur from Water Quality Changes:** No impact.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 13: Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 13: Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife:** Less than significant.	**A3-BR – 13: Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife:** Less than significant.	**A4-BR – 4: Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife:** Less than significant.
BR – 14: Installation of Seepage Recovery Systems Could Remove Tamarisk Scrub and Affect Associated Wildlife: Less than significant. No impact if only on-farm or fallowing methods are used.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 14: Installation of Seepage Recovery Systems Could Remove Tamarisk Scrub and Affect Associated Wildlife:** Less than significant. No impact if only on-farm or fallowing methods are used.	Not applicable.
BR – 15: Reservoir Construction Could Remove Tamarisk Scrub and Affect Associated Wildlife: Less than significant.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 15: Reservoir Construction Could Remove Tamarisk Scrub and Affect Associated Wildlife:** Less than significant.	Not applicable.
BR – 16: Installation of On-farm Irrigation System Measures Could Affect Wildlife Using Agricultural Fields: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 14: Installation of On-farm Irrigation System Measures Could Affect Wildlife Using Agricultural Fields:** Less than significant.	**A3-BR – 16: Installation of On-farm Irrigation System Measures Could Affect Wildlife Using Agricultural Fields:** Less than significant.	Not applicable.
BR – 17: Operation of On-Farm Water Conservation Measures Could Affect Wildlife Using Agricultural Fields: No impact.	Continuation of Baseline conditions.	**A2-BR – 15: Operation of On-Farm Water Conservation Measures Could Affect Wildlife Using Agricultural Fields:** No impact.	**A3-BR – 17: Operation of On-Farm Water Conservation Measures Could Affect Wildlife Using Agricultural Fields:** No impact.	Not applicable.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 18: Installation of System-Based Water Conservation Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife: Less than significant.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 18: Installation of System-Based Water Conservation Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife:** Less than significant.	Not applicable.
BR – 19: Fallowing Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife: Less than significant. No impact if only on-farm or system-based methods are used.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 19: Fallowing Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife:** Less than significant. No impact if only on-farm or system-based methods are used.	**A4-BR – 5: Fallowing Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife:** Less than significant.
BR – 20: Fallowing Would Not Change the Amount of Desert Habitat: No impact.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 20: Fallowing Would Not Change the Amount of Desert Habitat:** No impact.	**A4-BR – 6: Fallowing Would Not Change the Amount of Desert Habitat:** No impact.
BR – 21: Reduced Flows in the Drain Could Affect Fish and Aquatic Habitat: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 16: Reduced Flows in the Drain Could Affect Fish and Aquatic Habitat:** Less than significant.	**A3-BR – 21: Reduced Flows in the Drain Could Affect Fish and Aquatic Habitat:** Less than significant.	**A4-BR – 7: Reduced Flows in the Drain Could Affect Fish and Aquatic Habitat:** Less than significant.
BR – 22: Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 17: Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat:** Less than significant.	**A3-BR – 22: Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat:** Less than significant.	No impact.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 23: Reduced Flows in the Rivers Could Affect Fish and Aquatic Habitat: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 18: Reduced Flows in the Rivers Could Affect Fish and Aquatic Habitat:** Less than significant.	**A3-BR – 23: Reduced Flows in the Rivers Could Affect Fish and Aquatic Habitat:** Less than significant.	**A4-BR – 8: Reduced Flows in the Rivers Could Affect Fish and Aquatic Habitat:** Less than significant.
BR – 24: Reduced Flows in the Drains Could Affect Desert Pupfish: Less than significant with implementation of the HCP.	Continuation of Baseline conditions.	**A2-BR – 19: Reduced Flows in the Drains Could Affect Desert Pupfish:** Less than significant with implementation of the HCP.	**A3-BR – 24: Reduced Flows in the Drains Could Affect Desert Pupfish:** Less than significant with implementation of the HCP.	**A4-BR – 9: Reduced Flows in the Drains Could Affect Desert Pupfish:** Less than significant with implementation of the HCP.
BR – 25: Construction of System-Based Measures Could Affect Razorback Suckers: Less than significant with implementation of the HCP.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 25: Construction of System-Based Measures Could Affect Razorback Suckers:** Less than significant with implementation of the HCP.	Not applicable.
BR – 26: Water Quality Changes in the Drains Could Affect Special-Status Species: Less than significant with implementation of the HCP.	Continuation of Baseline conditions.	**A2-BR – 20: Water Quality Changes in the Drains Could Affect Special-Status Species:** Less than significant with implementation of the HCP.	**A3-BR – 26: Water Quality Changes in the Drains Could Affect Special-Status Species:** Less than significant with implementation of the HCP.	No impact.
BR – 27: Changes in Drain Habitat Could Affect Special-Status Species: Less than significant with implementation of the HCP.	Continuation of Baseline conditions.	**A2-BR – 21: Changes in Drain Habitat Could Affect Special-Status Species:** Less than significant with implementation of the HCP.	**A3-BR – 27: Changes in Drain Habitat Could Affect Special-Status Species:** Less than significant with implementation of the HCP.	**A4-BR – 10: Changes in Drain Habitat Could Affect Special-Status Species:** Less than significant.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 28: Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 22: Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species:** No impact.	**A3-BR – 28: Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species:** Less than significant.	**A4-BR – 11: Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species:** No impact.
BR – 29: Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 23: Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields:** Less than significant.	**A3-BR – 29: Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields:** Less than significant.	**A4-BR – 12: Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields:** Less than significant.
BR – 30: Water Conservation Practices Could Affect Special-Status Species Associated with Desert Habitat: Less than significant.	Continuation of Baseline conditions.	Not applicable.	**A3-BR – 30: Water Conservation Practices Could Affect Special-Status Species Associated with Desert Habitat:** Less than significant.	Not applicable.
BR – 31: Water Conservation Practices Could Affect Burrowing Owls: Less than significant.	Continuation of Baseline conditions.	**A2-BR – 24: Water Conservation Practices Could Affect Burrowing Owls:** Less than significant.	**A3-BR – 31: Water Conservation Practices Could Affect Burrowing Owls:** Less than significant.	**A4-BR – 13: Water Conservation Practices Could Affect Burrowing Owls:** Less than significant.
HCP-BR – 32: Creation of Managed Marsh Habitat Would Benefit Wildlife Associated with Drain Habitat: Beneficial impact.	Continuation of Baseline conditions.	**Same as HCP-BR-32.**	**Same as HCP-BR-32.**	**Same as HCP-BR-32.**
HCP-BR – 33: Creation of Managed Marsh Could Decrease Agricultural Field Habitat: No impact.	Continuation of Baseline conditions.	**Same as HCP-BR-33.**	**Same as HCP-BR-33.**	**Same as HCP-BR-33.**

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-BR – 34: Creation of Native Tree Habitat Could Benefit Wildlife Associated with Tamarisk Scrub: Beneficial impact.	Continuation of Baseline conditions.	**Same as HCP-BR-34.**	**Same as HCP-BR-34.**	**Same as HCP-BR-34.**
HCP-BR- 35: The Desert Habitat Conservation Strategy Would Avoid Impacts to Wildlife Associated with Desert Habitat: No impact.	Continuation of Baseline conditions.	**Same as HCP-BR-35.**	**Same as HCP-BR-35.**	**Same as HCP-BR-35.**
HCP-BR–36: Avoidance Measures Would Benefit Burrowing Owls: Beneficial impact.	Continuation of Baseline conditions.	**Same as HCP-BR-36.**	**Same as HCP-BR-36.**	**Same as HCP-BR-36.**
HCP-BR–37: Avoidance Measures of Burrowing Owl Conservation Strategy Would Benefit Other Special-Status Species: Beneficial impact.	Continuation of Baseline conditions.	**Same as HCP-BR-37.**	**Same as HCP-BR-37.**	**Same as HCP-BR-37.**
HCP-BR–38: Desert Pupfish Conservation Strategy Would Increase Habitat for Pupfish: Beneficial impact.	Continuation of Baseline conditions.	**Same as HCP-BR-38.**	**Same as HCP-BR-38.**	**Same as HCP-BR-38.**

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-BR–39: Increased Habitat from the Desert Pupfish Conservation Strategy Would Benefit Other Special-Status Species: Beneficial impact.	Continuation of Baseline conditions.	**Same as HCP-BR-39.**	**Same as HCP-BR-39.**	**Same as HCP-BR-39.**
HCP-BR– 40: HCP Measures Would Avoid Impacts to Razorback Suckers: No impact.	Continuation of Baseline conditions.	**Same as HCP-BR-40.**	**Same as HCP-BR-40.**	**Same as HCP-BR-40.**
Salton Sea				
BR – 41: Reduced Drain Flows Could Affect Adjacent Wetlands Dominated by Cattail/Bulrush Vegetation: No impact.	Continuation of Baseline conditions.	**Same as BR-41.**	**Same as BR-41.**	**Same as BR-41.**
BR – 42: Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand: Less than significant.	Reduced Sea elevation could decrease acreage of tamarisk-dominated areas and shoreline strand.	**A2-BR – 25: Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand:** Less than significant.	**A3-BR – 32: Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand:** Less than significant.	**A4-BR – 14: Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand:** Less than significant.
BR – 43: Increased Salinity Would Change Invertebrate Resources in the Salton Sea: Less than significant.	Continuation of existing trend toward dominance by halotolerant organisms.	**A2-BR – 26: Increased Salinity Would Change Invertebrate Resources in the Salton Sea:** Less than significant.	**A3-BR – 33: Increased Salinity Would Change Invertebrate Resources in the Salton Sea:** Less than significant.	**A4-BR – 15: Increased Salinity Would Change Invertebrate Resources in the Salton Sea:** Less than significant.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 44: Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds: Less than significant.	Continued use by shorebirds that feed on invertebrates in the Sea.	**A2-BR – 27: Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds:** Less than significant.	**A3-BR – 34: Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds:** Less than significant.	**A4-BR – 16: Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds:** Less than significant.
BR – 45: Increased Salinity Would Reduce Fish Resources in the Salton Sea: Less than significant.	Continuation of existing trend toward reduction and loss of fish species.	**A2-BR – 28: Increased Salinity Would Reduce Fish Resources in the Salton Sea:** Less than significant.	**A3-BR – 35: Increased Salinity Would Reduce Fish Resources in the Salton Sea:** Less than significant.	**A4-BR – 17: Increased Salinity Would Reduce Fish Resources in the Salton Sea:** Less than significant.
BR – 46: Reduced Fish Abundance Would Affect Piscivorous Birds: Less than significant with implementation of the HCP.	Continuation of existing trend toward reduction in use by piscivorous birds.	**A2-BR – 29: Reduced Fish Abundance Would Affect Piscivorous Birds:** Less than significant with implementation of the HCP.	**A3-BR – 36: Reduced Fish Abundance Would Affect Piscivorous Birds:** Less than significant with implementation of the HCP.	**A4-BR – 18: Reduced Fish Abundance Would Affect Piscivorous Birds:** Less than significant with implementation of the HCP.
BR – 47: Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds: No impact.	Continuation of Baseline conditions.	**A2-BR – 30: Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds:** No impact.	**A3-BR – 37: Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds:** No impact.	**A4-BR – 19: Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds:** No impact.
BR – 48: Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites: Less than significant.	Reduced Sea elevation would result in loss of water surrounding nesting areas.	**A2-BR – 31: Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites:** Less than significant.	**A3-BR – 38: Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites:** Less than significant.	**A4-BR – 20: Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites:** Less than significant.
BR – 49: Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat: Less than significant.	Reduced Sea elevation would result in changes in the amount of mudflat and shallow water habitat.	**A2-BR – 32: Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat:** Less than significant.	**A3-BR – 39: Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat:** Less than significant.	**A4-BR – 21: Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat:** Less than significant.

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
BR – 50: Water Quality Changes Could Increase the Incidence of Avian Disease Outbreaks: No impact.	Continuation of Baseline conditions.	**Same as BR-50.**	**Same as BR-50.**	**Same as BR-50.**
BR – 51: Increased Salinity Could Isolate Drains Supporting Desert Pupfish: Less than significant with implementation of the HCP.	Continuation of existing trend toward increased salinity, but salinity increases would not prevent movement of pupfish among drains.	**A2-BR – 33: Increased Salinity Could Isolate Drains Supporting Desert Pupfish:** Less than significant with implementation of the HCP.	**A3-BR – 40: Increased Salinity Could Isolate Drains Supporting Desert Pupfish:** Less than significant with implementation of the HCP.	**A4-BR – 22: Increased Salinity Could Isolate Drains Supporting Desert Pupfish:** Less than significant.
HCP1-BR – 52: Maintenance of Fish Resources Would Benefit Piscivorous Birds: Beneficial impact with implementation of HCP (Salton Sea Portion) Approach 1.	Continuation of existing trend toward reduction in use by piscivorous birds.	**Same as HCP1-BR-52.**	**Same as HCP1-BR-52.**	**Same as HCP1-BR-52.**
HCP1-BR – 53: Creation of Nesting/ Roosting Islands Would Benefit Gull-Billed Terns and Black Skimmers: Beneficial impact with implementation of HCP (Salton Sea Portion) Approach 1.	Reduced Sea elevation would result in loss of water surrounding nesting areas.	**Same as HCP1-BR–53.**	**Same as HCP1-BR–53.**	**Same as HCP1-BR–53.**

TABLE 3.2-1
Summary of Impacts to Biological Resources

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP1-BR–54: Creation of Native Tree Habitat Could Benefit Wildlife Associated with Tamarisk Scrub: Beneficial impact with implementation of HCP (Salton Sea Portion) Approach 1.	Continuation of Baseline conditions.	**Same as HCP1-BR–54.**	**Same as HCP1-BR–54.**	**Same as HCP1-BR–54.**
HCP1-BR-55: Maintenance of Population Connectivity Would Benefit Desert Pupfish: Beneficial impact with implementation of HCP (Salton Sea Portion) Approach 1.	Continuation of existing trend toward increased salinity with no increase in the isolation of pupfish populations.	**Same as HCP-BR-55.**	**Same as HCP-BR-55.**	**Same as HCP-BR-55.**
SDCWA service area				
No Impacts.	Continuation of Baseline conditions.	No impacts.	No impacts.	No impacts.

3.2.2 Regulatory Framework

3.2.2.1 Federal Regulations and Standards

The Proposed Project and alternatives would be subject to the following federal regulations with respect to biological resources:

- NEPA, as amended (42 USC §§ 4321 *et seq*). This act declares a national policy to promote efforts that prevent damage to the environment and benefit human health and welfare, increase understanding of natural resources, and establish a National Council on Environmental Quality.

- ESA, including coordination requirements of Sections 7 and 10 and HCP requirements of Section 9 (16 USC §§1531 *et seq.*; 50 Code of Federal Regulations [CFR] Part 402). Section 9 of ESA prohibits the "take" of species federally listed as threatened or endangered. Take is defined to include harm or harassment, including significant habitat modification or degradation that could potentially kill or injure wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Take incidental to otherwise lawful activities can be authorized under Section 7 of ESA, where a federal nexus or agency is involved. Section 10 of ESA provides for project proponents of non-federal activities to apply for an Incidental Take Permit. An HCP must be prepared that specifies impacts to federally listed species and measures to minimize and mitigate such impacts. If approved by the USFWS, an Incidental Take Permit for the action will be issued.

- Migratory Bird Treaty Act (16 USC 703-712; 50 CFR 10). The federal Migratory Bird Treaty Act prohibits the take of migratory birds, unless permitted.
- Fish and Wildlife Coordination Act of 1958 (16 USC 661-667[e]). This act authorizes the Secretaries of Agriculture and Commerce to cooperate with federal and state agencies to protect and increase the supply of game and mammals. Under an amendment to the act, consultation with the USFWS and state fish and wildlife agencies are required when the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted...or otherwise controlled or modified" by an agency under a federal permit or license. The purpose of the consultation is to prevent the loss of, or damage to, wildlife resources.
- Executive Order 11990 Protection of Wetlands. The purpose of the Protection of Wetlands Executive Order is to minimize the destruction or degradation of wetlands and avoid new construction in wetlands wherever a reasonable alternative exists.
- Sections 401 and 404 of the CWA (33 USC §§1344). Activities with the potential to discharge fill materials into "waters of the U.S." are regulated under Section 404 of the CWA, as administered by the Corps. Wetlands are considered "waters of the U.S." with respect to discharge of fill materials.

3.2.2.2 State Regulations and Standards

The Proposed Project and alternatives would be subject to the following state regulations and policies regarding biological resources:

- CEQA as amended (Public Resources Code [PRC] §§21000 et seq.). CEQA goals assist California public agencies in identifying potential significant environmental effects of their actions and either avoiding or mitigating those effects, when feasible.
- CESA (California Fish and Game Code §§2050 et seq.). Section 2050 of the California Fish and Game Code prohibits activities that jeopardize or take a species listed as threatened or endangered in the state. Projects that could affect species listed as threatened or endangered by the state might require an Incidental Take Permit from the California Department of Fish and Game (CDFG) under Section 2081 of the Fish and Game Code. The application for this permit requires an analysis of impacts to the species from the Proposed Project and measures to mitigate the impacts.
- California Fully Protected Wildlife Species Provisions (California Fish and Game Code §§3511, 4700, 5050, and 5515). These provisions prohibit the taking of fully protected birds, mammals, amphibians, and fish.

- Fish and Wildlife Protection and Conservation: Streambed Alteration Agreements (California Fish and Game Code §1600). Section 1600 of the Fish and Game Code regulates the alteration of the bed, bank, or channel of a stream, river, or lake, including dry washes. Alterations include diversion, obstruction, or change in the natural flow or bed, channel, or bank of any river, stream, or lake designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Activities that could affect jurisdictional areas can be authorized through issuance of a Streambed Alteration Agreement (SAA).

3.2.3 Environmental Setting

3.2.3.1 Lower Colorado River

The LCR geographic subregion is defined as the mainstem and the 100-year floodplain of the Colorado River from Parker Dam downstream to Imperial Dam. This subregion includes approximately 140 river miles.

HISTORIC AND CURRENT RIVER CONDITIONS

Historically, the Colorado River mainstem contained fast-moving water that carried high volumes of sediment that originated from tributaries and eroded from terraces and banklines. Consequently, little rooted vegetation was in the main channel. Riparian vegetation along the banklines contributed the majority of organic matter to the River, and the tributaries contributed the rest. River levels fluctuated seasonally with high flows in the spring that coincided with spring runoff from the upper reaches of the River (USFWS 1997a). Flows generally decreased during the summer, but could increase locally and daily with local rainfall (Turner and Karpiscak 1980). Lowest flows generally occurred between October and March, but flows could also be affected by rainfall that raised local water levels temporarily.

The dynamics of the River continually changed the adjacent environment by destroying and re-creating riparian and nearby upland habitats. The meanders of the Colorado River created oxbows, which were occasionally cut off from the mainstem and formed backwaters. Depending on local conditions, these backwaters could become unsuitable for wildlife as summer temperatures rose and high evaporation rates increased the salinity and TDS in the water. Other River features included eddies, channel pools, and runs. During the large spring floods, eroded terraces dumped into the River, transporting enough sediment to fill in marshes or backwaters.

River management has changed the River's morphology and processes from natural river conditions. In its current condition, the River has the following characteristics:

- An incised channel
- Decreased river level
- Stabilized banklines
- Clear water in the mainstem
- Little overbank flooding
- Fewer meanders
- Lowered groundwater
- Large bodies of calm water (i.e., reservoirs)

These characteristics have negatively affected historically occurring native species in the Colorado River ecosystem.

WILDLIFE AND WILDLIFE HABITAT

Riparian-Communities

The regional hydrology and geology of the LCR subregion historically interacted with site specific conditions (i.e., moisture, soil texture and salinity, and depth to groundwater) to create a regional mosaic of plant communities (Johnson et al. 1988). The distribution of communities varied over time, in response to the fluctuating River level and meandering channel. Spring floods could destroy a patch of riparian forest, but they also deposited sediment downstream onto which a similar plant community could become re-established. Riparian vegetation was established on the terraces, beaches, and sandbars created each year. The location of a specific plant community depended on the relationship between the flood and the elevation of the terrace or beach (Rosenberg et al. 1991).

Periodic flooding was instrumental in the establishment of plant communities because it dispersed and scoured seeds, buried competitive woody and herbaceous cover, moistened the soil, recharged the groundwater, flushed salts, and contributed to nutrient cycling and overall system productivity (Stromberg et al. 1991 and 1993). Riparian areas along the River provided organic material to support aquatic resources. The structure of the vegetation and distribution of plant communities provided habitat for riparian wildlife species locally and regionally.

Based on 1997 aerial photographs, vegetation communities along the LCR between Parker and Imperial Dams were characterized following the classification developed by Anderson and Ohmart (1976, 1984a) and mapped (Younker and Andersen 1986; CH2M HILL 1999; Figure 3.2-1). The acreage of each plant community is presented in Table 3.2-2.

TABLE 3.2-2
Plant Communities within the LCR 100-Year Floodplain

Structure Type	Acres	Percent of Total Vegetation[a]
Cottonwood-willow	1,502	3
Salt cedar-honey mesquite	14,200	24
Salt cedar-screwbean mesquite	5,025	9
Salt cedar	30,840	53
Honey mesquite	3,128	5
Arrowweed	2,773	5
Atriplex	511	<1
Creosote	317	<1
TOTAL	**58,296**	

[a] Excluding 1,723 acres of agriculture.
Source: CH2M HILL, 1999.

Although species composition along the River always varied locally, modifications to the river and its floodplain since the mid-1900s have altered plant species composition and structural characteristics of riparian habitats. As shown in Table 3.2-2, the 1,502 acres of native cottonwood-willow (*Populus* spp.-*Salix* spp.) in the Project area account for only 3 percent of the vegetation. The introduced suite of tree species of the genus *Tamarix*, collectively known as salt cedar (*Tamarix chinensis*), now accounts for 85 percent of the acreage of riparian vegetation between Parker and Imperial Dams. Of the 58,296 mapped acres of vegetation (excluding agriculture), 30,840 acres are stands of nearly pure salt cedar and 19,225 acres are a mix of salt cedar and a native mesquite (*Prosopis* spp.). Further, most of the native vegetation does not exhibit the characteristics of a mature stand. The ecology, habitat characteristics, flooding, and groundwater requirements of the plant communities in the LCR subregion are described in more detail in the Target Restoration Parameters for the LCR Multi-Species Conservation Program (MSCP) (Ogden Environmental and Energy Services 1998).

Wildlife Associated with Riparian Communities. Riparian habitats, especially in arid regions, provide important habitat for wildlife. They provide a cooler microclimate and protection during hot temperatures and a source of water and food. Bird species occupying riparian habitat include riparian specialists, such as yellow warbler (*Dendroica petechia*), southwestern willow flycatcher (*Empidonax trailliiextimus*), yellow-breasted chat, and belted kingfishers, as well as more generalist species, such as mourning doves (*Zenaida macroura*). Historically, the Colorado River was a conduit for dispersing and migrating birds. Some of that movement is still seen today. Habitat conversion in the subregion has increased the richness of bird species through the addition of species with broad, general habitat requirements. Other species, particularly those dependent on riparian habitats, have declined as the plant communities changed in composition and structure.

Mammals associated with this riparian habitat include deer mouse (*Peromyscus maniculatus*), cotton rat (*Sigmodon hispisus*), muskrat, raccoon, common gray fox (*Urocyon cinereoargenteus*), ringtail cat (*Bassariscus astutus*), and coyote (*Canis latrans*). Beaver (*Castor canadensis*) was historically abundant in this Southwestern habitat but is associated primarily with willow and cottonwood trees and permanent water sources. These tree species have declined with disturbance and channelization of water resources, and the beaver is now generally absent or scarce along the river drainages.

Reptile and amphibian species that use this community type include the spiny softshell turtle, bullfrog, leopard frog, and Woodhouse's toad (*Bufo woodhousei*).

Backwaters and Marshes. Under historical conditions, backwaters were formed when the meandering Colorado River created oxbows that were occasionally cut off from the mainstem. Backwaters created by beaver dams were common in some areas (Hoffmeister 1986), but were not permanent. In addition to persistent natural backwaters, many have been constructed since the 1960s by Reclamation between Parker and Imperial Dams to improve recreational opportunities, river navigation, river hydraulics, and fish and wildlife (Reclamation 1987).

Backwaters provide important fish and wildlife habitat. Historically, native fish used backwaters throughout their life histories as locations for spawning, foraging, and protection from predation (Minckley 1979). Although the physical and chemical environment of backwaters has changed significantly since management of the River began, backwater environments still fall within the physiological tolerances of the native fish (Marsh and Langhorst 1988; Robinson et al. 1996). Backwater areas also support riparian vegetation that provides habitat for riparian bird species. However, the edges of some backwaters have been stabilized with riprap or other structures, which reduces their value to wildlife.

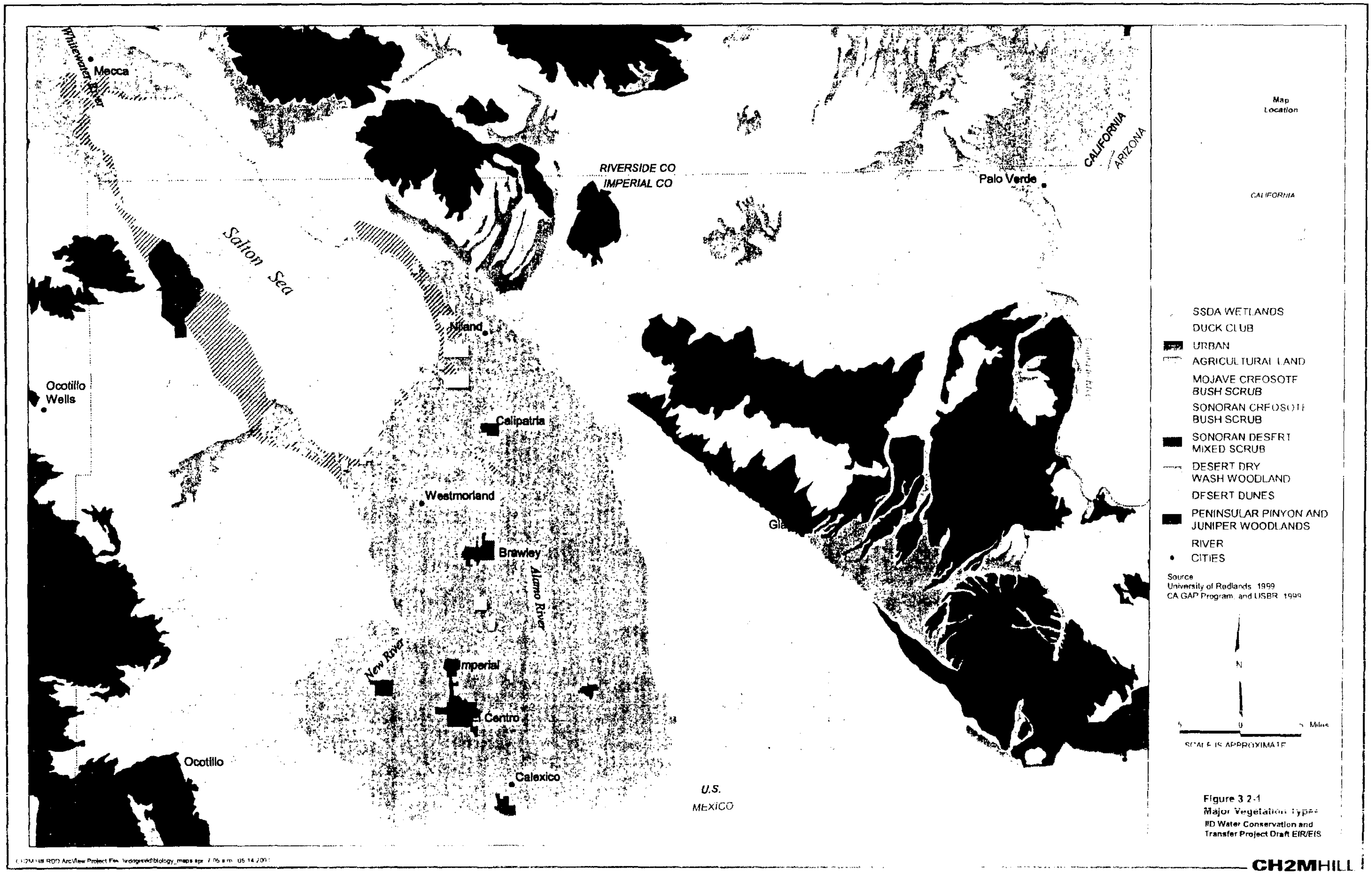

Figure 3.2-1
Major Vegetation Types
IID Water Conservation and Transfer Project Draft EIR/EIS

CH2MHILL

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Within the reach from Parker Dam to Imperial Dam, 198 backwaters represent 3,955 acres with 6,170 acres of emergent vegetation (Table 3.2-3). Most of the acreage in backwater habitat is concentrated in the southern portion of the reach. Between Parker Dam at River Mile 189.5 and River Mile 160, there are approximately 792 acres of backwaters and emergent vegetation. There are approximately 1,274 acres between Parker Dam and River Mile 95 at Cibola National Wildlife Refuge (NWR) and 7,000 acres between Cibola NWR and Imperial Dam (River Mile 49.2).

TABLE 3.2-3
Acreage of Backwaters Along the LCR Between Parker and Imperial Dams

State	Number of Backwaters	Acres of Open Water	Acres of Emergent Vegetation
Arizona	95	2,256	3,307
California	103	1,699	2,863
Total	**198**	**3,955**	**6,170**

Source: Ogden Environmental and Energy Services Geographic Information System.

Marshes develop at the lowest terraces of the floodplain where water persists or the water table is at the surface (USFWS 1997a). Like backwaters, marshes are ephemeral features whose persistence depends on their size and the severity of natural disturbances. Marshes combine terrestrial and aquatic environments that provide habitat for some species. Currently, approximately 5,798 acres of marshes are in the LCR subregion (Table 3.2-4).

TABLE 3.2-4
Structural Characteristics and Acreage of Marsh Habitat

Acres	Characteristics
1,554.0	Nearly 100 percent cattail/bulrush, small amounts of *Phragmites*, open water
405.4	Nearly 75 percent cattail/bulrush, many trees and grasses interspersed
2,129.7	About 20-25 percent cattail/bulrush, small amounts of *Phragmites*, open water, some trees and grasses
955.0	About 30-35 percent cattail/bulrush, many trees and grasses interspersed
280.7	About 50-75 percent cattail/bulrush, few trees and grasses interspersed
344.8	Nearly 100 percent *Phragmites*, little open water
128.1	Open marsh (75 percent water) adjacent to sparse marsh vegetation, sandbars, and mudflats when the river is low

Source: Anderson and Ohmart 1984a.

Wildlife Associated with Backwater/Marsh Communities. Backwater and marsh habitats provide habitat for a diversity of wildlife species. The shallow water of these backwater areas supports emergent vegetation. Aquatic areas interspersed with emergent vegetation create a structurally diverse and complex habitat that attracts wildlife.

Backwater and marsh habitats provide stopover habitat for migrating birds. In addition to neotropical migrants, white pelicans (*Pelecanus erythrorhynchos*) that migrate through the LCR corridor in the fall probably forage in backwaters. Bald eagles forage in backwaters throughout the year. Many birds and amphibians also use these habitats for breeding. Backwaters support development of willows that provide nesting habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*) and other songbirds. Clark's grebe (*Aechmophorus clarkii*) typically builds a floating nest platform in large stands of tules or cattails. Backwaters support the persistently submerged vegetation onto which adult frogs attach eggs, and the shallow pools are used by tadpoles (Zeiner et al. 1988).

Like riparian habitats, marshes provide a unique combination of terrestrial and aquatic habitats used by species in the LCR subregion. Most notable are amphibians, which use these two habitat types for different stages of their life histories. The California black rail (*Laterallus jamaicensis coturniculus*) is found in shallow marshes where it probes the substrate or picks food from the surface (Ehlrich et al. 1992). The white-faced ibis (*Plegadis chihi*) nests in colonies near the ground or over water in extensive, undisturbed marshes with large stands of tall bulrushes (Palmer 1962; Burger and Miller 1977; Terres 1980). In the U.S., the Yuma clapper rail (*Rallus longirostris yamanensis*) is found at the highest densities in mature stands of dense to moderately dense cattails and bulrushes of freshwater marshes.

Special-Status Species. The LCR provides habitat for many species with special state or federal status. Special-status species potentially along the LCR, their status, and general habitat associations are summarized in Table 3.2-5.

TABLE 3.2-5
Special-Status Species Potentially Along the LCR

Common name	Scientific Name	Federal Status[a]	State Status[a]	Habitat[b]
Amphibians And Reptiles				
Colorado river toad	*Bufo alvarius*	-	CSC	D, A
Lowland leopard frog	*Rana yavapaiensis*	SC	AWC	W, A
Northern leopard frog	*Rana pipiens*	-	CSC AWC	W, A
Relict leopard frog	*Rana onca*	-	AWC	W, A
Sonoran mud turtle	*Kinosternon sonoriense*		CSC	A
Birds				
American peregrine falcon	*Falco peregrinus anatum*	DM	CE/FP AWC	G
Arizona Bell's vireo	*Vireo bellii arizonae*		CE	R
Bald eagle	*Haliaeetus leucocephalus*	FT	CE/FP AWC	A, W
Burrowing owl	*Athene cunicularia*	SC	CSC	Ag
California black rail	*Laterallus jamaicensis coturniculus*		CT/FP AWC	W
California brown pelican	*Pelecanus occidentalis californicus*	FE	CE/FP	A, W
Clark's grebe	*Aechmophorus clarkii*		AWC	A
Crissal thrasher	*Toxostoma crissale*	-	CSC	D
Elf owl	*Micrathene whitneyi*		CE	D
Fulvous whistling-duck	*Dendrocygna bicolor*	SC	CSC	W
Gila woodpecker	*Melanerpes uropygialis*		CE	R
Gilded northern flicker	*Colaptes auratus chrysoides*		CE	R

TABLE 3.2-5
Special-Status Species Potentially Along the LCR

Common name	Scientific Name	Federal Status[a]	State Status[a]	Habitat[b]
Golden eagle	*Aquila chrysaetos*		CSC/FP	G
Greater sandhill crane	*Grus canadensis tadiba*	-	T/FP	Ag, W
Harris hawk	*Parabuteo unicinctus*		CSC	R
Large-billed savannah sparrow	*Passerculus sandwichensis rostratus*	S	-	R
Least bittern	*Ixobrychus exilis*	SC	CSC AWC	W
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE / CH	CE/AWC	R
Summer tanager	*Piranga rubra*	-	CSC	R
Swainson's hawk	*Buteo swainsoni*		CT AWC	R, Ag
Vermilion flycatcher	*Pyrocephalus rubinus*	-	SCS	R
Western yellow-billed cuckoo	*Coccyzus americanus*		CE AWC	R
Willow flycatcher	*Empidonax traillii*		CE	R
Yellow warbler	*Dendroica ptechia*	-	CSC	R
Yuma clapper rail	*Rallus longirostris yumanensis*	FE	CT/FP AWC	W
Mammals				
Allen's big-eared bat	*Idionycteris (=Plecotus) phyllotis*	SC	CSC AWC	G
Big free-tailed bat	*Nyctinomops macrotis*	-	CSC	G
Cave myotis	*Myotis velifer brevis*	SC	CSC	G
California leaf-nosed bat	*Macrotus californicus*	SC	AWC CSC	G
Greater western mastiff	*Eumops perotis californicus*	SC	AWC CSC	G
Mexican long-tongued bat	*Choeronycteris mexicana*	SC	CSC	G
Occult little brown bat	*Myotis lucifugus occultus*	S	CSC	G
Pale Townsend's big-eared bat	*Corynorhynus townsendii pallescens*	SC	CSC	G
Pallid bat	*Antrozous pallidus*	SC		G
Red bat	*Lasiurus blossevilli*		AWC	G
Spotted bat	*Euderma maculatum*		AWC	G
Colorado River hispid cotton rat	*Sigmodon arizonae plenus*	-	CSC	Ag, R
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	BLMSS		D
Ringtail	*Bassariscus astutus*		FP	R
Yuma hispid cotton rat	*Sigmodon hispidus eremicus*	SC	CSC	Ag, R

TABLE 3.2-5
Special-Status Species Potentially Along the LCR

Common name	Scientific Name	Federal Status[a]	State Status[a]	Habitat[b]

[a] Status Codes:
SC: Species of Concern
CSC: California Species of Special Concern
AWC: Arizona Wildlife of Concern
CE: California endangered
CH: Critical habitat
CT: California threatened
FE: Federally endangered
FT: Federally threatened
FP: California Fully Protected
DM: Delisted – monitored
BLMSS: Bureau of Land Management Sensitive Species

[b] Habitat Codes
A: Aquatic
Ag: Agricultural fields
D: Desert
G: Generalist at this level and/or requires specific microhabitat to persist in area
R: Riparian
W: Wetland

FISH AND AQUATIC RESOURCES

Several species of fish endemic to the Colorado River are in the LCR subregion. The natural history of these fish was tied to the changing physical environment of the Colorado River. When seasonal floods inundated the floodplains, pools were created behind sandbars and formed backwaters (Mickley 1979). The native fish did not spend time in the fast-flowing mainstem, but navigated to refuge areas along the main channel and off-channel areas (i.e., backwaters). Periodic droughts made these habitats unsuitable, and the fish entered the mainstem and traveled to other refuge areas. All age classes used these refuge habitats (Minckley 1979).

At least 24 non-native species of fish have been introduced into the LCR (Minckley 1979; Marsh and Langhorst 1988). They are a combination of sport fish (such as channel catfish [*Ictalurus punctatus*], largemouth bass [*Micropterus salmonides*]), discarded bait fish (such as golden shiner [*Notemigonus crysoleucus*]), and biological control introduced species (such as mosquitofish [*Gambusia affinis*]). Predation of native fish or their eggs by these non-native species has largely eliminated the native species from the mainstem and backwaters of the LCR (Minckley 1979). Currently, native fish persist in reservoirs created by dams on the LCR's mainstem, although these populations show no evidence of successful recruitment.

Special-Status Species. Three native fish species are listed by the federal government as endangered within the LCR subregion (Table 3.2-6). The life history, habitat requirements, status, and distribution of these three fish species are available in other sources, including the Federal Register listings (razorback suckers [56 FR 54957], bonytail chub [45 FR 27713], Colorado pikeminnow [32 FR 4001]), recovery plans (razorback suckers [USFWS 1998A], bonytail chub [USFWS 1991]) and Biological Opinions on the operation of the LCR facilities (USFWS 1997, 2001).

3.2.3.2 IID Water Service Area, AAC, and Salton Sea

To describe the existing environment for biological resources, the IID water service area and AAC discussion is combined with the Salton Sea discussion.

TABLE 3.2-6
Special-Status Fish Species in the LCR

Common Name Scientific Name	Status	Occurrence In LCR
Razorback sucker *Xyrauchen texanus*	FE/CH designated CE, CFP	Mainstem LCR below Parker Dam, Lake Mohave, Lake Mead, and Lake Havasu
Bonytail chub *Gila elegans*	FE/CH designated CE	Lake Mohave and Lake Havasu
Colorado pikeminnow *Ptychochelus lucius*	FE/CH designated CE, CFP	None; extirpated

Notes: CE: California endangered
CH: Critical habitat
CT: California threatened
FE: Federally endangered
FT: Federally threatened

BACKGROUND

The Imperial Valley lies within the Salton Trough (Cahuilla Basin), which is flat terrain. The Salton Trough encompasses a large portion of the Colorado Desert (a subdivision of the Sonoran Desert, extending through portions of Mexico and southern Arizona), with much of the area below sea level. Prior to European settlement, the area consisted of native desert vegetation and wildlife. As a result of the formation of the Salton Sea and the intensification of agricultural activities in the Imperial and Coachella Valleys, Salton Trough ecology has changed radically. Water in the drains and canals created for agricultural activity supports the development of mesic (marsh-associated) vegetation and, in some locations, patches of marsh-like habitats. These mesic habitats, in addition to the productive agricultural fields, attract and support wildlife that historically would have been absent or present in low numbers in the native desert habitat. Today, small areas of native desert habitat persist in the area, but the area mainly supports habitats created and maintained by water imported to Imperial Valley for agricultural production.

WILDLIFE AND WILDLIFE HABITAT

Four general terrestrial wildlife habitats occur in the Salton Sea and Imperial Valley areas and along the AAC:

- Drain habitat
- Tamarisk scrub habitat
- Desert habitat
- Agricultural field habitat

These habitats and the associated wildlife are described subsequently.

Drain Habitat. Wet area habitats in the Project area are collectively referred to as drain habitat. Drain habitat in the Project area occurs in association with the drainage and conveyance systems, in managed marshes on state and federal refuges and private duck clubs, and as unmanaged vegetation adjacent to the Salton Sea.

Drainage System. Currently, IID operates and maintains 1,456 miles (cited from IID Memorandum, dated October 4, 2000) of agricultural drains (Figure 3.2-2). These drains typically are unlined, dirt channels with 65 miles of the drainage network in buried pipes. Main drain channels have an average depth of 8 to 11 feet, with a typical side-slope embankment ratio of 1:1. Lateral ditches have an average depth of 7 feet, with a typical side-slope embankment ratio of 1:1. Some drainage channels are steep-sided with sloughing embankments from years of erosion prior to stabilization; others are sloped more gradually. Water flow in drains is determined by the irrigation practices on fields adjacent to the drains. Drains contain flows during irrigation, and storms may add to flows in the drains. Peak flows occur during storms and during April and May.

Vegetation in the drains is limited to the embankment slope or sediments directly in the drain channel and typically consists of invasive species, such as saltgrass, salt bush, bermuda grass, common reed, and salt cedar. Emergent vegetation is restricted to a narrow strip at the drain bottom from 3 to 15 feet wide, with more drought-tolerant vegetation on drain embankments. Some drain banks are devoid of vegetation, with only a narrow band of saltgrass or bermuda grass adjacent to the edge of the water. Cattail, bulrushes, rushes, and sedges occur in drain channels, typically in sparse, isolated patches. More extensive stands of cattail/bulrush vegetation may persist where maintenance activities are infrequent. In addition, stands of common reed and cattails occur at the mouths of drains where they empty into rivers or the Salton Sea. Table 3.2-7 lists plant species in irrigation drains in the Imperial Valley.

TABLE 3.2-7
Typical Plant Species in Drains in Imperial Valley

Species Name	
Adenophyllum porophylloides (false odora)	*Leptochloa uninerva* (mexican sprangletop)
Aristida oligantha (prairie three awn)	*Malvella leprosa* (alkali mallow)
Atriplex sp. (saltbrush)	*Paspalum dilatatum* (dallisgrass)
Baccharis emoryi (Emory's baccharis)	*Phragmites communis* (common reed)
Bassia hyssopifolia (five-hook bassia)	*Polygonum aviculare* (prostrate knotweed)
Carex sp. (sedge)	*Polygonum* sp. (knotweed)
Chamaesyce melanadenia (prostrate spurge)	*Polygonum* sp. (beard grass)
Croton californicus (croton)	*Prosopis* sp. (mesquite)
Cryptantha sp. (popcorn flower)	*Psilostrophe cooperi* (paper-daisy)
Cynodon dactylon (desert tea)	*Rumex crispus* (curly dock)
Eriogonum sp. (buckwheat)	*Salsola tragus* (Russian thistle)
Heliotropium curassavicum (alkali heliotrope)	*Scirpus* sp. (bulrush)
Juncus sp. (rush)	*Sesbania exaltata* (Colorado river hemp)
Lactuca serriola (prickly lettuce)	*Suaeda torreyana ramosissima* (iodine bush)
Larrea tridentata (creosote bush)	*Tamarix* sp. (salt cedar)
Leptochloa fascicularis (bearded sprangletop)	*Typha* sp. (cattail)

Sources: IID 1994; Reclamation and SSA 2000.

Maintenance activities associated with the drains include maintaining the gravity flow of tilewater into the drains, conveyance capacity and efficiency, and structural integrity of the drains. Vegetation is cleared from drains primarily via mechanical means; occasionally, vegetation is controlled by prescribed burns or chemical and biological control methods. Drains are cleaned as needed, depending on the extent of sediment and vegetation

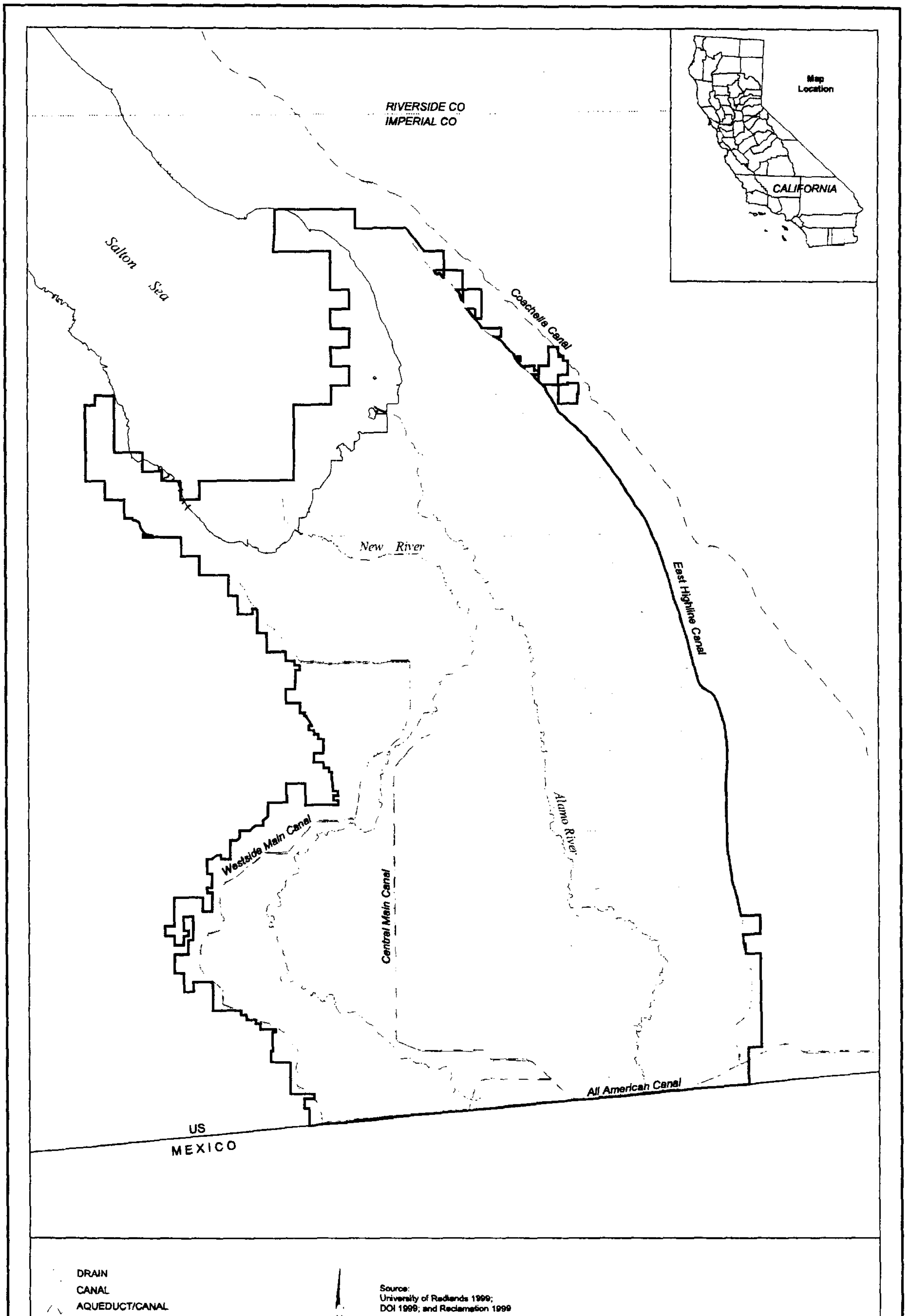

Figure 3.2-2
Canals and Drains in the IID Water Service Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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accumulation. Drains with the lowest gradient accumulate sediment more rapidly and may require cleaning annually. Other drain segments may not require cleaning for 10 years or more. Maintenance activities limit the extent of vegetation in the drains.

During the development of an EIR for IID's Modified East Lowline and Trifolium Interceptors and Completion Projects (IID 1994), drains were surveyed in areas potentially affected by the projects (Figure 3.2-3). In all, about 506 miles of drain were surveyed. For each drain, the general vegetation characteristics were described, with particular emphasis given to patches of cattail or bulrush vegetation. The qualitative assessment showed that vegetation in the drains is dominated by such species as common reed, saltgrass, bermuda grass, salt bush, and mallow, with only limited areas of cattails. Habitat conditions of the drains surveyed for the Lowline and Trifolium Interceptors and Completion Projects are described in Table 2.3-2 of the HCP.

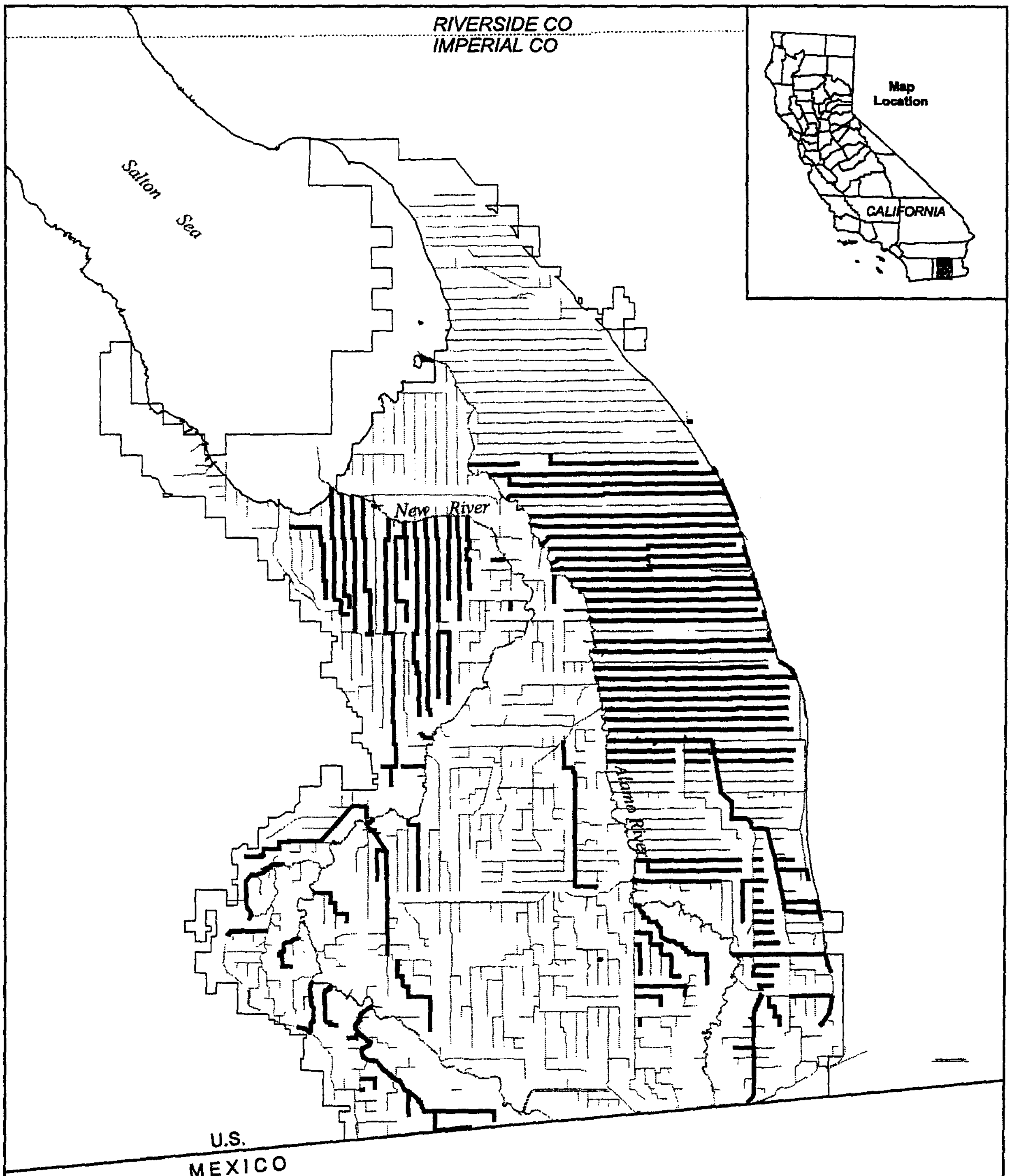
Hurlbert (1997) also surveyed drains in the Project area. In this study, the percent cover for each major vegetation species (*Phragmites*, *Tamarix*, *Pluchea*, *Typha*, and *Atriplex*) and habitat type (herbaceous, bare ground, and other) was estimated in 10 drains. Each drain was surveyed by driving its length and stopping every 0.1 mile. At each stop, percent coverage for each major vegetation species or habitat type was determined in the area extending 100 feet on either side of the point. The survey was conducted in the winter (late 1994/early 1995) and spring (late May 1995). Based on these data, Hurlbert (1997) calculated the average percentage cover of each major vegetation species in each drain separately for the winter and spring surveys. The 10 drains surveyed were distributed throughout Imperial Valley and covered about 78 miles (Figure 3.2-4)[1].

Hurlbert (1997) summarized the data in two ways. First, the percentage of the total drain covered by the major vegetation species and cover categories was calculated (Table 3.2-8). This method provides the most accurate characterization of the plant species composition and percentage of the drain supporting vegetation. The second method of summarizing the data focused on habitat characteristics rather than plant species composition. In this method, survey locations with less than a median of 15 percent vegetation cover were classified as bare ground/herbaceous. Survey locations with between 15 and 37.5 percent vegetation cover were classified as sparse cover.

Survey locations with 37.5 percent vegetation cover or greater were classified according to the dominant vegetation species (Table 3.2-9). Values reported in Tables 3.2-8 and 3.2-9 are the average of winter and spring surveys.

Hurlbert's (1997) quantitative data are consistent with the qualitative descriptions of the drains reported in the 1994 EIR (IID 1994). The first method used to characterize vegetation showed that herbaceous cover and bare ground composed the majority of the drains (median equals 82.7 percent, range 43.6 to 94 percent). Except for Holtville Main Drain, herbaceous cover and bare ground composed about 75 to 95 percent of the drains. The second method used to characterize drain habitat showed a similar pattern. Bare ground/herbaceous cover and sparse cover composed 72 to 96 percent of the drains, except for the Holtville Main Drain where these habitats covered only 35 percent of the drain. The

[1] Data for P Drain are believed to be reported incorrectly in Hurlbert (1997), and data from this drain were not used in this analysis. Without inclusion of P Drain, about 70 miles of drains were surveyed.



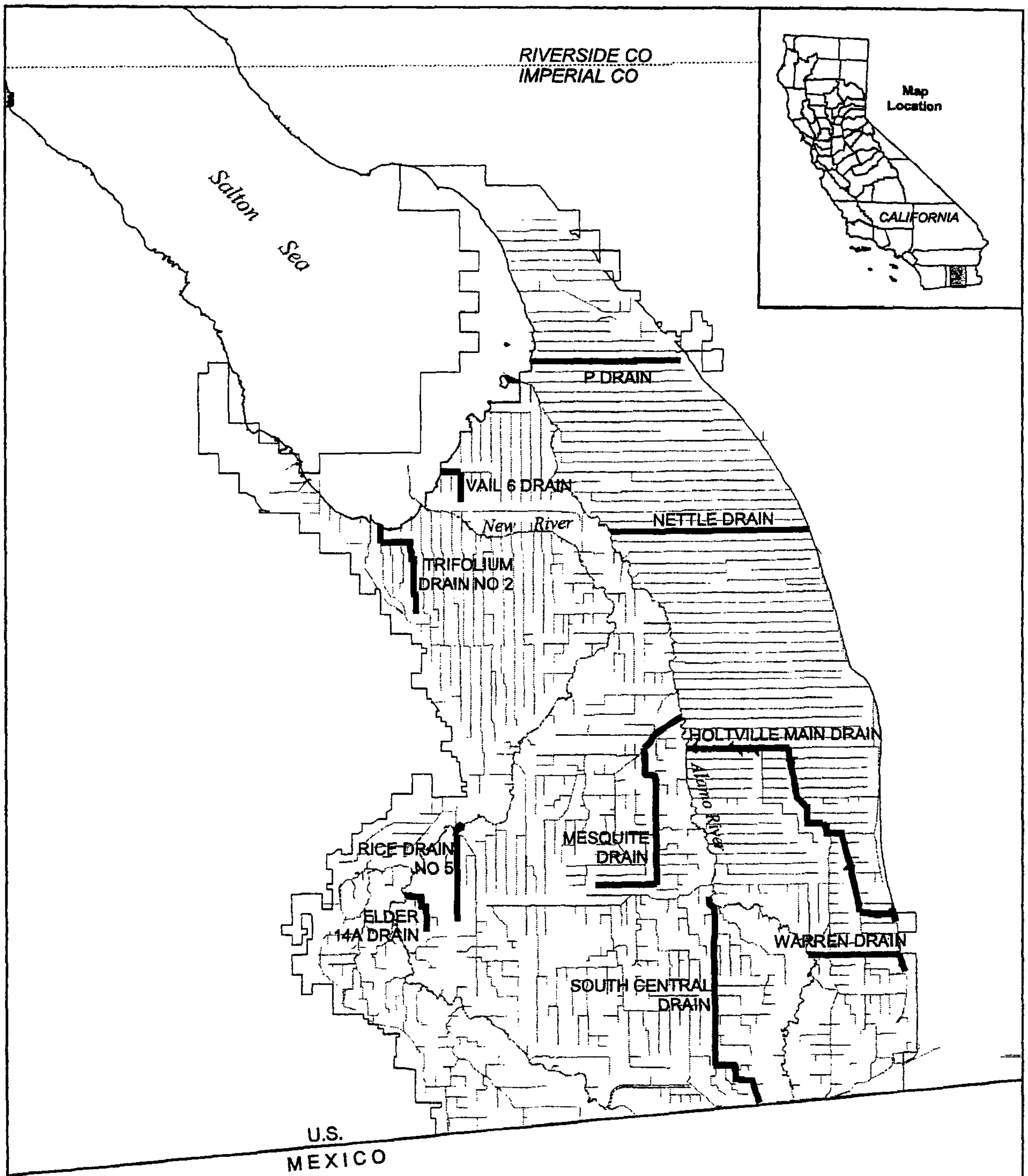
DRAINS SURVEYED
OTHER DRAINS
COUNTY LINE
INTERNATIONAL BORDER
RIVER

N

Source:
University of Redlands, 1999;
DOI, 1999; USBR, 1999

5 0 5 Miles
SCALE IS APPROXIMATE

Figure 3.2-3
Drains Surveyed for the Modified Trifolium Interceptor, East Lowline, and Completion Projects
IID Water Conservation and Transfer Project Draft EIR/EIS



DRAINS SURVEYED BY HURLBERT ET AL 1997
DRAINS
COUNTY LINE
INTERNATIONAL BORDER
RIVER

N

Source:
University of Redlands, 1999; DOI, 1999; USBR, 1999

5 0 5 Miles
SCALE IS APPROXIMATE

Figure 3.2-4
Drains Surveyed in HCP Area by Hurlbert, et al (1997)
IID Water Conservation and Transfer Project Draft EIR/EIS

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qualitative descriptions from the 1994 EIR and Hurlbert (1997) data show that vegetation typically is limited along the drains.

Both studies indicate that common reed (*Phragmites* sp.) is the most prevalent plant species. Cattails are uncommon and occur in small, localized areas. Except for small, localized areas of cattails and occasionally bulrushes, the drains do not support emergent vegetation. As such, habitat availability and quality for marsh-associated species are poor.

Data reported by Hurlbert (1997) were used to estimate the acreage of vegetation supported by IID's drainage network. Hurlbert (1997) only characterized vegetation between the drain banks. A standard lateral drain (excluding the water surface) is about 14 feet wide at the top of the drain embankment (Figure 3.2-5). Assuming all drains are 14 feet wide, the 1,456 miles (cited from IID Memorandum, dated October 4, 2000) of drains in the Imperial Valley cover 2,471 acres. However, as described, potential habitat includes only a small proportion of the drains. The average percent cover of bare ground and herbaceous cover[2] was calculated for each of nine drains from data in Hurlbert (1997).[3] The remaining portion of the drain was assumed to be vegetated. It was then assumed that the drains surveyed represented all drains in the Imperial Valley. Acres of vegetation supported by the entire drainage system were calculated based on the percentage vegetation supported by the drains surveyed weighted by the drain's length. With this method, an estimated 652 acres of vegetation are supported in the drains.

As noted, the nine drains surveyed were assumed to represent the entire drainage system. This assumption may not be accurate, but is necessary without more complete information. In particular, Holtville Main Drain is unusual. Good water quality, combined with the drain's large size, allows Holtville Main Drain to support substantially more vegetation than is typical. As shown by Hurlbert's data, Holtville Main Drain is 56 percent vegetated, while the next most vegetated drain (Trifolium 2) is only 23 percent vegetated. The remaining drains surveyed have less vegetation. Holtville Main Drain was also the longest drain surveyed at 17.8 miles, followed by South Central Drain at 12.2 miles. Because the estimate of the amount of vegetation in the drainage system was derived from the percentage of vegetation in each of the drains surveyed weighted by their lengths, inclusion of Holtville Main Drain (the longest drain with an atypical amount of vegetation) may have overestimated the amount of vegetation in the entire drainage system.

Only a small proportion of the vegetated acreage consists of cattails or bulrushes, which are favored by wildlife species associated with drain habitats. Holtville Main Drain had the greatest percentage of cattails at 6.3 percent, followed by South Central, Warren, and Mesquite Drains at 3.8, 1.5, and 1.1 percents, respectively. The remaining five drains did not support cattails. For the nine drains, the average percent cover of cattails weighted by drain length was 2.5 percent. Based on this average, the entire IID water service area drainage system supports about 63 acres of cattail vegetation.

Conveyance System. Canals that convey water from the LCR to customers in the IID water service area support little vegetation. Approximately 70 percent of the 1,667 miles (cited

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2 Herbaceous cover consists of annual weedy vegetation that provides little or no habitat value to wildlife.

3 As noted in Table 2.3-4, data presented for P Drain in Hurlbert (1997) are believed to be incorrectly reported. As such, data from P Drain were not used in this analysis.

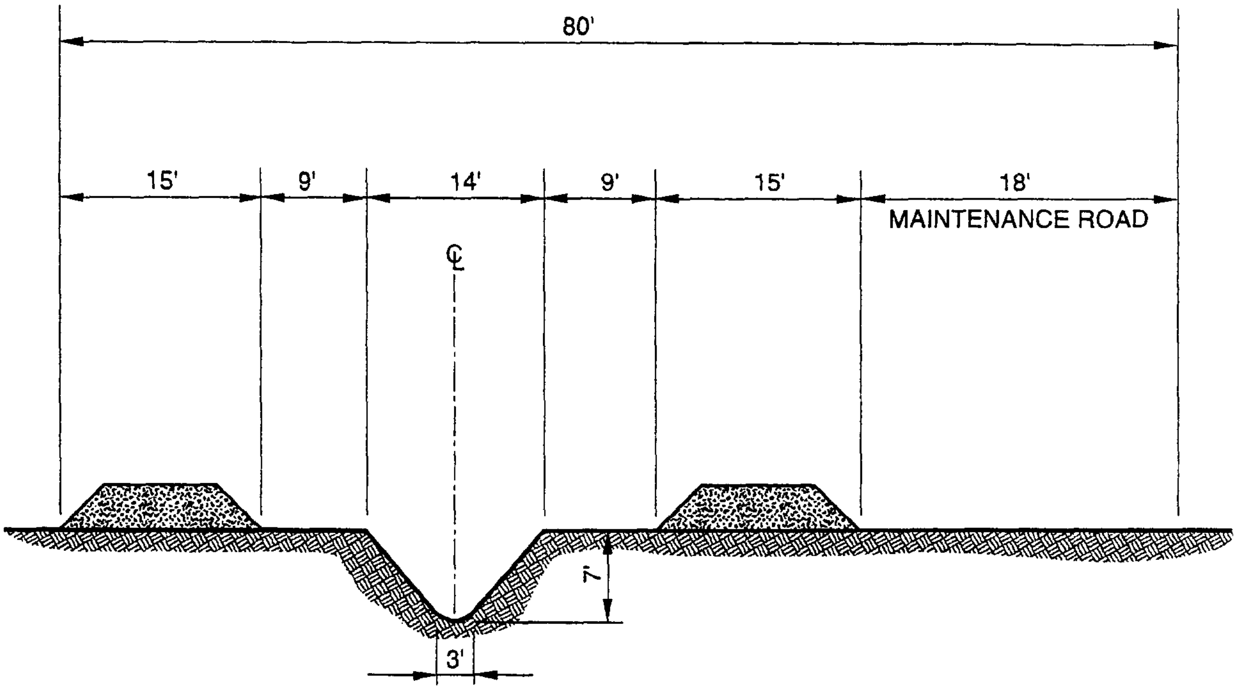

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Figure 3.2-5
Typical Lateral Drain Profile
IID Water Conservation and TransferProject Draft EIR/EIS
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TABLE 3.2-8
Percentage of Drain Area Composed of Each Major Plant Species or Other Habitat Type for the 10 Drains Surveyed by Hurlbert (1997)

	Drains									
Vegetation Cover	**Vail Cut-off**	**Trifolium No. 2**	**Elder Nos. 14/14A**	**Rice No. 5**	**Nettle**	**Holtville Main**	**Warren**	**South Central**	**Mesquite**	**P[a]**
Herbaceous	70.7	44.9	32.2	29.2	55.5	22.9	46.3	40.7	34.9	*34.9*
Bare ground	18.9	31.7	58.9	64.8	31.3	20.7	33.0	41.9	45.8	*45.8*
Atriplex		0.6				2		1.1	3.2	*3.2*
Phragmites	7.5	3.5	2.1	3.3	10.6	7.7	12.9	3.5	0.9	*0.9*
Pluchea		8.7		0.9	0.7	6.8		4.6	5.2	*5.2*
Tamarix		7.6	0.5			29.6	1.0	0.5	3.0	*3.0*
Typha						6.3	1.5	3.8	1.1	*1.1*
Other	2.7	2.9	6.3	1.7	1.7	3.8	5.1	3.7	6.1	*6.1*

[a] Numeric values reported of percent vegetation for P Drain are identical to Mesquite Drain and are inconsistent with other information presented for P Drain. Thus, these values are believed to be incorrect.
Source: Hurlbert 1997.

TABLE 3.2-9
Percent of Habitat Types at Survey Points Along Drains Surveyed by Hurlbert (1997)

	Drains									
Habitat	Vail Cut-off	Trifolium No. 2	Elder Nos. 14/14A	Rice No. 5	Nettle	Holtville Main	Warren	South Central	Mesquite	P
Bare Ground/ Herbaceous	79.2	41.0	88.0	89.2	58.2	13.5	59.1	61.9	48.8	64.3
Sparse cover	6.3	31.4	8.0	4.9	19.8	22.2	17.2	20.0	36.0	17.1
Phragmites	14.6	2.9	4.0	3.6	19.6	9.4	19.8	3.5	1.2	7.1
Pluchea	0	13.3	0	0	1.5	6.4	0	6.2	6.0	5.5
Tamarix	0	10.5	0	0	0	35.1	0	0.5	0	0
Phragmites/Pluchea	0	0	0	2.5	0.5	0	0	0.5	0	5.5
Atriplex	0	0	0	0	0.5	0	0	0.5	0.4	0
Typha	0	0	0	0	0	7.6	0	0	0.8	0
Tamarix, Pluchea	0	0	0	0	0	3.2	0	6.7	0	0
Phragmites, Tamarix	0	1.0	0	0	0	0	3.9	0	0	0
Tamarix, Typha	0	0	0	0	0	1.8	0	0	0	0
Tamarix, Other	0	0	0	0	0	0.8	0	0	0	0
Pluchea, Atriplex	0	0	0	0	0	0	0	0	0	0.7
Other	0	0	0	0	0	0.4	0	0.5	6.8	0

Source: Hurlbert 1997.

from IID Memorandum, dated October 4, 2000) of canals in Imperial Valley are concrete-lined or in pipes and, therefore, do not support rooted vegetation. Embankment slopes of the lined canals also are maintained free of vegetation. About 537 miles (cited from IID Memorandum, dated October 4, 2000) of the delivery system consist of earthen channels (Figure 3.2-6). The canal slopes support vegetation that typically consists of bands of vegetation at the water surface. The bands of vegetation consist of common reed, saltgrass, Bermuda grass, and salt cedar. Tree and shrub covers are rare or nonexistent on most canals and laterals (IID 1994). Along the AAC, an almost continuous thick stand of common reed (3 to 15 feet wide) grows along both sides of the canal for the majority of its length. The 30-mile-long section of the AAC between Pilot Knob and Drop 4 supports about 30 acres of common reed (Reclamation and IID 1994). Vegetation along the canals is of minimal value to wildlife because it has little emergent vegetation, and water velocity and depth in the canals are too great for most species.

Water seepage has induced phreatophytic vegetation[4] to develop along the AAC in a landscape previously dominated by dry, desert scrub. Between Drops 2 and 3, about 100 acres of scattered phreatophytic vegetation are supported by seepage. Only about 1 acre is emergent wetland vegetation. The remaining vegetation consists of screwbean and honey mesquite (22.6 acres), salt cedar (28.7 acres), and arrowweed (47.2 acres). However, under the AAC lining project, this portion of the AAC will be abandoned and this vegetation will be lost. Effects of loss of this habitat on listed species were evaluated in the EIS/EIR for the AAC Lining Project (Reclamation and IID 1994). A larger (1,422 acres) marsh complex that will not be affected by the AAC lining project is between Drops 3 and 4. Marsh vegetation composes about 111 acres of the complex. Other vegetation within the complex includes salt cedar (755 acres), arrowweed (233 acres), screwbean mesquite (251 acres), and cottonwood and willow (39 acres).

In addition to these areas, phreatophytic vegetation supported by seepage from the AAC exists between Drop 4 and the East Highline Canal. This area is about 100 to 150 acres. Closer to the LCR near Mission Wash, seepage from the AAC supports phreatophytic vegetation totaling about 100 acres. The vegetation composition of these areas has not been determined, but is expected to exhibit a plant species composition similar to that found in other seepage areas along the AAC.

Seepage communities along Imperial Valley canals are rare and mostly limited to areas adjacent to the East Highline Canal. As part of the system-based water conservation activities, IID may install seepage recovery systems along the west side of the East Highline Canal. Seepage communities near proposed seepage recovery systems were digitized from Digital Orthophoto Quarter Quadrangles (DOQQ) and visited during May 2001 to assess vegetation characteristics. Seepage communities on the east side of the East Highline Canal would not be affected by the proposed water conservation measures. The locations of seepage communities near proposed seepage recovery systems are shown in Figure 3.2-7, and the sizes of the seepage areas are listed in Table 3.2-10.

The plant species composition of the seepage communities is diverse and varies substantially among the seepage areas. Arrowweed, common reed, and tamarisk are the

[4] Phreatophytic vegetation is vegetation associated with wet areas. In the HCP area, phreatophytic plant species include tamarisk, common reed, willows, and cattails.

most common species in the seepage communities, with mesquite, cattails, and cottonwoods in some areas. About 412 acres of vegetation supported by seepage from the East Highline Canal occur in areas where seepage recovery systems are under consideration.

TABLE 3.2-10
Seepage Communities Along the East Highline Canal

Area ID	Acres	Area ID	Acres
1	3.2	17	10.2
2	6.8	18	7.9
3	3.1	19	6.1
4	3.3	20	43.3
5	2.0	21	24.8
6	0.9	22	26.6
7	11.9	23	3.8
8	16.1	24	56.6
9	18.1	25	54.9
10	13.5	26	3.6
11	6.8	27	5.7
12	13.4	28	7.0
13	12.3	29	11.0
14	8.3	30	3.5
15	6.5	31	5.6
16	9.4	32	6.0
		Total (Both Columns)	412.2 acres

Note: Area ID refers to Figure 3.2-7.

Unmanaged Vegetation Adjacent to the Salton Sea. Vegetation has naturally developed along the margins of the Salton Sea. This phreatophytic vegetation occurs above the shoreline and shoreline strand community (see the following discussion of tamarisk scrub habitat). Unmanaged vegetation includes diked wetlands below the water surface elevation of the Salton Sea. The Salton Sea database (University of Redlands 1999) refers to these unmanaged areas of phreatophytic vegetation as "adjacent wetlands."

The Salton Sea database (University of Redlands 1999) classifies 6,485 acres along the Salton Sea as adjacent wetlands and 64 acres as mudflat. Tamarisk and iodine bush are the most common species of adjacent wetlands (Table 3.2-11; Figure 3.2-8). Cattails and bulrushes are the primary vegetation on 217 acres of adjacent wetlands. In the IID water service area, the Salton Sea database identifies three parcels dominated by cattails: one on the southwestern edge of the Salton Sea (35 acres) and two on the southern edge (32 acres). A fourth parcel on the eastern edge of the Salton Sea is dominated by bulrushes (17 acres). However, three of these areas are misclassified in the Salton Sea database. The first parcel of 35 acres is a managed duck club and, therefore, does not meet the definition of an adjacent wetland (i.e., unmanaged areas). Of the two parcels totaling 32 acres, one is an IID drain and the other is a marsh managed by the USFWS. The drain parcel is managed by IID as part of its

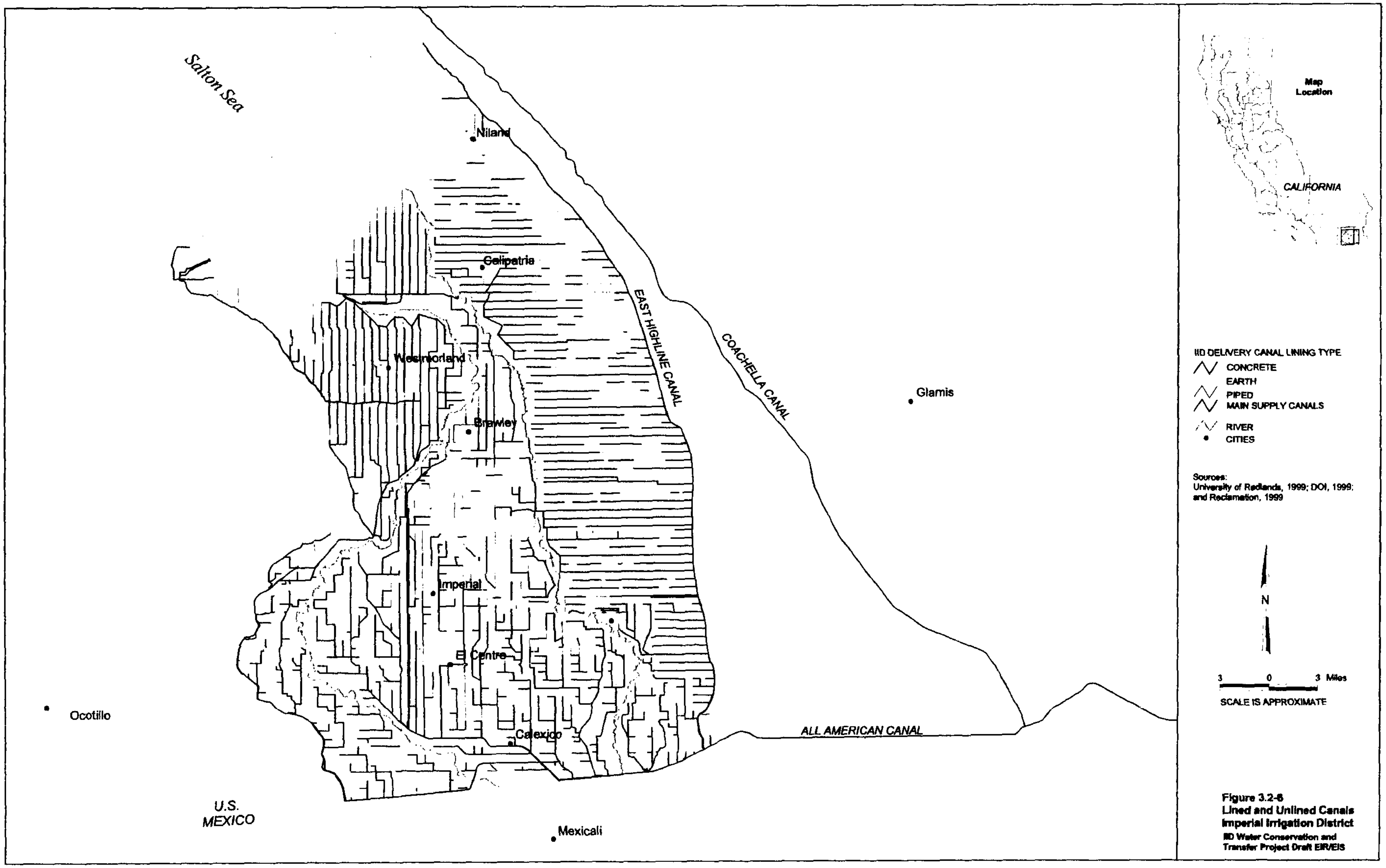

Figure 3.2-6
Lined and Unlined Canals
Imperial Irrigation District
IID Water Conservation and Transfer Project Draft EIR/EIS

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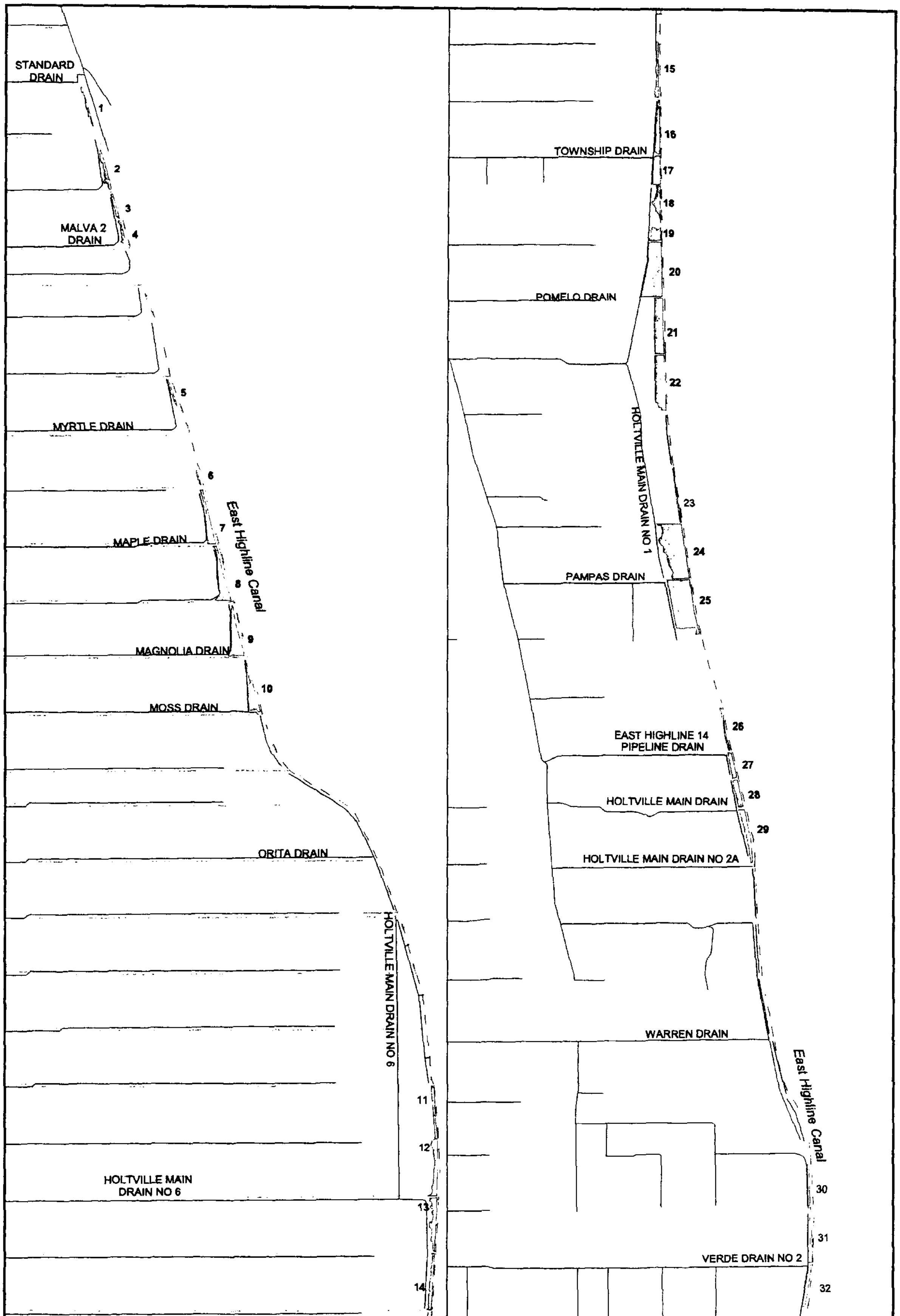

SEEPAGE AREAS
DRAINS
CANALS
AQUEDUCT/CANAL

Source:
University of Redlands, 1999; DOI, 1999

N

2000 0 2000 Feet

SCALE IS APPROXIMATE

Figure 3.2-7
Seepage Communities Adjacent to the East Highline Canal
IID Water Conservation and Transfer Project Draft EIR/EIS

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TABLE 3.2-11
Primary Vegetation of Areas Classified as Adjacent Wetlands in the Salton Sea Database

Primary Vegetation	Total Acres at Salton Sea	Percentage of Adjacent Wetlands	Acres in HCP Area
Iodine bush	1,577	24	1,509
Mixed halophytic shrubs	65	1	-
Arrowweed	597	9	-
Bulrush	17[a]	<1	17
Sea-blite	86	1	86
Tamarisk	2,349	36	437
Cattail	200[a]	3	67
No primary wetland vegetation	1,595	25	1,305
Total	**6,485**		**3,421**

[a] See text for further description of these areas.
Source: Salton Sea Database (University of Redlands 1999).

drainage system. Habitat in this drain was accounted for in the quantification of habitat in the drainage system above. The other parcel managed by USFWS does not meet the definition of an adjacent wetland (i.e., unmanaged areas). The last parcel encompassing 17 acres is sustained by runoff from CDFG's managed marsh area in the Wister Unit. The remaining 133 acres identified as adjacent wetland dominated by cattail or bulrush occur adjacent to the northwestern portion of the Salton Sea and is presumably maintained by drain flows from CVWD.

Managed Marsh. Managed marsh consists of areas actively managed for one or more marsh habitat values and functions. In the Project area, managed marsh occurs primarily on state and federal refuges. Private duck clubs also support managed marsh. These marshes are freshwater marshes maintained with irrigation delivery purchased from IID. They are not supported by the Salton Sea nor are they supported by drainwater. As a result, managed marshes in the Imperial Valley would not be impacted by the Proposed Project or alternatives. They are described here only to provide improved understanding of the habitats available in the Project area.

The Imperial Wildlife Area (WA), managed by the CDFG, and the Sonny Bono Salton Sea NWR, managed by the USFWS lie within the Project area (Figure 3.2-9). Both refuges provide habitat for a wide diversity of resident and migratory waterfowl. The refuges provide marsh habitat and offer the highest quality, year-round marsh habitat value in the Project area.

The Project area also contains 17 private duck clubs, covering about 5,582 acres. Most of the duck clubs are near the Salton Sea. These clubs attract wintering waterfowl, although other wildlife use these marsh areas when available. Managed marsh units on the duck clubs are flooded in fall and winter when wintering waterfowl are in the valley. They are not flooded during other times of the year; therefore, they do not provide habitat for year-round resident wildlife associated with marsh habitat.

Wildlife Associated with Drain Habitat. A number of birds use the Imperial Valley agricultural drains, supply canals, and laterals. The Imperial Valley irrigation infrastructure offers wetland habitat and food, including snails, midge larvae, fish, and seeds and vegetative material from wetland plants. Wading birds using this habitat include green-backed heron (*Butorides striatus*), great blue heron (*Ardea herodias*), and great egret (*Ardea alba*). Other riparian and wetland birds species include the red-winged blackbird (*Agelaius phoeniceus*), common yellowthroat, Yuma clapper rail, and black phoebe (*Sayornis nigricans*). Canal embankments and levees provide open forage habitat for mourning dove, greater roadrunner, and killdeer (*Charadrius vociferus*). Channel embankments also provide burrow sites for burrowing owl (*Athene cunicularia*), kingfisher (*Ceryle alcyon*), and southern rough-winged swallows (*Stelgidopteryx ruficollis*). Species of waterfowl using the drains include American coots (*Fulica americana*) and mallards (*Anas platyrhynchos*). Refuges and duck clubs are managed to attract waterfowl.

Mammals associated with drain habitat include muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), and numerous species of bats, which often forage over wetlands. Round tailed ground squirrel, muskrat, and southern pocket gopher (*Thomomys bottae*) use the canal and drain embankments. Reptile and amphibian species associated with this habitat type include bullfrog, spiny softshell turtle (*Apalone spinifera*), and red-spotted toad (*Bufo punctatus*).

Tamarisk Scrub Habitat. Native riparian plant communities in the desert southwest are dominated by cottonwoods and willows, but palo verde and mesquite also occur. Much of the native riparian plant communities in the desert southwest were replaced by non-native plant species, particularly tamarisk. Tamarisk scrub communities supplant native vegetation following major disturbance, including alterations in stream and river hydrology, and form extensive stands in some places. Characteristic species include salt cedar (*Tamarix chinensis, T. ramosissima*), big saltbrush (*Atriplex lentiformis*), *Coldenia palmeri*, and saltgrass (*Distichlis spicata*); associated species include common reed (*Phragmites communis* var. *berlandieri*) and giant reed (*Arundo donax*).

In the Project area, tamarisk scrub is found along the New and Alamo Rivers. Areas along the New River are composed of a virtual monoculture of tamarisk, with only a few areas of native vegetation. Vegetation along the Alamo River is similarly dominated by tamarisk. Dredging has extended the river channels of both the New and Alamo Rivers into the Salton Sea. The banks of the extended river channels support a thick stand of tamarisk and common reed.

The width of tamarisk scrub stands adjacent to the New and Alamo Rivers varies substantially along their lengths. Based on a review of DOQQs, much of the length of the rivers supports only a narrow band of tamarisk of less than 50 feet on both sides of the channels. In more limited portions of the rivers, larger stands of tamarisk have developed that may extend 500 feet or more from the river channel. To estimate the amount of tamarisk scrub habitat along the floodplains of the New and Alamo Rivers, vegetation along the rivers was digitized from the DOQQs. Vegetation along the rivers was assumed to consist of tamarisk scrub. Based on this work, the New and Alamo Rivers support about 2,568 acres and 962 acres of tamarisk scrub habitat, respectively, for a total of 3,530 acres.

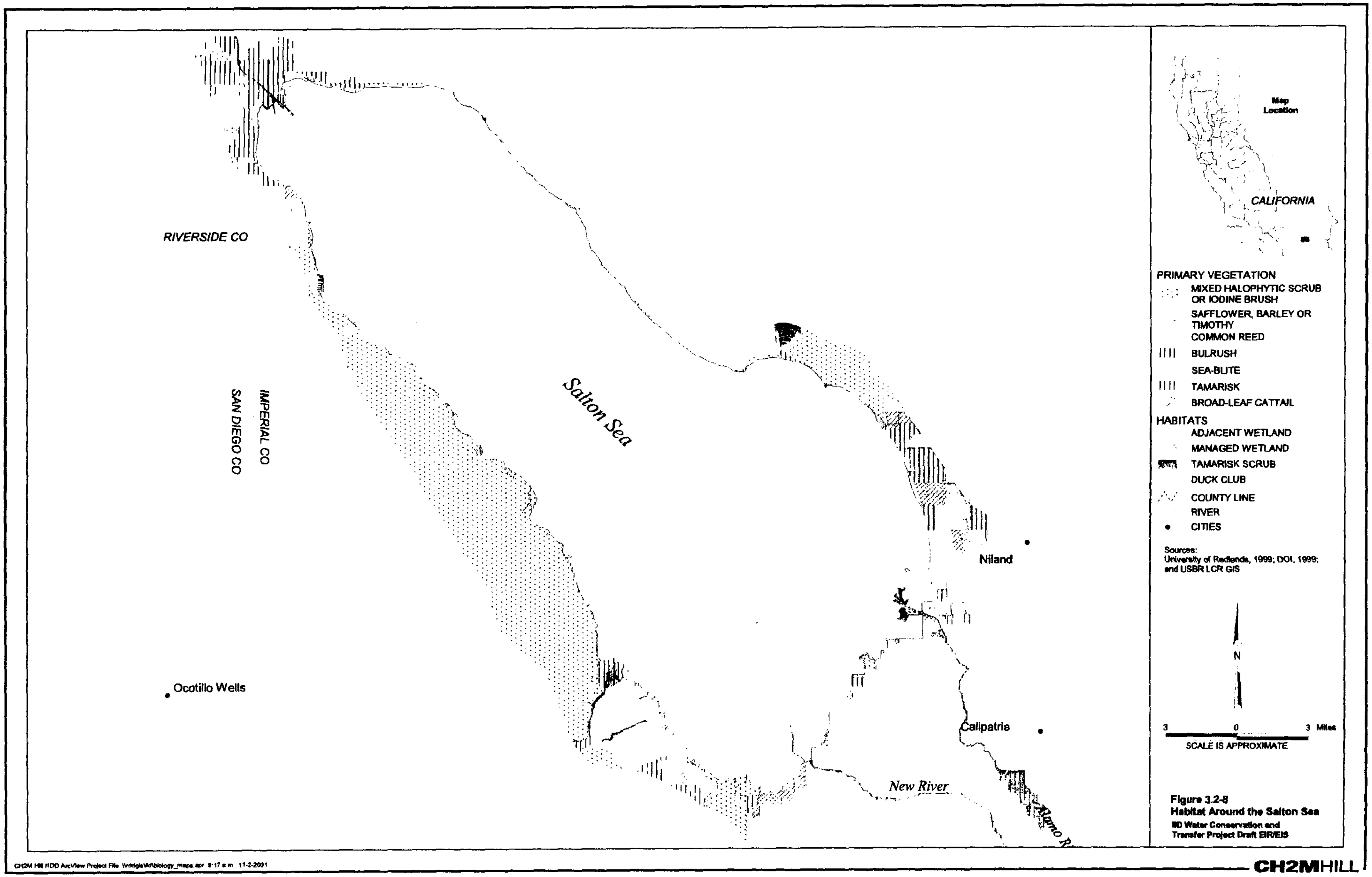

Figure 3.2-8
Habitat Around the Salton Sea
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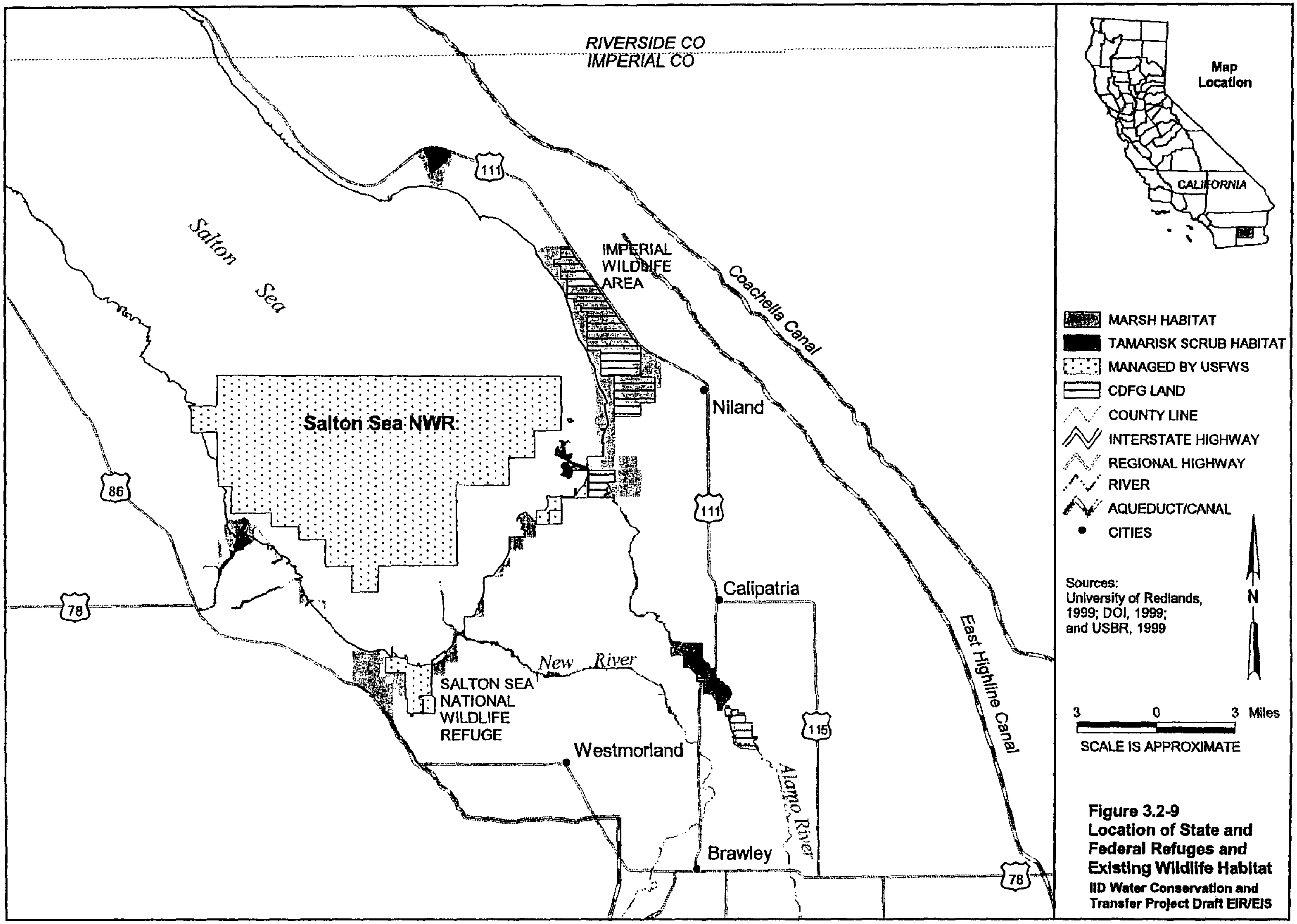

Figure 3.2-9
Location of State and Federal Refuges and Existing Wildlife Habitat
IID Water Conservation and Transfer Project Draft EIR/EIS

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Tamarisk scrub occurs in other portions of the Project area, wherever water is available, including the margins of the Salton Sea (Table 3.2-11). Tamarisk scrub is also one of the major plant species composing vegetation along the drains and is found in seepage areas adjacent to canals. The IID water service area contains about 438 acres of the tamarisk-dominated areas adjacent to the Salton Sea (University of Redlands 1999). The source of the water that supports tamarisk adjacent to the Salton Sea is uncertain, but is likely the result of shallow groundwater and seepage rising to the surface at its interface with the Sea. In addition to the adjacent wetlands, tamarisk is a primary component of areas designated as shoreline strand community in the Salton Sea database. The shoreline strand community occupies about 293 acres (University of Redlands 1999) immediately adjacent to the Salton Sea and consists of tamarisk and iodine bush. As with the tamarisk-dominated areas adjacent to the Salton Sea described, the source of water supporting this community is undetermined, but is likely the result of shallow groundwater and seepage rising to the surface at its interface with the Sea.

Along IID's drainage system, Hurlbert (1997) can be used to estimate the acreage of tamarisk scrub supported by the drains. Of the drains surveyed by Hurlbert (1997), the percentage of drain area composed of tamarisk varied from 0 to 29.6 percent (Table 3.2-8), yielding a weighted average percentage of 8.7. Assuming that tamarisk covers 8.7 percent of the drains, the drainage network in the HCP supports about 215 acres of tamarisk scrub habitat.

Cottonwood-willow habitat is largely absent from the Project area. Cottonwoods and willows occur in seepage communities along the AAC. In addition, remnant cottonwoods occur in Imperial Valley 20 to 60 feet from the East Highline Canal (IID 1994). A few patches of willow also persist along the Alamo River.

Wildlife Associated with Tamarisk Scrub. Tamarisk is a non-native species that has invaded riparian areas of the southwest and readily colonizes non-riparian areas with adequate soil moisture. Tamarisk is considered poor quality habitat for native wildlife species, although some wildlife species have adapted to using tamarisk where it has displaced native vegetation. Tamarisk forms dense monocultures with little structural diversity. Bird species diversity and abundance are lower in tamarisk than in stands of native riparian vegetation. Bird species potentially using tamarisk scrub and other riparian habitat include yellow warbler (*Dendroica petechia*), southwestern willow flycatcher (*Empidonax traillii extimus*), mourning dove (*Zenaida macroura*), black-crowned night heron, cinnamon teal (*Anas cyanoptera*), and phainopepla. Two groups, large raptors and cavity-nesting species, are not known to occur in tamarisk. Tamarisk's growth form is generally as a large shrub that does not possess the structural characteristics required by species, such as raptors or woodpeckers, that rely on trees as perch or nest sites.

Mammals associated with this habitat include deer mouse (*Peromyscus maniculatus*), cotton rat (*Sigmodon hispidus*), muskrat, raccoon, common gray fox (*Urocyon cinereoargenteus*), ringtail cat (*Bassariscus astutus*), and coyote (*Canis latrans*). Reptile and amphibian species that use this community type include the spiny softshell turtle, bullfrog, leopard frog, and Woodhouse's toad (*Bufo woodhousei*).

Desert Habitat. The Project area supports little native desert habitat. The primary occurrence of native desert habitat in the Project area is along the AAC within IID's right-of-way (Figure 3.2-10). The 82-mile AAC traverses desert habitat for 60 miles; the remaining 22

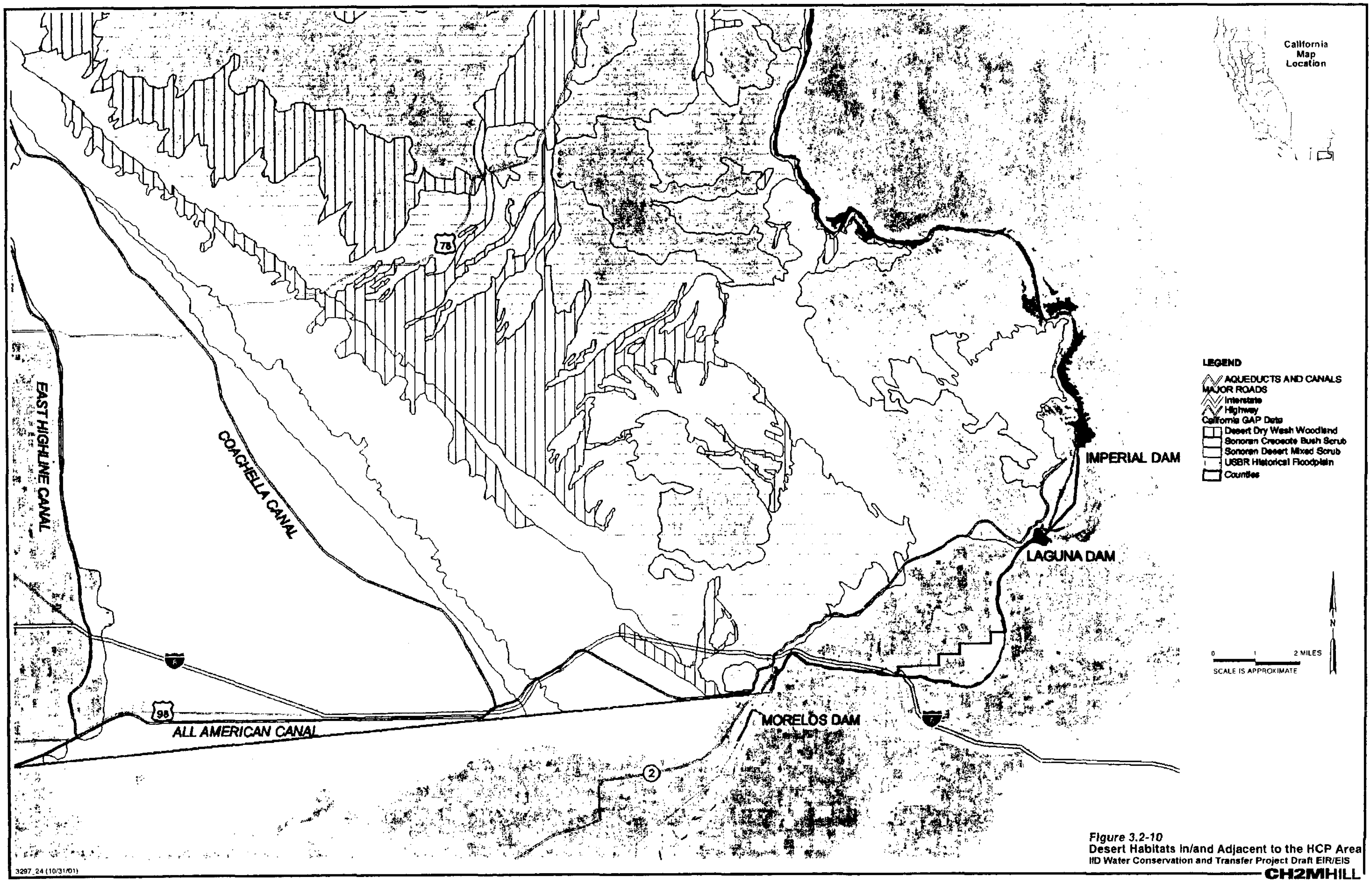

Figure 3.2-10
Desert Habitats In/and Adjacent to the HCP Area
IID Water Conservation and Transfer Project Draft EIR/EIS
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Desert Habitats in/and Adjacent to the HCP Area (Color)miles of the canal lie within agricultural areas of the Imperial Valley. Desert habitat also occurs adjacent to the East Highline Canal and portions of the Thistle, Trifolium, and Westside Main Canals. In the Imperial Valley, desert plant species have colonized small areas that have not been under agricultural production for many years. These areas occur as inclusions in the predominantly agricultural landscape. Two principal desert habitats are supported in the Project area: creosote bush scrub and dunes. The characteristics and distribution of each of these habitats are described subsequently.

Creosote Bush Scrub. Creosote bush scrub is characterized by widely spaced shrubs, approximately 1.6 to 9.8 feet tall, usually with largely bare ground between. It is the basic creosote scrub community of the Colorado Desert, typically occurring on well-drained secondary soils of slopes, fans, and valleys. Characteristic species include creosote bush (*Larrea tridentata*), burro weed (*Ambrosia dumosa*), brittle brush (*Encelia farinosa*), and ocotilla (*Fouquieria splendens*). Succulents are common, and ephemeral annual herbs generally bloom during late February and March. Mesquite thickets, an important wildlife habitat component, are in creosote bush scrub habitat.

Creosote bush scrub, the predominant desert habitat in the Project area, occurs along much of the AAC. It is also adjacent to the Project area along the East Highline and Westside Main Canals. Plant species composing this habitat may occur in the Imperial Valley in fallowed areas.

Desert Dunes. The AAC traverses the Algodones Dunes. The dunes consist of both active desert dunes and stabilized or partially stabilized dunes. Active desert dune communities are characterized as essentially barren expanses of actively moving wind-deposited sand, with little or no stabilizing vegetation. Dune size and shape are determined by abiotic site factors, including wind patterns, site topography, and source of sand deposits. Characteristic plant species include bee plant (*Cleome sparsifolia*), *Dicoria canescens*, evening primrose (*Oenothera avita*), and *Tiquilia plicata*.

Some desert dunes have been stabilized or partially stabilized by shrubs, scattered low annuals, and perennial grasses in areas with less wind or higher water availability. These dunes typically occupy sites lower and more sheltered than active dunes, with soil moisture retained just below the sand surface, allowing perennial vegetation to survive long drought periods. Mesquite (*Prosopis glandulosa, P. pubescens*) scrub is often associated with this community. Other characteristic plant species include sand verbena (*Abronia villosa*), burro weed, ankle grass (*Astragalus* spp.), salt cedar (*Tamarix* spp.), saltbrush (*Atriplex canescens*), croton (*Croton californicus* var. *mojavensis*), dalea grass, wild buckwheat (*Eriogonum deserticola*), and desert sunflower (*Geraea canescens*). Plant cover increases as dunes are progressively stabilized. This community intergrades with sandier phases of creosote bush scrub.

Wildlife Associated with Desert Habitat. Desert habitat areas support birds, mammals, and reptiles that are adapted to arid desert conditions. Resident bird species include the white-crowned sparrow (*Zonotrichia leucophrys*), greater roadrunner (*Geococcyx californianus*), great-horned owl (*Bubo virginianus*), and loggerhead shrike (*Lanius ludovicianus*). Mammals use this habitat, generally in low densities, including the Merriam's kangaroo rat (*Dipodomys merriami*), little pocket mouse (*Perognathus longimembris*), desert kangaroo rat (*Dipodomys *deserti*), ground squirrels (*Spermophilus sp.*), striped skunk (*Mephitus mephitis*), and black-tailed hare (*Lepus californicus*). Reptile species include the zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), and California whiptail (*Cnemidophorus tigris mundus*).

Plant species in this community, including mesquite, are important food resources to wildlife. Bird species that use this habitat include phainopepla (*Phainopepla nitens*), mockingbird (*Mimus polyglottos*), and ash-throated flycatcher. Mammals that use this habitat include black-tailed hare, desert cottontail (*Sylvilagus andubonii)*, striped skunk, coyote, common gray fox (*Urocyon cinereoargenteus)*, Merriam's kangaroo rat, and white-throated woodrat (*Neotoma albigula*). Reptiles include sidewinder (*Crotalus cerastes*), coachwhip (*Masticophis flagellum*), desert iguana (*Dipsosaurus dorsalis*), and side-blotched lizard.

Agricultural Fields. Irrigated agricultural land, the predominant land cover type in the Imperial Valley, composes most of the Proposed Project area. Agricultural fields attract a variety of wildlife species. The crops grown, the methods used, and the total acreage in production in the IID water service area are based on the decisions of individual farmers. Current and anticipated market prices have an important role in the crops that are economically beneficial for farmers to grow. As a result, the types and amount of crops grown fluctuate from year to year. The types of crops and the range of acreage of the major crops grown in the service area for 1999 are shown in Table 3.2-12. The cropping pattern is likely to be similar to Table 3.2-12 for the short term, but could change as markets for crops or other conditions change.

TABLE 3.2-12
Crops Produced (Greater Than 200 Acres) in IID Service Area During 1999

Crop Description	Acres	Percentage
Alfalfa (all)	192,633	35.56
Sudan grass (all)	62,881	11.61
Bermuda grass (all)	55,179	10.19
Wheat	42,464	7.84
Sugar beets	33,997	6.28
Lettuce (all)	22,558	4.16
Carrots	16,995	3.14
Melons, spring (all)	14,293	2.64
Broccoli	12,305	2.27
Onions	11,526	2.13
Duck ponds (feed)	9,105	1.68
Cotton	7,131	1.32
Ear corn	6,790	1.25
Citrus (all)	6,169	1.14
Asparagus	6,166	1.14
Cauliflower	3,960	0.73
Onions (seed)	3,541	0.65
Potatoes	3,159	0.58
Klien grass	3,113	0.57
Rape	3,034	0.56
Rye grass	3,034	0.56
Vegetables, mixed	2,162	0.40
Watermelons	2,158	0.40

TABLE 3.2-12
Crops Produced (Greater Than 200 Acres) in IID Service Area During 1999

Crop Description	Acres	Percentage
Tomatoes, spring	2,024	0.37
Melons, fall (all)	2,019	0.37
Rapini	1,323	0.24
Fish farms	1,293	0.24
Cabbage	1,284	0.24
Spinach	1,229	0.23
Garbanzo beans	1,057	0.20
Barley	868	0.16
Field corn	844	0.16
Pasture, permanent	701	0.13
Peppers, bell	429	0.08
Garlic	308	0.06
Flowers	279	0.05
Oats	212	0.04
Total	**538,223**	**99.37**

Source: IID, unpublished data.

Wildlife Associated with Agricultural Fields. Agricultural fields are throughout the Imperial and Coachella Valleys adjacent to the Salton Sea. Agricultural fields are used by a large number and wide variety of species. They attract geese, ibis, gulls, blackbirds, long-billed curlews (*Numenius americanus*), and mountain plovers (*Charadrius montanus*) (Knopf 1998). Bird species use agricultural fields, ruderal communities along the edges of agricultural fields, fields that are inactive or fallow, or fields that are temporarily flooded during irrigations. Red-tailed hawk (*Buteo jamaicensis*), northern harrier, and wintering ferruginous hawks (*B. regalis*) forage on agricultural fields. Flooded fields are often used by foraging wading birds and waterfowl, such as egrets and geese, particularly during winter. Geese will also forage on crops when there is no standing water in the fields. Other species that forage in agricultural fields include a number of species of gulls, wintering mountain plovers, brown-headed cowbirds (*Molothrus ater*), and horned larks (*Eremophila alpestris*)

Common mammals in agricultural and ruderal habitats include western harvest mouse (*Reithrodontomys megalotis*) and southern pocket gopher.

Special-Status Species. The Project area provides habitat for a large number of special-status plants and animals. Special-status species of plants include those listed by federal or state agencies as threatened or endangered or candidates for such listing, those listed as species of special concern by federal and state agencies, those listed by the state as rare, or those identified by the California Native Plant Society (CNPS) for inclusion on official lists. Special-status plant species with the potential to occur in the Project area are listed in Table 3.2-13. All special-status plant species in the Project vicinity are associated with desert habitat or forest/woodland habitat. No forest/woodland habitat occurs in the Project area, and species associated with this habitat do not occur. Desert habitat is limited to areas along the AAC and adjacent to the East Highline Canal, and portions of the Westside Main, Thistle, and Trifolium Extension Canals on the margins of the IID water service area. Special-status plants would not be expected elsewhere in the Project area.

TABLE 3.2-13
Special-Status Plants of Imperial and Riverside Counties

Name (Common/Scientific)	Status Federal	Status State	Other[a]	General Habitat
Harwood's milk-vetch/ *Astragalus insularis* var. *harwoodii*			CNPS: 2	D
Coachella Valley milk-vetch/ *Astragalus lentiginosus* var. *coachellae*	FE		CNPS: 1B	D
Peirson's milk-vetch/ *Astragalus magdalenae* var. *peirsonii*	FT	SE	CNPS: 1B	D
Triple-ribbed milk-vetch/ *Astragalus tricarinatus*	FE		CNPS: 1B	D
Ayenia/ *Ayenia compacta*			CNPS: 2	D
Arizona carlowrightia/ *Carlowrightia arizonica*			CNPS: 2	D
Crucifixion thorn/ *Castela emoryi*			CNPS: 2	D
Peirson's pincushion/ *Chaenactic carphodinia* var. *peirsonii*			CNPS: 1B	D
Arizona spurge/ *Chamaesyce arizonica*			CNPS: 2	D
Flat-seeded spurge/ *Chamaesyce platysperma*	SC		CNPS: 1B	D
Wiggin's croton/ *Croton wigginsii*		SR	CNPS: 2	D
Gander's cryptantha/ *Cryptantha ganderi*	SC		CNPS: 1B	D
California ditaxis/ *Ditaxis californica*	SC		CNPS: 1B	D
Glandular ditaxis/ *Ditaxis dariana*			CNPS: 2	D
Parish's daisy/ *Erigeron parishii*	FT		CNPS: 1B	D
Foxtail cactus/ *Escobaria vivipara* var. *alversonii*	SC		CNPS: 1B	D
Little San Bernardino Mtns. Gilia/ *Gilia maculata*	SC		CNPS: 1B	D
Algodones Dunes sunflower/ *Helianthus niveus* spp. *tephrodes*	SC	SE	CNPS: 1B	D
Borrego Valley peppergrass/ *Lepidium flarum* var. *felipense*	SC		CNPS: 1B	D
Santa Rosa Mtns. Linanthus/ *Linanthus floribundus* spp. *halli*			CNPS: 1B	D
Parish's desert-thorn/ *Lycium parishii*			CNPS: 2	D
Spearleaf/ *Matelea paruifolia*			CNPS: 2	D
Munz's cholla (cactus)/ *Opuntia munzii*	SC		CNPS: 1B	D

TABLE 3.2-13
Special-Status Plants of Imperial and Riverside Counties

Name (Common/Scientific)	Federal	Status State	Other[a]	General Habitat
Giant Spanish-needle/ *Palafoxia arida* var. *gigantea*	SC		CNPS: 1B	D
Slender-stem bean/ *Phaseolus filiformis*			CNPS: 2	D
Sand food/ *Pholisma sonorae*	SC		CNPS: 1B	D
Orocopia sage/ *Salvia greatae*	SC		CNPS: 1B	D
Desert spike-moss/ *Selaginella eremophila*			CNPS: 2	D
Mecca aster/ *Xylorhiza cognata*	SC		CNPS: 1B	D
Orcutt's aster/ *Xylorhiza orcuttii*	SC		CNPS: 1B	D

[a] Federal and state statuses have legal repercussions. CNPS statuses are assigned for information only.

Key:

FE: Federally endangered
FT: Federally threatened
FPE: Proposed endangered
FPT: Proposed threatened
SC: Species of concern

C: Candidate
SE: State endangered
ST: State threatened concern
SR: State rare
CSC: CDFG Species of Special Concern

Habitat Codes:

D: Desert dunes/ scrub

Sources: CNPS 1994; CDFG 1994; USFWS 1999b.

Special-status wildlife species potentially in the Salton Sea and Imperial Valley Project area and their general habitat usage are listed in Table 3.2-14. Status, life-history requirements, and occurrence in the Project area are described in Appendix A of the HCP.

TABLE 3.2-14
Special-Status Wildlife Species Potentially Occurring in the Imperial Valley and Salton Sea and General Habitat Associations

Common Name/ Scientific Name	Federal	Status State	Other[a]	General Occurrence	General Habitat
Invertebrates					
Cheeseweed moth lacewing/ *Oliarces clara*	SC			R	D
Andrew's dune scarab beetle/ *Pseudocotalpa andrewsi*	SC			R	D
Amphibians					
Colorado River toad/ *Bufo alvariu*			CDFG: SC	R	W
Lowland leopard frog/ *Rana yavapaiensis*	SC			R	W

TABLE 3.2-14
Special-Status Wildlife Species Potentially Occurring in the Imperial Valley and Salton Sea and General Habitat Associations

Common Name/ Scientific Name	Federal	Status State	Other[a]	General Occurrence	General Habitat
Couch's spadefoot toad/ *Scaphiopus couchii*			CDFG: SC	R	D
Reptiles					
Desert tortoise/ *Gopherus agassizi*	FT	ST		R	D
Banded gila monster/ *Helodema sespectum cinctum*			CDFG: SC	R	D
Flat-tailed horned lizard/ *Phrynosoma mcallii*	FPT		CDFG: SC	R	D
Western chuckwalla/ *Sauromalus obesus obesus*	SC			R	D
Colorado Desert fringe-toed lizard/ *Uma notata notata*	SC		CDFG: SC	R	D
BIRDS					
Cooper's hawk/ *Accipiter cooperi*			CDFG:SC	W	R
Sharp-shinned hawk/ *Accipiter striatus*			CDFG: SC	W	R
Tri-colored blackbird/ *Agelaius tricolor*	SC		CDFG: SC	M	W
Golden eagle/ *Aquila chrysaetos*			CDFG: SC CDFG: FP	M	G
Short-eared owl/ *Asio flammeus*			CDFG: SC	M	Ag
Long-eared owl/ *Asio otus*			CDFG: SC	R	R
Burrowing owl/ *Athene cunicularia hypugea*	SC		CDFG: SC	R	Ag
Aleutian Canada goose/ *Branta canadensis leucopareia*	DM			W	Ag, W
Ferruginous hawk/ *Buteo regalis*	SC		CDFG: SC	W	Ag
Swainson's hawk/ *Buteo swainsoni*		ST		M	Ag
Western snowy plover/ *Charadrius alexandrinus nivosus*			CDFG: SC	R	A
Vaux's swift/ *Chaetura vauxi*			CDFG: SC	M	G
Mountain plover/ *Charadrius montanus*	FPT		CDFG: SC	W	Ag

TABLE 3.2-14
Special-Status Wildlife Species Potentially Occurring in the Imperial Valley and Salton Sea and General Habitat Associations

Common Name/ Scientific Name	Federal	Status State	Other[a]	General Occurrence	General Habitat
Black tern/ *Chlidonias niger*	SC			S	Ag, A
Northern harrier/ *Circus cyaneus*			CDFG: SC	W	Ag, W
Western yellow-billed cuckoo/ *Coccyzus americanus occidentalis*	C	SE		M	R
Gilded flicker/ *Colaptes chrysoides*		SE		R	R
Black swift/ *Cypseeloides niger*			CDFG: SC		
Fulvous whistling-duck/ *Dendrocygna bicolor*	SC		CDFG: SC	R	Ag, W
Yellow warbler/ *Dendroica petechia*			CDFG: SC	M	R
Reddish egret/ *Egretta rufescens*	SC			W	A, W
White-tailed kite/ *Elanus leucurus*			CDFG: SC CDFG: FP	R	Ag
Little willow flycatcher/ *Empidonax trailii brewsteri*	SC	SE		M	R
Southwestern willow flycatcher/ *Empidonax trailii extimus*	FE	SE		S	R
Merlin/ *Falco columbarius*			CDFG: SC	W	G
Prairie falcon/ *Falco mexicanus*			CDFG: SC	W	Ag
Peregrine falcon/ *Falco peregrinus*	DM	E	CDFG: FP	M	G
Greater sandhill crane/ *Grus canadensis tabida*		ST	CDFG: FP	W	Ag, W
Bald eagle/ *Haliaeetus leucocephalus*	FT	SE	CDFG: FP	W	W, A
Yellow-breasted chat/ *Icteria virens*			CDFG: SC	S	R
Least bittern/ *Ixobrychus exilis*	SC			R	W
Loggerhead shrike/ *Lanius ludovicianus*	SC			R	Ag, D
Laughing gull/ *Larus atricilla*			CDFG: SC	S	A

TABLE 3.2-14
Special-Status Wildlife Species Potentially Occurring in the Imperial Valley and Salton Sea and General Habitat Associations

Common Name/ Scientific Name	Federal	Status State	Other[a]	General Occurrence	General Habitat
California black rail/ *Lateralius jamaicensis coturniculus*	SC	ST	CDFG: FP	R	W
Gila woodpecker/ *Melanerpes uropygialis*		SE		R	R
Elf owl/ *Micrathene whitneyi*		SE		S	D, R
Wood stork/ *Mycteria americana*			CDFG: SC	S	A, W
Brown-crested flycatcher/ *Myiarchus tyrannulus*			CDFG: SC	M	D, R
Long-billed curlew/ *Numenius americanus*			CDFG: SC	W	Ag
Osprey/ *Pandion haliaetus*			CDFG: SC	W	A
Harris' hawk/ *Parabuteo unicinctus*			CDFG: SC	R	D, R
Large-billed savannah sparrow/ *Passerculus sandwichensis rostratus*	SC			R	R
American white pelican/ *Pelecanus erythrorhynchos*			CDFG: SC	W	A
Brown pelican/ *Pelecanus occidentalis*	FE	SE	CDFG; FP	S	A
Double-crested cormorant/ *Phalacrocorax auritus*			CDFG: SC	R	A
Summer tanager/ *Piranga rubra*			CDFG: SC	S	R
White-faced ibis/ *Plegadis chihi*	SC		CDFG: SC	R	Ag, W
Purple martin/ *Progne subis*			CDFG: SC	M	G
Vermilion flycatcher/ *Pyrocephalus rubinus*			CDFG: SC	R	R
Yuma clapper rail/ *Rallus longirostris yumanensis*	FE	ST	CDFG: FP	S	W
Bank swallow/ *Riparia riparia*		ST		M	G
Black skimmer/ *Rynchops niger*			CDFG: SC	R	A
California least tern/ *Sterna antillarum browni*	FE	SE	CDFG: FP	S	A
Elegant tern/ *Sterna elegans*	SC			S	A
Van Rossem's gull-billed tern/ *Sterna nilotica vanrossemi*	SC		CDFG: SC	S	A
Crissal thrasher/ *Toxostoma crissale*			CDFG: SC	R	D

TABLE 3.2-14
Special-Status Wildlife Species Potentially Occurring in the Imperial Valley and Salton Sea and General Habitat Associations

Common Name/ Scientific Name	Federal	Status State	Other[a]	General Occurrence	General Habitat
Leconte's thrasher/ *Toxostoma lecontei*			CDFG: SC	R	D
Arizona Bell's vireo/ Vireo bellii arizonae		SE		M	R
Least Bell's vireo/ *Vireo bellii pusillus*	FE	SE		M	R
Mammals					
Pallid bat/ *Antrozous pallidus*			CDFG: SC	R	G
Mexican long-tongued bat/ *Choeronycteris mexicana*	SC		CDFG: SC	M	G
Pale western big-eared bat/ *Corynorhinus townsendii pallescens*			CDFG: SC	R	G
Spotted bat/ *Euderma maculatum*	SC		CDFG: SC	R	G
Western mastiff bat/ *Eumops perotis californicus*	SC		CDFG: SC	R	G
Yuma puma/ *Felis concolor browni*	SC		CDFG: SC	R	G
California leaf-nosed bat/ *Macrotus californicus*	SC		CDFG: SC	R	G
Western small-footed myotis/ *Myotis ciliolabrum*	SC			R	G
Occult little brown bat/ *Myotis lucifugus occultus*	SC		CDFG: SC	R	G
Southwestern cave myotis/ *Myotis velifer brevis*	SC		CDFG: SC	R	D
Yuma myotis/ *Myotis yumanensis*	SC		CDFG: SC	R	G
Pocketed free-tailed bat/ *Nyctinomops femorosaccus*			CDFG: SC	R	D
Big free-tailed bat/ *Nyctinomops macrotis*			CDFG: SC	R	G
Nelson's bighorn sheep/ *Ovis canadensis nelsoni*	BLMSS			R	D
Jacumba little pocket mouse/ *Perognathus longimembris internationalis*	SC		CDFG: SC	N	D
Yuma hispid cotton rat/ *Sigmodon hispidus eremicus*	SC		CDFG: SC	R	Ag
Colorado River hispid cotton rat/ *Sigmodon hispidus plenus*			CDFG: SC	R	R, Ag

[a] Federal and state status have legal consequence. CDFG: SC (California Department of Fish and Game, Species of Concern) is assigned for information only.

Key:
FE: Federally Endangered
FT: Federally Threatened
C: Candidate
SE: State Endangered

TABLE 3.2-14
Special-Status Wildlife Species Potentially Occurring in the Imperial Valley and Salton Sea and General Habitat Associations

Common Name/ Scientific Name	Federal	Status State	Other[a]	General Occurrence	General Habitat

FPE: Proposed Endangered
FPT: Proposed Threatened
SC: Species of Concern
FP: State Fully Protected
BLMSS: Bureau of Land Management Sensitive Species
ST: State Threatened Concern
SR: State Rare
CSC: CDFG Species of Special Concern
DM: Federal Delisted – Monitored

Habitat Codes:
W: Wetland Habitat
A: Aquatic Habitat, predominantly Salton Sea
Ag: Agricultural fields
R: Riparian
G: Generalist at this level and/or requires presence of specific microhabitat features to persist in area
D: Desert dunes/ scrub

Occurrence Codes:
N: Does not occur in Project area
M: Migrates through Project area
S: Summer resident in Project area
W: Winter resident in Project area
R: Year-long resident in Project area

Sources:
CDFG 1999; USFWS 1999b.

FISH AND AQUATIC HABITAT

Aquatic habitat occurs in the Project area in the IID water service area's conveyance system and drainage infrastructure and in the New and Alamo Rivers. Aquatic habitat conditions of these areas are described subsequently. The Salton Sea also provides aquatic habitat, but is discussed separately.

Conveyance System. IID maintains 1,667 miles of canals in its service area, which distribute water diverted from the LCR to farms in the Imperial Valley. Most of the canals are concrete lined (1,114 miles). About 16 miles of the system are pipelines; the remaining 537 miles are earthen canals. IID also operates the 82-mile AAC, which conveys water from Imperial Dam to IID's conveyance system in the valley. The AAC is unlined, but portions are planned to be concrete lined in the future (Reclamation and IID 1994).

Water levels in the AAC are kept as high as possible to maximize power generation from hydropower facilities. Lowest flows in the canal system occur in January and February. Water velocity in the AAC ranges from about 0.5 to 1 foot per second (ft/s) during these months. The highest flows occur during March through August, which is the main irrigation season. During this period, water velocities in the AAC increase to about 2.5 to 3.5 ft/s (Corps 1996).

In the AAC and Imperial Valley main canals, aquatic habitat in the center of the canals is characterized by high water velocities and a lack of aquatic vegetation and aquatic invertebrates. The central portions of the main canals provide poor conditions for fish and other aquatic organisms. Along the canal edges, lower water velocities and deposition of sediment allow limited development of submerged and emergent vegetation. The lower water velocities and cover provided by aquatic vegetation, in combination with vegetation on the canal banks (primarily the common reed), offer better habitat conditions for aquatic invertebrates and fish. Submerged vegetation consists primarily of Eurasian water-milfoil (*Myriophylum spicatum*) with some sago pondweed (*Potamogeton pectinatus*) (Reclamation and IID 1994). The noxious aquatic weed hydrilla (*Hydrila verticulata*) is common in the Imperial Valley canal system, but is rare in the AAC (Reclamation and IID 1994). Vegetation is routinely cleaned from the canals.

Because of high velocities, concrete substrates, and lack of submerged and aquatic vegetation, many canals (except for the AAC) support few invertebrates. In the AAC, mollusks, particularly the exotic Asiatic clam and aquatic snail, are common along the shoreline where sediment deposits and submerged and emergent vegetation develops. Crayfish are present in small numbers (Corps 1996).

The IID conveyance system, including the AAC, supports populations of game and non-game fish from three sources: the Colorado River, IID water service area canals, and fish stocking (Corps 1996). The CDFG previously stocked channel catfish, and IID stocks sterile grass carp (*Ctengoharyngodon idella*) in the canal system. The AAC fishery is dominated by channel catfish introduced by CDFG. Threadfin shad (*Dorosoma Petense*) are the next most abundant fish (Table 3.2-15). Gamefish, including largemouth bass, sunfish (*Lepomis cyanellus*), and flathead catfish (*Pylodictis olivaris*), represent a minor component of the AAC fish community. Common carp and striped bass are also typical of the AAC's population (Corps 1996). Small numbers of razorback suckers have been found during canal and reservoir dewaterings in the Imperial Valley over the years. Between the Pilot Knob and Drop 4 hydroelectric facilities on the AAC, an estimated 284,738 fish yield an average density of 430 fish per acre. Although no surveys have been conducted of the fish community of the main IID canal system (East Highline Canal, Westside Main Canal, and Central Main Canal), the fish community is believed to be similar in composition to that in the AAC.

TABLE 3.2-15
AAC Fish Community between Pilot Knob and Drop 4

Species	Estimated Numbers	Percentage of Total Species
Channel catfish	258,464	90
Threadfin shad	10,706	4
Shoreline gamefish[a]	10,851	4
Common carp	4,575	2
Striped bass	142	Trace
Total	**284,738**	**Approximately 100%**

[a] Largemouth bass, sunfish, and flathead catfish.
Source: Reclamation and IID 1994.

Drainage System. A system of subsurface tile drains, surface drainage ditches, and stream channels collects and conveys agricultural drainwater in the IID water service area. Currently, IID operates and maintains 1,456 miles of drains. These drains are primarily unlined earthen channels.

Aquatic habitat in the drains is of poor quality because of silty substrates, poor water quality, and shallow depth. Portions of the drains support rooted vegetation, such as cattails, common reed (*Phragmites* sp.), or filamentous and mat-forming algae. These areas are more frequently found where canal (operational) discharge provides better water quality. However, vegetation is regularly cleared from the drains.

Aquatic habitat in drains depends on drainwater from agricultural fields. This water comes from both surface and subsurface (tile) sources. As a result, the amount of water in the drains varies throughout the year in response to the level of irrigation. When the agricultural fields discharging into a drain are not irrigated (i.e., little surface runoff), the drainwater flows are dominated by the highly saline subsurface (tile) water. In the upper portions of the drain watersheds, no irrigation activity can dry out drains and might not support aquatic habitat.

During irrigation, the drainage network supports abundant aquatic invertebrates, especially waterboatman (*Corixa* sp) (Radke 1994). Analysis of benthic invertebrate communities in several of the irrigation drains indicates the communities are composed of relatively few species and are dominated by one or two taxa. In the 10 drains sampled, the mollusk family Thiaridae was the most abundant taxon in 8 of the drains, composing between 50 and 95 percent of the sample. Another taxon observed frequently (but with lesser abundance than Thiaridae) was the mollusk family Physidae. Pollution-sensitive mayflies, stoneflies, and caddisflies (*Ephemeroptera, Plecoptera, and Trichoptera*) were poorly represented. A single caddisfly larvae of the family Philopotamidae was the only pollution-sensitive taxon documented in the benthic samples (Setmire et al. 1996).

Invertebrate densities have been found to be much lower in the water column than in the benthic samples. Taxa richness ranged from 4 to 10. Chironomid larvae were the most abundant invertebrates in 6 of the 10 drainwater column samples. Other frequently observed taxa include mosquito larvae (*Culicidae*) and oligochaete worms. Larval chironomids are a food source for fish and other invertebrates and are eaten by many kinds of birds. Five pollution-sensitive taxa of the orders Ephemeroptera and Trichoptera were observed in the water column samples (Setmire et al. 1996).

At least 13 species of fish are known to inhabit the surface drains that discharge directly to the Salton Sea (Table 3.2-16). Sport fish, such as green sunfish (*Lepomis cyanellus*), tilapia (*Tilapia mossambica* and *T. zilli*), livebearer species (*mollies*), and mosquitofish, are common in the drains adjacent to the southern Salton Sea. The state and federally endangered desert pupfish (*Cyprinodon macularius*) is also known to inhabit the terminus of irrigation drains that discharge directly into the Salton Sea, in addition to tributary streams, washes, and near-shore pools.

Fish populations in drain habitat vary greatly because of seasonal and operational changes. Species composition is derived from migrants and juveniles from the Alamo River, New River, supply canals, and the Salton Sea. The presence and abundance of fish in specific drains are affected by irrigation flows, operational discharges, pesticide and herbicide usage by farmers, water quality, and other factors. Water quality conditions and the effects of water quality on fish and aquatic invertebrates are addressed more thoroughly in the Water Quality and Biological Resources discussion in this section.

New and Alamo Rivers. The New River enters the U.S. from Mexico, and, when it crosses the border, it is primarily composed of agricultural drainage water and wastewater from the Mexicali Valley. In the Imperial Valley, agricultural drains discharge into the river. The

TABLE 3.2-16
Fish Species Known to Inhabit Irrigation Drains Adjacent to the Salton Sea

Desert pupfish (*Cyprinodon macularius*)	Common carp (*Cyprinus carpio*)
Sailfin molly (*Poecilia latipinna*)	Shortfin molly (*P. mexicana*)
Mozambique mouthbrooder (*Tilapia mossambica*)	Zill's cichlid (*T. zilli*)
Longjaw mudsucker (*Gillichthys mirabilis*)	Mosquitofish (*Gambusia affinis*)
Red shiner (*Cyprinella lutrensis*)	Porthole livebearer (*Poeciliopsis gracilis*)
Variable platyfish (*Xiphophorus variatus*)	Green sunfish (*Lepomis cyanellus*)
Corvina (*Cynoscion* sp.)	Yellow bullhead (*Ameiurus natalis*)
Gulf croaker (*Bairdeilla icistia*)	

Source: Corps 1996.

Alamo River also enters the U.S. from Mexico and receives Imperial Valley agricultural drainage water.

Aquatic habitat quality in the New and Alamo Rivers is poor because of poor water quality, high turbidity, and unstable substrates, which inhibit production of benthic invertebrates and rooted vegetation. Although comprehensive fish distribution and abundance surveys have not been conducted in the New and Alamo Rivers, qualitative information is available. Fish populations are probably limited by food availability and water quality, not by flow. Channel catfish, common carp, tilapia, largemouth bass, red shiner, mosquitofish, sailfin molly, Zill's cichlid, yellow bullhead, and flathead catfish are found in the New and Alamo Rivers (Corps 1996). Desert pupfish are not known to occur, nor are they expected, in the New or Alamo Rivers because of high sediment loads, excessive velocities, and predators.

Special-Status Species. Two special-status fish species occur in the aquatic habitats of the Imperial Valley. These species are the desert pupfish and razorback sucker, both of which are listed as federally and state endangered. The razorback sucker is also a California fully protected species. Life history traits, habitat requirements, and occurrence in the Project area for these species are described in Appendix A of the HCP.

Desert pupfish populations inhabit drains that discharge directly into the Salton Sea, shoreline pools of the Salton Sea, and desert washes at San Felipe Wash and Salt Creek. Pupfish movement between the Salton Sea and nearby drains has been observed (Sutton 1999). Because pupfish prefer shallow, slow-moving waters with some vegetation for feeding and spawning habitat, the shallow Salton Sea pools probably do not provide an optimal habitat (UCLA 1983).

Razorback suckers historically occupied the major river systems of the Colorado River Basin between southwestern Wyoming and northern Mexico (Minckley et al 1991). Some individuals are believed to inhabit the canal system in Imperial County, but the population s is believed to be made up of old members of a dwindling, non-reproductive stock (Tyus 1991; Minckley et al. 1991); no recruitment of wild-spawned fish occurs, probably because of predation by introduced fish (Tyus 1991). Razorback suckers, also known to occur in the AAC, are likely to occur elsewhere in the canal system.

SALTON SEA

The Salton Sea was created in the early 1900s, when the course of the Colorado River changed and flowed north. The Salton Sea is relatively shallow, with a maximum depth of about 49 feet (Radke 1994). Since the Salton Sea's creation, its primary inflow has been agricultural drainage water from the Coachella, Mexicalli, and Imperial Valleys. This agricultural drainage water carries high levels of phosphorous, nitrogen, and salinity; thus, Salton Sea salinity has increased and evaporative losses have contributed to the creation of a hypersaline lake. Salinity of greater than 44 g/L of TDS and summer temperatures in excess of 30 °C limit fish species diversity in the Sea. The saline condition is due to the Salton Sea having no outlet.

Phosphorous and nitrogen inputs to the Salton Sea result in eutrophic conditions that stimulate high primary productivity of phytoplankton and phytobenthic algae. These primary producers, in turn, support high concentrations of zooplankton and benthic worms (i.e., pileworms) that feed on the phytoplankton and algae. Fish species that can tolerate the high temperatures and salinity and low dissolved oxygen concentrations find favorable conditions in the Salton Sea.

Lower Trophic Level Resources. The Salton Sea is considered eutrophic with plentiful phytoplankton, a condition that often results in algal blooms (Hurlbert 1999a). The dominant primary producers are phytoplankton and phytobenthos; plant life in the Salton Sea predominantly is single-celled algae. Major groups of algae include diatoms (*Chrysophyta*), dinoflagellates (*Pyrrophyta*), and green algae (*Chlorophyta*) (Carpelan 1961). Blue-green algae (*Cyanophyta*) are also on the seafloor in shallow water and on buoys and pilings in the Salton Sea. During recent sampling, several new species of diatoms were observed (Hurlbert 1999b). Many of the previously observed species are still in the Salton Sea. The phytoplankton composition changes may be caused by an increase in the salinity of the Salton Sea and from the introduction of tilapia (Hurlbert 1999b).

In the Salton Sea, five phyla of invertebrates are represented: Protozoa, Rotifera, Nematoda, Annelida, and Arthropoda. Common invertebrates in the Salton Sea include ciliate protozoans, foraminifera, rotifers, copepods, barnacle, pileworm, amphipod, and the water boatman (a corixid). The rotifer *Brachionus plicatilis* is the dominant rotifer species, is completely planktonic, and has great value as food for larval fish. The pileworm *Neanthes*, a major food source for fish and birds, is a significant species in the benthos of the Salton Sea. Pileworms, abundant since their introduction to the Salton Sea during the 1930s, are the principal detritus-feeding benthic organisms in the Salton Sea.

Major zooplanktonic organisms in the Salton Sea include *Brachionus*, copepods (*Apocyclops dengizicus, Cletocamptus dietersi*), the egg and larval stages of the pileworm, and the larval stages of the barnacle (*Balanus amphitrite saltonensis*). Other zooplanktonic species in the Salton Sea include brinefly larva and surface-dwelling insects. The remaining invertebrate species or life stages are primarily benthic. Organisms that attach permanently to a hard surface are limited to the few rocky areas, docks, debris, or inundated brush along the shore.

Fish Resources. Fish species inhabiting the Salton Sea are adapted to living in high-salinity waters. Most of the fish are non-native species (Walker 1961; Dritschilo and Pluym 1984; Setmire et al. 1993) that have been introduced from the Gulf of California by CDFG. Fish in the Salton Sea include the sport fish sargo (*Anisotremus davidsoni*), orangemouth corvina

(*Cynoscion xanthulus*), Gulf croaker (*Bairdiella icistia*), tilapia (*Tilapia mossambica*), and other fish species listed in Table 3.2-17. Gulf croaker, sargo, and corvina are marine species, while the remaining species are estuarine or freshwater fish with extreme salinity tolerances. Tilapia are the most abundant fish in the Salton Sea.

TABLE 3.2-17
Fish Species in the Salton Sea

Species Name	
Sargo (*Anisotremus davidsoni*)	Mosquitofish (*Gambusia affinis*)
Gulf croaker (*Bairdiella icistia*)	Longjaw mudsucker (*Gillichthys mirabilis*)
Orangemouth corvina (*Cynoscion xanthulus*)	Sailfin molly (*Poecilia latipinna*)
Desert pupfish (*Cyprinodon macularius*)	Mozambique tilapia ()
Common carp (*Cyprinus carpio*)	Zill's tilapia (*Tilapia zilli*)
Threadfin shad (*Dorosoma petenense*)	

Source: Black 1988.

Tilapia were introduced into drainage ditches to control aquatic weeds in the late 1960s and early 1970s. They were also produced on fish farms close to the Salton Sea. The Salton Sea was colonized by tilapia that escaped from the fish farm and from those stocked in the drainage system. Anglers first reported catching tilapia in the Salton Sea in 1967 (Costa-Pierce and Riedel 2000a). The highest densities reported are from areas around the New and Alamo Rivers and nearshore areas extending about 6,458 feet (600 m) from the shoreline (Costa-Pierce and Riedel 2000a; Costa-Pierce, pers. comm.). Tilapia productivity of the nearshore area has been estimated at 3,600 kilograms per hectare per year (kg/ha/yr), far exceeding productivity of tilapia in tropical lakes (Costa-Pierce and Riedel 2000a).

The fish community experiences periodic large-scale die-offs. Fish kills can be massive, averaging between 10,000 and 100,000 fish, but sometimes reaching upwards of several million fish. A fish die-off estimated at 7.6 million fish was reported in August 1999. Causes are not always clear, but many die-offs are caused by rapid declines in dissolved oxygen levels resulting from seasonal algal blooms (Salton Sea Science Subcommittee 1999). Potential pathogens have also been identified. Pathogens implicated in fish kills include infestations of a lethal parasitic dinoflagellate (*Amyloodinium ocellatum*) and acute bacterial infections from bacteria of the genus *Vibrio* (USFWS 1997a). Fish deaths can happen at any time of the year, but the largest die-offs occur during the summer in association with high water temperatures.

Food-Chain Relationships. The aquatic food web of the Salton Sea is unusual because it lacks an adult fish that is exclusively planktivorous. Corvina are the top predators, feeding on tilapia, longjaw mudsuckers, Gulf croaker, sargo, and threadfin shad. Adults of these fish forage on macroinvertebrates, of which the pileworm is important. The invertebrate herbivores, rotifers, and copepods provide food for larval fish (Thiery 1994).

A food habit study of tilapia in the Salton Sea showed that in pelagic areas, tilapia feed on zooplankton, particularly copepods and rotifers, whereas in the nearshore and deltaic areas, their diet was much more diverse and included sediment and detrital matter (Costa-Pierce and Riedel 2000b). The high concentration of tilapia in the river deltas and nearshore areas may be related to the high levels of organic matter in river and drain discharges to the Sea.

Avian Resources. The Salton Sea represents a major center for avian biodiversity in the southwest U.S., with occurrence records for more than 400 species and an annual average abundance of 1.5 million to 2 million waterbirds (SSA and Reclamation 2000; Hart et al. 1998; Shuford et al. 1999). The Salton Sea is an integral part of the Pacific Flyway, providing a migratory stopover for fall and spring shorebirds and supporting large populations of wintering waterfowl. The Salton Sea represents 1 of only 4 interior sites along the Pacific Flyway, which supports more than 100,000 shorebirds during migration (Page et al. 1992), consisting of as many as 44 species (McCaskie 1970; Shuford et al. 1999). The Salton Sea also supports large or unique breeding populations of some species.

The overall high productivity of the Salton Sea can be attributed to a number of factors, including relatively mild year-round temperatures, ample nutrient input through agricultural runoff and wastewater discharges to the tributary rivers, and a generally high morpho-edaphic index in the Salton Sea. A high morpho-edaphic index reflects the high surface-to-volume ratio of the Salton Sea (i.e., it has a large area, but is relatively shallow), which results in conditions that generate higher productivity (e.g., with more of the water column in the zone of light penetration, there is greater production of phytoplankton and other photosynthetic organisms relative to the overall quantity of water). The higher productivity transfers steadily up the food chain, resulting in higher densities of prey species for birds.

Aquatic invertebrates, important as food for birds in the Salton Sea, include brine fly larvae (*Ephydra sp.*), adult pileworm (*Neanthes succinea*), and the nauplia and cypris of the barnacle (*Balanus amphitrite saltonensis*) (Reclamation and SSA 2000). Aquatic invertebrates are forage for a variety of species, including diving ducks, grebes, phalaropes (*Phalaropus* spp.), and piscivorous fish that supplement their diet with invertebrates. Dabbling ducks also may forage on aquatic invertebrates in shallow areas, and many shorebirds will forage for invertebrates in shallow flooded areas and mudflats. Other birds forage on fish, including cormorants, diving ducks, pelicans, black skimmer, terns, egrets, and herons. Fish in the Salton Sea used as prey include tilapia, bairdiella, sargo, mosquito fish, and larval orange-mouthed corvina (Reclamation and SSA 2000).

Colonial Nesting Populations. Most bird activity at the Salton Sea is concentrated in three primary locations: along the north shore, along the south shore, and near the mouth of Salt Creek on the eastern shore (Figure 3.2-11) (SSA and Reclamation 2000). In these areas, populations of colonial breeding birds occur (Table 3.2-18). Suitable habitat conditions for colonial birds include an easily accessible and abundant food source and nest sites, such as tree nests or islands protected from predators. Some natural islands are available for nesting at the Salton Sea; however, a number of sites consist of old levees now inundated in sections and separated from the mainland and other manmade islands. Except for Mullet Island at the south end of the Sea, most sites are less than 11,000 square feet in area. Fluctuations in the Sea's level increase or decrease habitat for island nesting birds. Island suitability as nesting habitat for some species is also determined by competition for nest sites.

Mullet Island is 1.6 miles from the Alamo River mouth and has relatively high relief and ample nesting areas. It has historically supported nesting black skimmers, cormorants, gull-billed terns, and Caspian terns; since 1992, gulls have also nested there (Molina 1996). The site is subjected to human disturbance, with the Red Hill Marina only 1.9 miles away. Other

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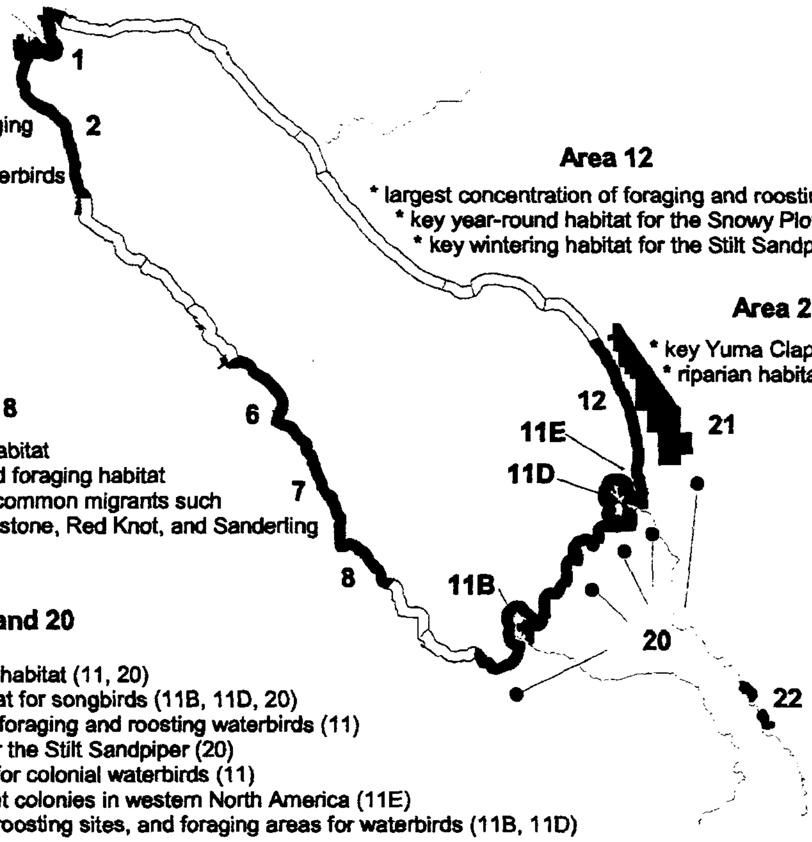

Areas 1 and 2

* large concentrations of foraging and roosting waterbirds
* nesting area for colonial waterbirds

Area 12

* largest concentration of foraging and roosting waterbirds
* key year-round habitat for the Snowy Plover
* key wintering habitat for the Stilt Sandpiper

Area 21

* key Yuma Clapper Rail habitat
* riparian habitat for songbirds

Areas 6 to 8

* key Snowy Plover habitat
* isolated roosting and foraging habitat
* prime habitat for uncommon migrants such as the Ruddy Turnstone, Red Knot, and Sanderling

Areas 11 and 20

* key Yuma Clapper Rail habitat (11, 20)
* important riparian habitat for songbirds (11B, 11D, 20)
* large concentrations of foraging and roosting waterbirds (11)
* key wintering habitat for the Stilt Sandpiper (20)
* important nesting area for colonial waterbirds (11)
* one of largest cormorant colonies in western North America (11E)
* key breeding colonies, roosting sites, and foraging areas for waterbirds (11B, 11D)

Area 22 and Imperial Valley

* important nesting and roosting habitat for colonial waders (22)
* important riparian habitat for songbirds (needs cowbird control) (22)
* agricutural fields provide key foraging for Cattle Egret, White-faced Ibis, various raptors, Sandhill Crane, Mountain Plover, Whimbrel, Long-billed Curlew
* wetlands provided by duck clubs provide important roosting sites for Cattle Egret, White-faced Ibis, and Sandhill Cranes, and important foraging areas for ducks and other waterbirds

Source: Shuford et al., 2000

Figure 3.2-11
Areas of Particular Importance to Birds at the Salton Sea
IID Water Conservation andTransferProject Draft EIR/EIS

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TABLE 3.2-18
1998 Estimate of Salton Sea Nesting Birds

Common Name	Scientific Name	Number of Pairs
Great egret	*Ardea alba*	227
Great blue heron	*Ardea herodias*	364
Cattle egret	*Bubulcus ibis*	11,138
Snowy egret	*Egretta thula*	337
Laughing gull	*Larus atricilla*	A
California gull	*Larus californicus*	37
Black-crowned night heron	*Nycticorax nycticorax*	282
Brown pelican	*Pelecanus occidentalis*	b
Double-crested cormorant	*Phalacrocorax auritus*	3,584
White-faced ibis	*Plegadis chihi*	a
Black skimmer	*Rynchops niger*	450
Caspian tern	*Sterna caspia*	800
Forster's tern	*Sterna forsteri*	a
Gull-billed tern	*Sterna nilotica*	*160*

[a] Not known to nest in 1998.
[b] Nesting attempts only.
Source: Shuford et al 1999.

nesting sites in the south portion of Salton Sea include Morton Bay, which consists of an eroded impoundment east of the Alamo River mouth. It has two low-lying nesting islets, protected from wave inundation by a nearly continuous perimeter levee. Near Rock Hill, small flat earthen islets in a freshwater impoundment have been suitable for nesting since 1995. This site is in the Sonny Bono Salton Sea NWR and is actively managed, including water-level controls and protection from disturbances.

Adjacent to Obsidian Butte, a nesting site is on a small, low islet, consisting of a rocky perimeter and an interior beach composed of crushed barnacle. A small nesting site is at Elmore Ranch on the southwest shore of the Salton Sea; it lies on a single, earthen levee remnant and is susceptible to wave action, erosion, and inundation. On the north end of the Salton Sea, one site is at Johnson Street near the mouth of the Whitewater River; this site consists of remnants of earthen levees isolated from the shore by rising water levels.

Gulls, terns, skimmers, and pelicans nest communally on isolated islands free from predators. Sites are typically open, lack high vegetation, and are above the level of inundation from wind-generated wave action (Molina 1996). In recent years, black skimmer nesting colonies have been reduced from six to only two, probably as a result of competition with larger, more gregarious ground-nesting species, such as cormorants or gulls (Shuford et al. 1999). Current population estimates include about 40 pairs of California gull at the south end of the Salton Sea in 1997. Black skimmers maintain a population of about

300 pairs at the north and south ends of the Salton Sea, despite reduced numbers of colonies (Molina 1996). Gull-billed terns form nesting colonies of about 160 pairs annually (Shuford et al. 1999). Little information on the population size of Forster's tern is available, although colonies were reported at the Salton Sea as early as 1978 (Garrett and Dunn 1981). Caspian terns have large nesting colonies, with total numbers of up to 3,000 pairs. Cormorants also nest on isolated islands, preferring sites that contain rock ledges; they might also nest in trees inside heron and egret rookeries (Shuford et al. 1999). Small nesting colonies were documented at the north end of the Sea in 1995 (USFWS 1996a), but recently (1999) more than 7,000 double-crested cormorants and 4,500 nests were counted on Mullet Island. Mullet Island now represents the largest breeding colony of double-crested cormorants in California (Shuford et al. 1999).

Most herons and egrets nest colonially, generally in large trees that support substantial nest platforms, but sometimes in smaller trees and shrubs or in emergent wetland vegetation (Zeiner et al. 1990). Near the Salton Sea, herons and egrets typically nest in lower trees, including stands of tamarisk trees and mesquite snags (Shuford et al. 1999). A colony is in snags on the north side of the Salton Sea, near the mouth of the Whitewater River.

Wintering Populations. Large numbers of wintering waterfowl use the Salton Sea and adjacent agricultural areas. Eared grebes are the most numerous waterbirds on the Salton Sea, with 65,000 to 700,000 individuals annually on average (SSA and Reclamation 2000; USFWS 1996a). As many as 1 million eared grebes might winter at the Salton Sea (Jehl 1996), and as many as 3.5 million were estimated during March 1988 (Jehl 1988; Shuford et al. 1999). By some estimates, 90 percent of the North American population of eared grebes might pass through the Salton Sea in some years. Other waterfowl using the Salton Sea in large numbers include northern shovelers, northern pintail, green-winged teal, American wigeon, ruddy ducks, Snow geese, and Ross's geese. The maximum number of waterfowl reported during aerial surveys conducted in 1999 was 55,062 recorded in January. By March, numbers had declined to about 39,539 birds (Shuford et al. 2000)

In addition to large fall and spring migrant populations of shorebirds (see below), the Salton Sea hosts a large wintering population. Along with the Central Valley of California, the Sea represents one of only two interior sites in the west that hosts more than 10,000 wintering shorebirds (Page et al. 1992). Wintering shorebird populations at the Salton Sea number up to 30,000 birds. Table 3.2-19 summarizes counts conducted in 1999 (Shuford et al. 1999). Numbers of individuals per species from earlier counts include about 9,500 dowitcher (*Limnodromus* spp.), 4,700 western sandpiper (*Calidris mauri*), 5,800 American avocet (*Recurvirostra americana*), 4,300 black-necked stilt (*Himantopus mexicanus*), 1,800 willet (*Cataptrophorus semipalmatus*), 1,400 marbled godwit (*Limosa fedoai*), and 1,000 black-bellied plover (*Pluvialis squatarola*) (Shuford et al. 1999).

Large numbers of white pelicans use the Salton Sea as a migratory stopover and wintering area. Some birds probably remain at the Salton Sea throughout the winter rather than continuing on to Mexico. The number of pelicans using the Salton Sea at any time varies substantially. According to counts reported by USFWS and aerial surveys conducted by Point Reyes Bird Observatory (Shuford et al. 2000), the Salton Sea at times supports one of the largest concentrations of white pelicans in the Pacific Flyway. McKay reported

TABLE 3.2-19
1999 Winter Shorebird Populations at the Salton Sea (January and February)

Species	Number of Individuals
Black-bellied plover	1,310
Snowy plover	275
Semi-palmated plover	73
Killdeer	277
Black-necked stilt	3,941
American avocet	7,318
Greater yellowlegs	81
Lesser yellowlegs	62
Willet	1,162
Spotted sandpiper	7
Long-billed curlew	737
Marbled godwit	1,297
Ruddy turnstone	17
Sanderling	52
Western sandpiper	1,573
Least sandpiper	2006
Dunlin	799
Stilt sandpiper	164
Ruff	1
Dowitcher spp.	6,356
Common snipe	24
Wilson's phalarope	1
Total	**27,533**

Source: Shuford et al. 2000.

maximum counts of white pelicans at the Salton Sea during 1984 to 1990 of 2,000 to 17,000. More recently, Shuford et al. (2000) reported 19,197 pelicans at the Salton Sea. The USFWS recorded numbers of white pelicans at the Salton Sea for a 21-month period between December 1999 and August 2001. White pelican numbers were highest (24,110) in February 2000 and lowest (770) in June 2001.

The largest populations of gulls at the Salton Sea occur in winter, with a total population of many tens of thousands. In 1998, tens of thousands of ring-billed gulls (*Larus delawarensis*) and California gulls (*Larus californicus*), as well 1,000 to 2,000 herring gulls were present along with other rarer species (McCaskie 1998). These estimates suggest the Salton Sea supports wintering gull populations that are among the largest for any inland site in North America (Shuford et al. 1999).

Migratory and Post-Breeding Populations. The Salton Sea and surrounding environments support transient species during post-breeding periods and during spring and fall migrations. More than 100,000 shorebirds use the Sea during migrations from wintering grounds in Central or South America to breeding grounds in the Arctic, or on their return trips in the fall. Other common migrants include black tern (*Chlidonias niger*) and American white pelicans, some of which winter at the Salton Sea, but many more of which migrate to wintering grounds along the west coast of Mexico (Shuford et al. 1999).

In terms of overall numbers, the Salton Sea is the most used spring stopover area in the intermountain and desert regions of the west and the second most important, after the Great Salt Lake, in the fall. Shorebird populations at the Salton Sea averaged about 85,000 in August, 24,000 in December, and 90,000 in April (Shuford et al. 1999). Eleven taxa had populations of more than 1,000 in at least one season, with more than 44 total species of shorebirds recorded (McCaskie 1970, Shuford et al. 1999). General numbers of migrating shorebirds are summarized in Table 3.2-20. They have included up to 10,200 black-necked stilts, 15,700 American avocets, 50,000 western sandpipers, 15,800 dowitchers, 7,000 whimbrels (*Numenius phaeopus*), 4,500 red-necked phalaropes (*Phalaropus lobatus*), 3,000 Wilson's phalaropes (*Steganopus tricolor*), 2,100 long-billed curlews, and 1,700 marbled godwits (*Limosa fedoai*).

TABLE 3.2-20
Migratory Shorebirds at the Salton Sea

Species Name (Scientific/Common)	Mean Number of Individuals	
	August	**April**
Calidris mauri (western sandpiper)	33,600	50,000
Cataptrophorus semipalmatus (willet)	900	200
Erolia minutilla (least sandpiper)	2,300	1,800
Himantopus mexicanus (black-necked stilt)	10,200	4,500
Limnodromus spp. (dowitcher)	10,400	15,800
Limosa fedoai (marbled godwit)	1,700	1,200
Numenius americanus (long-billed curlew)	2,100	50
Numenius phaeopus (whimbrel)	30	7,000
Phalaropus lobatus (red-necked phalarope)	4,500	700
Recurvirostra americana (American avocet)	15,700	7,600
Steganopus tricolor (Wilson's phalarope)	3,000	250
Total Shorebirds	**85,430**	**89,100**

Note: Mean figures are based on Pacific Flyaway Project (1989-1995) Comprehensive Surveys.
Source: Schuford et al. 1999.

Several species use the Sea during the post-breeding season in summer and early fall. The wood stork (*Mycteria americana*) breeds in Florida and Mexico, but it is a common post-breeding visitor to the Salton Sea, with as many as 275 individuals recorded during the post-breeding season. Some gulls, such as laughing gulls, breed elsewhere in California, but visit the Salton Sea later in the summer. Brown pelicans maintain a year-round presence at the Salton Sea, but are most common as post-breeding visitors. These post-breeding visitors could be from the nearest nesting colony in the Gulf of California on San Luis Island, about 220 miles from the Salton Sea (IID 1994). As many as 5,000 individuals have been observed at the Salton Sea.

Avian Die-Offs and Diseases. Since the early 1990s, there has been an unprecedented series of fish and bird die-offs at the Salton Sea (USFWS 2000; Kuperman and Matey 1999). A number of diseases have been implicated, but some causes of mortality remain unknown. Fish kills directly affect birds and can be massive, averaging between 10,000 and 100,000 fish and sometimes reaching upwards of a million fish. Causes are not always clear, but potential pathogens have been identified, and low oxygen levels might also be responsible. Pathogens implicated in fish kills include infestations with a lethal parasitic dinoflagellate

(*Amyloodinium ocellatum*) and acute bacterial infections from bacteria of the genus *Vibrio* (USFWS 2000).

Large fish kills have been associated with avian botulism die-offs. Fish septicemia produce conditions in the intestinal tracts of sick fish that allow botulism spores to germinate. Birds foraging on sick fish could ingest fatal doses of the botulism toxin (USFWS 2000). In 1996, a large avian botulism (Type C) outbreak killed 8,538 white pelicans and 1,129 brown pelicans and many great egret, snowy egret, eared grebe, black-crowned night heron, and other birds (Jehl 1996). More than 14,000 birds died in this event (USFWS 1996b).

Other major diseases causing significant bird die-offs include avian cholera, which killed up to 5,000 birds in 1992; salmonellosis, which killed more than 4,500 cattle egrets in 1989; and Newcastle disease. In 1992, a die-off of an estimated 150,000 eared grebes occurred (USFWS 1996c); the causes are still unknown. These deaths represented close to 7 percent of the world's eared grebe population (Jehl 1996). In 1997, 6,845 species died, and in 1998, 18,140 birds died from such agents as avian cholera, botulism, Newcastle disease, and salmonella. Since 1987, significant die-offs have been recorded almost annually.

WATER QUALITY AND BIOLOGICAL RESOURCES

This section presents information regarding the association of water quality and biological resources in the IID water service area and Salton Sea geographic subregions.

Constituents of Concern. Water quality COCs for biological resources in the IID water service area and Salton Sea are:

- Salinity
- Selenium
- Nitrogen and phosphorus
- Organochlorine insecticides
- Organophosphorus insecticides
- Organochlorine herbicide
- Boron

Salinity. Salinity is primarily a concern for biological resources at the Salton Sea. The current salinity level of the Salton Sea is about 44 grams per liter (g/L). Studies have indicated that many fish and invertebrates in the Sea are at risk from this high level. The Salton Sea Science Subcommittee summarizes the latest information on salinity tolerances of invertebrates and fish from the Salton Sea. Salinity occurrence and tolerance data are presented in Table 3.2-21.

The actual response of the organisms to salinity levels in the Salton Sea above the levels shown in Table 3.2-21 is somewhat uncertain for several reasons, including:

- Toxicity studies might not have been conducted on actual Salton Sea fish populations or on fish acclimated to current Salton Sea salinity.
- Temperature, dissolved oxygen, parasitism, toxic substances, and other factors could affect the salinity tolerances of fish.
- The importance and limits of selective forces and genetic adaptation are unknown.

TABLE 3.2-21
Salinity Occurrence and Tolerance Data for Species Inhabiting the Salton Sea

Invertebrates (Scientific/Common Name)	Collection	Life-Stage Survival	Life-Cycle Completion	Population Maintenance
Brachionus plicatilis (rotifer)	76	50	48-50	40
Apocyclops dengizicus (copepod)	75	79	68	51
Cletocamptus deitersi (copepod)	44 [a]	107	80	80
Balanus amphitrite (barnacle)	44 [a]	60	60	50
Nereis succinea (pileworm)	44 [a]	67.5	50	–
Gammarus micronatus (amphipod)	50	57	–	–
Trichlcorixa reticulata (waterboatman)	200	100	–	–
Fish (Scientific/Common Name)				
Cynoscion xanthulus (orangemouth corvina)	44 [a]	57.5	40 [b]	–
Bairdiella icistia (Gulf croaker)	44 [a]	55	55	–
Anisotremus davidsonii (sargo)	44 [a]	52.5	50	–
Oreochromis mossambica (tilapia)	120	70	60 [c]	–
Cyprinodon macularius (desert pupfish)	90	70	70	–
Mugil cephalus (mullet)	80	126	–	–
Poecilia latipinna (sailfin molly)	87	80	–	–
Gillichthys mirabilis (longjaw mudsucker)	82.5	–	75	–

Explanation of columns:
Collection. Refers to the salinity at a site where an organism was collected in nature.
Life-Stage Survival. The maximum salinity, in experimental work, at which one or more life stages of a species can survive for an extended time, but where completion of the entire life cycle has not been established.
Life-Cycle Completion. The maximum salinity, in experimental work, at which completion of a species' entire life cycle has been demonstrated. This salinity theoretically should always be lower than the life stage survival salinity.
Population Maintenance. The maximum salinity, in experimental work, at which population growth has been demonstrated and theoretically should be lower than the life cycle and life stage salinity values.

Notes:
Salinity concentrations in g/L = no data
a: Based on current conditions of Salton Sea.
b: Juvenile corvina have been observed under current conditions 44 g/L. This may indicate either a higher salinity tolerance than previously recorded or successful reproduction is occurring in areas with lower salinity levels.
c: Costa-Pierce and Riedel (2000a)

Source: Salton Sea Science Subcommittee (1999).

- Laboratory studies on salinity tolerance might not prove applicable to natural conditions.
- Portions of fish life stages could take place in less saline environments outside the Salton Sea (i.e., in drainage canals).

Further, little is known about the interaction of other factors with increased salinity. For example, evidence shows that certain fish die-offs caused by pathogens could be a result of or aggravated by increased salinity (USFWS 1997a and b). Thus, some species could be at risk from other factors at salinities lower than suggested by those presented in Table 3.2-21.

Current salinity levels in the Salton Sea are 44 g/L. Studies have indicated that many fish and invertebrates in the Sea are at risk from this high level. Bairdiella and sargo larvae die at salinity levels starting at 40 g/L (Lasker et al. 1972); adult orangemouth corvina and sargo die at 62.5 g/L (Hanson 1970). Reproductive failure of bairdiella, sargo, and tilapia at 40 g/L is moderately probable, along with declining productivity of pileworms, which reduces food available for bairdiella and young corvina.

Tilapia have a high salinity tolerance. They adapt to high salinity levels, particularly if the increase in salinity is gradual (Phillipart and Ruwet 1982, cited in Costa-Pierce and Riedel 2000a). Tilapia have been collected at a salinity level of 120 g/L, but reproduction has not been reported at this salinity level (Whitfield and Blaber 1979). Costa-Pierce and Riedel (2000a) reviewed reported salinity tolerances of tilapia. Highest growth rates were reported at 14 g/L, but growth was still good and tilapia reproduced at 30 g/L. At 69 g/L, tilapia grew poorly, but reproduced well. In the Salton Sea at about 44 g/L, tilapia also grew poorly, but reproduced well. Based on these studies, Costa-Pierce and Riedel (2000a) suggested that tilapia in the Salton Sea could successfully acclimate to and reproduce at a salinity level of 60 g/L. Above a salinity level of 60 to 70 g/L, growth, survival, and reproduction would decline (Costa-Pierce, pers. comm. January 12, 2001).

In the drains, salinity levels influence the distribution of freshwater emergent plants, such as cattails. Cattails grow best in water with a salinity of less than 3 g/L. Between 3 and 5 g/L, growth of cattails can be stunted; cattails are rare at salinity levels above 5 g/L.

Selenium. Soil derived from parent rocks containing high amounts of selenium is found throughout the west (Seiler et al. 1999). Selenium enters soils, groundwater, and surface waters through irrigation of selenium-bearing soils, selenium-bearing sediments brought in through local drainages, or water imported for irrigation. Selenium enters the Imperial Valley through Colorado River water brought in for irrigation; its ultimate source is upstream from Parker Dam (Engberg 1992). Selenium is concentrated in irrigated soils through evapotranspiration and flushed into water sources through irrigation practices (Ohlendorf and Skorupa 1989; Seiler et al. 1999). The primary source of selenium in surface drains is from subsurface drainage discharges from sumps and tile drains (Setmire et al. 1996); subsequently, it is discharged into rivers and the Salton Sea.

Selenium is essential in trace amounts for both plants and animals, but toxic at higher concentrations (Rosenfeld and Beath 1946). At excessive levels, selenium can adversely affect reproduction in mammals, but it is especially toxic to egg-laying organisms, including birds and fish. Reproductive impairment is generally a more sensitive response variable than adult mortality. Selenium bioaccumulates readily in invertebrates (typically 1,000 times the waterborne concentration) and fish; hence, fish and birds that feed on aquatic organisms are most at risk for showing adverse effects (Ohlendorf 1989; Eisler 2000).

Selenium concentrations were measured from Imperial Valley and Salton Sea in a number of studies. These include broad-based studies of selenium in water, sediment, and biotic samples (Setmire et al. 1990; Setmire et al. 1993; Rasmussen 1997a) to more focused surveys looking at concentrations in tissues of specific fish or bird species (Ohlendorf and Marois 1990; Bruehler and de Peyster 1999; Audet et al. 1997). These studies are reviewed below.

Early sampling (Rasmussen 1988; Rasmussen and Starrett 1988) identified levels of selenium higher in Salton Sea fish than those in the New and Alamo Rivers, reflecting the primary source of bioaccumulation of selenium from benthic food sources of the Salton Sea. More recent data show a similar pattern (Table 3.2-22).

TABLE 3.2-22
Selenium Concentrations in Freshwater and Marine Fish from Imperial Valley Rivers and the Salton Sea

Station No.	Station Name	Species	Tissue	Sample Date	Selenium (mg/kg ww)
719.47.00	Coachella Valley Stormwater Channel	Tilapia *Tilapia sp.*	Fillet	11/17/97	1.020
723.10.01	Alamo River / Calipatria	Channel Catfish *Ictalurus punctatus*	Fillet	11/20/97	1.060
723.10.02	New River / Westmorland	Channel Catfish *Ictalurus punctatus*	Fillet	11/20/97	0.360
723.10.02	New River / Westmorland	Channel Catfish *Ictalurus punctatus*	Liver	11/20/97	3.230
723.10.58	New River / Interboundary	Carp *Cyprinus carpio*	Fillet	12/10/97	0.460
728.00.90	Salton Sea / South	Tilapia *Tilapia sp.*	Fillet	11/20/97	1.310
728.00.90	Salton Sea / South	Tilapia *Tilapia sp.*	Liver	11/20/97	6.650
728.00.92	Salton Sea / North	Orangemouth Corvina *Cynoscion xanthulus*	Fillet	11/18/97	1.360
728.00.92	Salton Sea / North	Orangemouth Corvina *Cynoscion xanthulus*	Liver	11/18/97	2.040

Notes: Concentrations in wet weight; mg/kg – milligrams per kilogram.
Source: Rasmussen 1997b.

Other early studies on selenium in tissues include the Selenium Verification Study (White et al. 1987), the reconnaissance investigation by the DOI in 1986 and 1987 (Setmire et al. 1990), and a follow-up detailed study by DOI from 1988 to 1990 (Setmire et al. 1993; Schroeder et al. 1993). The Selenium Verification Study also identified higher selenium concentrations in samples from the Salton Sea fish than those reported in freshwater fish from the Alamo and New Rivers. In the reconnaissance investigation by DOI (Setmire et al. 1990), samples were taken of water, sediment, and biota in the Imperial Valley. Levels in fish and waterfowl in this study indicated bioaccumulation of selenium. Selenium concentrations in fish and invertebrates are shown in Tables 3.2-23 and 3.2-24, respectively.

TABLE 3.2-23
Selenium Concentrations in Mosquitofish and Sailfin Molly from the Salton Sea, New and Alamo Rivers and Irrigation Drains, and San Felipe and Salt Creeks, 1988-1990

	Salton Sea			New and Alamo Rivers and Irrigation Drains			San Felipe and Salt Creeks		
	N/DV	GM (µg/g dw)	Range (µg/g dw)	N/DV	GM (µg/g dw)	Range (µg/g dw)	N/DV	GM (µg/g dw)	Range (µg/g dw)
Fish Species									
Bairdiella	5/5	12.9	12.0-16.0	-	-	-	-	-	-
Longjaw mudsucker	1/1	-	6.1	-	-	-	-	-	-
Mosquitofish	-	-	-	3/3	3.5	2.6-4.7	2/2	6.9	6.4-7.4
Sailfin molly	-	-	-	4/4	3.9	2.5-5.8	2/2	6.4	5.5-7.4

Notes: N/DV = number of samples collected per number of samples with detectable values.
Geometric mean (GM) calculated using one-half detection limit when data set has more than 50 percent detectable values.
µg/g dw = microgram per gram dry weight.

Source: Setmire et al. 1993.

TABLE 3.2-24
Selenium Concentrations in Invertebrates from the Salton Sea, New and Alamo Rivers and Irrigation Drains. 1988-1990

Pelagic Invertebrate Species	Salton Sea			New and Alamo Rivers and Irrigation Drains		
	N/DV	GM (µg/g dw)	Range (µg/g dw)	N/DV	GM (µg/g dw)	Range (µg/g dw)
Amphipod, pileworm, waterboatman composite	2/2	2.8	2.6-3.1	-	-	-
Asiatic river clam	-	-	-	5/5	4.4	2.6-6.4
Crayfish	-	-	-	2/2	3.1	2.4-3.3
Pileworm	8/8	3.1	0.8-12.1	-	-	-
Waterboatman	3/3	2.1	1.4-3.3	-	-	-

Notes:
–: no data
N/DV" number of samples collected per number of samples with detectable values
Geometric mean (GM) calculated using one-half detection limit when data set has more than 50 percent detectable values
µg/g dw: microgram per gram dry weight

Source: Setmire et al. 1993.

Selenium concentrations in most invertebrates were generally below 5 micrograms per gram (µg/g) dry weight (dw), which has been recommended as a dietary threshold to avoid adverse effects in fish and birds that prey on invertebrates (Setmire et al. 1993). This finding indicates that selenium in invertebrates at the Salton Sea are unlikely to cause toxicity to predators feeding on invertebrates. However, some of the pileworms analyzed did exceed 5 µg/g dw, with concentrations ranging from 0.8 to 12.1 µg/g dw.

Several species of aquatic birds or eggs were also sampled (Tables 3.2-25 and 3.2-26). Selenium exposure and potential effects in birds can be assessed most directly through the selenium concentrations in eggs (Skorupa and Ohlendorf 1991; DOI 1998). In the detailed study, black-necked stilts were the only species for which eggs were sampled. Stilt eggs had a geometric mean concentration of 4.3 µg/g. Based on Lemly (1996), the geometric mean indicates that risks are low to none for reproductive impairment in black-necked stilts; however, the range of selenium concentrations observed in stilt eggs exceeds 6 µg/g and could impair reproduction. In fact, Bennett (1998) conducted a study that evaluated nesting proficiency in comparison to egg selenium concentrations, and results indicated the species is likely experiencing a low level of selenium-induced reproductive depression at the Salton Sea.

A focused survey was conducted on selenium concentrations in subsurface drainwater, surface drainwater, bottom sediments, and transplanted Asiatic river clams at 48 irrigation drain sites in the Imperial Valley (Setmire et al. 1996; Roberts 1996; Hurlbert 1997). Tilewater had the highest concentrations of selenium (median 28 µg/L). Drain samples showed considerable dilution of tilewater selenium (median 6 µg/L). Selenium in bottom sediments was correlated (r^2=0.55) with the percent material finer than 0.062 millimeter (mm) (median 0.5 µg/g).

To evaluate concentrations of compounds in colonial waterbirds, Audet et al. (1997) sampled eggs, bird livers, and fish from waterbird nesting colonies or adjacent areas at the Salton Sea. The results for selenium concentrations for bird egg and liver samples are presented in Tables 3.2-25 and 3.2-26. Selenium concentrations in eggs at the Salton Sea were below teratogenesis thresholds (DOI 1998), indicating that selenium levels are below those found to cause teratogenesis. However, selenium concentrations in eggs were within the range at which reproductive performance could be affected. Fish samples were within the range of earlier studies (Saiki 1990; Setmire et al. 1993).

Studies conducted on Yuma clapper rails (Roberts 1996; USFWS 1994) involved analyses of sediment, crayfish, bird egg, kidney, liver, and whole body samples from salvaged birds for selenium and organochlorines. Samples were taken in the CDFG Wister Wildlife Management Unit when drainwater was used as a water source for managed marshes. Concentrations of selenium from the study are presented in Table 3.2-27.

Nitrogen and Phosphorus. Nitrogen and phosphorus concentrations are high in the Imperial Valley; these elements are the primary components of fertilizers applied to agricultural fields. Although nitrogen and phosphorus are essential for plant growth, an excess of these nutrients can lead to algal blooms and eutrophication (Thiery 1994). Blooms of these organisms are common in the Salton Sea. Excess algal growth can lead to oxygen depletion, which occurs after excessive plant growth, subsequent senescence, and decomposition by bacteria. High-standing stock of algae and enhanced levels of decomposition consume oxygen and produce oxygen deficiencies, particularly in deeper regions of the lake. This lack of oxygen can adversely affect plant and animal communities, including causing large fish die-offs. Studies of the Salton Sea have identified high nutrient levels, high photosynthetic capacity and oxygen production in surface waters, and high decomposition rates with oxygen depletion at depths (Thiery 1994; Setmire 1984; Anderson and Amrhein 1999; Holdren 1999; Reclamation 1970).

Concerns about these nutrients relate to eutrophication and its relation to potentially toxic species of algae in the Sea, disease outbreaks, and dissolved oxygen depletion in the Sea. Nutrient stimulation has been implicated in causing blooms of green and blue-green algae in the Sea (Thiery 1994). Both may be added to the river and drain systems (and eventually to the Sea) through agricultural drainage.

TABLE 3.2-25
Selenium Concentrations in Migratory Birds and Estimated Egg Concentrations from the New and Alamo Rivers, Agricultural Drains, San Felipe Creek, Salt Creek, and the Salton Sea Collected During 1988-1990

	Salton Sea				New and Alamo Rivers and Irrigation Drains			
Bird species	N/DV	GM (µg/g dw)	Range (µg/g/dw)	Estimated egg Concentration (µg/g dw)[1]	N/DV	GM (µg/g dw)	Range (µg/g dw)	Estimated Egg Concentration (µg/g dw)[a]
Migratory Birds								
Northern shoveler (liver)	-	-	-	-	19/19	19.1	9.1-47.0	6.3
Northern shoveler (muscle)	-	-	-	-	6/6	5.2	3.8-12.0	-
Ruddy duck (liver)	57/57	11.7	5.2-41.5	3.86	-	-	-	-
Ruddy duck (muscle)	17/17	4.8	2.7-7.2	-	-	-	-	-
White-faced ibis (carcass)	-	-	-	-	9/9	5.3	3.9-6.6	-
White faced ibis (liver)	-	-	-	-	9/9	7.4	5.0-13.2	2.44
Resident Birds								
American coot (liver)	-	-	-	-	3/3	10.3	7.9-16.3	3.4
Black-necked stilt (egg)	127/127	4.3	1.6-35.0	-	-	-	-	-
Black-necked stilt (carcass)	19/19	5.4	3.2-11.3	-	-	-	-	-
Listed Birds								
Yuma clapper rail (whole body)	-	-	-	-	1/1	-	4.8	-

[a] Estimated from geometric mean using conversion factor from Lemly (1996)
Notes:
-: no data
N/DV: number of samples collected per number of samples with detectable values.
Source: Setmire et al. 1993.

TABLE 3.2-26
Selenium Concentrations in Bird Eggs and Livers Collected at the Salton Sea, 1991

	Egg Samples			Liver Samples		
Species	**N**	**GM (µg/g dw)**	**Range (µg/g dw)**	**N**	**GM (µg/g dw)**	**Range (µg/g dw)**
Double-crested cormorant	–	–	–	6	21.96	17-29
Great-blue heron	4	3.86	2.8-5	10	9.57	3.5-17
Black-crowned night-heron	3	5.27	4.6-6.5	4	12.24	4.8-20
White pelican	–	–	–	6	14.79	11-22
Black skimmer	12	4.65	2.2-8.2	–	–	–
Cattle egret	3	3.6	2.7-5.4	–	–	–
Great egret	9	4.77	3.5-7.1	–	–	–
Gull-billed tern	6	4.1	3.4-5.3	–	–	–

Notes:
–: no data.

Source: Audet et al. 1997.

TABLE 3.2-27
Detection Frequency and Summary Statistics for Selenium in Yuma Clapper Rail Diet and Tissue Samples

Matrix	N/DV	Geometric Mean (µg/g dw)	Range (µg/g dw)
Sediments	19/19	1.43	0.55-9.57
Crayfish	19/19	2.16	0.92-4.67
Rail eggs	2/2	–	4.98-7.75
Rail liver	2/2	–	3.09-11.78
Rail kidney	1/1	–	3.69

Notes:
–: no data
N/DV: number of samples collected per number of samples with detected value.

Source: Roberts 1996.

Organochlorine Insecticides. DDT and its metabolites persist in the environment and, although banned in the U.S. in the 1970s, remain in the environment on agricultural land. They are in the Imperial Valley and, through mobilization by irrigation water, are carried into surface drainage systems (Setmire et al. 1993). DDT and its metabolites, DDD and DDE, are also in sediments in drains and rivers and mobilize during turbulent flows. DDT also enters the Imperial Valley through irrigation drainwater from Mexico via the New and Alamo Rivers. Agricultural fields, irrigation drains, the New and Alamo Rivers, and the Salton Sea are sources of biological uptake of DDT and its metabolites, primarily DDE (IID 1994). Studies show high concentrations of DDT-related compounds in the Imperial Valley and Salton Sea (Audet et al. 1997; Setmire et al. 1993; Rasmussen 1997a, 1997b).

The toxicity and accumulation of DDT and its metabolites are of primary concern for birds. DDT has long been identified to cause reproductive failure in many species. DDT and DDE have been associated with eggshell thinning and reduced reproductive success (Mendenhall et al. 1983; Henny et al. 1984; Gress 1973; Ohlendorf and Marois 1990). DDT and its metabolites are especially problematic for birds that forage high on the food chain and are subject to bioaccumulation and biomagnification (Blus 1996). Birds that feed on fish or other birds have higher tissue residues than birds that feed on vegetation or seeds, and DDE is more common than DDT or DDD in bird tissues (DOI 1998). Toxic effects of DDT poisoning in birds include reproductive impairment, reduced fledgling success, eggshell thinning, and death when levels are high.

Toxaphene is toxic to some aquatic organisms, particularly fish. It can impair reproduction and reduce embryo vitality in fish at low concentrations and produce debilitating diseases at higher levels. It is less harmful to birds than it is to fish (Eisler 2000; TOXNET 2000).

Organochlorine concentrations in biota in the IID water service area, AAC, and Salton Sea were measured in many of the same studies that evaluated selenium concentrations. The most recent toxaphene and DDT data from five sites sampled along the New and Alamo Rivers and at the Salton Sea are presented in Table 3.2-28.

In a detailed water quality study of the drains (Setmire et al. 1993; Schroeder et al. 1993), organochlorine concentrations were generally below detection limits (0.01 μg/g ww for most chemicals; 0.05 μg/g ww for PCBs and toxaphene), except for DDE. Aquatic invertebrates from rivers and drains had higher concentrations of p-p'-DDE than invertebrates in the Salton Sea. In general, DDT metabolite concentrations in clams from rivers and drains ranged from 0.16 to 0.47 μg/g dw. Bioaccumulation tests of clams in Imperial Valley drains showed that DDE exposure corresponded to increased drainwater flows during late winter to early spring peak irrigation periods. Exposure occurs as sediment-borne DDT metabolites are transported with tailwater runoff or resuspended from sediment in drains and rivers. Rivers were observed to have higher potential for DDT metabolite exposure than drains, and rivers also have higher suspended sediment loads and higher sediment DDE concentration than drains.

TABLE 3.2-28
Organochlorine Insecticide Concentrations in Freshwater and Marine Fish

Station No.	Station Name	Species (Common/ Scientific Name)	Tissue	Sample Date	p-p' DDE ppb	Total DDT ppb	Diazinon ppb	Toxaphene ppb
723.10.01	Alamo River, Calipatria	Channel catfish *Ictalurus punctatus*	Fillet	11/20/97	2,500	2,621	<50.0	340.0
723.10.02	New River, Westmorland	Channel catfish *Ictalurus punctatus*	Fillet	11/20/97	450.0	482.0	<50.0	340.0
723.10.58	New River, International Boundary	Carp *Cyprinus carpio*	Fillet	12/10/97	60.0	80.0	<50.0	<100.0
728.00.90	Salton Sea, South	Tilapia *Tilapia* sp.	Fillet	11/20/97	31.0	31.0	<50.0	<100.0
728.00.92	Salton Sea, North	Orangemouth corvina *Cynoscion xanthulus*	Fillet	11/18/97	<10.0	190.0	<50.0	<100.0

Source: Rasmussen 1997b.

Concentrations of DDE in mosquitofish in IID water service area river and drain sites were higher than concentrations in fish collected from other locations in California and nationwide, but they were still below levels known to adversely affect fish. Concentrations of DDE in fish from the Salton Sea were generally low. Concentrations of p-p'-DDE suggested that waterfowl and other aquatic species using drains and rivers could be exposed to higher levels of DDT metabolites than birds that primarily forage at Salton Sea (Table 3.2-29). Birds foraging in agricultural fields had some of the highest detected DDE concentrations in liver and fat tissue of the birds studied. White-faced ibis that winter in the Imperial Valley and forage in agricultural fields had DDE liver concentrations of 5.93 μg/g ww and fat concentrations of 5.57 μg/g ww (Setmire et al. 1993).

Audet et al. (1997) determined the p-p'-DDE concentrations in bird eggs and livers from waterbird nesting colonies or adjacent areas at the Salton Sea (Table 3.2-30). Eggshell samples were in the range known to cause thinning (0.26 to 66 mg/kg ww in piscivores and 0.25 to 20 mg/kg ww in omnivores). Fish samples were within the range of earlier studies, and higher concentrations were found in fish from rivers and drains than in those from the Salton Sea (Setmire et al. 1993).

Ohlendorf and Marois (1990) measured organochlorine concentrations in black-crowned night heron and great egret eggs collected at the Salton Sea from 1982 to 1985. Most (70 percent) of those eggs contained DDE concentrations exceeding 8 μg/g ww. The level of thinning for night-heron eggshells approached levels that have been associated with reduced reproductive success, but no significant eggshell thinning was reported for egret eggs (snowy and great combined).

Embryo malformations were observed in 5 of the 17 embryos that were examined for malformations, and signs of embryo toxicity were observed in an additional. This indicates a malformation rate of 29 percent, which exceeds the typical incidence of embryo malformations (Bennett 1998). The causative agents for this elevated incidence of teratogenesis could not be identified, but were consistent with DDE contamination.

Organophosphorus Insecticides. Like DDT, diazinon and chlorpyrifos were first introduced to the Imperial Valley as agricultural insecticides. Although organophosphorus insecticides are less persistent than organochlorines, sediments could retain these toxic compounds. Chlorpyrifos has a large molecular weight and density and is likely to settle in sediments and persist in the soil. The organophosphates are transported to the Salton Sea through irrigation drain channels.

Diazinon is acutely toxic to terrestrial invertebrates and is used widely as an insecticide; effects on aquatic invertebrates are less known, but many toxicity thresholds have been demonstrated (TOXNET 2000). Diazinon can be toxic to birds. Data on teratogenic effects from chronic exposure are less conclusive, but studies have identified effects (TOXNET 2000). Chronic and acute toxicity to aquatic organisms, including aquatic invertebrates, is the primary concern related to organophosphorus compounds in the Project area (De Vlaming et al. 2000).

TABLE 3.2-29
1986-1990 p-p'-DDE Concentrations in Migratory Birds

	Salton Sea			New and Alamo Rivers and IID Drains		
	N/DV	GM (µg/g ww)	Range (µg/g ww)	N/DV	GM (µg/g ww)	Range (µg/g ww)
Migratory Birds						
Eared grebe (muscle)	5/5	0.28	0.17-1.10	–	–	–
Northern shoveler (muscle)	–	–	–	6/6	0.55	0.17-2.10
Ruddy duck (muscle)	30/30	0.26	0.096-1.50	–	–	–
White-faced ibis (fat)	–	–	–	9/9	5.57	3.70-11.0
White-faced ibis (liver)	–	–	–	9/9	5.93	3.10-9.60
Resident Birds						
American coot (liver)	–	–	–	3/3	0.014	0.01-0.03
American coot (muscle)	–	–	–	4/4	0.22	0.09-0.45
Barn owl (muscle)	–	–	–	1/1	–	2.7
Black-necked stilt (egg)	84/84	2.54	0.05-12.0	–	–	–
Black-necked stilt (carcass)	38/38	0.69	0.02-2.76	–	–	–
Cattle egret	–	–	–	2/2	2.3	2.20-2.40
Double-crested cormorant (muscle)	3/3	1.13	0.38-4.90	–	–	–
Great blue heron (muscle)	–	–	–	1/1	–	13.0
Herring gull	1/1	–	2.80	–	–	–

Notes:

Ww: wet weight.
N/DV: number of collected samples per samples with detectable values.
GM: geometric mean (calculated using one-half detection limit when data set had more than 50 percent detectable values).
-: no data.

Source: Setmire et al. 1993.

TABLE 3.2-30
1991 p-p'-DDE Concentrations in Salton Sea Bird Eggs and Livers

	Egg Samples			Liver Samples		
Species	**N**	**GM (µg/g)**	**Range (µg/g)**	**N**	**GM (µg/g)**	**Range (µg/g)**
Double-crested cormorant	–	–	–	6	2.47	0.49-11
Great blue heron	4	5.78	2.6-10	10	1.89	0.28-25
Black-crowned night heron	3	2.34	1.7-3.6	4	14.02	7.8-33
White pelican	–	–	–	6	5.43	1.3-35
Black skimmer	12	4.9	1.8-16.4	–	–	–
Cattle egret	3	2.81	1.6-4.8	–	–	–
Great egret	9	8.36	0.86-31	–	–	–
Gull-billed tern	6	1.32	0.54-2.8	–	–	–

Notes: concentrations in wet weight
-: no data
N=4 where 4 represents the number of organisms sampled.
Source: Audet et al. 1997.

Diazinon and chlorpyrifos are used by farmers in the IID water service area and could appear in the drains, in rivers, or at the Sea. Although recent studies have not found these compounds in Salton Sea and river sediments (Levine-Fricke 1999b; Vogle et al. 1999), chlorphyrifos has been found in fish tissue from the New and Alamo Rivers as part of the Toxic Substances Monitoring Program (TSMP).

Organochlorine Herbicides. Organochlorine herbicides are typically used to limit the growth of annual grasses and broadleaf weed species in vegetable crops. Irrigation can mobilize organochlorine herbicides, depositing them in surface drainage systems. Organochlorine herbicides are often found in fish from the Imperial Valley (Rasmussen 1997a, 1997b).

Dacthal is used as a herbicide in the IID water service area. Dacthal has been detected in fish tissue from the New and Alamo Rivers; the Peach Drain, Barbara Worth Drain, Greeson Drain, and Reservoir Main South Drain; and the south end of the Salton Sea (Table 3.2-31). Recent studies have not found Dacthal in Salton Sea and river sediments (Levine-Fricke 1999b; Vogle et al. 1999). Dacthal toxicity to animals is considered low by the EPA. However, toxicological concerns do arise for mammals exposed to high levels. Chronic exposure has been shown to alter adrenal weights of female rats and kidney weights in male rats, but it did not pose a threat to reproductive ability (TOXNET 2000).

Boron. Boron is an essential micronutrient for higher plants. Though beneficial in small quantities, boron in elevated concentrations can adversely affect organisms. At increased levels, boron can affect reproduction and fish survival. In waterbirds, high concentrations of boron lead to abnormal growth rates and can act as a potent teratogen if an embryo is exposed during its first 96 hours of development (Eisler 2000).

TABLE 3.2-31
1992-1995 Chlorpyrifos and Dacthal Concentrations in Fish Tissue from IID Drains, New and Alamo Rivers, and the Salton Sea

Water Body	Chlorpyrifos (ppb, ww)	Dacthal (ppb, ww)
Peach Drain	ND	5,500
Barbara Worth Drain	ND	5
Greeson Drain	ND	27,740
Reservoir Main Drain	ND	6.2
Alamo River	27-230	9.7-4,000
New River	28-130	7.6-4,100
Salton Sea	ND	5.2-7.6

Note: ND: not detected
Source: Rasmussen 1995, 1997a

Results from the investigations on boron in tissue samples from invertebrates in the Project area are presented in Table 3.2-32. The highest levels of boron in aquatic invertebrates were detected in pileworms in the Salton Sea (up to 160 μg/g dw). Waterboatmen concentrations were comparable to background concentrations detected elsewhere (10 μg/g dw) (Setmire et al. 1993). A typical waterbird diet sample, consisting of pileworms, amphipods, and waterboatmen, had a concentration of 20 μg/g dw (IID 1994). This is less than the level of concern for waterfowl diet (greater than 30 μg/g dw) (Reclamation 1998). The highest dissolved boron concentration detected in Imperial Valley surface water was 11 mg /L. This level is lower than concentrations shown to cause chronic effects in invertebrates but is higher than the no-effect level reported for invertebrates and fish.

Boron concentrations in fish from the Salton Sea, such as bairdiella, were 5.0 to 8.3 μg/g dw; freshwater fish from rivers and drains had boron concentrations in the same range as Salton Sea species. Effects levels for boron in fish are unknown (Setmire et al. 1993; Reclamation 1998). Boron concentrations in birds were reported up to 52 μg/g dw for livers of resident waterbirds (Setmire et al. 1990). Liver samples in brown pelicans had a geometric mean of 1.41 μg/g dw, with a maximum of 5.92 μg/g dw. Liver samples in white pelicans had a geometric mean of 2.16 μg/g dw, with a maximum of 3.63 μg/g dw (Roberts 1997). These levels are below known thresholds for adverse or toxic effects (Reclamation 1998).

Overall, little evidence indicates that boron concentrations reach levels that would adversely affect IID aquatic habitats outside the Salton Sea. Studies have identified concentrations that could cause sublethal effects, but these concentrations appeared to be temporary (Setmire et al. 1990), and no adverse effects have been documented in birds from IID water service area agricultural areas (Schroeder et al. 1993; Setmire et al. 1993).

Food-Chain Pathways of Toxic Compounds. Waterborne constituents are of concern mainly because they bioaccumulate in organisms. This occurs through either bioconcentration (the direct uptake of dissolved compounds across respiratory and epithelial membranes by passive or active mechanisms) or bioaccumulation (a more general term that also includes uptake through food). Biomagnification occurs when higher trophic-level organisms

TABLE 3.2-32
Boron Concentrations in Invertebrates from the Salton Sea, New and Alamo Rivers, and Irrigation Drains, 1986-1990

	Salton Sea			New and Alamo Rivers and IID Drains		
Species	**N/DV**	**GM (µg/g dw)**	**Range (µg/g dw)**	**N/DV**	**GM (µg/g dw)**	**Range (µg/g dw)**
Asiatic river clam	–	–	–	5/0	–	<29.2
Crayfish	–	–	–	2/0	–	<23.9
Waterboatman and amphipod composite	1/1	–	21.0	–	–	–
Waterboatman, amphipod, and pileworm composite	1/1	–	20.0	–	–	–
Pileworm	8/7	70.2	22-160	–	–	–
Waterboatman	3/1	–	10	–	–	–

Notes:

Dw: dry weight
N/DV: number of collected samples per samples with detectable values
GM: geometric mean (calculated using one-half detection limit when data set had more than 50 percent detectable values)
-: no data

Source: Setmire et al. 1993.

accumulate progressively higher concentrations of compounds by ingesting and assimilating them through lower-trophic-level organisms (Maier et al. 1988). Tissue concentrations for some compounds (such as DDT) increase with each higher food-chain level, and high trophic-level consumers have concentrations of toxic compounds many times higher than those of primary producers. Consequently, high trophic-level consumers are more likely to show deleterious effects. Top predators, such as herons, egrets, or birds of prey, are most at risk.

Selenium, boron, and organochlorine insecticides, including DDT and its metabolites, bioaccumulate. Food-chain relationships and toxic contaminants in the Imperial Valley vary, according to habitat and contaminant. In general, the potential for accumulation of selenium is great in the Salton Sea and in IID water service area drains, rivers, and wetlands. The potential for elevated boron is low in IID water service area aquatic habitats but higher in the Salton Sea.

Trophic relationships for species using rivers and drains in IID water service area are presented in Figure 3.2-12. Selenium and other toxic compounds enter the food chain through the water, and they are first incorporated into lower trophic levels, such as plants and invertebrates, including phytoplankton and zooplankton. Larger invertebrates, such as waterboatman, forage on plankton. Filter-feeding invertebrates, such as clams, feed on plankton and likely concentrate selenium. Amphibians and fish that forage on aquatic invertebrates represent the next step along the biological pathway. Ducks, egrets, herons, grebes, and other species foraging on fish and amphibians represent the following step and have the greatest exposure to bioaccumulated compounds.

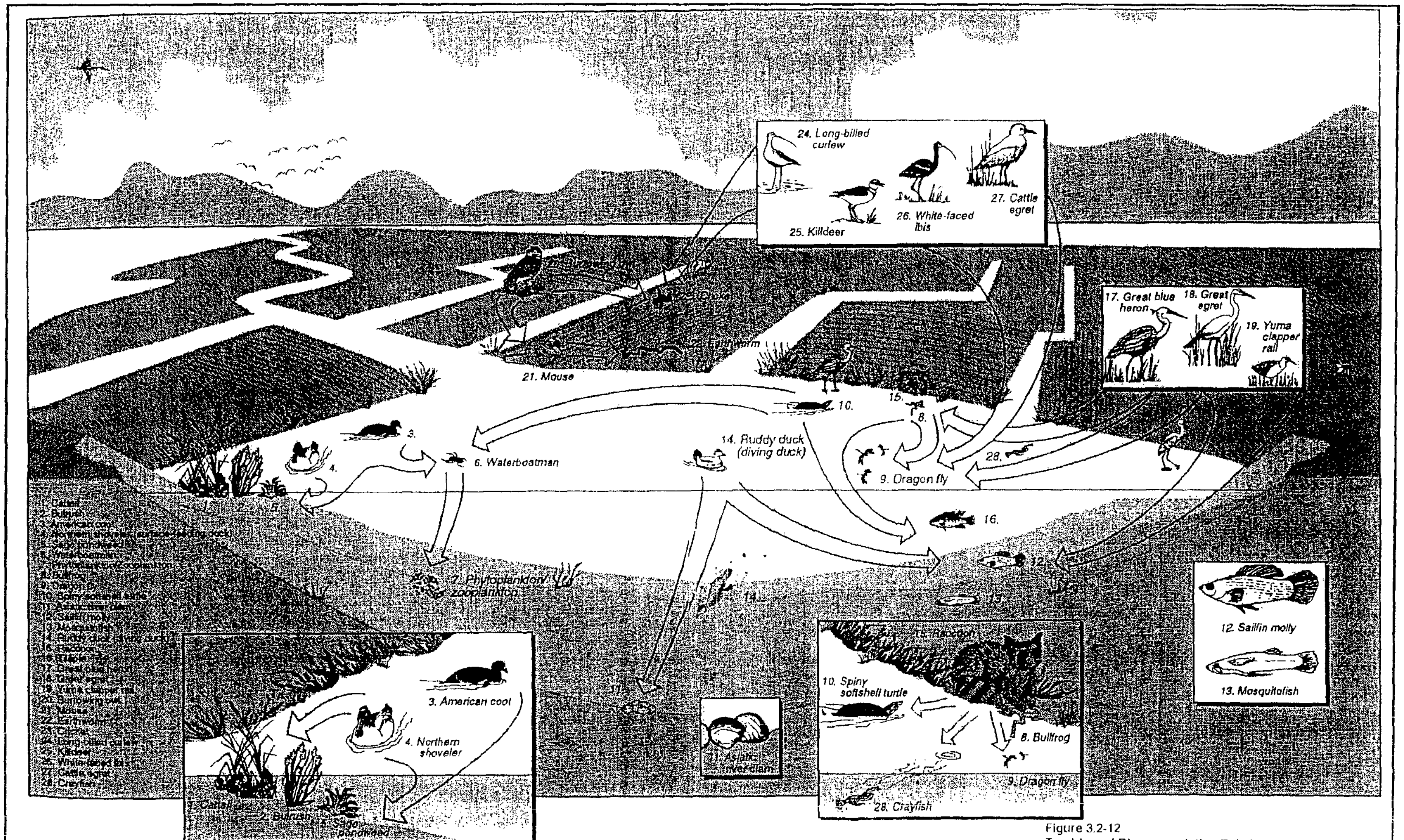

Figure 3.2-12
Trophic and Bioaccumulation Relations Among Organisms of Rivers and Drains in the Imperial Valley
(Source: Setmire et al, 1993)
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Trophic relationships for the Salton Sea are presented on Figure 3.2-13. Toxic compounds enter the food chain through the water and are incorporated into plants and invertebrates, including phytoplankton and zooplankton. Although larval tilapia and bairdiella forage on zooplankton, the lack of an effective planktivorous fish in the Salton Sea means that most energy must flow through the benthos. Pileworms are the primary detritivores and represent the next major step in bioaccumulation of toxic compounds. Adult fish and waterbirds forage on pileworms; piscivorous birds, generally highest on the food chain, are susceptible to risks from toxic compounds. Another food-chain pathway with bioaccumulation risks consists of phytoplankton, zooplankton, and other invertebrates, which are then eaten by ducks, shorebirds, and other waders. These species, in turn, could be eaten by birds of prey, such as peregrine falcon.

Potential Role of Water Quality in Fish and Avian Disease. Disease outbreaks in fish and birds at the Salton Sea have focused attention on the condition of this ecosystem, with special attention to the role of water quality in disease outbreaks (Bruehler and de Peyster 1999; Rocke 1999; Roberts 1997; Carmichael 1999). High selenium levels, high concentrations of nutrients resulting in eutrophication and algal blooms, and increasing salinity have been suggested as possible contributors to epizootic events at the Salton Sea. Research is ongoing, and many causes of disease outbreaks at the Salton Sea remain unknown. This section summarizes recent research and suspected causes.

Fish kills are common at the Salton Sea, often involving hundreds of thousands of fish. Fish kills of tilapia, Gulf croakers, and corvina have been recorded in conditions of large algal blooms, low dissolved oxygen, and high ammonia readings (USFWS 1998A, 1999b, 1997b). These conditions are characteristic of a eutrophic system, with high nitrogen and Insert phosphorus loading (Thiery 1994; Setmire 1984; Anderson and Amrhein 1999; Holdren 1999).

Diseases can also cause fish kills. During a September 1997 fish kill involving more than 1 million tilapia, sick and freshly killed fish were infested with a lethal parasite. The parasite, known as *Amyloodinium ocellatum*, is found worldwide and infects marine fish. In wild fish, the numbers of parasites per fish are typically low, and infections are not lethal. When present in high levels, the parasite impairs respiratory function and can suffocate fish. High temperatures and high salinities, such as those present at the Salton Sea in summer months, are optimal for this parasite. Under these conditions, the parasite can reach high levels rapidly (USFWS 1997a).

In 1996, a severe avian botulism (Type C) outbreak killed more than 14,000 pelicans and other fish-eating birds (USFWS 1996b). Large fish kills coincided with this event, and both live and dead tilapia collected during the event tested positive for avian botulism. Fish collected during this event and additional events in 1997 also had gross external and internal signs of bacterial septicemia; tissue cultures indicated infections with one or more of the following bacteria: *Vibrio alginolyticus, V. Vulnificus, V. Damsela, Pseudomonas putrefaciens,* and a *Bacillus* species (USFWS 1997a, 1997b). Bacteria of the genus *Vibrio* are common marine fish pathogens (USFWS 1997b) and are potential avian or human pathogens (Rocke 1999). At least one of these fish kills was associated with a large algal bloom; pollution, overcrowding, high temperatures, and high salinity could have contributed (USFWS 1996b).

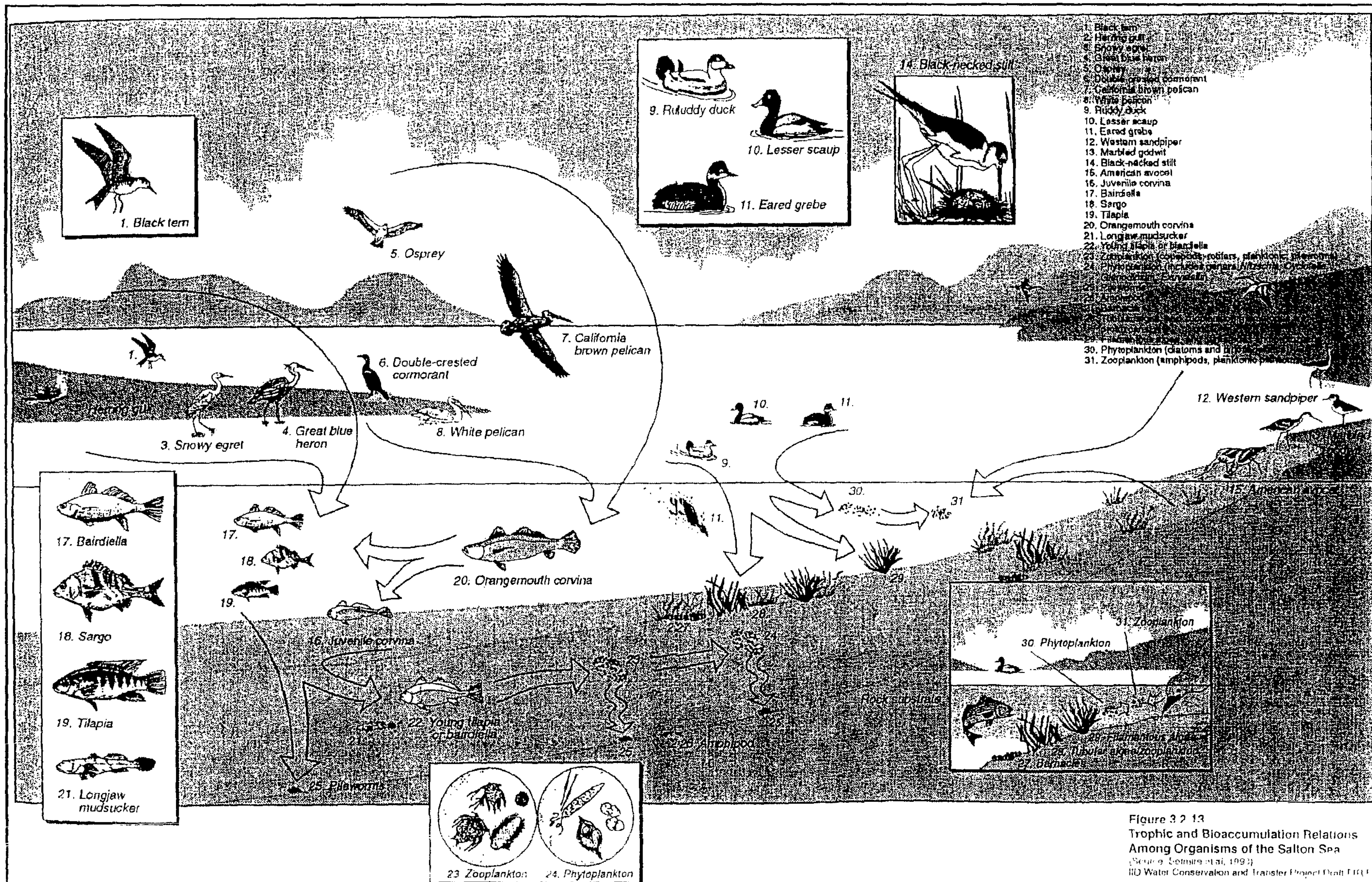


Figure 3.2-13
Trophic and Bioaccumulation Relations Among Organisms of the Salton Sea
(Source: Setmire et al, 1993)
IID Water Conservation and Transfer Project Draft EIR/EIS

CH2MHILL

Selenium has been investigated as a contributor in the pelican die-off of 1996. Chronic contaminant exposure can result in immune suppression and increase susceptibility to disease (Fairbrother and Fowles 1990; Peterle 1991; Bobker 1993). Birds and fish suffering from selenium-induced immune dysfunction are hypersensitive to pathogen challenges (USFWS unpublished data; Larsen et al. 1997). Bruehler and de Peyster (1999) and Roberts (1997) evaluated levels of selenium and other contaminants in pelicans collected during the 1996 die-off event. In both studies, selenium concentrations in livers were elevated, and Bruehler and de Peyster found concentrations significantly higher than levels in control birds from Sea World. Selenium also could have contributed to immune suppression in

Salton Sea fish, leaving them hypersensitive to the *Vibrio* bacterial attacks and facilitating the fish-mediated pathway for the avian botulism outbreak (USFWS unpublished data).

Between January and March 1992, an estimated 145,000 eared grebes died from an undetermined cause at the Salton Sea, representing the largest documented epizootic event in eared grebes and killing about 10 percent of the North American population (Jehl 1996; Rocke 1999). In 1994, 1995, and 1997, similar but smaller-scale mortality events were reported. Despite efforts to identify a responsible agent, the cause of this event remains unknown. Present research focuses on algal biotoxins. Preliminary results from eared grebe tissues collected during the events identified microcystins produced by cyanobacteria; additional information suggests that a toxin produced from a nannoplankton could also be present. Increased nutrient loading and consequent algal blooms have been suggested as a possible contributor (Carmichael 1999).

Several algal species are abundant during the winter when grebe mortality takes place. This includes organisms from at least four genera (*Heterocapsa*, *Gyrodinium*, *Gonyaulax*, and *Gymnodinium*) that are toxic to other microorganisms, bivalves, birds, or marine mammals (Dexter et al. 1999). In 1994, a large plankton bloom occurred at the south end of the Salton Sea; species of *Gonyaulax* and possibly *Gyrodinium* or *Gymnodinium* were present, and extracts of the mixture were toxic in a mouse bioassay. The rapidophyte *Chattonella marina* has also been identified in the Salton Sea and was determined to be associated with a conspicuous "green tide." This species has caused major fish kills in Japan, and studies indicate that it produces neurotoxins and other compounds potentially lethal to fish (Dexter et al. 1999). Selenium levels could play a role in toxic algal blooms (Imai et al. 1996).

3.2.3.3 SDCWA Service Area

The following narrative summarizes biological resources found in the SDCWA water service area. The information is based on data compiled from four City and County of San Diego habitat conservation programs (SANDAG 1998). Data were compiled in support of the Multiple Habitat Conservation Program (MHCP), MSCP, MSCP North County Subarea, and the Multiple Habitat Conservation and Open Space Program (MHOCSP). Areas covered by the programs include all of San Diego County (except for the Marine Corps Air Station at Miramar and the Marine Corps Base Camp at Pendleton). Biological resources information compiled for the MHCP is current as of 1998 and covered 78 percent of San Diego County. Areas not mapped primarily consist of desert habitats in the eastern third of the county. The SDCWA service area covers San Diego County; therefore, the information correlates to the SDCWA service area and is used for this analysis.

San Diego County encompasses biologically diverse environments, attributable to the variety of regional soil types, topography, and climates. Of the approximately 2.1 million acres of land mapped for the MHCP, approximately 1.6 million acres are natural habitat. Although the majority of San Diego County remains in natural habitat, development has led to habitat loss, primarily in the western portion of the County. In addition to habitat loss, development patterns have fragmented natural areas in the County. The effects of development on habitat are addressed as part of the habitat conservation programs.

Habitats within San Diego County support numerous federal- and state-listed (and proposed) endangered/threatened species.

General habitat types include desert communities, montane and riparian forests, foothill chaparral and scrub communities, coastal scrub communities, lagoons, estuaries, and beaches. Lands in agricultural production are considered non-natural habitat for this analysis. General vegetation in the natural habitats is shown in Table 3.2-33.

TABLE 3.2-33
Generalized San Diego Region Vegetation

Generalized Vegetation Type	Acres	Percent of Total	Percent of Natural Habitats
Coastal and Desert Dunes	1,517	0.1	0.1
Coastal Sage Scrub	234,070	11.0	14.6
Desert Scrub	122,655	5.8	7.7
Chaparral	795,354	37.4	49.7
Grasslands	148,623	7.0	9.3
Meadows and Seeps	17,259	0.8	1.1
Marshes	6,870	0.3	0.4
Riparian Forest	32,548	1.5	2.0
Riparian Woodland	8,285	0.4	0.5
Riparian Scrub	16,748	0.8	1.0
Woodlands	123,122	5.8	7.7
Forests	77,636	3.7	4.8
Marine and Bay	199	<0.1	<0.01
Estuaries and Beaches	2,484	0.1	0.2
Freshwater and Wetlands	14,130	0.7	0.9
Natural Habitats	1,601,501	75.3	100.0
Non-Natural Habitats[a]	524,814	24.7	N/A
Total	**2,126,315**	**100.0**	**N/A**

[a] Includes developed, agricultural, and disturbed land.
Note: Figures pertain only to the 2.1 million acres of the San Diego region mapped to date.
Source: SANDAG 1998.

The majority of the natural vegetation in the County is chaparral (approximately 50 percent), consisting mostly of southern and northern mixed chaparral communities. Chaparral communities serve as secondary and foraging habitats for species associated with coastal sage scrub communities.

Other major habitat types in the habitat conservation area include coastal sage scrub (approximately 15 percent), grasslands (approximately 9 percent), desert scrub (approximately 8 percent, but likely to be underestimated because of incomplete mapping in 1998), and woodlands (approximately 8 percent). Coastal sage scrub communities provide habitat for many of the endangered and threatened species in the County, including the federally listed California gnatcatcher (*Polioptila californica*). It is estimated that 90 percent of the coastal sage scrub habitat in San Diego County has been removed by development. County grassland communities are mostly non-native (44 percent), but approximately 39 percent are native, with the remainder being unidentified or mixed habitats. Grasslands provide foraging areas for raptors. Woodland habitats consist mostly of coast live oak and Engelmann oak woodlands.

Other habitat types making up 5 percent or less each of the natural habitats include forests, riparian forests, meadows and seeps, and riparian scrub. A small amount (less than 1 percent each) of the natural habitats in the County are coastal and desert dunes, marshes, riparian woodland, marine and bay vegetation, estuaries and beaches, and freshwater and wetland vegetation.

Land ownership in San Diego County is primarily private and federal ownership. For all ownership categories, the majority of lands are natural habitats. The land ownership mix might contribute to the majority of lands remaining in natural habitat within the County. The majority of state and federal agencies owning land have a conservation function and will likely preserve natural habitat. Private lands might be subject to future development. Except for beach and other marine-related habitats, generalized vegetation types are roughly equally divided between public and private ownership.

From 1990 to 1995, a decrease of 0.5 percent of natural habitats and an increase of 1.5 percent of non-natural habitats were estimated. Of the generalized habitat types, the greatest decrease occurred for riparian forest and riparian woodland communities (approximately 3 percent each of the vegetation community types). The greatest increase occurred in freshwater and wetland habitats (approximately 6 percent of the total vegetation community type). Indicated by the varied vegetation types in private ownership, it is likely that losses might occur for a range of communities. However, as discussed previously, the purpose of the habitat conservation programs is to minimize loss of natural habitats for developable land ownership categories.

3.2.4 Impacts and Mitigation

This section describes the methodology for assessing project impacts and addresses the impacts associated with the Proposed Project and alternatives for the four geographic areas (the LCR, the IID water service area and the AAC, the Salton Sea, and the SDCWA service area). Mitigation is identified for impacts determined to be significant.

3.2.4.1 Methodology

LOWER COLORADO RIVER

The environmental baseline for this LCR assessment includes the effects of past and ongoing human and natural factors leading to the current status of biological resources in the LCR. This baseline also includes existing facilities, ongoing operations and maintenance activities, the existing extent of land cover types, and the existing species abundance and distribution.

Under the IID water conservation and transfer agreement, water now diverted from the LCR at Imperial Dam by IID would be reduced. MWD would continue to divert an equivalent volume of water at the Whitsett intake behind Parker Dam. The intake is an existing structure, and the volume of water to be diverted to account for the transfer is within the range of diversion volumes at this point over the past several decades. Therefore, no additional water will be transported to the Coastal Plain of Southern California through the CRA.

Operations of the Whitsett Intake and CRA will continue at historic levels or slightly less as they have since the 1960s with implementation of the transfer project and, therefore, would be unchanged from baseline conditions. For CEQA, the baseline is defined as the physical conditions at the time the Notice of Preparation is published. Therefore, these physical structures and diversion volume represent baseline conditions, and this assessment focuses on potential biological effects on the LCR between Parker Dam and Imperial Dam in which physical changes from Baseline conditions could occur. Analysis of these potential changes is based on predicting possible changes in water surface elevations that could occur with implementation of the transfer. This approach to the baseline also is consistent with Reclamation's Baseline definition for the Interim Surplus Criteria, Biological Assessment, and the resulting USFWS Biological Opinion.

Historically, the CRA has transported up to 1.3 MAF of Colorado River water each year into Southern California. Implementation of the transfer would change only the source from which the Colorado River water is derived. Historically, the water in the CRA has consisted of some combination of MWD's basic apportionment, water from a conservation agreement with IID, any unused higher priority agricultural water in California, unused apportionment from Arizona and Nevada, and surplus water. Under the water conservation transfer program (and related lining actions), the CRA will continue to transport the same amount of Colorado River water each year, with a greater proportion of that water coming from conservation.

Reclamation evaluated impacts to biological resources along the LCR in its Biological Assessment for the Interim Surplus Criteria, Secretarial Implementation Agreements, Water Administration, and Conservation Measures on the LCR, Lake Mead to the Southerly International Boundary (Reclamation 2000). This analysis and the resultant Biological Opinion for that project issued by the USFWS (2001) are the basis for the impact evaluation for biological resources along the LCR for this project.

Potential impacts to the biological resources in the LCR relate to the change in the point of diversion of water that would reduce flows in the River between Parker and Imperial Dams. A hydrologic model (the Colorado River Simulation System [CRSS]) developed by Reclamation for the LCR was used to assess impacts to biological resources in the Project area. Reclamation's model addressed the potential transfer of 1.574 MAFY (one of the covered actions to be included in the LCR Multi-Species Conservation Program [MSCP]), of which 400 KAFY was included in the IA analysis. The IA would change the point of diversion from Imperial Dam to Parker Dam for up to 400 KAFY. Additional projects covered under the MSCP change the point of diversion for 1.574 MAFY, including the 400 KAFY under the IA.

The assessment of potential effects on biological resources covers a wide variety of habitat types and the species that rely on that habitat for feeding, cover, nesting, breeding, and rearing young. Federal and state special-status species are addressed using this habitat-based approach as well, under the premise that if the underlying habitat is protected or mitigated for sensitive species, potential impacts on more common species and general habitat conditions will be avoided and mitigated as well. Exhaustive evaluation of water surface elevation effects on every individual species encountered in the LCR subregion has therefore not been performed, and is not needed to reach meaningful conclusions regarding potential impacts.

Wildlife and Wildlife Habitat

Riparian Habitat. Using the model described previously, Reclamation modeled the effect of a change in the point of diversion for 1.574 MAFY. Under the IA, up to 400 KAFY of water would be transferred. Reclamation (2000) estimated the changes in cottonwood-willow vegetation for a change in the point of diversion for 400 KAFY, 300 KAFY, and 200 KAFY. To estimate the effects of these increments from the model that considered a change in point of diversion for 1.574 MAFY, the changes in river surface elevation, groundwater elevation, and vegetation responses were assumed to be proportional to the amount of water transferred. For Alternatives 2 and 3, under which 130 KAFY and 230 KAFY, respectively, would be conserved by the IID water service area, changes in cottonwood-willow vegetation were estimated by assuming a linear relationship between the acreage affected and amount of water transferred.

Backwaters and Marshes. A reduction in river flow can directly and indirectly affect the quantity and quality of available aquatic and terrestrial habitat associated with backwaters. For backwaters connected to the River by open water, a drop in water surface elevation in the River will drop the water surface elevation of the backwater and subsequently reduce the acreage of aquatic habitat. Perimeter vegetation supported by the inundated feature also could be affected. For backwaters without an open connection to the River, the drop in River water surface elevation can drop groundwater elevation that is assumed to supply the water source to the isolated backwater.

Reclamation estimated potential impacts to backwater and marsh (i.e., acreage loss and impact to vegetation) for a change in the point of diversion for 400 KAFY, 300 KAFY, and 200 KAFY by assuming that the amount of backwater habitat affected was linearly related to the amount of water transferred, based on the results for transfer of 1.574 MAFY. For Alternatives 2 and 3, under which 130 KAFY and 230 KAFY, respectively, would be conserved by IID, changes in backwater and marsh habitat were estimated by assuming a linear relationship between acreage affected and amount of water transferred.

Special-status Wildlife Species. As part of its Biological Assessment, Reclamation (2000) evaluated the potential impact to special-status wildlife species from the habitat losses predicted by the model. The analysis was based on recorded occurrence data for the species and known habitat associations. For the Proposed Project and alternatives, the magnitude of the response of wildlife populations was assumed to be directly proportional to the changes in vegetation communities. Reclamation's analysis focused on federally-listed species. For this Project, impacts to state-listed species and species of concern also are considered. Impacts to species not addressed in Reclamation's analysis were evaluated, based on the habitat associations for these species (Table 3.2-34).

TABLE 3.2-34

Primary Association and Use of Vegetation Communities by Selected Wildlife Species in the Study Area

Common Name	Habitat Association	Habitat Use	Federal Status	California Status	Arizona Wildlife of Concern
Arizona Bell's vireo	Cottonwood-willow/early successional	Nesting		CE	
Yuma hispid cotton rat	Cottonwood-willow/early successional	Year-round		SC	
Colorado River hispid cotton rat	Cottonwood-willow/early successional	Year-round		SC	
Southwestern willow flycatcher	Cottonwood-willow/mid-successional, salt cedar	Nesting	FE	CE	
willow flycatcher	Cottonwood-willow/mid-successional	Nesting		CE	
brown crested flycatcher	Cottonwood-willow/mature	Nesting		SC	
Common black-hawk	Cottonwood-willow/mature	Nesting			X
Harris hawk	Cottonwood-willow	Nesting		CSC	
Cooper's hawk	Cottonwood-willow/mature	Nesting		SC	
elf owl	Cottonwood-willow/mature	Nesting		CE	
Gila woodpecker	Cottonwood-willow/mature	Nesting		CE	
Gilded northern flicker	Cottonwood-willow/mature	Nesting		CE	
Long-eared owl	Cottonwood-willow/mature or salt cedar (*Athel* spp)/tall	Nesting		SC	

TABLE 3.2-34

Primary Association and Use of Vegetation Communities by Selected Wildlife Species in the Study Area

Common Name	Habitat Association	Habitat Use	Federal Status	California Status	Arizona Wildlife of Concern
Mississippi kite	Cottonwood-willow/mature or salt cedar(*Athel* spp)/tall	Summer migrant and visitor			X
Summer tanager	Cottonwood-willow	Nesting		SC	
Yellow warbler	Cottonwood-willow/early to mid-successional	Nesting		SC	
Vermilion flycatcher	Cottonwood-willow/mature	Nesting		SC	
Western yellow-billed cuckoo	Cottonwood-willow/mature	Nesting	C	CE	
Red bat	Cottonwood-willow	Breeding			X
Belted kingfisher	Backwaters	Nesting/ winter foraging			X
California brown pelican	Backwaters	Migration and winter	FE	CE; Fully protected	
Bald eagle	Backwaters	Breeding, wintering	FT	CE; Fully protected (Southern Bald Eagle)	
Bonytail chub	Backwaters	All life stages	FE	CE	
Flannelmouth sucker	Backwaters	All life stages			X
Razorback sucker	Backwaters	All life stages	FE, CH designated	CE	
Colorado River pupfish	Springs and marshes	All life stages	FE		
Allen's big-eared bat	Backwaters	Breeding			X
California leaf-nosed bat	Backwaters	Breeding/ Wintering		SC	
Greater western mastiff	Backwaters	Breeding			X
Pallid bat	Backwaters	Breeding		SC	
Pale big-eared bat	Backwaters	Breeding		SC	
Spotted bat	Backwaters	Breeding			X
Big free-tailed bat	Backwaters	Breeding		SC	
Cave myotis	Backwaters	Breeding		SC	

TABLE 3.2-34

Primary Association and Use of Vegetation Communities by Selected Wildlife Species in the Study Area

Common Name	Habitat Association	Habitat Use	Federal Status	California Status	Arizona Wildlife of Concern
Mexican long-tongued bat	Backwaters	Breeding	SC	SC	
Occult little brown bat	Backwaters	Breeding	SC	SC	
Ringtail	Cottonwood-willow	Breeding		FP	
American bittern	Marsh	Breeding			X
California black rail	Marsh	Nesting, foraging, and wintering		CT; Fully protected	
Clark's grebe	Marsh	Breeding			X
Western least bittern	Marsh	Breeding			X
Yuma clapper rail	Marsh	Nesting	FE	CT; Fully protected	
American peregrine falcon	Backwaters and marshes	Winter foraging		CE; CA Fully protected	
Colorado river toad	Backwaters and marshes	All life stages		SC	
Lowland leopard frog	Backwaters and marshes	All life stages			X
Northern leopard frog	Backwaters and marshes	All life stages		SC	X
Sonoran mud turtle	Backwaters	All life stages		SC	
Desert tortoise (Mojave population)	Floodplain, uplands	All life stages	FT		

CE: California Endangered
SC: Species of Special Concern in California or Federal Species of Concern
CT: California Threatened
FE: Federally Endangered
FT: Federally Threatened
C: Candidate
FP: Fully Protected

Fish and Aquatic Resources. Reclamation's model predicted changes in the acreage of open water habitat in the main river channel and in backwater habitats. As described for riparian habitat and backwaters, Reclamation (2000) predicted changes in backwaters and open water in the main river channel for a change in the point of diversion for 400 KAFY, 300 KAFY, and 200 KAFY. This information was used to predict changes in backwaters and open water in the main river channel for the transfer for 130 KAFY and 230 KAFY to capture the range of transfer amounts potentially resulting under the Proposed Project and alternatives.

Wildlife and Wildlife Habitat

Drain Habitat. Drain habitat could be affected by the Proposed Project and alternatives through changes in the amount or the quality of water in the drains. The IID Water Conservation Model (described in Appendix E as the Imperial Irrigation Decision Support System) predicted average annual flows in the drains under the Proposed Project and alternatives. Potential responses of vegetation (both amount and species composition) to flow changes were predicted by considering the magnitude of flow changes; the drought-tolerance of plant species composing drain habitat; and other factors affecting the amount, distribution, and composition of drain habitat (e.g., drain maintenance activities).

Effects of salinity changes on vegetation in the drains were predicted using results from the IID Water Conservation Model. Cattails were the focus of this assessment because of their sensitivity to salinity and their importance as wildlife habitat. Cattails have a low salinity tolerance and provide habitat for some species using the drains. At a salinity below 3 g/L, cattails are not adversely affected. At a salinity of 3 to 5 g/L, growth of cattails is stunted. Cattails are typically absent in water with a salinity greater than 5 g/L.

To estimate the potential effects of water quality on drain habitat under the Proposed Project and alternatives, the number of miles of drains with an average salinity of less than 3 g/L, between 3 and 5 g/L, and above 5 g/L were predicted with the IID Water Conservation Model. The acreage of cattails in the drains was estimated based on Hurlbert (1997) as described in the Existing Environment section. Based on drain mileage, cattails were assumed to be proportionately distributed in drains with salinity less than 3 g/L and between 3 and 5 g/L. Loss of cattail acreage was predicted from the reduction in miles of drains with a salinity of less than 5 g/L relative to existing conditions under the Proposed Project and alternatives. The total acreage of cattails remaining under each alternative was then assumed to be proportionately distributed in drains with salinity less than 3 g/L and between 3 and 5 g/L.

Tamarisk Scrub Habitat. The Proposed Project and alternatives could reduce flows in the New and Alamo Rivers. Potential changes in tamarisk scrub adjacent to the New and Alamo Rivers were evaluated, based on changes in flows in these two rivers under the Proposed Project and alternatives. The IID Water Conservation Model predicted average annual flows in the New and Alamo Rivers under the Proposed Project and alternatives. Potential responses of tamarisk scrub to flow changes were predicted by considering the magnitude of flow changes and the drought tolerance of tamarisk.

Other potential effects of the Proposed Project and alternatives to tamarisk scrub include removal of tamarisk during construction to install water conservation measures. These potential effects were determined by identifying whether water delivery system improvements would be in areas known or likely to support tamarisk scrub habitat.

Wildlife Resources. Under the Proposed Project and alternatives, wildlife resources could be affected by changes in the amount or quality of habitat, changes in water quality, or disturbance during construction to install water conservation measures. Special-status species were the focus of the evaluation of potential impacts to wildlife resources. By focusing on special-status species, it was assumed that the most sensitive species and those potentially experiencing the greatest impact would be addressed. Other species using the same habitats were assumed to respond similarly. The special-status species potentially occurring in the IID water service area and AAC were assigned to one or more of the following groups based on their primary habitat association:

- Drain habitat associates
- Tamarisk scrub habitat associates
- Agricultural field habitat associates
- Desert habitat associates

Species associated with wetland habitat were classified as drain habitat associates and species associated with riparian habitat were classified as tamarisk scrub habitat associates (Table 3.2-14). Desert and agricultural field habitat associates were as indicated in Table 3.2-14. Potential impacts to special-status species were evaluated for these habitat groups, based on predicted changes in the amount or quality of habitat and the occurrence of construction or operation of water conservation practices in each habitat. When necessary to fully evaluate and disclose potential impacts of the Proposed Project and alternatives, individual species were addressed. Species associated with aquatic habitat were those typically found at the Salton Sea or other relatively large water bodies in the Imperial Valley (e.g., Finney and Ramer Lakes). Impacts to these special-status species are evaluated under the Salton Sea section.

Fish and Aquatic Resources. Fish and aquatic habitat could be affected by the Proposed Project and alternatives from reductions in flows in the rivers or drains, changes in vegetation that affect aquatic habitat quality, or changes in water quality. Water quality and flows in the drains and rivers were predicted for the Proposed Project and alternatives using the IID Water Conservation Model. The products of the model include predictions of average flow in the drains and rivers, and average concentrations of several constituents of concern. Impacts to aquatic habitat were assessed, based on changes in flow under the Proposed Project and alternatives.

Water Quality Effects on Biological Resources. Changes in water quality in the drains and rivers were predicted using the IID Water Conservation Model. This model predicts average monthly water quality for eight categories of constituents of concern. Estimates of water quality conditions under existing conditions, represented by the historic Baseline, and the Proposed Project and alternatives are presented in Section 3.1, Hydrology and Water Quality. Output from the model is summarized as average monthly concentrations and as the miles of drains with certain constituent concentrations. Water quality impacts were evaluated relative to the significance criteria in Section 3.1.4.2.

Although eight water quality categories, including individual classes of pesticides and nutrients, were available as model output, the water quality impacts presented here and in Section 3.1 (Hydrology and Water Quality) are limited to model results for TSS, TDS, and selenium. The limited number of field samples available for the pesticides precludes their usefulness as model output presentations and interpretations. As discussed in Section 3.1, the model output for those parameters is not precise enough to predict water quality exceedances. Nitrogen and phosphorus predictions are more precise, but water quality standards for those parameters are not available and their impacts to downstream nutrient enrichment are extremely difficult to predict. Boron concentrations do not exceed water quality concentrations of concern under the Proposed Project and alternatives.

The three constituents with the greatest degree of accuracy of model results and greatest importance in predicting project impacts are selenium, TSS, and TDS. Selenium is of particular concern because of its prevalence in the supply water, concentration effects through agricultural practices, and potential for food chain accumulation and toxicity in aquatic environments. TDS is a direct measure of salinity loading to the Salton Sea and a useful surrogate for all dissolved water constituents. It also is a direct measure of suspended sediment concentrations for those constants where results are not presented increases or decreases relative to Baseline can be assumed based on their tendency to be mobilized as dissolved constituents (boron, nitrogen) or with the particulate fractions of runoff (phosphorus, organochlorine and organophosphorus compounds) and sediment loadings, and a surrogate for all particulate-associated compounds.

Water delivery system improvements and on-farm irrigation system improvements, in combination, could contribute to increased selenium concentrations in drainwater and affect reproductive success of some Proposed Project covered species associated with drain habitat. The potential effect of the water conservation activities on selenium concentrations in drainwater and the subsequent potential effects on reproductive success were predicted using results from the IID Water Conservation Model and mathematical equations that relate selenium concentrations in water-to-egg concentrations and hatchability as described below.

Prediction of Selenium Concentrations. The IID Water Conservation Model predicted selenium concentrations (parts per billion [ppb]) in drainwater at specific locations (nodes)[5] in the drainage system over a 12-year period for the following scenarios:

- Capped Baseline conditions (No Project alternative)
- Conservation of 300 KAFY consisting of 130 KAFY from on-farm irrigation water delivery system improvements and 170 KAFY from on-farm irrigation system improvements, system improvements, or Fallowing (Proposed Project)
- Conservation of 130 KAFY from on-farm irrigation system improvements (Alternative 2)
- Conservation of 230 KAFY consisting of 130 KAFY from on-farm irrigation system improvements and 100 KAFY from water delivery system improvements (Alternative 3)
- Conservation of 300 KAFY through Fallowing (Alternative 4)

On-farm irrigation system improvements of 130 KAFY (Alternative 2) are the lowest level of conservation under the IID/SDCWA water conservation and transfer agreement. Under the Quantification Settlement Agreement (QSA), a minimum of 230 KAFY is to be conserved. The maximum amount of water that can be conserved using water delivery system improvements is 100 KAFY. The maximum amount of conservation and transfer is 300 KAFY under both agreements. Thus, the scenarios reflect the range of water

[5] In the IID Water Conservation Model, nodes were located at the end of each drain where the drain empties into the New or Alamo River or the Salton Sea.

conservation levels (130 KAFY to 300 KAFY) and techniques (up to 100 KAFY water delivery system improvements).

Implementation of on-farm irrigation system improvements will vary from year to year and cannot be predicted with certainty for each node. Therefore, a number of model runs for each level of conservation were completed, and the average selenium concentration at each node over the runs was computed for use in the analysis of potential toxic effects. The number of miles of drain associated with each node was used to compute summary statistics that express the overall number of miles of drain with waterborne selenium concentrations in the following categories:

0-5 ppb	5-6 ppb	6-7 ppb	7-8 ppb	8-9 ppb
9-10 ppb	10-11 ppb	11-12 ppb	12-13 ppb	>13 ppb

For both the conversion from waterborne selenium to egg selenium concentrations and the probability of effects on hatchability (following discussion), the upper end of each concentration category was used (e.g., 5, 6, 7… ppb). For the category representing greater than 13 ppb of waterborne selenium, the maximum selenium concentration predicted by the model under each conservation level was used.

Conversion of Waterborne Selenium to Egg Selenium Concentration. Based on samples of eggs from 18 pond systems and 3 non-drainwater reference sites in the San Joaquin Valley (Skorupa et al. unpublished data), there is a strong correlation between mean waterborne selenium and mean egg concentrations ($r=0.901$, $N=36$, $P<0.01$), with the following regression equation for the relationship as reported by Ohlendorf et al. (1993) for black-necked stilt:

$$\log \text{egg Se } (\mu g/g) = 0.44 + 0.434 \log \text{water Se } (\mu g/l)$$

Based on this relationship, the predicted selenium concentrations in drainwater were converted to selenium concentrations in eggs for black-necked stilt. Black-necked stilt was used because of the extensive data available on this species and because it displays an intermediate level of sensitivity to selenium (Skorupa 1998). The "stilt standard" is considered the appropriate standard for generalized assessments of toxic impacts (Skorupa 1998).

Probability of Toxic Effects from Selenium. Based on the predicted concentration of selenium in eggs for black-necked stilt, the probability of effects on the hatchability of eggs was computed from the following logistic equation reported in Skorupa (1998):

$$P(>1 \text{ inviable egg}) = EXP(-2.327 + 0.0503[\text{selenium conc.}]) / \{1 + EXP(-2.327 + 0.0503[\text{selenium conc.}])\}$$

Although the probability of teratogenic effects (e.g., embryonic deformities) could have been used as a measure of potential impact, egg hatchability was chosen as the response variable for assessing the potential impact of selenium toxicity because of the relative insensitivity of teratogenesis as a response variable. Egg hatchability effects were expressed as the probability of a hen producing a clutch in which at least one egg was inviable (did not hatch). Hatchability effects were corrected for background rates of inviability as described in Skorupa (1998).

Computation of Habitat by Increased Selenium. The number of drain miles at each selenium concentration and the probability of hatchability effects at that concentration were used to predict the potential effect at each level of water conservation. The probability of hatchability effects in each category of waterborne selenium concentration was multiplied by the number of miles in each category as predicted with the IID Water Conservation Model and summed over all categories to estimate the number of miles of drain habitat affected by waterborne selenium. This estimate is not the total number of miles of drain habitat that would be affected (even minimally) by waterborne selenium, but rather, is an estimate of the "equivalent" number of miles that would be fully (i.e., 100 percent) affected by waterborne selenium. For example, 100 miles of drain habitat with a 10 percent (i.e., 0.10) probability of hatchability effects is "equivalent" to 10 miles of fully affected habitat (100 x 0.10). The hatchability effects were presented at the level of the clutch (or hen) rather than at the level of an individual egg.

SALTON SEA

Adjacent Wetlands and Shoreline Strand. Tamarisk scrub is supported in areas adjacent to the Salton Sea and along its immediate margins. Where freshwater is available, cattails and bulrush vegetation can develop. Changes in the surface water elevation can affect the amount and distribution of these plant communities adjacent to the Salton Sea. The potential response of tamarisk scrub and cattail/bulrush areas adjacent to the Salton Sea were evaluated to consider likely sources of water supporting these communities, the magnitude of reductions in water surface elevation, and ability of tamarisk to colonize new areas. The surface water elevation of the Salton Sea was predicted for the Proposed Project and alternatives using a model developed by Reclamation. This model is described in Section 3.1.4.1.

Aquatic Resources. Potential impacts to aquatic resources under the Proposed Project and alternatives relate to changes in the rate of salinization of the Salton Sea resulting from reduced inflows. Reclamation developed a model Sea that predicts the average salinity of the main body of the Salton Sea at inflow levels expected under the Proposed Project and alternatives over a 75-year period. Changes in fish and invertebrate resources were evaluated, based on predicted changes in salinity and species-specific salinity tolerances (Table 3.2-35). The long-term persistence of fish and invertebrate species in the Salton Sea depends on their ability to complete their life cycles. Therefore, the salinity threshold for life-cycle completion was used to evaluate changes in the invertebrate and fish resources. Even though adults of some species, particularly long-lived fish species, could persist at higher salinity levels, their populations would eventually decline as the older fish died.

Avian Resources. Potential impacts to birds at the Salton Sea relate to changes in the fish and invertebrates on which birds forage, in the amount of shallow water and mudflat habitat, and in the suitability of nesting and roosting sites for colonial species. Increases in the salinity of the Salton Sea could change the abundance and composition of fish and invertebrate resources. Reductions in the surface water elevation could change the amount of shallow water and mudflat habitat. Snags and islands used for nesting also could be affected by reductions in the surface water elevation that result in these areas becoming accessible from the mainland.

TABLE 3.2-35
Salinity Occurrence and Tolerance Data for Species Inhabiting the Salton Sea

Invertebrates (Scientific/Common Name)	Collection	Life-Stage Survival	Life-Cycle Completion	Population Maintenance
Brachionus plicatilis (rotifer)	76	50	48-50	40
Apocyclops dengizicus (copepod)	75	79	68	51
Cletocamptus deitersi (copepod)	44 [a]	107	80	80
Balanus amphitrite (barnacle)	44 [a]	60	60	50
Nereis succinea (pileworm)	44 [a]	67.5	50	–
Gammarus Mucronatus (amphipod)	50	57	–	–
Trichlcorixa reticulata (waterboatman)	200	100	–	–
Fish (Scientific/Common Name)				
Cynoscion xanthulus (orangemouth corvina)	44 [a]	57.5	40 [b]	–
Bairdiella icistia (Gulf croaker)	44 [a]	55	55	–
Anisotremus davidsonii (sargo)	44 [a]	52.5	50	–
Oreochromis mossambica (tilapia)	120	70	60 [c]	–
Cyprinodon macularius (desert pupfish)	90	70	70	–
Mugil cephalus (mullet)	80	126	–	–
Poecilia latipinna (sailfin molly)	87	80	–	–
Gillichthys mirabilis (longjaw mudsucker)	82.5	–	75	–

Explanation of columns:
Collection. Refers to the salinity at a site where an organism was collected in nature.
Life-Stage Survival. The maximum salinity, in experimental work, at which one or more life stages of a species can survive for an extended time, but where completion of the entire life cycle has not been established.
Life-Cycle Completion. The maximum salinity, in experimental work, at which completion of a species' entire life cycle has been demonstrated. This salinity theoretically should always be lower than the life stage survival salinity.
Population Maintenance. The maximum salinity, in experimental work, at which population growth has been demonstrated and theoretically should be lower than the life cycle and life stage salinity values.

Notes:
Salinity concentrations in g/L
-: no data
a: Based on current conditions of Salton Sea.
b: Juvenile corvina have been observed under current conditions 44 g/L. This may indicate either a higher salinity tolerance than previously recorded, or successful reproduction is occurring in areas with lower salinity levels.
c: Costa-Pierce and Riedel (2000a)

Source: Salton Sea Science Subcommittee (1999).

Potential effects to birds from changes in fish and invertebrate resources were determined based on the changes to these resources expected as a result of increased salinity and the food habits of bird species using the Salton Sea. To assess potential effects to colonial nesting/roosting birds, colonial nest and roost sites at the Salton Sea were identified (Shuford et al. 2000), and the depth of water separating these sites from the mainland was estimated from discussions with biologists knowledgeable of specific sites at and bathymetry data available for the Salton Sea. Water surface elevations predicted with

Reclamation's Salton Sea model were used to determine when colonial nest and roost sites would connect to the mainland under the Proposed Project and alternatives.

Potential impacts to shorebirds were assessed by evaluating potential changes in the amount of mudflat and shallow water habitat. Two metrics were used to represent the amount of mudflat and shallow water habitat: (1) total shoreline length and (2) acreage of water less than 1 foot deep. These metrics were calculated from bathymetric data from the University of Redlands for the water surface elevations that Reclamation's Salton Sea model predicted under the Proposed Project and alternatives.

Subregions Excluded From Impact Analysis

No impacts to biological resources would occur in the SDCWA service area geographic subregion because no construction of new facilities or changes in operation of existing facilities would occur. Furthermore, operation of SDCWA service area facilities would not change because the Proposed Project would replace water for the SDCWA service area and, therefore, would not change the total amount of water in the SDCWA service area. The SDCWA Service Area is not included in the impact discussions for each of the alternatives below.

Operation and Maintenance Activities

Activities proposed for coverage under the HCP include IID's operation and maintenance activities associated with its water conveyance and drainage system. IID's operation and maintenance activities would not differ among the Proposed Project and alternatives. These activities and their effects on habitats and special-status species proposed for coverage are described in the HCP (Appendix C). This section focuses on the effects of the implementation of the water conservation and transfer project and associated HCP on biological resources.

3.2.4.2 Significance Criteria

For this analysis, the Proposed Project would have a significant impact if it:

- Causes a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFG or USFWS
- Causes a substantial adverse effect on native riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG or USFWS
- Causes a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruptions, or other means
- Interferes substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native fish and wildlife nursery sites
- Conflicts with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

- Conflicts with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

3.2.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Under the Proposed Project, IID would conserve 300 KAFY of water for transfer to SDCWA, CVWD, and/or MWD. Conservation and transfer of 300 KAFY of water is assumed for the analysis of the Proposed Project to capture the maximum potential impact. At least 200 KAFY and up to 300 KAFY of the water conserved would be diverted at Parker Dam rather than at Imperial Dam. If all conserved water is transferred to SDCWA or MWD, the reduction in flows below Parker Dam would be 300 KAFY. If 100 KAFY is transferred to CVWD, the reduction would be 200 KAFY. This change in the point of diversion for 200 to 300 KAFY of water from Imperial Dam to Parker Dam would reduce the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. The method of water conservation would not influence the flow levels resulting in the LCR under the Proposed Project; thus, the evaluation focuses on the level of water conservation. Under the Proposed Project, Reclamation would implement a number of conservation measures on the LCR. Thus, combined effects of the flow reductions and conservation measures are considered.

Change in Water Surface Elevations. The flow of the Colorado River between Parker and Imperial Dams generally is set at the amount needed to meet diversion requirements in the United States plus treaty obligation deliveries to Mexico. Exceptions occur during periods of surplus river flow or unanticipated rainstorms, and when delivery requirements are less than 2,000 cfs, the minimum flow rate generally provided.

Post-project analysis of water surface elevations was undertaken, based on modeling performed by Reclamation in 1991 and 2000. The modeling utilized CRSS, a detailed computer model of the entire Colorado River System, used regularly by Reclamation to analyze operation of federal reservoirs. These complex models are the only analytical tools of their kind available to perform this type of impact assessment.

During the spring, summer, and fall, the average monthly flow of the river as it approaches Imperial Dam varies between 9,000 and 11,000 cfs. During winter months, the average monthly flow drops to about 5,000 cfs. River flows are determined by release schedules from the dams, and water levels vary throughout the day. At Parker Dam, this variation is on the order of 5 feet (60-inches) during summer peak irrigation season and about 2.5 feet (30-inches) in winter low demand periods. Flow variations are dampened by channel storage downstream of Parker Dam and average about 0.5 feet daily fluctuation at Imperial Dam.

The 1991 study used the CRSS model to predict LCR discharge and stage for an assumed maximum transfer volume of 480,000 acre-feet. The 2000 modeling used the updated CRSS for 20 transects at stations throughout the river channel between Parker Dam and Imperial Dam. Average water levels at each of these transects were determined, based on measured values for existing conditions, and were computed and calibrated for total annual reductions in flow volume in increments of 100,000 acre-feet, ranging from 100 KAF to 1.6 MAF.

For a total annual flow reduction of 400 KAF, average water surface elevations throughout the Parker Dam to Imperial Dam river segment ranged from a low of 0.03 feet (0.5 inch) to a high of 0.37 feet (4.48 inches). This 2000 model result is very consistent with the previous 1991 analyses, which concluded that: "Reduction of the river's discharge below Parker Dam by 480 KAFY...would cause, at most, a 4-inch reduction in average water surface elevations when more or less normal flows occur." (page 2, Findings and Conclusions; *Assessment of Cumulative Impacts on the Colorado River from Water Projects That Would Reduce Releases from Parker Dam*, April 1991, Bureau of Reclamation, Lower Colorado Region, Boulder City, Nevada).

Under terms of the water conservation and transfer agreement, these total depletion levels would occur incrementally over 10 to 20 years or more. Assuming the minimum time of 10 years to estimate maximum potential impacts conservatively, and using the more refined 2000 model data, water surface elevations are predicted to decrease in a range from 0.05-inch to a maximum of 0.45-inch annually over the minimum 10-year period. At completion of full diversion volumes, the change in average water surface elevation would range from 0.5 to 4.48 inches. At this maximum flow depletion condition, exposed shoreline along the river channel would range from about 1 inch (for the 0.5-inch water surface elevation drop) to a maximum of about 10 inches (for the 4.48-inches water surface elevation drop).

The 10 to 20 year implementation time permits substantial adjustment to this change in average water levels, as successional colonization of plants occurs naturally along the new wetted perimeter. Even in backwater and slough areas, plant root systems should be able to adjust to the very minor water levels reductions occurring in minute increments over a prolonged period. The 2000 analysis focused on cumulative effects of the 400 TAF as a part of the total 1.574 MAF considered under the LCR MSCP. Conclusions of the 1991 analysis, limited to a total flow volume change of 480 TAF and, therefore, more representative of the project-specific impacts contemplated here include:

- A 4-inch reduction in water level during normal flow would reduce the surface area of the LCR and the backwaters along the LCR by 30 acres at most, less than 1 percent of the total, during normal flow conditions, against a background of greater changes in area caused by fluctuations of the LCR.
- Riparian and marsh vegetation would adapt to the minor shift in average bank line.
- Fish spawning would not be impacted.
- Recreation on the Colorado River would not be impacted.
- The flow weighted average salinity of the Colorado River at Imperial Dam would be increased by approximately 5 mg/L by all the water projects.
- The water projects and resulting changes in river operation would reduce hydropower generation along the river by approximately 36 million kWh per year.

(Bureau of Reclamation, Lower Colorado Region, April 1991)

Low Flow Conditions. Reclamation's 1991 analysis addressed potential effects of 480 KAF diversions on low flows in the LCR as well. Their conclusions follow.

Projected average monthly flow without the projects would be about 10,000 cubic feet per second (cfs). A reduction of river discharge below Parker Dam of 480,000 acre-feet would reduce the average monthly flow below Cibola Lake (a point between Blythe, California, and Imperial Dam) by about 700 cfs in April and August, critical months from a biological standpoint. The reduction in flow would occur gradually over more than a decade. ... From April through September, flows with the projects range from 93 percent to 94 percent of flows without the projects.

The water level in the river downstream from Parker Dam fluctuates in a pattern set by dam releases. Upstream from the Palo Verde Diversion Dam near Blythe, California, the highs and lows are directly influenced by the pattern of releases from Parker Dam, which is high during the day and low at night. Typically, there is a summer fluctuation of 5 feet (winter, 2.5 feet) immediately downstream from Parker Dam. This fluctuation gradually attenuates as the river flows downstream. The river water level upstream from Imperial Dam has a daily fluctuation of about one-half foot, superimposed on monthly and yearly fluctuations of several feet.

Results of the analysis indicate that upstream from the Palo Verde Diversion Dam near Blythe, California, the daily fluctuations (highs and lows) would be unaffected in magnitude. The duration of the highs would decrease slightly. Downstream from the Palo Verde Irrigation District, centered near Blythe, implementing all projects would cause, at most, a 4-inch reduction in average water surface elevations when more or less "normal" flows occur in the Imperial Division (area of greatest biological concern). This reduction would occur against the background of continually fluctuating River flow and water levels, *in which the minimum and maximum flows would remain unchanged.* (emphasis added)

The total change in average water surface levels attributable to the IID water conservation and transfer project (4.5 inches) is substantially less than the normal water surface elevation changes of approximately 2.5 to 5.0 feet, which occur under the existing flow regimen between Parker and Imperial Dams. Under these average reduced flows, the new exposed shoreline area along the LCR and in backwater and slough areas is predicted to be approximately 1 inch to a maximum of 10 inches and would occur in small increments over an extended period such that they would be less than 15 percent (maximum) of the baseline daily fluctuation levels in any one year.

Based on all available evidence for determining water surface elevation changes, it is concluded that the transfer could have potentially significant adverse impacts to habitat in riparian and backwater marsh areas along the LCR. As an individual project, this small increment of water level reduction would not substantially diminish the value of habitat for any species, or cause the direct demise of any species associated with those habitats. However, using the worst-case methodology, the reduction of LCR flows by about 400,000 acre-feet annually could contribute to a potentially significant cumulative impact on habitat areas along the LCR corridor between Parker Dam and Imperial Dam.

The federal analysis was not based on standards for cumulative impact assessment prescribed by the California Environmental Quality Act. The CEQA Guidelines provide that the definition of cumulative impacts should be based on reasonably foreseeable related actions (section 15130). The only known and reasonable foreseeable diversions identified at this time are those covered by this transfer and the Quantification Settlement Agreement, totaling up to 400,000 acre-feet.

The cumulative diversions included in the federal analysis totaled 1.574 million acre-feet based on speculative projections of total water supplies that could be sought by the lower basin states over the next 50 years, and quantified at that speculative level for purposes of a very different biological planning effort (the Lower Colorado River Multi-Species Habitat Conservation Plan).

All agencies party to the transfer desire to meet the required implementation goals for the QSA and California Water Plan. With those goals in mind, and notwithstanding concerns regarding the overestimation of potential impacts and mitigation needs, the transfer parties are prepared to accept the findings of potentially significant impacts to habitat along the Lower Colorado River and implement a host of conservation and habitat enhancement measures to ensure that any potential impacts to the habitat, and to the species reliant on that habitat, are fully offset and mitigated.

Reclamation's Biological Assessment completed in 2000 provided federal assessment of potential river impacts attributable to this transfer and other related transfer actions up to 400,000 acre-feet, and a Biological Opinion was issued by the USFWS (January 2001) which does identify habitat enhancement measures required to mitigate all potential habitat impacts identified for NEPA purposes and to satisfy requirements of the federal Endangered Species Act. These habitat enhancement measures are described below, and implementation of these measures would effectively reduce all potential habitat and related species impacts below a level of significance (less than significant; fully mitigated). (Reclamation 2000. *Proposed Interim Surplus Criteria, Secretarial Implementation Agreements for California Water Plan Components, and Conservation Measures on the Lower Colorado River*; U. S. Fish and Wildlife Service 2001. *Biological Opinion for Interim Surplus Criteria, Secretarial Implementation Agreements, and Conservation Measures on the LCR, Lake Mead to the Southerly International Boundary Arizona, California and Nevada.* Phoenix, Arizona, January.)

Impact avoidance to habitat and related species can be accomplished by implementing a variety of habitat improvement and species actions, including a mix of:

- Restoration or enhancement of existing degraded or marginal habitat
- Construction of new habitat
- Fish rearing and stocking
- Measures to remove and control exotic species and other pest management measures
- Purchase of conservation easements or fee title lands for long-term preservation
- Construction of nesting boxes and/or platforms

With implementation of suitable mitigation, and particularly as the mitigation actions will be put in place incrementally prior to development of the full transfer volume, potential effects on species and their habitat can be avoided and reduced to levels that are less than significant.

Because this project-specific analysis comes later in time than the federal document for purposes of the BO, consultation has not been completed with the California Department of

Fish and Game. Consultation was initiated in fall of 2000, and is ongoing, and the transfer parties acknowledge their obligations under the California Endangered Species Act (CESA). The parties will consult with CDFG to determine the required actions to satisfy applicable requirements of the State Fish and Game Code. The transfer parties goal is to work with CDFG to identify measures that avoid, minimize and mitigate potential significant impacts to California species. If mitigation is necessary to offset impacts, the transfer parties will work with CDFG and USFWS to establish proportionate mitigation acreage in California to the extent feasible and reasonable.

Impact BR – 1. Reduced Flow Levels in the LCR Could Reduce the Acreage of Cottonwood-Willow Communities. Under the Proposed Project, the reduced flows in the LCR between Parker and Imperial Dams would reduce the surface water and adjacent groundwater elevation in this reach of the River. This drop in surface water and groundwater elevation could adversely affect the persistence and future establishment of cottonwood-willow communities between Parker and Imperial Dams. Of the vegetation communities in the study area, cottonwood-willow is the most susceptible to changes in the groundwater elevation. A reduction in the groundwater elevation can cause mortality of established cottonwoods and willows. Further, regeneration of cottonwood and willow can be adversely affected by a drawdown of groundwater, especially when high groundwater provides a moist seedbed during the short period of native seed dispersal.

Occupied southwestern willow flycatcher habitat was used to represent cottonwood-willow habitat. Under the Proposed Project, 186 to 279 acres of cottonwood-willow habitat would experience reduced surface water and groundwater levels, depending on the amount of water transferred to SDCWA and MWD (Table 3.2-36). The response of individual cottonwood-willow stands to this change would vary according to many factors not captured in the analysis. Thus, the actual changes in the cottonwood-willow community that would result from reduced surface water and groundwater elevations cannot be predicted. Nevertheless, up to 279 acres of occupied southwestern willow flycatcher habitat (predominantly cottonwood-willow) could be lost.

TABLE 3.2-36
Acreage of Cottonwood-Willow/Salt Cedar Habitat Occupied by Southwestern Willow Flycatchers Between Parker and Imperial Dams Affected by the Proposed Project and Alternatives

Habitat Type	Total Acres in Study Area	Proposed + Alt 4[b] (300 KAF[a])	Alt 3 (230 KAF[a])	Proposed + Alt 4[c] (200 KAF[a])	Alt 2 (130 KAF[a])
Occupied Cottonwood-Willow/Salt cedar Habitat	1,529	279	214	186	121

[a] Estimated as proportion of impacts from 1.574 MAF.
[b] All 300 KAFY of water conserved is transferred to SDCWA and/or MWD.
[b] 100 KAFY of water conserved is transferred to CVW.D
Source: Reclamation 2000.

Reclamation also estimated that 5,404 additional acres of cottonwood-willow habitat not currently occupied by willow flycatchers occur along the LCR between Parker and Imperial Dams. The lowering of the groundwater predicted between Parker and Imperial Dams under the Proposed Project could further reduce growth and development of some of this habitat. However, as noted, the actual response of individual stands would vary according to many factors not captured in the analysis.

Under the Proposed Project, Reclamation would implement the following measures to address impacts to southwestern willow flycatchers:

- Monitor 372 acres of occupied habitat that could be affected by the change in the point of diversion for 400 KAF of water
- Restore and maintain 372 acres of new replacement willow flycatcher habitat along the LCR within 5 years of execution of the SIA that provides federal approval for the water transfer actions
- Restore and maintain additional habitat (up to 744 acres) if monitored habitat is found to be affected

Through these measures, Reclamation would replace cottonwood-willow habitat occupied by willow flycatchers that is affected by reduced flows and, depending on monitoring results, potentially increase the amount of cottonwood-willow habitat. Thus, impacts to cottonwood-willow habitat along the LCR would be less than significant. (Less than significant impact.)

Impact BR – 2. Reduced Flow Levels in the LCR Could Reduce the Acreage of Honey Mesquite Bosque Communities. Establishment and persistence of honey mesquite communities could be affected by the reduction in surface water and groundwater elevation between Parker and Imperial Dams. Although groundwater is the primary source of water for the maintenance of mesquite bosques, additional water is derived from surface flow (e.g., flooding) and precipitation (Minckley and Brown 1982; Stromberg et al. 1992). Some honey mesquite could be lost because of reduced groundwater levels, but the relative magnitude of the impact would be less than for cottonwood-willow habitat because honey mesquite is less sensitive to groundwater changes. Because honey mesquite bosque does not provide primary habitat for special-status species, potential changes in the acreage or structural characteristics of honey mesquite under the Proposed Project would be a less-than-significant impact. (Less than significant impact.)

Impact BR – 3. Reduced Flow Levels in the LCR Could Reduce the Acreage of Screwbean Mesquite Bosque Communities. Under the Proposed Project, establishment of screwbean mesquite bosque could be adversely affected by the decrease in surface water and groundwater elevations. Mesquite seedlings that germinate in areas with low soil moisture have low survivorship (Stromberg 1993), and mortality, stunting, or extremely slow growth occurs at soil moisture levels of less than 2 percent (Reclamation 1988). Thus, changes in surface water or groundwater elevations could reduce the suitability for mesquite in some areas. The amount or structural characteristics of screwbean mesquite could be altered by reduced surface water or groundwater levels. However, because screwbean mesquite bosque does not provide primary habitat for special-status species, these potential changes would be a less-than-significant impact. (Less than significant impact.)

Impact BR – 4. Reduced Flow Levels in the LCR Could Reduce the Acreage of Backwater Habitat. Because the amount and quality of backwater habitat along the LCR are affected by surface water elevation, the Proposed Project would directly affect backwaters along the

LCR between Parker and Imperial Dams. Table 3.2-37 shows the acreage of backwaters (open water and emergent vegetation) affected at the range of water conservation levels under the Proposed Project. Between 22 and 33 acres of backwaters could be affected, depending on the amount of water transferred to SDCWA and/or MWD.

TABLE 3.2-37
Acreage of Backwaters between Parker and Imperial Dams Affected by the Proposed Project and Alternatives

Habitat Type	Proposed + Alt 4[b] (300 KAF[a])	Alt 3 (230 KAF[a])	Proposed + Alt 4[c] (200 KAF[a])	Alt 2 (130 KAF[a])
Backwater – open water	12	9	8	5
Backwater – emergent	21	16	14	9
Backwater Total	**33**	**25**	**22**	**14**

[a] Estimated as proportion of impacts from 1.574 MAF
Source: Derived from USFWS (2001).

The acreage and characteristics of open water and marsh in backwaters would be reduced. The water depth of the backwaters would decrease, and there could be a chemical change to the water with an increase in the concentrations of dissolved salt, fertilizers, and pesticides as the water volume decreases. Water temperature could increase throughout the backwaters as the volume of water is decreased under the Proposed Project.

The vegetated portion of backwaters between Parker and Imperial Dams would be directly affected by the reduced surface water and groundwater levels. Because marsh vegetation zones characteristically occur as a series of concentric rings that follow basin contours and reflect the relative depth and duration of flooding, they would reflect a decrease in surface water and groundwater (Kramer 1988). As marshes dessicate, salt cedar could replace the cattails at the margins. Dense stands of three-square bulrush, which occur in patches under specific conditions where water is only centimeters deep, could also be adversely affected as those sites dry (Todd 1986). Dessication of marshes also would directly affect the establishment of marsh vegetation. Cattails and bulrush seeds germinate under shallow water or damp soil conditions, and spread into deeper water. Decreased water levels in a marsh could elevate water temperatures and salinity, which could inhibit seed germination (Ungar 1978; Galinato and Van der Valk 1986). The Proposed Project could change the species composition and occurrence of emergent perennials usually found in marshes along the LCR. As marshes dessicate from the edges inward, the conditions for invasion by the common reed (*Phragmites australis*) or giant reed (*Arundo donax*) are created, resulting in a potential indirect impact. Additionally, these two reeds could displace willows that could otherwise become established along the marsh edges.

Under the Proposed Project, Reclamation would restore 44 acres of backwater habitat along the LCR between Parker and Imperial Dams. With this replacement of backwater habitat affected by reduced flows, impacts of the Proposed Project to backwater habitat along the LCR would be less than significant. (Less than significant impact.)

Impact BR – 5. Reduced Acreage of Cottonwood-Willow Vegetation Could Affect Special-Status Species. Based on predicted changes in surface water and groundwater elevations, up to

279 acres of cottonwood-willow habitat could be affected by the Proposed Project. Effects of reduced surface water or groundwater levels could be manifested as reduced total acreage of cottonwood-willow habitat or changes in the species composition or structural characteristics of the habitat. Special-status species associated with cottonwood-willow habitat could be affected by these changes.

Thirteen special-status bird species nest in the cottonwood-willow community (Table 3.2-34). Changes in the structural characteristics and species composition could increase mortality in those nests exposed to higher solar radiation and air temperatures (Walsburg and Voss-Roberts 1983; Serena 1986; Hunter et al. 1987). The loss of cottonwood-willow could affect the species composition and quantity of the insect prey base on which these birds depend during the breeding season. As a result, less offspring could survive. Because these are neotropical migrants, an increased number of adults and juveniles could fail to survive the migration because they did not gain sufficient mass during the summer.

Southwestern willow flycatchers primarily occupy cottonwood willow habitat, but can also use salt cedar (Reclamation 2000). The occupied acreage of habitat is shown in Table 3.2-36. Of those 1,529 acres (Table 3.2-36), up to 279 acres of occupied habitat could be affected by the Proposed Project (Reclamation 2000). Other special-status species similarly affected by the potential loss of cottonwood-willow habitat are:

- Western yellow-billed cuckoo
- Arizona Bell's vireo
- Gila woodpecker
- Gilded flicker
- Elf owl
- Summer tanager
- Yellow warbler
- Long-eared owl
- Cooper's hawk
- Harris hawk
- Mississippi kite
- Red bat
- Colorado River hispid cotton rat
- Yuma hispid cotton rat

As described in Impact BR-1 under the Proposed Project, Reclamation would replace cottonwood-willow habitat occupied by willow flycatchers that is affected by reduced flows, and depending on monitoring results, potentially increase the amount of cottonwood-willow habitat. As a result, impacts to other special-status species associated with cottonwood-willow habitat along the LCR would be less than significant. (Less than significant impact.)

Impact BR – 6. Reduced Acreage of Open Water in Backwaters Could Affect Special-Status Wildlife Species. Special-status wildlife species that could use open water habitat in backwaters are:

- Bald eagles
- California brown pelicans

- Belted kingfishers
- Several bat species (see Table 3.2-34)
- Sonoran mud turtles

Bald eagles, brown pelicans, and kingfishers could forage for fish in open water portions of backwaters, and the bat species could seek out backwaters as a water source. Under the Proposed Project, these species would not be adversely affected by the small change in backwater habitat because they do not depend on backwaters and other aquatic habitats that these species could use and are available and abundant in the LCR Geographic Subregion (e.g., reservoirs).

Backwaters are primary habitat for the highly aquatic Sonoran mud turtle. Changes in water chemistry resulting from less water in backwaters could affect benthic organisms and submergent vegetation on which the turtle feeds. The turtle uses backwaters adjacent to native vegetation that provide the food base for development of aquatic invertebrate biomass and avoids areas lined by salt cedar, which do not provide a suitable food base (Jennings et al. 1994). Also, the turtle could be affected by increased water temperature or changes in the vegetative cover adjacent to backwaters, which removes the places in which the turtles can escape the summer heat. As described in Impact BR-4 under the Proposed Project, Reclamation would restore 44 acres of backwaters. Thus, impacts to this habitat and the Sonoran mud turtle would be less than significant. (Less than significant impact.)

Impact BR – 7. Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species. The zone patterns in vegetation, resulting from variations in water availability, result in different types of wildlife habitat (Weller 1978). Special-status species associated with marsh habitat could be adversely affected by changes in emergent vegetation along the LCR under the Proposed Project.

Between 14 and 21 acres of emergent vegetation habitat (Table 3.2-37) could be affected by the Proposed Project. Effects to emergent vegetation could be manifested as changes in the total acreage of vegetation, water depths, vegetation structure and composition, water temperature, and other water quality parameters. A reduction in the acreage could directly affect the population size of special-status species. Changes in vegetation structure and composition, water depth, and water quality parameters could affect habitat quality, which could affect survival rates and reproductive success of special-status species. Special-status species associated with marsh habitat along the LCR and that could be affected by these changes emergent vegetation are:

- California black rail
- Yuma clapper rail
- American bittern
- Least bittern
- Colorado River toad
- Lowland leopard frog
- Northern leopard frog

As described in Impact BR-4 under the Proposed Project, Reclamation would restore 44 acres of backwaters. Thus, impacts to this habitat and associated special-status species would be less than significant. (Less than significant impact.)

Impact BR – 8. Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species. Backwaters provide key habitat for the razorback sucker and bonytail chub. Bonytail chub does not inhabit the mainstem below Parker Dam but likely will be introduced. The razorback sucker and bonytail chub could be affected by less open water in the River and backwaters. Decreased river elevation could lessen the amount of habitat in transition between terrestrial and aquatic (e.g., submerged tree roots) in which fish forage or escape from predators.

These fish also could be affected by higher water temperature, less dissolved oxygen, and increased contaminant levels (e.g., selenium) in backwaters as water volumes decrease, if connection to the mainstem is not adequate. Historically, fish could navigate the mainstem to escape backwaters as quantity decreases but lower water levels could increase the isolation of backwaters and prevent fish from entering and exiting the mainstem.

Between 22 and 33 acres of backwater habitat could be affected by the flow reductions under the Proposed Project Reduced flows in the LCR also would reduce the amount of open water available to fish in the main river channel. Between 18 and 26 acres of open water habitat could be lost, depending on the amount of water transferred to SDCWA/MWD (Table 3.2-38).

TABLE 3.2-38
Acreage of Open-Water Habitat between Parker and Imperial Dams Potentially Affected by the Proposed Project and Alternatives

Habitat Type	Acres affected at 300 KAF[a]	Acres affected at 230 KAF[a]	Acres affected at 200 KAF[a]	Acres affected at 130 KAF[a]
Open Water in Main LCR Channel	26	20	18	11

Source: Derived from USFWS (2001).

Critical habitat was designated for the razorback sucker in the LCR below Parker Dam. The loss of 22 to 33 acres of backwater habitat and 18 to 26 acres of open water habitat in the main channel would affect critical habitat for razorback suckers. In addition to the direct loss of habitat, the USFWS (2001) identified other potential adverse effects to critical habitat as follows:

Changes in flows and water surface elevations resulting from those flows can affect habitat values for razorback suckers and any future bonytail population. Increased fluctuations can strand fish or expose spawning areas causing death of eggs and just hatched young fish. This area is critical habitat for the razorback sucker, and changes to constituent elements of water and physical habitat are expected to occur due to declining water levels. Declining water levels force fish into deeper water where there may be less cover and protection from predators. Exposure of shallow areas also reduces the benthos and may affect the ability of fish to feed and remain healthy. Shallow waters also become very hot in the Colorado River, and reduced water quality may make preferred backwaters less able to support fish over the entire day or even season.

Under the Proposed Project, Reclamation will restore or create 44 acres of backwaters (USFWS 2001). Reclamation also will re-introduce and monitor 20,000 sub-adult razorback suckers below Parker Dam and continue the ongoing study of Lake Mead for an additional 4 years to determine reasons for persistence of adult razorback suckers in the reservoir (USFWS 2001). Reclamation will fund the capture of wild-born or F1 generation bonytail chubs from Lake Mohave to be incorporated into broodstock for this species (USFWS 2001). With implementation of these measures, impacts to razorback suckers and bonytail chub under the Proposed Project would be less than significant. (Less than significant impact.)

Impact BR – 9. Reduced Diversions from the LCR Could Benefit Special-Status Fish Species. Razorback suckers potentially could be entrained in canals by water diversion from the LCR. Assuming the potential for entrainment is proportional to the amount of water diverted, the Proposed Project would reduce this potential. Under the Proposed Project, IID would reduce its diversion at Imperial Dam by 200 to 300 KAFY. Water transferred to SDCWA service area or MWD service area would serve as replacement water for these agencies, and the overall amount of water diverted at Parker Dam would not change. However, the reduced diversions by the IID water service area at Imperial Dam would result in a net decrease in the amount of water diverted from the LCR and could reduce the risk of entrainment of razorback suckers, which is a potential beneficial effect. (Beneficial impact.)

Biological Conservation Measures in USFWS' Biological Opinion

Implementation of biological conservation measures, while increasing habitat for the listed species, may also result in temporary impacts to vegetation, fish, and wildlife species through physical activities, such as dredging, removing salt cedar by mechanical or other means, and converting agricultural lands to native habitat. These impacts are addressed generally in the Draft IA EIS because specific areas where these conservation measures would occur have not been identified. Site-specific studies would be conducted as needed and mitigation measures identified prior to the actual implementation of the conservation measures (Reclamation 2001).

Impacts from implementing biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4 and are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact BR – 10. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under the Proposed Project, between 130 KAFY and 300 KAFY of water would be conserved using a combination of on-farm irrigation system improvements, water delivery system improvements, and Fallowing. This combination would reduce flows in the drains by about 28 percent relative to the Baseline. If Fallowing is used to conserve water, the percent reduction in flows would be lower. If all Fallowing is used to conserve water, then the flows would be reduced 9 percent. Thus, depending on the amount of water conserved through Fallowing, the reduction in drain flows would be between 9 and 28 percent relative to the Baseline.

Changes in flow in the drains resulting from the Proposed Project would be manifested as a total reduction in flow volume, with potentially shorter durations of peak flows and reduced frequency of peak flows. Periods of dryness likely would increase in frequency and duration, and potentially a greater number of drains would be dry at any given time. Nevertheless, the level of potential flow reduction in the drains is within the historic range of drain flows.

Most of the drainage system is devoid of vegetation; only about 25 percent of the drainage system supports vegetation. The IID water service area regularly conducts maintenance activities on its drainage system to maintain unimpeded gravity flow of drainage water. Maintenance activities include sediment removal and vegetation control. As a result of these activities, vegetation in the drainage system is limited.

Much of the vegetation in the drainage system is tamarisk and *Phragmites*. These exotic and highly invasive species are tolerant of a wide range of conditions. As such, they would adjust to flow changes in the drains, and their occurrence and distribution of species would not change substantially. Cattails and other wetland plants are limited. Cattails are concentrated in the bottom of the drain. Because of the steep sides of the drains, little difference in water depths would occur with lower flow volumes. If drains were drier for longer periods of time, minor, temporary changes in the extent of cattails would potentially occur. However, because drain maintenance activities probably have a greater influence on the extent of vegetation in the drains and the projected decrease in drain flows would be within the range of historic levels, changes in drain flows would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, the species and numbers of wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and effects to associated wildlife resulting from changes in drain flows under the Proposed Project would be less than significant. (Less than significant impact.)

Impact BR – 11. Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife. If system-based and on-farm conservation methods are used, water conservation under the Proposed Project would increase the salinity of water in the drains. Cattails are sensitive to salinity levels. Growth is best when water salinity is less than 3 g/L. Salinity levels of 3 to 5 g/L stunt the growth of cattails. Above 5 g/L, growth and survival of cattails are limited.

Currently, about 1,412 miles of the drainage system have a salinity below 5 g/L (921 miles < 3 g/L and 491 miles at 3 to 5 g/L). The drainage system is estimated to support about 63 acres of cattail vegetation. Assuming this vegetation is proportionately distributed between areas with a salinity of less than 3 g/L and those with a salinity of 3 to 5 g/L, about 40 acres of cattails are in drains with a salinity less than 3 g/L, and 23 acres are in drains with a salinity of 3 to 5 g/L (Table 3.2-39).

By increasing the ratio of tilewater to tailwater in the drains, the Proposed Project would increase the salinity in the drains. The total amount of cattail vegetation would decline as would the amount with good growing conditions (Table 3.2-39). With conservation of 300 KAFY under the Proposed Project through on-farm and system-based measures, the acreage of cattails supported in the drains would potentially be reduced by 4 acres. Most (46 acres) of the remaining cattail vegetation would be subjected to salinity levels that could stunt growth and reduce vigor of the plant. If all Fallowing is used to conserve water, there

TABLE 3.2-39
Acres of Cattail Vegetation in the Drains Potentially Affected by Increases in Salinity under the Proposed Project and Alternatives

Alternative	Good Growth (salinity < 3 g/L)	Stunted Growth (salinity 3-5 g/L)	Total Cattail Vegetation
Baseline (Alt 1)	40	23	63
130 KAF on-farm (Alt 2)	30	32	62
230 KAF on-farm (Alt 3)	20	39	59
130 KAF on-farm + 100 KAF system (Alt 3)	19	41	60
230 KAF on-farm + 70 KAF system (Proposed Project)	13	46	59

would be no change in salinity in the drains and therefore no impacts to cattail vegetation. Use of Fallowing to meet a portion of the conserved water would result in intermediate effects. Yuma clapper rails, a federally and state listed species, are associated with cattails and have been reported in the IID drainage system. Because cattails in the drainage system provide habitat for Yuma clapper rails, the loss of cattail vegetation is a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP component of the Proposed Project would reduce this potential impact to a less than significant level. (Less than significant impact.)

Impact BR – 12. Changes in Water Quality in Drains Could Affect Wildlife. Under the Proposed Project, the primary effect of water conservation would be reduced agricultural drainwater, with the greatest reduction from tailwater rather than tilewater. The relative reduction of these two types of drainwater would vary with the methods used to conserve water, and water quality conditions would reflect the proportional contribution of tailwater and tilewater to the total drainwater.

The IID Water Conservation Model predicted the range of water quality changes under the Proposed Project. These water quality effects were evaluated in two ways. First, average monthly concentrations of constituents of concern were compared to the Baseline and to toxicity-based water quality criteria. Second, the miles of drains with different average concentrations of TDS, selenium, and TSS between the Proposed Project and the Baseline were compared. This approach determined the relative extent of aquatic habitat estimated to contain potentially toxic concentrations of constituents of concern. The behavior of TDS and selenium represents water-soluble, dissolved constituents that behave somewhat conservatively in transport characteristics (e.g., TDS, selenium, boron, and nitrogen). TSS is a surrogate for the less water soluble, particulate-associated constituents that deposit with sediments (e.g., TSS, phosphorous, and pesticides). The nutrients behave differently because phosphorous will occur primarily as sediment-adsorbed phosphate, while nitrogen will be primarily transported as soluble, dissolved nitrate.

Of primary concern for evaluating potential water quality impacts to biological resources are selenium, TDS, and TSS. Figures 3.2-14a, b, and c show the miles of drains at average concentrations for selenium, TDS, and TSS under the Proposed Project and Baseline. Based on these modeling results, the Proposed Project would result in no change or a net decrease in the concentrations of TSS, phosphorous, and pesticides relative to the Baseline. Decreases in these constituents would improve water quality conditions for biological resources and, thereby, provide an overall benefit. In contrast, concentrations of dissolved constituents (total salinity, selenium, boron, and nitrogen) would increase under the Proposed Project. This increase is reflected as an overall increase in average concentrations of selenium under the Proposed Project relative to the Baseline and as an increase in the miles of drains at the higher average concentrations. Under both the Proposed Project and Baseline, almost all drains would have an average selenium concentration greater than 5 µg/L.

Increased selenium concentrations in drain water would increase the exposure of birds, such as rails, herons, and egrets that feed on invertebrates and fish there. Following the methods described previously in Section 3.2.4.1, the potential effects of increased selenium concentrations in the drains on egg hatchability were predicted for the Proposed Project and alternatives. The estimated "equivalent" number of miles fully affected by reduced hatchability due to increased selenium concentrations in the drains under the Proposed Project and Baseline is presented in Table 3.2-40. The hatchability effects are presented at the level of the clutch (or hen) rather than at the level of an individual egg. Hens that are affected may still produce viable eggs, but this analysis assumes that the entire clutch is lost, making the estimate of overall effect a conservative measure of potential impacts. It is also important to note that the estimate of hatchability effects is based on the total miles of drain within each selenium concentration category. Only a portion of the total drain mileage is vegetated. While unvegetated portions of the drains could be used, most marsh-associated birds will occur in association with vegetated areas, so the actual amount of habitat in which birds could be exposed to increased selenium is over-represented.

Results of the analysis indicate that under the Baseline, the equivalent of approximately 48 miles of drain would be fully affected by waterborne selenium through hatchability effects (Table 3.2-40). Under the Proposed Project, up to an equivalent of about 94 miles would be affected depending on the total amount of conservation and methods of conservation (Table 3.2-40). The potential for reduced reproductive success of birds using the drains constitutes a potentially significant impact of the water conservation and transfer component of the Proposed Project. Implementation of the HCP component of the Proposed Project would reduce this impact to less than significant. (Less than significant impact.)

Impact BR – 13. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under the Proposed Project, water conservation would reduce flows in the New and Alamo Rivers. With conservation of 300 KAFY through on-farm and water delivery system improvements, flows in the Alamo and New Rivers would be reduced relative to the Baseline by 30 percent and 22 percent, respectively (Table 3.2-41). If Fallowing is used to conserve water, the percent reduction in flows would be lower. If all Fallowing is used to conserve water, then

TABLE 3.2-40
Estimated Number of Miles Potentially Affected by Reduced Hatchability due to Increased Selenium Concentrations Associated with Varying Water Conservation Amounts and Techniques

			Miles of drain habitat fully affected by reduced hatchability				
Maximum Water Se conc. (µg/L)	Egg Se conc. (µg/g)	Probability of >1 inviable eggs in clutch (Corrected)	Baseline (No Project) Alternative 1	300 KAFY (Proposed Project)	130 KAFY On-Farm (Alternative 2)	230 KAFY 130 OF + 100 System (Alternative 3)	300 KAFY All Fallowing (Alternative 4)

5	5.538	0.02767	5.20	1.86	3.30	2.24	5.96
6	5.994012	0.03024	12.45	2.33	7.92	3.90	13.09
7	6.408738	0.03262	14.10	7.88	13.01	9.81	13.58
8	6.791115	0.03485	7.76	11.11	11.02	13.18	7.26
9	7.147287	0.03695	3.60	11.25	6.39	9.81	3.31
10	7.481695	0.03895	1.67	8.19	3.33	5.48	1.37
11	7.797662	0.04086	0.84	4.22	1.44	2.76	0.78
12	8.097756	0.04270	0.56	2.13	0.82	1.39	0.62
13	8.384003	0.04447	0.43	1.30	0.67	0.85	0.42
>13	Variable	Variable	1.27[a]	44.02[b]	2.56[a]	33.15[b]	1.06[a]
		Total	47.89	94.28	50.44	82.56	46.39

[a] Maximum water concentration = 46.5; egg concentration = 14.6; probability of hatchability effects = 0.08768
[b] Maximum water concentration = 2658.8; egg concentration = 84.4; probability of hatchability effects = 0.85940

TABLE 3.2-41
Annual Average Discharge (thousand acre-feet)) to the Salton Sea from the Alamo and New Rivers under the Proposed Project and Alternatives

Conservation Level and Methods	Alamo River	New River
Baseline/No Project (Alt 1)	576	431
130 KAF On-farm irrigation system improvements only (Alt 2)	503	382
230 KAF all conservation measures (Alt 3)	448	346
200 on-farm + 100 KAF all conservation measures (Proposed Project)	401	335
300 KAF Fallowing only (Alt 4 and Proposed Project)	517	399

the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in Alamo River flows would be between 10 and 30 and in the New River between 7 and 22 percent relative to the Baseline.

Vegetation along the New and Alamo Rivers consists predominantly of tamarisk, often in dense stands. Tamarisk is a fairly drought-tolerant and invasive exotic species that has a high tolerance for environmental change (Kerpez and Smith 1987; Brotherson and Field 1987; Deloach et al. 1996). As the flow levels in the New and Alamo Rivers decrease under the Proposed Project, tamarisk would colonize newly exposed ground. Because tamarisk can survive on soil water alone, reductions in the groundwater level potentially resulting from reduced flows in the New and Alamo Rivers are unlikely to change the amount of tamarisk along these two rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. (Less than significant impact.)

Impact BR – 14. Installation of Seepage Recovery Systems Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under the Proposed Project, IID would conserve between 130 KAFY and 300 KAFY of water using on-farm irrigation system improvements, and/or fallowing.

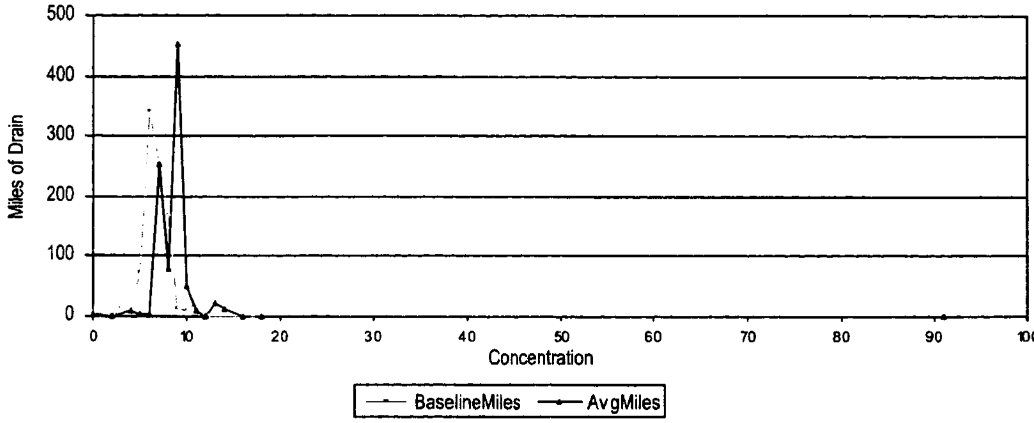
Potential water delivery system improvements include installing seepage recovery systems along the East Highline Canal. Subsurface recovery systems are proposed where there is not an existing drain adjacent to the canal. These systems consist of an underground, perforated pipeline that collects the water and directs it to a sump. Along the East Highline Canal, the pipelines would be installed close to the outside toe of the canal embankment. Vegetation supported by seepage generally occurs on the embankment where it intercepts seepage water. Because the recovery system would be at the base of the embankment, vegetation would not be lost as a consequence of removing seepage water. However, construction likely would require removal of some seepage-supported vegetation. Construction to install these systems disturbs an area about 70 feet wide along the pipeline installation route. About 13.2 miles of pipeline are anticipated to be installed for the seepage recovery systems, removing about 43 acres of vegetation. This amount constitutes about 10 percent of the estimated 412 acres of tamarisk scrub habitat supported in seepage areas adjacent to the East Highline Canal in the IID water service area.

The plant species composition of the seepage communities adjacent to the East Highline Canal is diverse and varies substantially among the seepage areas. Arrowweed, common reed, and tamarisk are the most common species in the seepage communities, with mesquite, cattails, and cottonwoods in some areas. The reduction in acreage of seepage communities has the potential to affect migratory songbirds that use these habitats. However, most of the vegetation consists of tamarisk, which is of limited value to migratory songbirds, and is present in dense stands along rivers and in other locations throughout the region (Guers and Flannery 2000). Furthermore, the potential loss of seepage community vegetation constitutes only 10 percent of the available seepage community vegetation. Because only a small amount of the seepage community vegetation would be lost, and the habitat is dominated by non-native plant species, the loss of seepage community vegetation is a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

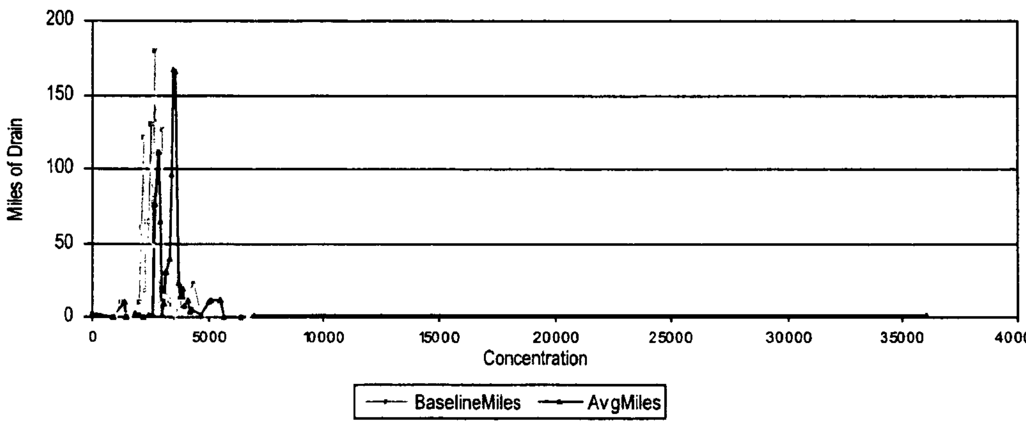
Impact BR – 15. Reservoir Construction Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under the Proposed Project, IID would conserve between 130 KAFY and 300 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, and/or Fallowing. Potential water delivery system improvements include lateral interceptors. Locations for 16 lateral interceptor systems have been identified. These systems consist of a canal and a reservoir about 40 surface acres. Some of the reservoirs could be located close to the New or Alamo Rivers, and their construction could remove tamarisk scrub adjacent to these rivers. Up to 15 acres of tamarisk scrub could be removed to construct reservoirs associated with lateral interceptor systems. This effect would occur only if IID installs lateral interceptors. Tamarisk—non-native, highly invasive plant—provides poor quality habitat to wildlife and has colonized many areas throughout the IID

Proposed Project
200K On-Farm/100K System COC Concentrations per Miles of Drain in IID,
12-Year Model Run

Selenium (ug/L) IID Surface Drain Discharge to the Alamo River



TDS (mg/L) IID Surface Drain Discharge to the Alamo River



TSS (mg/L) IID Surface Drain Discharge to the Alamo River

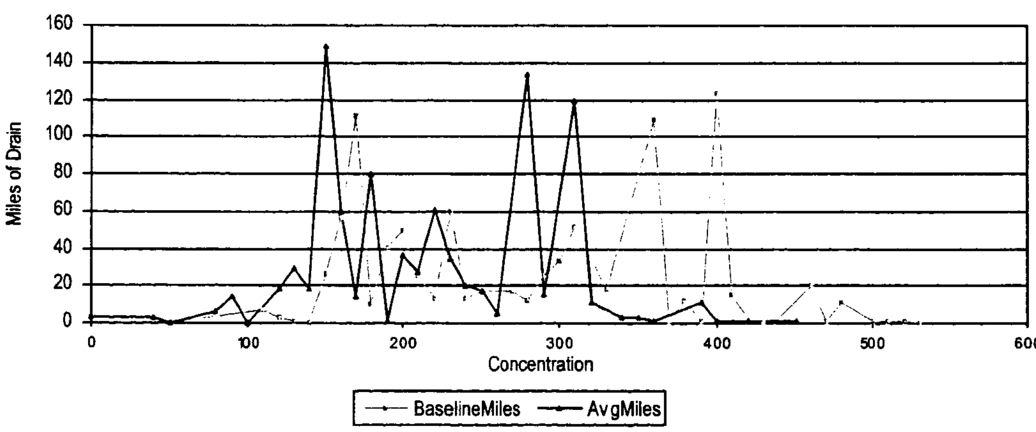


Figure 3.2-14a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under the Proposed Project for Drain Discharging into the Alamo River
IID Water Conservation and Transfer Project Draft EIR/EIS

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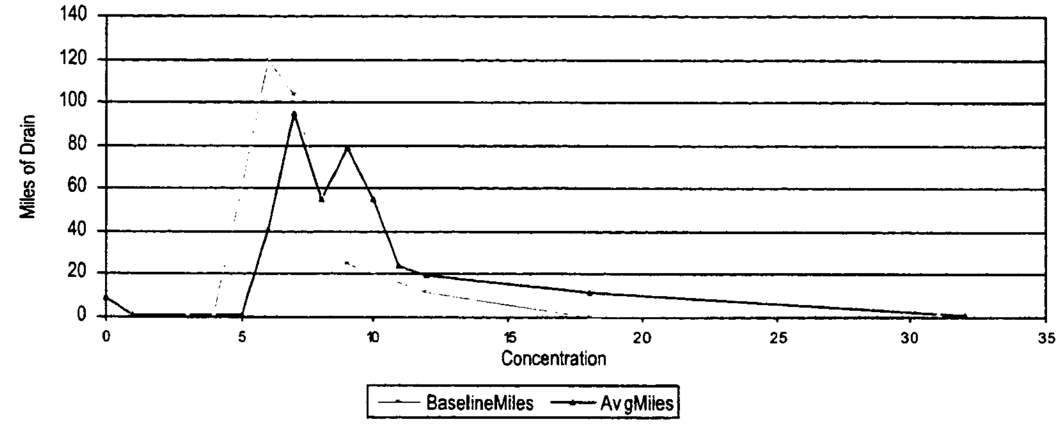
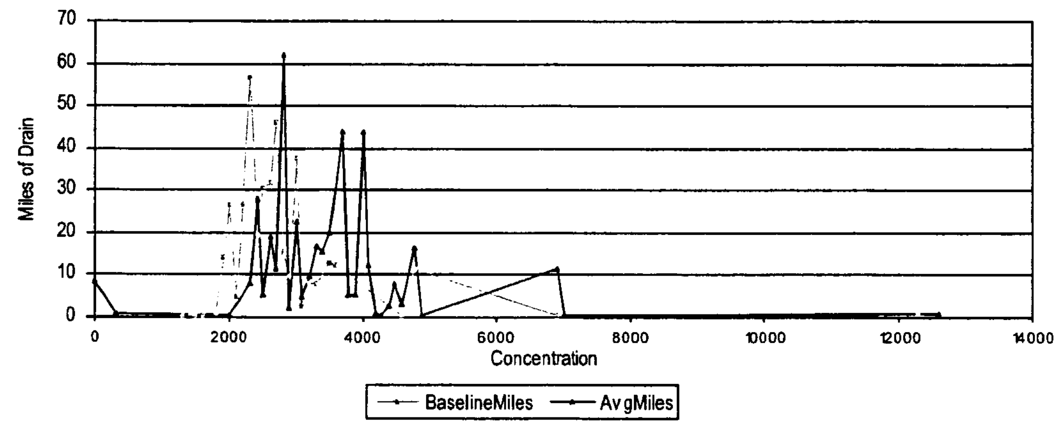
Proposed Project
200K On-Farm/100K System COC Concentrations per Miles of Drain in IID,
12-Year Model Run

Selenium (ug/L) IID Surface Drain Discharge to the New River



TDS (mg/L) IID Surface Drain Discharge to the New River



TSS (mg/L) IID Surface Drain Discharge to the New River

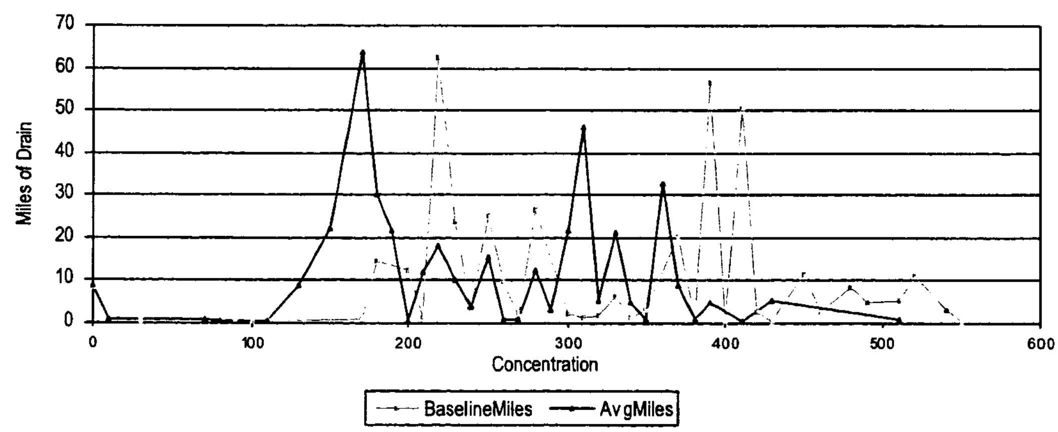


Figure 3.2-14b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under the Proposed Project for Drain Discharging into the New River
IID Water Conservation and Transfer Project Draft EIR/EIS

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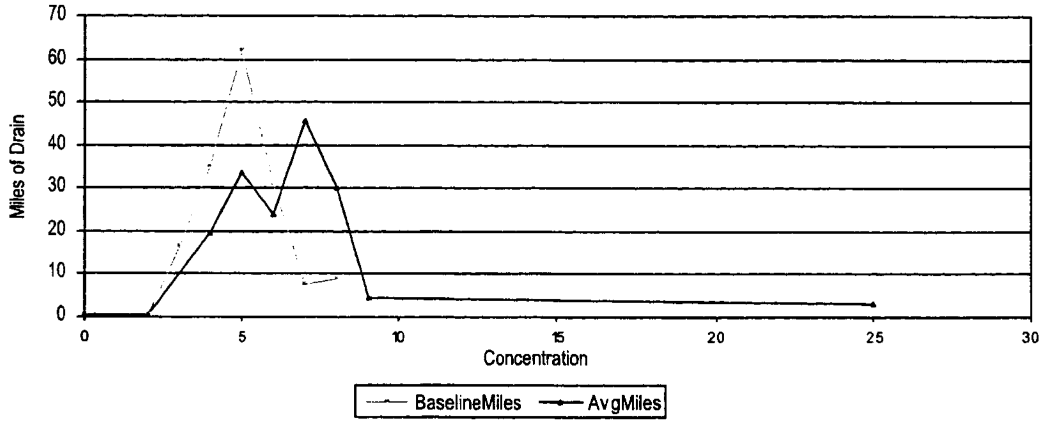
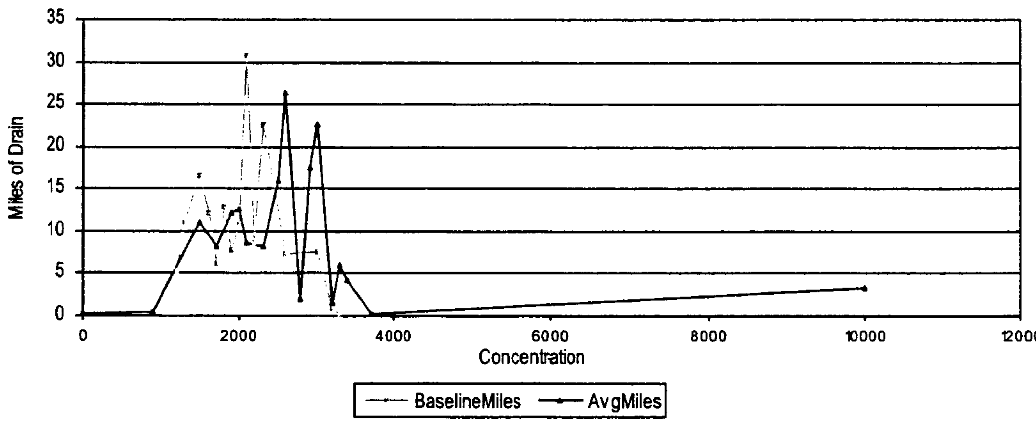
Proposed Project
200K On-Farm/100K System COC Concentrations per Miles of Drain in IID,
12-Year Model Run

Selenium (ug/L) IID Surface Drain Discharge to the Salton Sea



TDS (mg/L) IID Surface Drain Discharge to the Salton Sea



TSS (mg/L) IID Surface Drain Discharge to the Salton Sea

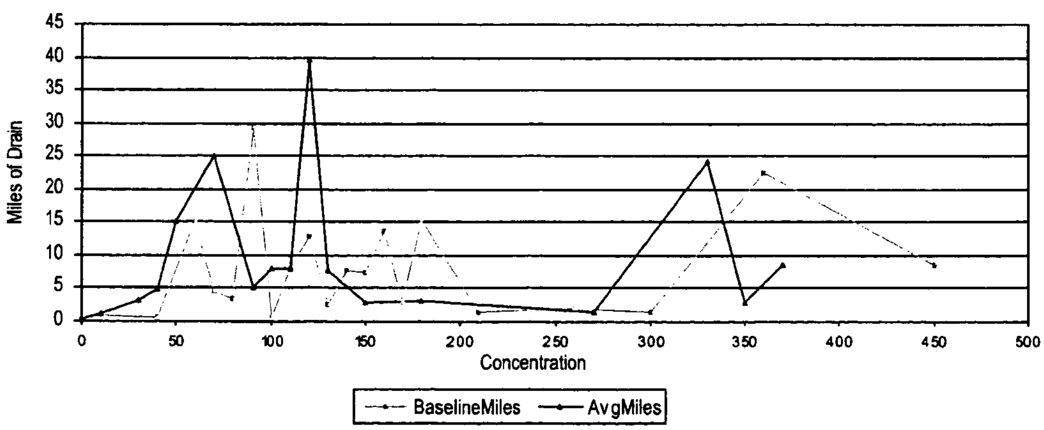


Figure 3.2-14c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under the Proposed Project for Drain Discharging into the Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

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water service area. The small loss of tamarisk potentially resulting from installation of reservoirs would not adversely affect wildlife or wildlife habitat. (Less than significant impact.)

Impact BR – 16. Installation of On-farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. Under the Proposed Project, between 130 KAFY and 300 KAFY of water would be conserved using on-farm irrigation system improvements, water delivery system improvements, and Fallowing. On-farm irrigation system improvements could generate up to of 230 KAFY. Farmers in the IID water service area could implement a variety of measures to conserve water, including the following:

- Installing tailwater return systems
- Dividing fields into level basins
- Installing drip irrigation systems
- Shortening furrows/border strips
- Narrowing border strips
- Implementing cutback irrigation
- Laser leveling fields
- Changing field slopes to improve water distribution uniformity
- Employing cascading tailwater systems

Installation of tailwater return systems would remove a small amount of agricultural land from production to accommodate tailwater ponds. Tailwater ponds typically have about a 3 to 4 AF capacity and cover 1 to 2 acres. Assuming an average farm is 80 acres, a 2-acre tailwater return pond would eliminate about 2.5 percent of the area from agricultural production. If all farms installed tailwater systems, a 2.5 percent reduction in farmed area throughout the Imperial Valley would amount to about 12,500 acres (2.5 percent of the 500,000 acres of irrigated agricultural land in the IID water service area). Farmers typically locate tailwater return ponds in the least productive portions of their fields, particularly in areas farmed irregularly, so the actual loss in agricultural field habitat likely would be less than 12,500 acres in the extreme case that all farms install tailwater return systems. Tailwater return systems are installed when no crops are produced, typically, during the summer. Because they would be installed when no crops are grown on the field, the potential for disturbance to wildlife would be limited.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, potentially disturbing wildlife. Drip systems would be installed between crops; therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

The remaining water conservation techniques require reconstructing/recontouring an agricultural field. Wildlife using agricultural field habitat could be disturbed during reconstructing/recontouring. However, because reconstructing/recontouring would be conducted when no crops are grown on the field, the potential for disturbance to wildlife is limited. The amount of agricultural field habitat would not change as a result of reconstructing/recontouring agricultural fields to conserve water.

As described previously, installing on-farm irrigation system improvements could remove a small amount of agricultural field habitat, depending on the improvements implemented, and presents a minor potential for disturbance of wildlife. However, because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact BR – 17. Operation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. The agricultural fields in the Imperial Valley attract many wintering and migrating birds. Many species (e.g., white-faced ibis and cattle egrets) are attracted to fields while they are being irrigated. Birds commonly follow the water line during flood irrigations, preying on insects flushed by the water. Changes in irrigation practices under the Proposed Project have the potential to affect the quality of the foraging opportunities for wintering and migrating birds.

Farmers' water conservation practices would not change irrigation practices in a manner that would reduce habitat suitability for wildlife. A given crop consumes a certain amount of water. This consumptive use would not change with water conservation, and a given crop would need to be irrigated at the same frequency as under existing irrigation practices. The water conservation techniques would reduce the amount of tailwater (i.e., surface water that runs off the field), not the amount of water consumed by the crops. Also, except for drip irrigation systems, the water conservation techniques improve the efficiency of surface irrigation, rather than change how the crop is irrigated. For example, tailwater return systems collect and store water from a flood-irrigated field for use in subsequent flood irrigations. The improved efficiencies would reduce the amount of water leaving the field as tailwater. Thus, on-farm irrigation system improvements would not change the suitability of agricultural fields as foraging habitat. (No impact.)

Impact BR – 18. Installation of Water Delivery System Improvements Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife. Under the Proposed Project, the IID water service area would conserve between 130 KAFY and 300 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, or Fallowing. These improvements with the potential to eliminate agricultural field habitat are installing lateral interceptors and constructing new reservoirs. These activities could remove about 8,630 acres of agricultural field habitat. Relative to the entire irrigated area of Imperial Valley that covers about 500,000 acres, this potential loss constitutes about 1.7 percent of the agricultural land. Construction would not occur in agricultural fields under active production so the potential for disturbance of species using this habitat would be minor. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact BR – 19. Fallowing Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife. Under the Proposed Project, between 130 KAFY and 300 KAFY of water would be conserved using a combination of on-farm irrigation system improvements, water delivery system improvements, or Fallowing. Fallowing could reduce the acreage of irrigated agriculture available in the IID water service area at any one time. If only Fallowing is used to conserve water, about 50,000 acres of land would be needed. This acreage represents about 10 percent of the irrigated area in the IID water service area. Even with this reduction, agricultural field habitat would remain abundant in the IID water service area, consisting of about 450,000 acres. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. This potential effect would not occur if only on-farm irrigation system and water delivery system improvements are used to conserve water. (Less than significant impact.)

Impact BR – 20. Fallowing Would Not Change the Amount of Desert Habitat. Fallowing could be used to generate some or all of conserved water. Fallowing could include land retirement for the entire 75-year project duration or for shorter periods, ranging from a single season to several years. Land removed from agricultural production for a long time could be colonized by desert plants. The likelihood of desert plants becoming reestablished would be influenced by the proximity of the retired land to desert habitat, soil conditions, and rainfall among others. Land retired for short periods of time probably would not be colonized by desert plants. Some fields in the Imperial Valley that have been out of agricultural production for many years do not support vegetation. The limited amount of vegetation that has developed consists of ruderal species rather than native desert plant species. Thus, Fallowing would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats. (No impact.)

Impact BR – 21. Reduced Flows in the Drain Could Affect Fish and Aquatic Habitat. Under the Proposed Project, up to 300 KAFY of water would be conserved. The specific combination of conservation methods implemented under the Proposed Project would have less effect on aquatic resources than the total amount of water conserved.

Water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Relative to the Baseline, with conservation of 300 KAFY through on-farm irrigation system improvements, water delivery system improvements, and/or Fallowing, flow in the drains could be reduced by 28 percent. If Fallowing is used to conserve water, the percent flow reduction would be less. If all Fallowing is used to conserve water, then the percent reduction in flows would be 9 percent. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in drain flows would be between 9 and 28 percent, relative to the Baseline. As explained subsequently, reduced flows in the drains would have a less-than-significant impact on fish and other aquatic resources in the drains.

TABLE 3.2-42
Total Annual Discharge (KAF) from the IID Water Service Area Under the Proposed Project and Alternatives

Alternatives	Alamo River	New River	Drains Direct to Sea	Total
No Project/Baseline (Alt 1)	576	431	92	1,099
130 KAF On-farm irrigation system improvements only (Alt 2)	503	382	80	965
230 KAF all conservation measures (Alt 3)	448	346	70	864
200 on-farm + 100 KAF all conservation measures (Proposed Project)	401	335	56	792
300 KAF Fallowing only (Alt 4 and Proposed Project)	517	399	86	1,002

Aquatic habitat in the drains is of poor quality because of silty substrates, poor water quality, and shallow depth. Aquatic habitat in drains depends on drainwater from agricultural fields. As a result, the amount of water (and aquatic habitat) in the drains varies throughout the year in response to the level of irrigation. When the agricultural fields discharging into a drain are not irrigated, the drains dry out and do not provide aquatic habitat. Currently, water volume in drains fluctuates because of seasonal cropping patterns, with some drains or portions of drains drying out.

The quality of aquatic habitat in the drains also could be affected by changes in the vegetation in the drains that support fish and aquatic invertebrates. Because of the artificial nature of drain plant communities and the probable lack of substantial changes in drain plant communities from water conservation, the potential impacts to aquatic communities through changes in vegetation in the agricultural drains, resulting from the Proposed Project would be less than significant.

Reductions in flows (and resulting decreases in water depths) could make fish residing in the drains more vulnerable to predation by fish-eating birds. The overall impact of this potential increase in predation, however, is moderated by the generally high turbidity of drainwater and thus the low visibility of fish in the drains.

Reductions in the amount or quality of aquatic habitat as a result of flow reductions in the drains not emptying to the Salton Sea would affect only aquatic invertebrates and non-native fish (e.g., tilapia, mosquitofish, and carp) that periodically inhabit these drains. No special-status species inhabit the drains emptying to the New and Alamo Rivers. Desert pupfish (a state- and federal-listed species) inhabit drains emptying directly to the Salton Sea and are not found in the New or Alamo Rivers or their drains. Impacts to desert pupfish, resulting from the Proposed Project, are discussed under Impact BR-24. (Less than significant impact.)

Impact BR – 22. Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat. Under both the Proposed Project and the Baseline, the Alamo River would exhibit concentrations of water-borne selenium over chronic water quality criteria levels (5 μg/L). In contrast, New River discharges to the Salton Sea would remain below this level. The linear miles of drains discharging to the Alamo and New Rivers and directly to the Salton Sea probably exceed the 5-μg/L selenium chronic water quality criteria level; the 4,000-mg/L salinity criterion is shown on Figures 3.2-14a, b, c. The results show that almost all of the drains exceed the 5-:g/L concentration for selenium under both the Proposed Project and Baseline. However, the Proposed Project (assuming water conserved through on-farm irrigation system and water delivery system improvements) would increase the miles of drains at higher selenium concentrations above 5 :g/L (Figures 3.2-14a, b, c). If all the conserved water was generated with Fallowing, there would be no change in water quality conditions as explained for Alternative 4. Thus, the magnitude of water quality changes under the Proposed Project would depend on the amount of water conserved through Fallowing.

Adverse effects to fish via bioaccumulation can occur at waterborne selenium concentrations as low as 1 to 3 μg/l (DOI 1998). Reproductive and developmental toxicity in fish has been observed at these concentrations. The increase in selenium concentrations could reduce reproductive success of fish in the drains and rivers. The Proposed Project also would increase the miles of drains, with average salinity levels exceeding 4,000 mg/L. Except for desert pupfish, which inhabit drains that discharge directly to the Sea, all the fish in the drains and rivers are introduced species. A potential for reduced reproductive success of fish in the rivers and drains is not considered a significant impact to fish resources, because all the species are introduced species. Impacts to desert pupfish are addressed separately under Impact BR-24 (Less than significant impact.)

Impact BR – 23. Reduced Flows in the Rivers Drain Could Affect Fish and Aquatic Habitat. Water conservation under the Proposed Project would reduce flows in the New and Alamo Rivers. Conservation measures would result in less flow in agricultural drains, with consequently less discharge into rivers. Table 3.2-41 shows the mean annual discharge of the New and Alamo Rivers into the Salton Sea under the Proposed Project. Relative to the Baseline, conservation of 300 KAFY of water through on-farm irrigation system and water delivery system improvements would reduce flows in the Alamo and New Rivers by 30 percent and 22 percent, respectively. If Fallowing is used to conserve water, the percent reduction in flows would be lower. If all Fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in Alamo River flows would be between 10 and 30 and in the New River between 7 and 22 percent, relative to the Baseline. The reduced volume of water returning to the New and Alamo Rivers through the drainage network would not significantly affect habitat for fish and other aquatic resources in the New and Alamo Rivers for the reasons that follow.

Aquatic habitat quality in the New and Alamo Rivers is poor because of poor water quality, high turbidity, and unstable substrates that inhibit production of benthic invertebrates and rooted vegetation. The flow reductions anticipated under the Proposed Project would have little effect on the quality of aquatic habitat in these river systems. Fish populations in the New and Alamo Rivers are probably limited by food availability and water quality rather than by flow. The anticipated reductions in flows at the upper level of conservation would not significantly reduce the amount of fish habitat or limit fish productivity in the rivers. Reductions in the amount or quality of aquatic habitat as a result of flow reductions in the New and Alamo Rivers would affect only aquatic invertebrates and non-native fish. Therefore, impacts from flow reductions would be less than significant. (Less than significant impact.)

Impact BR – 24. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Under the Proposed Project, water conservation is predicted to reduce flow levels in drains in the IID water service area that discharge directly to the Sea (Table 3.2-42). If water is transferred to CVWD, flows in drains that discharge directly to the Sea in the CVWD service area would increase. It is uncertain to what extent increased flows in drains in the CVWD service area would increase habitat for pupfish because the drains that discharge directly to the Sea are steep, with only a mount drain at the drain outlets with a shallow enough slope to be suitable for pupfish.

With conservation of 300 KAFY through on-farm irrigation-system and water delivery system improvements, flows in the drains that discharge directly to the Sea from the IID water service area, would be reduced by 39 percent, relative to the Baseline. If all Fallowing is used to conserve water, then the percent reduction in flows in drains that discharge directly to the Salton Sea from the IID water service area would be 7 percent. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in flows would be between 7 and 39. This reduction in flow would potentially decrease the amount of habitat for desert pupfish in the IID water service area, which could increase their susceptibility to interspecific competition/interference and predation and result in a smaller overall population size because of reduced physical space. Because water conservation would reduce the contribution of tailwater to the drainage system, water quality conditions also would worsen. This potential effect is addressed subsequently.

The changes in flow and water quality in the drains discharging directly to the Sea and supporting pupfish constitute a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP component of the Proposed Project would reduce this potential impact to less than significant (see Impact BR - 38). (Less than significant impact.)

Impact BR – 25. Construction of Water Delivery System Improvements Could Affect Razorback Suckers. Razorback suckers inhabit portions of the conveyance system and are known to occur in the All American and East Highline Canal systems. The suckers in the IID water service area are composed of old members of a dwindling, non-reproductive, remnant stock (Tyus 1991; Minckley et al. 1991). No recruitment of wild-spawned fish occurs, and they are isolated from the main razorback sucker population in the Colorado River and its tributaries.

Under the Proposed Project, the amount of water in the conveyance system would be reduced by 300 KAFY. Although the volume of water would be reduced, this reduction would not affect the amount of aquatic habitat in the canal system because the water surface elevation in the conveyance system is tightly controlled to maximize hydroelectric power generation and efficient delivery of irrigation water.

Installation of some water delivery system improvements (e.g., canal lining) would require dewatering the canal. In accord with the HCP, a qualified biologist will be on-site when canals are dewatered. If razorback suckers are found in the canal when it is dewatered, they will be captured and returned to LCR. Thus, adverse impacts to razorback suckers would be avoided. (Less than significant impact.)

Impact BR – 26. Water Quality Changes in the Drains Could Affect Special-Status Species. The primary concern for special-status species associated with drain habitat is changes in water quality in the drains of the Imperial Valley. Special-status bird species associated with drain habitat feed on aquatic invertebrates (e.g., Yuma clapper rail) or fish and can accumulate pesticides or selenium to levels that reduce reproductive success. The desert pupfish inhabits drains that discharge directly to the Salton Sea and are directly exposed to water quality constituents. Assuming water conservation using on-farm irrigation-system and water delivery system improvements, the Proposed Project would decrease the concentration of pesticides in drainwater (as associated with TSS and sediment-associated contaminants), benefiting the special-status species associated with drain habitat, but the concentration of selenium, salinity, and dissolved constituents in the drains would increase relative to the Baseline. If all conserved water was generated with Fallowing, there would be no change in water quality conditions, as explained for Alternative 4. Thus, the magnitude of water quality changes under the Proposed Project would depend on the amount of water conserved through Fallowing. Nevertheless, the increase in selenium concentration that would occur with conservation using on-farm irrigation system and/or water delivery system improvements is a potentially significant impact of the water conservation and transfer component of the Proposed Project on special-status species. However, implementation of the HCP component of the Proposed Project would reduce this potential impact to less than significant. The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing the HCP on special-status species. (Less than significant impact.)

Impact BR – 27. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impact BR - 10, reduced flow in the drains would not significantly change the amount or species composition of vegetation in the drains. However, increased salinity of drainwater under the Proposed Project would reduce cattail vegetation in the drains. Cattails are preferred habitat for the Yuma clapper rail and provide habitat for other special-status species potentially using the drains. The predicted reduction in cattails could adversely affect Yuma clapper rails and other special-status species using the drains. This effect constitutes a potentially significant impact of the water conservation and transfer component of the Proposed Project. In addition to changes in physical habitat, increased selenium concentration in the drains under the Proposed Project could adversely affect Yuma clapper rails and other special-status species using the drains. These potential effects are addressed under Impact BR - 26. These water quality changes also are a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP component of the Proposed Project would reduce these potential impacts to less than significant (see Impact BR - 32). The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing the HCP on special-status species associated with drain habitat. (Less than significant impact.)

Impact BR – 28. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Special-status species associated with tamarisk scrub habitat consist of species that find optimal habitat conditions in native riparian communities. Tamarisk has invaded riparian areas in the Imperial Valley and become established in other areas with available soil moisture, such as along agricultural drains and in seepage areas. Tamarisk scrub habitat does not represent optimal habitat for the species that use this habitat in the Proposed Project area. Rather, it constitutes the only available tree-dominated habitat in the Proposed Project area. Tamarisk may be used by special-status species, but it provides poor quality habitat. None of the special-status species associated with tamarisk scrub depends on this habitat.

The Proposed Project would not significantly reduce the availability of tamarisk scrub supported by the agricultural drains or along the New and Alamo Rivers as a result of changes in flow or water quality. Installation of seepage recovery systems and lateral interceptors could eliminate about 58 acres of tamarisk scrub habitat. This small reduction in tamarisk scrub would not significantly adversely affect special-status species because (1) tamarisk is common and abundant throughout the project area, (2) tamarisk is of limited habitat quality, and (3) none of the special-status species depend on this habitat.

Construction of water delivery system improvements (e.g., reservoirs) has a minor potential to disturb special-status species using tamarisk scrub habitat. This potential disturbance would not significantly affect special-status species because few species breed in the Proposed Project area when disturbance could cause nest abandonment or interfere with care of the young. During other periods, construction activities could flush special-status birds from tamarisk scrub. Because of the availability of other areas of tamarisk, birds flushed by construction could find alternative habitat, and no significant impacts would occur. The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing various water conservation activities and the HCP on special-status species associated with tamarisk scrub habitat. (Less than significant impact.)

Impact BR – 29. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Installation of on-farm irrigation system improvements under the Proposed Project would require construction and ground disturbance. Installation of water conservation measures in agricultural fields would not adversely affect special-status species using this habitat because the conservation measures would be installed when crops are not grown, primarily in the summer. Special-status species predominantly occur in the Proposed Project area during the winter or as fall and spring migrants and also predominantly use agricultural fields when they are in active production and being irrigated.

As explained under Impacts BR-16, BR-18, and BR -19, installation of on-farm irrigation system and water delivery system improvements or fallowing would not substantially reduce the availability of agricultural lands in the IID water service area. Thus, the Proposed Project would not significantly affect special-status species associated with agricultural fields. Section 3.8 of the HCP (Appendix C) provides a species-by-species evaluation of the impacts of the Proposed Project on special-status species associated with agricultural fields in the IID water service area. (Less than significant impact.)

Impact BR – 30. Water Conservation Practices Could Affect Special-Status Species Associated with Desert Habitat. In the IID water service area, native desert habitat occurs adjacent to the East Highline, Westside Main, and All-American Canals and portions of the Thistle and Trifolium Extension Canals. These areas represent the only locations where special-status species associated with desert habitat could occur in the Proposed Project area. The only features of the Proposed Project that could affect desert habitat would be water delivery system improvements involving construction (e.g., canal lining, reservoirs) along the canals adjacent to desert habitat. No regulating reservoirs, mid-lateral reservoirs, or canal lining are proposed along these canals. Seepage recovery systems could be installed along the East Highline Canal, but these systems would be constructed on the agricultural field side of the canal. Thus, no construction activities required for the water delivery system improvements would occur in desert habitat, and no significant impacts to special-status species would occur as a result of the water conservation and transfer component of the Proposed Project. (Less than significant impact.)

Impact BR – 31. Water Conservation Practices Could Affect Burrowing Owls. Imperial Valley supports one of the highest populations of burrowing owls in the United States. Burrowing owls commonly inhabit the earthen banks of agricultural canals and drains in the Proposed Project area. Construction activities can adversely affect burrowing owls by trapping owls in their burrows, injuring individuals, or eliminating areas suitable for burrow creation.

Although installation of on-farm irrigation system improvements involves construction, they are not expected to significantly adversely affect burrowing owls. Burrowing owls are concentrated in drain and canal embankments, and construction for these improvements would occur primarily in the fields or field margins. Individual burrowing owls could be disturbed by installing new gates in concrete laterals required under the "shorten furrows/border strip improvement" conservation measure. This potential impact is considered less than significant because of the limited area affected and the low number of owls at risk to this impact. In addition, suitable habitat for burrowing owls would remain abundant in the Proposed Project area as drain and canal embankments, and the Imperial Valley would continue to support high population levels of owls.

The "level basin and shorten furrows/border strip improvement" conservation measures could benefit burrowing owls as these measures include construction of concrete-lined ditches. In the Imperial Valley and elsewhere, burrowing owls often locate their burrows at the base of concrete structures, and additional concrete-lined ditches could increase suitable burrow locations.

Installation of water delivery system improvements would not significantly affect burrowing owls. As part of the Proposed Project, IID could line 1.74 miles of canal. If burrowing owls inhabit burrows in the areas to be lined, they could be displaced or injured. After the lining is completed, burrowing mammals would create new burrows along the newly lined canal and replace burrows affected during the lining process. Because of the small amount of canal length affected (about 0.1 percent of the entire conveyance system) and the availability of suitable burrowing conditions after completion of the lining, the potential loss or displacement of a small number of owls would be an adverse, but less-than-significant impact on the burrowing owl population. In addition, the HCP component of the Proposed Project contains measures to further reduce and compensate for potential effects to burrowing owls associated with installation of water delivery system improvements.

Lateral interceptors and reservoirs would be installed in agricultural fields. Burrows used by burrowing owls are along drains and canals, rather than in an agricultural field. Because the new interceptors and canals would be constructed in agricultural fields, the potential for impacts to burrowing owls is low. Construction of these new features could increase nesting opportunities for burrowing owls because additional canals (i.e., the lateral interceptors) would be constructed. Construction of the entire lateral interceptor system identified would result in about 80 additional miles of canals. As burrows are created by burrowing mammals in the new canals, burrow availability for owls would increase. No significant impacts to burrowing owls would occur from installation of lateral interceptors.

Seepage recovery systems are contemplated along the East Highline Canal. Areas where seepage recovery systems would be installed probably provide poor habitat conditions for burrowing owls. The areas proposed for seepage recovery systems contain moist soils because of the seepage and most support dense vegetation. These characteristics are not conducive to burrowing owls, and no owls were observed in May 2001 when the proposed locations were visited. Thus, no significant impacts to burrowing owls would be expected from the installation of seepage recovery systems.

Fallowing could be used to generate a portion of the water conserved under the Proposed Project. As explained in more detail for Alternative 4 under Impact A4-BR-13, Fallowing has the potential to reduce the availability of insects on which burrowing owls prey. If fallowed fields are concentrated in a few areas, potentially, owls would abandon territories adjacent to fallowed fields. Because Fallowing would be only one of many methods used to conserve water under the Proposed Project and because owls are not limited by prey availability in the Imperial Valley, the amount of land fallowed would not reduce prey populations to a level that would be expected to cause owls to abandon territories. The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing various water conservation activities and the HCP on burrowing owls. (Less than significant impact.)

Inadvertent Overrun and Payback Policy (IOP)

It is estimated that conservation of 59 KAFY would be required with implementation of the IOP. Conservation of 59 KAFY for the IOP can be accomplished via Fallowing or other conservation measures. This conservation would be in addition to the up to 300 KAFY for the Proposed Project and is part of the Proposed Project. Hydrologic impacts of the IOP have already been modeled in the Baseline and are reflected in model results. If Fallowing is selected as a conservation measure, about 9,800 additional acres would be required.

Even with additional fallowing acres to meet the IOP requirements, agricultural field habitat would remain abundant in the IID water service area. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. The additional Fallowing associated with the IOP also would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats and is considered a less-than-significant impact.

Impacts resulting from the implementation of the IOP in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

Habitat Conservation Plan

As part of the Proposed Project, IID would implement an HCP to minimize and mitigate the impacts to special-status wildlife species inhabiting the IID water service area, AAC, and Salton Sea. The HCP consists of five habitat-based conservation strategies and three species-specific strategies:

- Salton Sea Conservation Strategy
- Tamarisk Scrub Conservation Strategy
- Drain Habitat Conservation Strategy
- Desert Habitat Conservation Strategy
- Agricultural Field Habitat Conservation Strategy
- Burrowing Owl Conservation Strategy
- Desert Pupfish Conservation Strategy
- Razorback Sucker Conservation Strategy

These strategies minimize and mitigate the impacts resulting from the conservation and transfer of water under the Proposed Project and O&M activities on the special-status species associated with these habitats or the individual species addressed by the species-specific strategies. For species associated with each habitat, the impact of the habitat-specific conservation strategy is beneficial. However, implementation of certain elements of each strategy could adversely affect species associated with other habitats. For example, construction of managed marsh under the Drain Habitat Conservation Strategy could reduce the amount of agricultural land and affect species associated with agricultural fields. The beneficial and adverse effects of implementing the elements of the HCP on biological resources in the Imperial Valley and AAC follow. The effects of implementing the Salton Sea Conservation Strategy are described under the Salton Sea section that follows this section.

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

HCP (IID Water Service Area Portion)

Impact HCP-BR – 32. Creation of Managed Marsh Habitat Would Benefit Wildlife Associated with Drain Habitat. As part of the Proposed Project, IID would implement an HCP that minimizes and mitigates the impacts of the proposed water conservation and transfer project on special-status species. Under the HCP, IID would create an amount of managed marsh habitat equal to the total amount of habitat in the drains plus an additional amount of habitat based on predicted toxicity effects from increases in selenium under the water conservation and transfer program. At least 190 acres of high-quality marsh habitat and up to 652 acres would be created within 15 years. This habitat would be created in large blocks and would consist of native marsh vegetation, such as cattails, bulrush, and sedges, depending on the USFWS management of emergent freshwater marsh units on the Sonny Bono Salton Sea NWR.

The HCP would more than double the acreage of habitat for both special-status species associated with drain habitat and species without special status. Composed of cattails and bulrush, the created habitat also would provide substantially greater habitat value than the existing vegetation in the drains that consist of exotic species, such as tamarisk and *Phragmites*. The larger blocks of created habitat also would increase its attractiveness and value to wildlife as compared to the narrow, linear habitat of the drains.

IID would use water with selenium concentrations low enough to avoid adverse reproductive effects to support the managed marsh habitat. The selenium concentration of water used to support the managed marsh is expected to be close to 2 ppb. This selenium concentration is considerably lower than the selenium concentration in most of the drains in the IID water service area. Adverse effects from selenium toxicity would be avoided in the managed marsh, and the quality of the managed marsh habitat would be further enhanced beyond that in the drains.

With implementation of the HCP component, the Proposed Project would have beneficial effects on special-status species associated with drain habitat. Section 3.5 Drain Habitat Conservation Strategy of the HCP (Appendix C) provides additional information on the effects of implementing the Drain Habitat Conservation Strategy on habitat conditions for species associated with drain habitat and the responses of special-status species. (Beneficial impact.)

Impact HCP-BR – 33. Creation of Managed Marsh Could Decrease Agricultural Field Habitat. Under the Drain Habitat Conservation Strategy, IID would create at least 190 and up to 652 acres of managed marsh habitat. This habitat is anticipated to be created on lands used for agricultural production. Thus, up to 652 acres of agricultural land could be converted to managed marsh.

This potential reduction in agricultural field habitat would not significantly affect species using this habitat for two reasons. First, 652 acres constitutes a small amount (about 0.1 percent) of the total agricultural area in the IID water service area. Even with consideration of the potential loss of agricultural field habitat from other aspects of the Proposed Project (e.g., installation of tailwater return systems), agricultural land would remain abundant. Secondly, some of the species using agricultural fields also would use managed marsh habitat (e.g., white-faced ibis), resulting in no net loss of habitat value. (No impact.)

Impact HCP-BR – 34. Creation of Native Tree Habitat Could Benefit Wildlife Associated with Tamarisk Scrub. As described under Impacts BR - 14 and BR-15, implementation of several of the water conservation methods (lateral interceptors, seepage recovery systems) could remove tamarisk scrub habitat and disturb species using this habitat. The HCP addresses potential take of special-status species associated with these activities. Under the Tamarisk Scrub Habitat Conservation Strategy, prior to conducting construction activities in tamarisk scrub habitat, IID would survey the habitat to determine if special-status species are breeding in the habitat. IID would avoid removing the habitat until after the breeding season if special-status species are found. This measure would benefit special-status species and species without special status by avoiding disturbance of breeding birds.

In addition to avoiding direct effects to species breeding in tamarisk scrub habitat, IID would create or acquire, and preserve native tree habitat to replace tamarisk scrub habitat permanently lost from construction activities. Tamarisk scrub is poor quality habitat, and most of the species using this habitat find optimal habitat in native riparian plant communities or mesquite bosque. By compensating for tamarisk scrub permanently lost with native tree habitat, species associated with tamarisk scrub would benefit from higher habitat quality. Section 3.4, Tamarisk Scrub Habitat Conservation Strategy of the HCP, provides additional information on the effects of implementing the Tamarisk Scrub Habitat Conservation Strategy on habitat conditions for species associated with tamarisk and the responses of special-status species. (Beneficial impact.)

Impact HCP-BR–35. The Desert Habitat Conservation Strategy Would Avoid Impacts to Wildlife Associated with Desert Habitat. The Desert Habitat Conservation Strategy would avoid impacts on special-status species associated with desert habitat and, therefore, would not adversely affect these species or species using other habitats. This strategy consists of IID implementing practices to avoid and minimize the potential for adverse effects to special-status species from O&M activities. If construction activities are required within the rights-of-way of the canals adjacent to desert habitat (AAC, East Highline, Westside Main, Thistle, or Trifolium Extension), additional measures would be implemented to minimize the potential for adverse effects to special-status species and to compensate for decrease in habitat quality or availability. Species not associated with desert habitat would not be affected by measures implemented under the Desert Habitat Conservation Strategy.

Section 3.6, Desert Habitat Conservation Strategy of the HCP, provides additional information on the effects of implementing this strategy on desert habitat and the responses of special-status species. (No impact.)

Impact HCP-BR–36. Avoidance Measures Would Benefit Burrowing Owls. The Burrowing Owl Conservation Strategy focuses on minimizing and avoiding direct impacts to burrowing owls during O&M and construction activities. Implementation of the HCP would minimize adverse impacts associated with these activities while perpetuating aspects of the IID water service area's activities that benefit owls. The Burrowing Owl Conservation Strategy would contribute to the persistence of burrowing owls in the Imperial Valley and thereby further benefit the species. Section 3.7.1, Burrowing Owls of the HCP, discusses the effects of implementing this strategy on burrowing owls. (Beneficial impact.)

Impact HCP-BR–37. Avoidance Measures of Burrowing Owl Conservation Strategy Would Benefit Other Special-Status Species. The Burrowing Owl Conservation Strategy does not include measures that would adversely affect habitat for other special-status species, and some measures could benefit other special-status species. Specifically, the Burrowing Owl Conservation Strategy includes requirements to avoid construction activities and certain earth-disturbing O&M activities along the drains and canals during the owl's breeding period, if occupied burrows would be affected. If other species breed nearby, they would similarly benefit from the avoidance measure for burrowing owls. (Beneficial impact.)

Impact HCP- BR – 38. Desert Pupfish Conservation Strategy Would Increase Habitat for Pupfish. For desert pupfish, the HCP requires IID to maintain the existing amount and quality of desert pupfish habitat and to increase the amount of habitat for pupfish over the life of project. In addition to these habitat measures, IID would implement measures to avoid and minimize direct impacts to desert pupfish from construction activities. With implementation of the HCP component, the Proposed Project would benefit desert pupfish. Section 3.7.2, Desert Pupfish of the HCP, discusses the response of desert pupfish to the HCP measures. (Beneficial impact.)

Impact HCP-BR–39. Increased Habitat from the Desert Pupfish Conservation Strategy Would Benefit Other Special-Status Species. The Desert Pupfish Conservation Strategy does not include measures that would adversely affect habitat for other special-status species, and some measures could benefit other special-status species. Specifically, the Desert Pupfish Conservation Strategy includes maintaining the existing amount of desert pupfish habitat and increasing the amount of pupfish habitat as the elevation of the Salton Sea recedes. So, this Strategy would contribute to maintaining and increasing the amount of drain habitat, benefiting species associated with drain habitat, both those with and without special state or federal status. (Beneficial impact.)

Impact HCP-BR – 40. HCP Measures Would Avoid Impacts to Razorback Suckers. Under the HCP, IID would salvage razorback suckers found when canals are dewatered and transport the fish to the LCR for release. As a result of this action, significant impacts to razorback suckers would be avoided. (No impact)

Impacts resulting from the implementation of the HCP (IID Water Service Area portion) would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

The potential effect of this approach to biological resources in the Imperial Valley would be to reduce the acreage of agricultural fields in active production. Initially, construction and operation of the hatchery could remove about 50 acres of agricultural land from production. This minor amount of land would not affect biological resources in the Imperial Valley. Five thousand acres of ponds would be constructed once the salinity of the sea exceeded the level at which tilapia could survive and grow. These ponds would be located on agricultural land and would reduce the amount of agricultural land in the Imperial Valley. This relatively small reduction (about 1 percent) in the amount of agricultural land would not adversely affect biological resources. Section 3.8.6 of the HCP (Appendix C) provides information on the potential effects of the Salton Sea mitigation approaches on special-status species.

HCP (Salton Sea Portion) Approach 2: Use of Conserved Water as Mitigation

Approach 2 of the Salton Sea Conservation Strategy entails generating mitigation water so there would be no change in inflow to the Salton Sea with implementation of the water conservation and transfer programs. Fallowing could be used for this water conservation. The amount of land that would need to be fallowed would depend on how water for transfer was conserved. If Fallowing was used to generate all the 300 KAFY of water for transfer, then about 25,000 acres of land would need to be fallowed for mitigation water. Under this scenario, a total of 75,000 acres of land would be fallowed. If on-farm irrigation system and water delivery system improvements were used to conserve 300 KAFY of water for transfer, then about 75,000 acres of lands would be needed for mitigation water. This approach would reduce the amount of agricultural land by about 15 percent. Even with this reduction, agricultural fields would remain abundant at about 425,000 acres, and no significant adverse effects to biological resources would be expected. Section 3.8.6 of the HCP (Appendix C) provides information on the potential effects of the Salton Sea mitigation approaches on special-status species.

Impacts resulting from the implementation of the HCP (Salton Sea Portion) Approaches 1 and 2 would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Under the Proposed Project, IID would conserve between 130 KAFY and 300 KAFY of water using a combination of on-farm irrigation system improvements, water delivery system improvements, and/or Fallowing. If all Fallowing was used to conserve water, effects to the salinity, surface elevation, and surface area would be the least of the possible methods for conserving water. This "best-case" scenario of the Proposed Project is analyzed under Alternative 4. The following analysis addresses the "worst-case" scenario of conservation of 300 KAFY of water using on-farm irrigation system improvements and water delivery system improvements and transfer to SDCWA. Use of Fallowing to generate a portion of the conserved water would have effects between those described here and those of Alternative 4.

Impact BR – 41. Reduced Drain Flows Could Affect Adjacent Wetlands Dominated by Cattail/Bulrush Vegetation. The Salton Sea database identifies 217 acres of adjacent wetlands dominated by cattails and bulrushes. In the IID water service area, the Salton Sea database identifies three parcels dominated by cattails: one on the southwestern edge (35 acres) and two on the southern edge (32 acres). A fourth parcel on the eastern edge of the Sea is dominated by bulrushes (17 acres). The remaining 133 acres identified as adjacent wetland dominated by cattail or bulrush are adjacent to the northwestern area of the Salton Sea in CVWD's service area. Because cattails and bulrush cannot tolerate saline water, these areas must be supported by a freshwater source (i.e., drainwater from CVWD or IID). The Proposed Project would increase freshwater flows in drains in the CVWD service area and would potentially increase freshwater flows to the 133 acre adjacent wetland in the CVWD service area.

The remaining three areas identified as adjacent wetlands are misclassified in the Salton Sea database. The first parcel of 35 acres is a managed duck club and does not meet the definition of an adjacent wetland (i.e., unmanaged areas). Of the two parcels totaling 32 acres, one is an IID drain, and the other is a marsh managed by USFWS. The drain parcel is managed by IID as part of its drainage system; impacts to drain vegetation are addressed under Impact BR- 10. The other parcel managed by USFWS does not meet the definition of an adjacent wetland (i.e., unmanaged areas). Habitat values of the parcel managed by USFWS and the duck club would not change with implementation of the Proposed Project; therefore, the two parcels would not be affected. The last parcel encompassing 17 acres is sustained by runoff from CDFG's managed marsh area in the Wister Unit. Because CDFG would not change management of marsh areas in the Wister Unit under the Proposed Project, the amount of water leaving the Wister Unit and supporting the 17-acre parcel would not change. Therefore, this parcel would not be affected under the Proposed Project. (No impact.)

Impact BR – 42. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. The Salton Sea database (University of Redlands 1999) classifies 6,485 acres along the Sea as adjacent wetlands. Tamarisk is the dominant vegetation on 2,349 acres. Adjacent wetlands dominated by cattail/bulrush were addressed previously. The remaining acres either lack vegetation or are dominated by iodine bush, arrowweed, or other mixed halophytic shrubs. Because these vegetation types provide little wildlife habitat, changes in the acreage of these types would not significantly or adversely affect wildlife or wildlife habitat. Tamarisk is also the primary component of the shoreline strand community. The following analysis addresses potential change in the amount of tamarisk scrub in areas designated as adjacent wetland or shoreline strand.

The water surface elevation of the Salton Sea is projected to decline under the Proposed Project. The magnitude and rate of the elevation decline would depend on the combination of methods used to conserve water. With conservation of 300 KAF through on-farm irrigation system and water delivery system improvements, the water surface elevation would decline rapidly for the first 30 years. After this period, the water surface elevation would stabilize at about -249 feet mean sea level (msl), about 22 feet below the existing level (Figure 3.2-15). Use of Fallowing to conserve a portion of the water would reduce the magnitude of the decline in water surface elevation.

The source of the water supporting the tamarisk in adjacent wetland and shoreline strand areas is uncertain, but could consist of a combination of shallow groundwater and seepage from the Salton Sea. The extent to which the water surface elevation of the Sea contributes to supporting this community is uncertain. Depending on the relationship between the water surface elevation of the Sea and maintenance of the shoreline strand and adjacent wetlands, water conservation under the Proposed Project could change the amount of tamarisk scrub habitat in shoreline strand and adjacent wetland areas. There is, however, uncertainty about the extent and likelihood of these possible changes. As the Sea recedes, tamarisk could establish at lower elevations, replacing habitat lost at high elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where drainwater or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas. Although it is not possible to predict the magnitude of change in the tamarisk adjacent to the Salton Sea, a reduction in the amount would not be anticipated to cause a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife and (2) no special-status species depend on tamarisk. Implementation of the Salton Sea Conservation Strategy under the HCP component of the Proposed Project would further ensure that no significant impacts occur. (Less than significant impact.)

Impact BR – 43. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. As the salinity of Salton Sea increases, the invertebrate community would change. The pileworm, *Neanthes succinea,* is a primary component of the Salton Sea food chain, providing food for several fish species. Reproduction of pileworms is substantially reduced when the salinity reaches about 50 g/L. *Brachionus plicatilis* (rotifer) would not be able to complete its life cycle at 48 g/L. A reduction in the abundance of these species could allow amphipods, such as *Gammarus mucronatus,* to become the dominant benthic invertebrate. At higher salinity levels, the Salton Sea would resemble Mono Lake, which is dominated by highly specialized halotolerant invertebrates, such as brine shrimp and brine flies.

The Proposed Project would accelerate the rate at which the Salton Sea transitions first to an invertebrate-dominated ecosystem, then to a system dominated by halotolerant organisms (e.g., brine shrimp and brine flies) similar to Mono Lake and the Great Salt Lake. Figure 3.2-16 shows the salinity level at which selected invertebrates would not be able to complete their life cycles and would be exceeded under the No Project alternative and the Proposed Project. As shown on Figure 3.2-16, the difference between when a specific salinity level would be exceeded under the Proposed Project and when it would occur under the No Project gets larger as the salinity threshold increases. For example, the modeling predicts only a 1-year difference between the Baseline and Proposed Project, with conservation of 300 KAFY for when the salinity tolerance of pileworms (50 g/L) would be exceeded. But for the copepod (*C. dietersi*), with a tolerance of 80 g/L, this difference increases to 44 years.

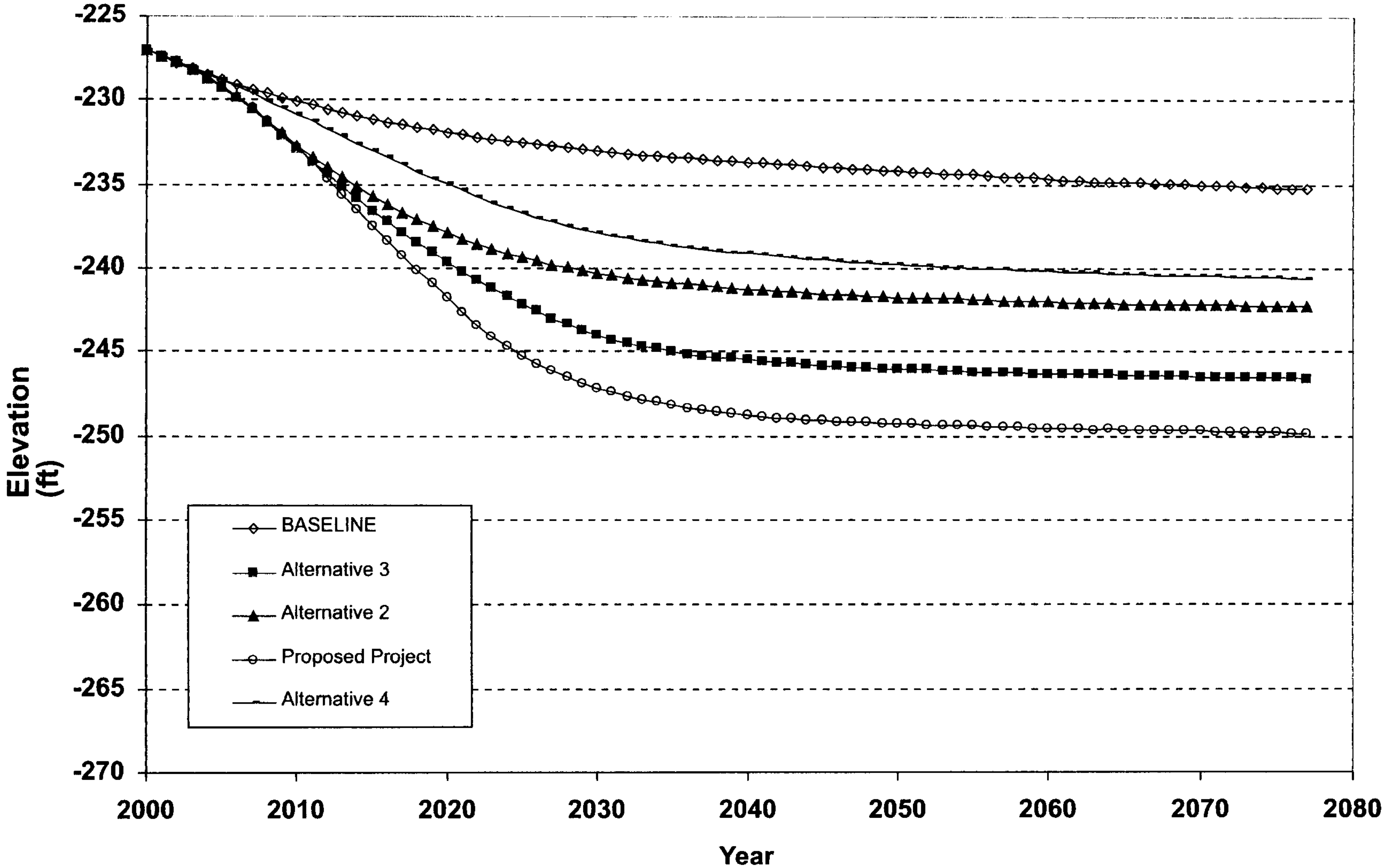

Figure 3.2-15
Projected Water Surface Elevations
Under the Proposed Project and Alternatives
IID Water Conservation and Transfer Project Draft EIR/EIS

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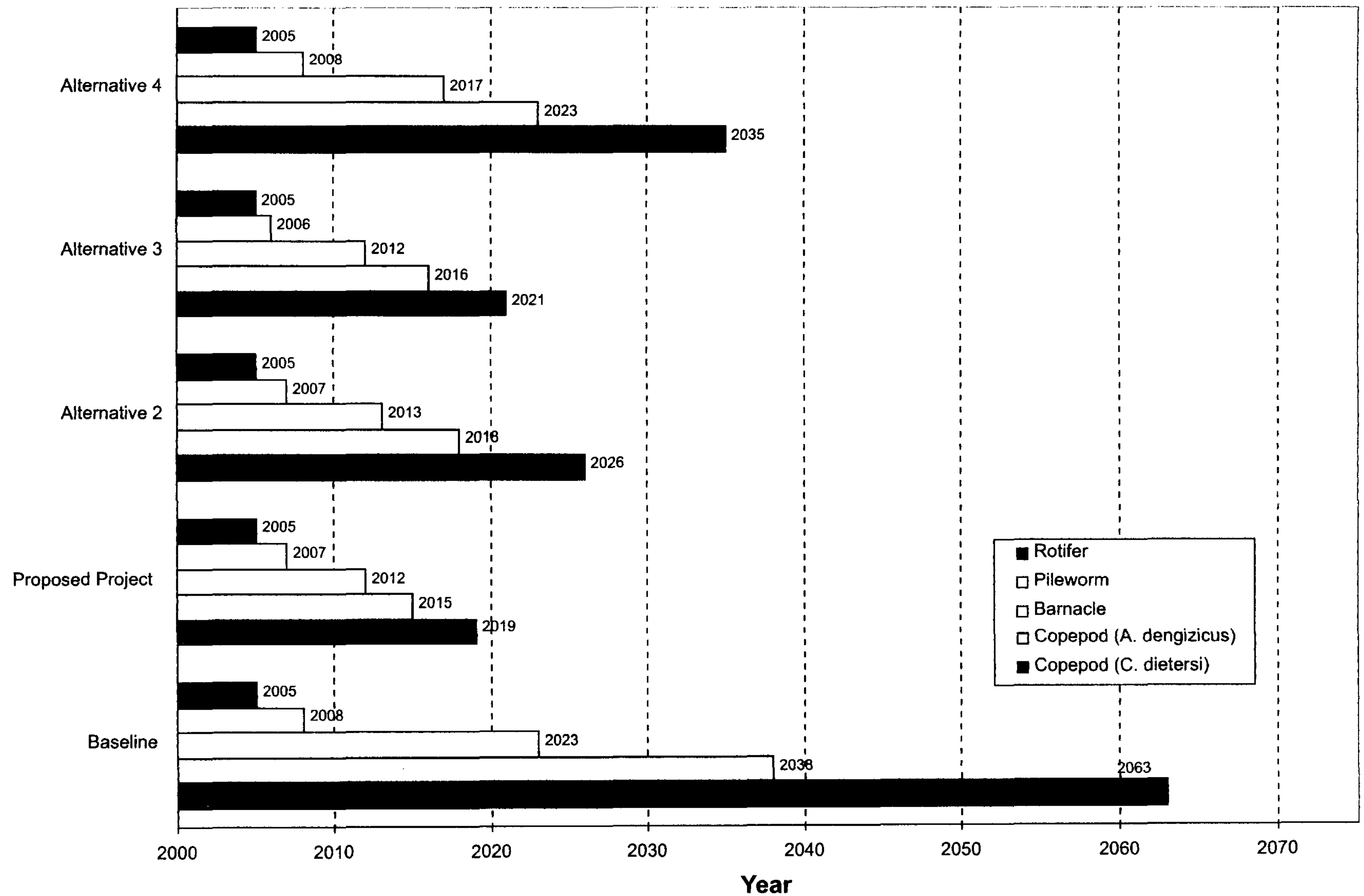

Figure 3.2-16
Projected Year at Which Salinity Would Exceed Tolerances for Invertebrate Species Under the Proposed Project and Alternatives
IID Water Conservation and Transfer Project Draft EIR/EIS

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As the thresholds of invertebrates are exceeded, the abundance of these species likely would decline. Concurrently, the abundance of brine flies and brine shrimp would increase. These species are tolerant of high salinities. Brine shrimp and brine flies are the dominant invertebrates at Mono Lake, an inland lake with a salinity of about 100 g/L. These species would increasingly dominate the invertebrate community as the salinity of the Sea increases.

In accord with the significance criteria, because no invertebrates are candidate, sensitive, or special-status species, the acceleration in the changes in the invertebrate community of the Salton Sea is not a significant impact (less than significant). Regardless of the Proposed Project, the Salton Sea is naturally transitioning to a more saline system, as has occurred at Mono Lake and the Great Salt Lake. The change in the composition of the invertebrate community in and of itself is not a significant impact but could significantly affect bird or fish resources through reduced food availability. These potential impacts are addressed separately under Impact BR-44. (Less than significant impact.)

Impact BR – 44. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. Under the Proposed Project and Baseline, the abundance and composition of the invertebrate community would change as the salinity of the Salton Sea increases, as described under Impact BR-43. The changes in the abundance and composition of the invertebrate community could alter the suitability of foraging conditions for birds using the Salton Sea.

The Salton Sea area is a primary wintering area for ducks and geese. Geese at the Salton Sea are predominantly Snow and Ross's geese. Ducks include dabbling ducks (predominantly northern shoveler, northern pintail, green-winged teal, and American wigeon) and diving ducks (predominantly ruddy ducks). Geese and dabbling ducks would not be affected by changes in the invertebrate community of the Salton Sea as a result of increased salinity. Snow and Ross's geese concentrate at the state and federal refuges and private duck clubs (Shuford et al. 2000) that are managed specifically to provide forage (i.e., grain) for these species and attract them. Dabbling ducks, generally intolerant of saline water, are predominantly found in freshwater impoundments on the state and federal refuges and private duck clubs (Shuford et al. 2000). Because they use the main body of the Salton Sea only minimally, and their main habitats (state and federal refuges and private duck clubs) would continue to be available under the Proposed Project, dabbling ducks and geese would not be adversely affected by increased salinity and changes in the invertebrate community at the Salton Sea. Ruddy ducks use the main body of the Salton Sea and could be affected by changes in the invertebrate community. Potential effects to ruddy ducks are evaluated below along with grebes and shorebirds.

Mono Lake provides the best model of what the bird species diversity and abundance likely would resemble as salinity of the Salton Sea increases. Mono Lake is a saline, inland sea like the Salton Sea. On the eastside of the Sierra Nevada Mountains in California, it also lies in the Pacific Flyway. At a salinity of about 100 g/L, the lake does not support fish; brine flies and brine shrimp dominate the invertebrate community and are the primary prey species for birds.

Mono Lake is designated as part of the Western Hemisphere Shorebird Network and is 1 of only 17 sites in the Western Hemisphere with this designation. The lake supports large numbers of migrating shorebirds. Wilson's and red-necked phalaropes are abundant with maximum counts of about 45,000 and 70,000, respectively (Jones & Stokes Associates 1993). Annual counts of eared grebes typically range from 600,000 to 900,000 (Jones & Stokes Associates 1993). Other abundant shorebird species identified by Point Reyes Bird Observatory during surveys conducted in late August 1989, 1990, and 1991 were American avocet (8,467), western sandpiper (4,043), and least sandpiper (1,408). Ruddy ducks also are common with Christmas bird counts typically in the range of 500 to 900. Other shorebird species in smaller numbers at Mono Lake include black-bellied plover, greater and lesser yellowlegs, long-billed curlews, black-necked stilts, semipalmated plover, and willets.

The species of shorebirds that use Mono Lake also occur at the Salton Sea as migratory birds or winter residents (see Tables 3.2-19 and 3.2-20). Similarly, eared grebes and ruddy ducks are abundant at both Mono Lake and the Salton Sea. Given that the shorebird and waterbird (grebes and ruddy ducks) species that use the Sea also use Mono Lake, in which the brine flies and brine shrimp are the primary prey species, it is reasonable to expect that these species would similarly exploit brine flies and brine shrimp as they become the dominant invertebrate at the Salton Sea. Therefore, changes in the invertebrate community would have less-than-significant impacts on shorebirds and other waterbirds using this resource. (Less than significant impact.)

Impact BR – 45. Increased Salinity Would Reduce Fish Resources in the Salton Sea. Since its formation, the salinity of the Salton Sea has increased because of high evaporative water loss and continued input of salts from irrigation drainage water. Increasing salinity of Colorado River water delivered at Imperial Dam, which is the sole source for irrigation water in Imperial Valley, also is a factor. The Salton Sea is hypersaline, with salinity greater than the ocean.

Under the Proposed Project, the salinity of the Salton Sea would continue to increase. Fish resources of the Salton Sea are expected to change with the increased salinity. These changes would occur without the Proposed Project, so the effect of the Proposed Project relates only to the rate of salinization. The expected response of the fish resources of the Salton Sea to increased salinity levels is described subsequently. The effect of the Proposed Project on the rate of salinization versus the Baseline is then discussed.

The current salinity level of the Salton Sea is about 44 g/L. Studies have indicated that many fish and invertebrates in the Sea are at risk from this high level. The Salton Sea Science Subcommittee developed the following general sequence of events anticipated as a result of increased salinity.

- Loss of sport fishery: Available evidence indicates that corvina reproduction could fail at any time, and, at a salinity level of 50 g/L, it will fail along with that of the croaker and sargo, leaving tilapia as the only sportfish species. Pileworm production could also fail at this concentration, allowing amphipods to assume increased importance in the benthos.
- Loss of tilapia: By 60 g/L, the salinity tolerance of tilapia reproduction will have been exceeded, leaving only smaller fish as a food source for piscivorous birds.
- Loss of metazoan zooplankton: At about 70 g/L, the cyclopoid copepod will disappear (rotifers will have already disappeared), leaving only protozoan zooplankton. This could affect phytoplankton species composition, with possible implications to nutrient cycling and overall productivity.
- Loss of all fish: This could occur at about 80 g/L, as even desert pupfish and sailfin mollies would reach salinity tolerance limits of reproduction. At this point, the Salton Sea would resemble Mono Lake, which is dominated by highly specialized halotolerant invertebrates, such as brine shrimp and brine flies.

Hagar and Garcia (1988) developed a prediction of the responses of the fish and invertebrate communities in the Salton Sea to increasing salinity (Table 3.2-43). They cautioned that their assessment should be viewed only as a professional opinion (Hager and Garcia 1988).

TABLE 3.2-43
Hypothetical Chronology for Salinity Effects on Salton Sea Biota

Salinity Level (g/L)	Event	Probability
40	Increased importance of environmental stress on all fish	High
	Reproductive failure of croaker, sargo, and tilapia	Moderate
	Declining abundance of primary forage for corvina with resulting lower growth rates, decreased reproduction, and higher mortality	Moderate
45	Declining productivity (standing crop) of pileworm reduces food for croaker and young corvina	Moderate
	Changes in lower trophic levels affecting recruitment success of corvina and other fish	Low
	Reproductive failure of croaker, sargo, and tilapia because of excessive salinity	High
	Loss of reproduction of tilapia because of excessive salinity	Moderate
	Reproduction of pileworm threatened	Moderate
	Declining productivity (standing crop) of pileworm reduces food for croaker, young corvina	Moderate
	Direct mortality to young and/or adult croaker and sargo because of excessive salinity	Moderate
	Declining abundance of primary forage for corvina with resulting lower growth rates, decreased reproduction, and higher mortality	Moderate
	Loss of recruitment of corvina because of reproductive failure at upper salinity tolerance	Moderate
	Changes in lower trophic levels affecting recruitment success of corvina	Low to moderate
50	Reproduction of croaker and sargo no longer possible	High

TABLE 3.2-43
Hypothetical Chronology for Salinity Effects on Salton Sea Biota

Salinity Level (g/L)	Event	Probability
	Loss of pileworm reproduction	High
	Declining productivity (standing crop) of pileworm reduces food for croaker and young corvina	High
	Upper salinity tolerance for adult sargo exceeded	High
	Total loss of sargo	High
	Total loss of croaker	High
	Loss of corvina recruitment because of reproductive failure at upper salinity tolerance	High
	Loss of forage for corvina; corvina fall to low numbers	High
	Loss of corvina sport fishery	High
	Reproductive failure for tilapia	Moderate to high
	Total loss of food source for croaker	Moderate
	Upper salinity tolerance for adult croaker exceeded	Moderate
55	Conditions intolerable for adult corvina because of lack of forage; corvina at very low numbers	Extreme
	Reproductive failure of tilapia	High
	Total loss of corvina	Moderate
	Conditions intolerable for adult corvina because of high salinity	Low to moderate
60	Tilapia success is highly variable from year to year because of interaction of salinity and other environmental factors	Extreme
	Corvina at very low numbers because of lack of forage, environmental stress, and no reproduction	Extreme
	Total loss of corvina	High
65	Total loss of corvina	Extreme
	Tilapia adults can no longer tolerate high salinities (regardless of other environmental factors)	High
	Reproductive failure of desert pupfish	High
	Loss of barnacle	High
	Phytoplankton and zooplankton communities have lost some species, perhaps gained a few new ones; species diversity is lower; no fish from previous community remain, with possible exception of desert pupfish	High

Source: Hagar and Garcia 1988.

The overall outcome of increasing salinity would be the loss of fish. While the demise of corvina, croaker, and sargo has been predicted for many years, they continue to reproduce. The available evidence indicates that corvina reproduction could fail at any time above the current salinity of 44 g/L. Sargo reproduction could cease at approximately 50 g/L. Croaker would not complete its life cycle at about 55 g/L. Above this level, only tilapia would remain as species large enough for sport fishing in the Sea and as prey for piscivorous birds.

Tilapia have a high salinity tolerance. They adapt to high salinity levels, particularly if the increase in salinity is gradual (Phillipart and Ruwet 1982, cited in Costa-Pierce and Riedel 2000a). Costa-Pierce and Riedel (2000a) suggested that tilapia in the Salton Sea could acclimate to and reproduce at a salinity level of 60 g/L. Above a salinity level of 60 to 70 g/L, growth, survival, and reproduction would decline (Costa-Pierce, pers. comm. January 12, 2001).

As noted, increased salinity and resultant changes in fish resources of the Salton Sea would occur with or without the Proposed Project. The Proposed Project would accelerate the changes. Based on Reclamation's projections for the Salton Sea, in the absence of the conservation and transfer of water under the Proposed Project, the salinity of the Salton Sea would exceed the level at which sargo, gulf croaker, and tilapia could complete their life cycles (Table 3.2-35) in 2008, 2015, and 2023, respectively (Figure 3.2-17). Under the Proposed Project, the thresholds for sargo, gulf croaker, and tilapia would be exceeded 1, 5, and 11 years earlier than under the Baseline (in 2007, 2010, and 2012, respectively).

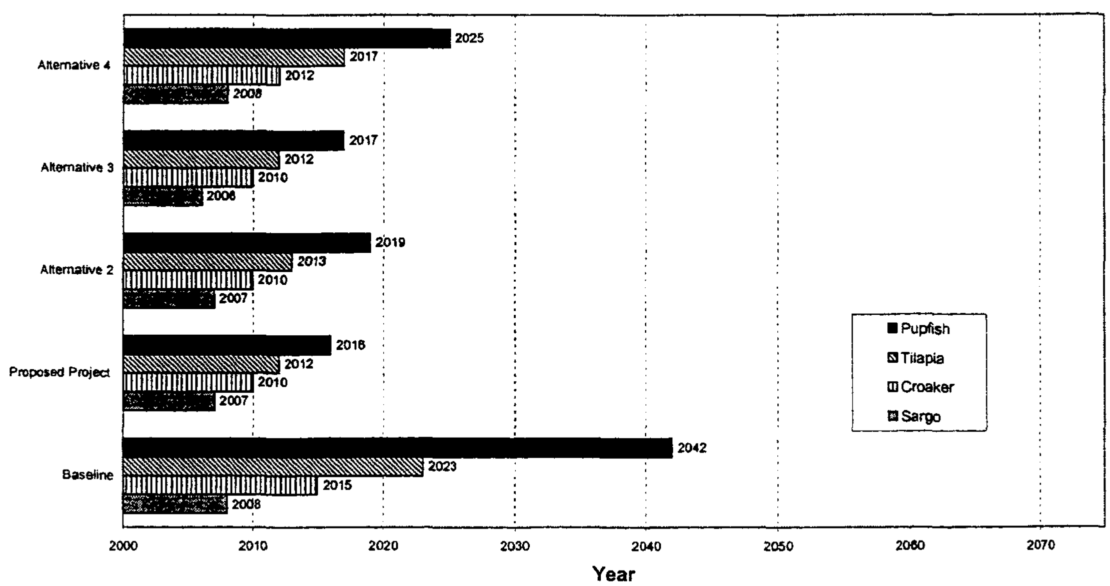


FIGURE 3.2-17
Projected Year that Tilapia, Gulf Croaker, Sargo, and Desert Pupfish Will Not Be Able to Complete Their Life Cycles Because of High Salinity levels in the Salton Sea under Proposed Project and alternatives.

Tilapia abundance likely would decline at salinity levels greater than 60 g/L. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas where salinity levels are lower than in the main body of the Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 g/L in the river deltas. Tilapia could persist if the deltas provide lower salinity environments.

The salinity threshold above which orangemouth corvina cannot complete their life cycle is about 40 g/L. However, young-of-the-year and juvenile corvina have been captured recently in the Salton Sea, indicating successful reproduction (Riedel et al. 2001). The highest catches of corvina were from the river deltas and nearshore areas (Riedel et al. 2001), where salinity levels are lower (Costa-Pierce and Reidel 2000c) and would potentially remain within tolerances of corvina. It is uncertain how much longer corvina will reproduce.

The abundance of gulf croaker could decline sooner than discussed if pileworms decline earlier. Pileworms are an important food source for gulf croaker and have a lower salinity tolerance. Pileworms are not expected to survive at a salinity greater than about 50 g/L, but may persist in the river deltas where salinities could be lower. This level would be exceeded under the Baseline in 2008 and under the Proposed Project in 2007. Because tilapia have a diverse diet (Costa-Pierce and Riedel 2000b), they would not be affected by a decline in pileworms.

Under both the Baseline and the Proposed Project, the salinity of the Salton Sea would rise and exceed levels at which fish species inhabiting the Salton Sea could reproduce. For gulf croaker and tilapia, the thresholds could be exceeded up to 5 and 11 years earlier under the Proposed Project, resulting in earlier declines in these two species. This acceleration is considered a less-than-significant impact to fish resources for two reasons. First, the differences between when species-specific salinity thresholds would be exceeded are small (5 to 11 years). Second, based on the significance criteria, only effects to candidate, sensitive or special-status species or certain effects to native fish (e.g., nursery habitat, migratory routes) constitute significant biological impacts. Because all fish species are introduced, non-native species, the impacts are less than significant. (Less than significant.)

Impact BR – 46. Reduced Fish Abundance Would Affect Piscivorous Birds. Tilapia is the most abundant fish species in the Salton Sea (Costa-Pierce and Riedel 2000a; Black 1988) and is the primary forage species for piscivorous birds at the Salton Sea (Molina 1996; S. Johnson, pers. comm. 2000). Because of the importance of tilapia in the diet of piscivorous birds at the Salton Sea, the potential change in the tilapia population of the Salton Sea was the focus of assessing the potential impact to piscivorous bird species. Based on Costa-Pierce and Riedel (2000a), the abundance of tilapia would decline substantially once the salinity of the Sea reaches about 60 g/L.

Modeling by Reclamation (2001) indicates that salinity of the Salton Sea would gradually increase over the next 75 years without the conservation and transfer of water under the Proposed Project. The mean of the salinity projections shows the salinity of the Salton Sea surpassing 60 g/L in 2023 under the Baseline (Figure 3.2-17). Tilapia abundance likely would decline after this point, as the increasing salinity impairs reproduction. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas, where salinity levels are lower than in the main body of the

Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 g/L in the river deltas. Tilapia could persist if the deltas provide lower salinity environments.

Water conservation under the Proposed Project would reduce inflows to the Salton Sea, which would increase its rate of salinization. With conservation and transfer of 300 KAFY, the rate of salinization would increase relative to the Baseline. The degree to which water conservation would accelerate salinization would depend on the method of conservation. The mean of the salinity projections under the Proposed Project shows the salinity of the Salton Sea surpassing 60 g/L in 2012 (Figure 3.2-17), 11 years earlier than Baseline projections. Use of Fallowing to conserve water would reduce the difference between the Proposed Project and the Baseline.

Under all alternatives (No Project, Proposed Project, and alternatives), tilapia could persist in the Salton Sea if low salinity areas persist around the deltas and potentially near drain outlets. Given tilapia's ability to tolerate high salinity levels, the deltas could serve as a breeding population from which individuals could disperse to populate other areas of the Sea. Although tilapia could persist in some areas, the total population supported in the Salton Sea would be reduced relative to existing conditions. This reduction would occur with or without implementation of the Proposed Project. As the abundance of fish decline at the Salton Sea, the level of use by piscivorous birds would decline. If fish persist in the deltas of the New and Alamo Rivers, a smaller level of use by piscivorous birds could be supported at the Salton Sea. The primary piscivorous birds of concern with respect to reduced fish abundance are white pelicans, brown pelicans, black skimmers, and double-crested cormorants. Large numbers of white pelicans use the Salton Sea; most of the white pelicans of the Pacific Flyway use the Sea as a migratory stopover or overwintering site. Because of this high level of use, they are a focus of the evaluation of potential effects of changes in fish abundance on piscivorous birds. California brown pelicans are a focus of this evaluation because they are a state and federally listed species. Black skimmers are a California species of special concern; the Sea supports the largest and one of the few nesting populations of this species in California. The Salton Sea supports a large population of breeding and overwintering double-crested cormorants and is believed to support the largest breeding colony on the West Coast at Mullet Island. As the abundance of fish declines at the Salton Sea, the level of use of the Sea by these four species would decline. Potential effects to each species follow.

American White Pelican. White pelicans use the Salton Sea as a migratory stopover and wintering area. As a migratory stopover, individual pelicans use the Sea for a few weeks to a few months before migrating to Mexico (Shuford et al. 1999). Some birds probably remain at the Sea throughout the winter rather than continuing on to Mexico.

The number of pelicans using the Salton Sea at any time varies substantially. Winter and migratory use of the Sea is highly variable within and among years. While large numbers of white pelicans stop at the Salton Sea for brief periods of time to migrate or exploit food resources sporadically during the winter, the average wintering population is much lower. Pelicans are at the Salton Sea in the greatest numbers from November to April (Shuford et al. 2000). The USFWS recorded numbers of white pelicans at the Sea for 21 months between December 1999 and August 2001. White pelican numbers were highest (24,110) in February 2000 and lowest (770) in July 2001. In addition to the Salton Sea, pelicans using the Pacific

Flyway also overwinter along the California coast south of San Francisco, throughout the San Joaquin Valley, throughout Baja California, and in the Gulf of California (Johnsgard 1993).

Pelicans are highly opportunistic and mobile in selecting foraging sites, and travel long distances to forage even during breeding, an energetically stressful time (Knopf and Kennedy 1980). At Pyramid Lake, Nevada, pelicans have been reported foraging at seven lakes during the breeding season. All the foraging sites were more than 37 miles from Pyramid Lake, where the breeding colony is, with the farthest foraging site (Stillwater NWR) nearly 62 miles away (Knopf and Kennedy 1980). Knopf and Kennedy (1980) found that pelicans nesting at Pyramid Lake switched foraging locations frequently during the nesting season. Changes in foraging location appeared to be linked to the availability of fish. For example, pelicans used Pyramid Lake, the closest foraging location to the breeding colony, at relatively low levels, except in June, when tui chub became available in shoreline areas. Knopf and Kennedy (1980) characterized pelicans as "opportunistic in selecting foraging sites where fish are most readily available." Johnsgard (1993) also notes the great distances that pelicans will travel to forage. Summarizing data from other studies, Johnsgard (1993) reports one-way foraging flights of up to 100 miles (Great Salt Lake), round trips of 60 to 380 miles (Chase Lake, ND), and one-way distances of 90 miles (Harvey and Warner basins).

The reported foraging behavior of white pelicans indicates they seek the most favorable foraging area in a wide area. The availability of an abundant source of fish, tilapia in particular, makes the Salton Sea attractive to pelicans. With increased salinity of the Salton Sea, the abundance of tilapia could decline if nearshore areas become unsuitable. However, tilapia could persist at the Sea, particularly in the New and Alamo River Deltas. Pelicans forage in the deltas (Shuford et al. 2000). If tilapia persist at the deltas, pelicans would likely continue to use the Salton Sea as a migratory stopover and wintering area. However, if salinity increases substantially, reducing the abundance of tilapia, the level of use of the Salton Sea by white pelicans would decline. A decline in the level of use by pelicans could be manifested as a shorter stopover time, lower numbers of birds, or shorter residence periods of overwintering birds. Given their opportunistic foraging strategy and ability to travel long distances, it is likely that at least some of the pelicans would be able locate other wintering areas, if fish at the Salton Sea became less abundant and if the energetic costs of foraging there became greater than at the other locations in California and Mexico used by white pelicans during migration and winter (i.e., California Coast south of San Francisco, San Joaquin Valley, Baja California, Gulf of California [Johnsgard 1993]). However, it is likely that the level of use of the Sea by white pelicans would decline as tilapia abundance declines. This effect would occur with or without implementation of the water conservation and transfer under the Proposed Project. The Proposed Project would accelerate the rate at which this effect would be manifested.

California Brown Pelican. Brown pelicans probably had little historical use of the Salton Sea (Anderson pers. comm.). Post-breeding pelicans were documented at the Sea in the late 1970s. Use of the Salton Sea by brown pelicans subsequently increased, with the maximum summer usage estimated at 5,000 birds. Nearly 2,000 were recorded in 1999, but a maximum of only 1,000 was recorded in 2000 (Shuford et al. 2000). The USFWS recorded numbers of brown pelicans at the Sea for 21 months between December 1999 and August 2001. Brown pelican numbers were highest (3,990) in July 2001 and lowest (5) in March 2000.

Most use of the Salton Sea is by post-breeding visitors, with more limited use for wintering. These visitors are mostly young birds that disperse northward from breeding areas in the Gulf of California (Hazard, pers. comm.). Shuford et al. (2000) reported that brown pelicans occur at the Salton Sea primarily from mid-June to early October. They observed the highest numbers in August. The primary wintering area in the U.S. is along the California coast (Johnsgard 1993).

Brown pelicans only recently, in 1996, started nesting at the Salton Sea (Shuford et al. 1999). The number of breeding birds has been low, with six pairs nesting in 1996 and several pairs attempting to nest in most years since then (Shuford et al. 1999). Brown pelicans did not nest at the Sea in 1999 (Shuford et al. 2000). Nesting birds have used tamarisk at the Alamo River Delta and attempted to nest at Obsidian Butte (S. Johnson, pers. comm.). Compared to the nearest breeding colonies of brown pelicans in the Gulf of California on San Luis Island (4,000 to 12,000 pairs), Puerto Refugio (1,000 to 4,000 breeding pairs), and Salsipuedes/Animas/San Lorenco area (3,000 to 18,000 pairs), the population nesting at the Salton Sea makes a small contribution to the overall population. Other breeding populations occur off the southern California Coast and the western coast of Baja California (Johnsgard 1993). Dispersing juveniles wander considerably from nesting locations and can travel long distances (Johnsgard 1993). Young eastern brown pelicans can move more than 310 miles from breeding areas (Johnsgard 1993). Similarly in California, most banded birds were recovered within 310 miles of the breeding site, but one was found in Mexico, 1,375 miles away from the banding location (Johnsgard 1993). Adults also become wanderers after breeding and have been reported to move 280 to 360 miles from nesting areas (Johnsgard 1993).

As previously described, the abundance of tilapia is expected to decline as the salinity of the Sea increases. However, tilapia could persist at the Salton Sea, particularly in the New and Alamo River Deltas. Pelicans forage in the deltas (Shuford et al. 2000). With the continued persistence of tilapia, pelicans would likely continue to visit the Salton Sea as post-breeders. Because post-breeding pelicans wander over large areas, pelicans would likely remain at the Sea for a shorter period of time or seek out more favorable foraging areas in the Gulf of California or along the Pacific Coast, if foraging becomes energetically unfavorable at the Salton Sea. These areas are within the distances that brown pelicans can travel. However, the level of use of the Sea by brown pelicans would likely decline as tilapia abundance declines. This effect would occur with or without the Proposed Project. The Proposed Project would accelerate the rate at which this effect would be manifested.

Depending on the degree to which the tilapia population declines, nesting might not occur again in the future. However, loss of breeding by brown pelicans at the Salton Sea would not affect the overall population. Brown pelicans have attempted to nest only a few times at the Sea and only in small numbers (six pairs or fewer), representing less than 1 percent of the California breeding population (Johnsgard 1993) and a far smaller percentage of the subspecies' entire population.

Black Skimmer. Black skimmers first appeared in California in 1962. Six years later, five skimmers were sighted at the Salton Sea (Collins and Garrett 1996). The first nesting by black skimmers in California occurred in 1972 at the Sea (Collins and Garrett 1996). Since black skimmers were first observed in California, their numbers have steadily increased. New breeding locations have been reported at several locations along the California Coast from San Diego to San Francisco Bay, and the number of birds using these locations has generally increased. In addition to the California nesting sites, black skimmers nest at Montague Island in the Gulf of California (Collins and Garret 1996).

At the Salton Sea, nesting colonies of black skimmers range from 10 to several hundred pairs; most colonies consist of 50 to 200 pairs (Molina 1996). As many as 777 black skimmers have been reported in summer (Shuford et al. 2000). The Sea is the only inland breeding site of this species and supports about 30 percent of the known breeding population in California. Skimmers nest on bare earthen slopes, terraces, and levees adjacent to the Sea. Nesting locations include Mullet Island, the Whitewater River Delta, Morton Bay, Rock Hill, and Obsidian Butte.

After breeding, skimmers move among a number of wintering locations. Gazzaniga (1996) showed wide month-to-month fluctuations in the number of skimmers using five locations on the California coast. The reasons for the fluctuations were unclear, but she suggested that weather and food resources could play a role. Long distance movements by black skimmers also have been reported. Palacios and Alfaro (1992) captured birds banded at Bolsa Chica along the coast of Baja California, and Gazzaniga (1996) observed a bird banded at Bolsa Chica at Princeton Harbor, 160 miles north of Bolsa Chica. Skimmers banded as chicks at Bolsa Chica have also been found breeding at Montague Island in the Gulf of California (Collins and Garret 1996). In combination with the observed colonization of several locations on the California coast since the 1970s, these observations suggest that skimmers regularly travel long distances during the winter and will establish breeding colonies where suitable nesting conditions exist.

Black skimmers could be adversely affected by the changes predicted at the Salton Sea in two ways. First, the water surface elevation of the Sea is projected to decline and to create a land bridge to Mullet Island. The suitability of this nesting location for black skimmers could decline, if predation or disturbance increases as a result of formation of the land bridge. In addition, other nesting and roosting locations could become less suitable for black skimmers as the Sea elevation declines. Second, the increased salinity would reduce abundance of tilapia. These effects would occur with or without the conservation and transfer of water under the Proposed Project. However, the Proposed Project would accelerate the projected salinity change and decline in tilapia abundance as well as the rate of elevation decline.

Skimmers feed on young tilapia to a large extent at the Salton Sea (Molina 1996). While tilapia would potentially persist at the Sea, their abundance and reproductive rate could decline. Prey availability for skimmers could decline as a result, and nesting might not be sustained or would potentially occur at a lower level than is currently supported at the Sea.

Double-Crested Cormorant. At the Salton Sea, cormorants nest on rocky ledges on Mullet Island or at the deltas of the New and Alamo Rivers. Snags in the Sea are important for providing protected roost sites for double-crested cormorants. Cormorants regularly move between the Sea and the lakes at the Finney-Ramer Unit of the Imperial WA where they forage. Lakes at the Finney-Ramer Unit of Imperial WA also support double-crested cormorant nesting and roosting.

Double-crested cormorants are common and abundant at the Salton Sea, with counts of up to 10,000 individuals (USFWS 1993; IID 1994). Small nesting colonies were documented at the north end of the Sea in 1995 (USFWS 1996a), but recently (1999), more than 7,000 double-crested cormorants and 4,500 nests were counted on Mullet Island. Mullet Island now represents the largest breeding colony of double-crested cormorants in California (Shuford et al. 1999).

With increased salinity of the Salton Sea, the abundance of cormorants there would potentially decline with reduced prey availability (i.e., tilapia). Increased salinity and reduced fish abundance at the Sea would occur with or without the water transfer and conservation programs. However, the Proposed Project could accelerate these changes. The suitability of nest and roost sites would potentially change as the Sea's elevation recedes. As described, the Sea's elevation is projected to decline under the Baseline and the Proposed Project, albeit at a somewhat faster rate under the Proposed Project. As a result, Mullet Island would connect to the mainland, potentially increasing disturbance or predation at the cormorant colony. Cormorants would potentially abandon the colony on Mullet Island as a result of changes in the suitability of the site or changes in prey availability.

Even with changes in the suitability of foraging, roosting, and nesting habitat quality at the Salton Sea, cormorants would still inhabit the Proposed Project area. They nest and roost on the Finney-Ramer Unit of the Imperial WA and forage at lakes on this unit and in agricultural drains, reservoirs, and Fig Lagoon. The New and Alamo River Deltas also would provide nesting, roosting, and foraging opportunities. However, the large colony on Mullet Island probably would not persist.

Significance Determination. As emphasized, the projected changes in fish abundance would occur under both the Proposed Project and the Baseline. The Proposed Project would accelerate the changes in fish abundance and the subsequent response of piscivorous birds by about 11 years. The earlier occurrence of adverse effects to piscivorous birds is considered a significant, but avoidable, impact of the water conservation and transfer component of the Proposed Project. Implementation of the HCP component of the Proposed Project would reduce this impact to less than significant. (Less than significant.)

Impact BR – 47. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. The Salton Sea has been characterized as containing relatively low concentrations of water column selenium (average of 2 μg/L), with more elevated selenium concentrations in surficial sediment and as bioaccumulated in resident invertebrates and fish (Schroeder et al. 1993). Apparently, natural processes of uptake and sedimentation or precipitation act to remove selenium effectively from the water column of the Sea. Because selenium does not behave conservatively, selenium concentrations in the Sea are not expected to build up in the water column as is predicted for salinity.

The Proposed Project would decrease annual loading of selenium to the Salton Sea relative to the Baseline. However, selenium exhibits unusual behavior in the Salton Sea, concentrating in the sediment rather than the water column. Most selenium in the Sea is in sediments, and the sediments are the dominant source for exposure to aquatic organisms. It is not possible to predict the selenium concentrations in biota or specific environmental media that would occur with implementation of the Proposed Project. However, it is likely that the Sea will continue to maintain waterborne concentrations near the current level of 2 μg/L and would not change exposure of fish and birds to waterborne selenium. The Proposed Project would decrease the amount of selenium entering the Salton Sea relative to the Baseline and in that way reduce the annual accumulation of selenium in sediments. However, because of the large amount of selenium stored in Sea sediments, the slight reduction in selenium loading relative to the Baseline would not substantially change the exposure of fish and birds to selenium in the sea, in general. Therefore, the Proposed Project would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact BR – 48. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Colonial nest or roost sites are available at the Salton Sea for ground-nesting birds, including black skimmers, terns and gulls, American white pelicans, California brown pelicans, and double-crested cormorants. Mullet Island has historically supported the largest population of ground-nesting birds, including double-crested cormorants, gull-billed terns, black skimmers, and Caspian terns. Mullet Island is isolated from the mainland by less than a few feet of water (K. Molina, pers. comm.). Salton Sea data on bathymetry support this, indicating that water depth between the mainland and Mullet Island is less than -231 feet or less than 4 feet below the existing elevation (University of Redlands 1999). Other nest sites include a small barren islet at Johnson Street, which supports gull-billed tern and black skimmer; a rock and barnacle islet at Obsidian Butte, which supports California gull; Morton Bay, which has two low-lying nesting islets; and a single levee remnant at Elmore Ranch, which has supported ground-nesting birds. These sites typically have less than 3 feet of water separating them from the mainland.

The surface elevation of the Salton Sea is projected to decline with or without the Proposed Project (Figure 3.2-15). Under the Baseline, the water surface elevation is projected to fall 3 feet by 2010 and 4 feet by 2015. This reduction in surface elevation would connect sites, including Mullet Island, to the mainland. The Proposed Project would accelerate the decline in surface water elevation by a few years. With 300 KAFY of conservation, the water surface elevation would fall by 3 feet and 4 feet, 3 and 7 years earlier than under the Baseline, respectively. The small temporal (3 years for most sites and 7 years for Mullet Island) difference in when the islands would connect to the mainland between the Proposed Project and the Baseline would not result in a substantial adverse affect to colonial, ground-nesting birds at the Salton Sea and is considered a less-than-significant impact. Furthermore, with implementation of the HCP component, IID would create islands for black skimmers and gull-billed terns that could be used by other ground-nesting birds as well.

Western snowy plovers nest on sandy flats on the western edge of the Salton Sea (Shuford et al. 1999). Sandy flats would continue to be available under the Proposed Project, and no changes in nesting habitat availability for this species are expected.

Brown pelicans have nested on the Alamo River Delta and roost at both the New River and Alamo River Deltas. White pelicans also roost at these deltas but do not nest at the Salton Sea. The IID routinely dredges the New River and Alamo River to maintain flow to the Salton Sea. The dredging has extended the river channels 1 to 2 miles into the Salton Sea, where they have formed the deltas of these two rivers. As the Sea recedes under the Proposed Project, IID would allow the river channels to extend into Sea, thus maintaining delta areas. Although the river deltas would continue to provide habitat for pelicans, as described, the suitability of Mullet Island as a roosting area could be compromised with creation of the landbridge.

Herons and egrets, along with other species, nest in communal rookeries in trees, large shrubs, and snags around the Salton Sea. In general, these rookeries are found over water or in trees in marshes or on islands. However, they also occur over land. Like the nesting/roosting islands and islets described, snags probably are in only a few feet of water. As with the nesting/roosting islands, these snags would connect to the mainland under both the Proposed Project and the Baseline, occurring up to 7 years earlier under the Proposed Project. Because of the small temporal difference in the snags connecting to the mainland, and considering that herons and egrets nest and roost in snags that are not surrounded by water, the Proposed Project would not significantly affect communal rookeries in snags or trees at the Salton Sea. (Less than significant.)

Impact BR – 49. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Migratory birds, specifically shorebirds and waterfowl, could be affected by the changes in salinity and surface water elevation predicted under the Proposed Project and Baseline in two ways. First, salinity increases could change the abundance or species composition of the invertebrate community supported by the Salton Sea. These potential changes are described under Impact BR-44. Second, projected declines in the water surface elevation could alter physical habitat availability. These potential effects are described subsequently.

The Salton Sea attracts thousands of migratory shorebirds. Resident and migratory shorebirds include American avocet, black-necked stilt, western sandpiper, whimbrel, and marbled godwit. For shorebirds, suitable foraging habitat ranges from shallow water (up to a few inches deep) to regularly inundated or saturated mudflats.

Under both the Proposed Project and Baseline, surface water elevation of the Salton Sea is projected to decline. The rate of decline would accelerate and be greater under the Proposed Project relative to the Baseline. Under the Baseline, the water surface elevation is projected to decline most rapidly over the first 30 years, but then decline at a lower rate through the end of the modeled period (Figure 3.2-15). The water surface elevation is projected to reach about -235 ft msl (about 8 feet below its current elevation) at the end of the modeling period but is not projected to stabilize. The Proposed Project would result in less inflow to the Sea and result in a more rapid decline in water surface elevation than under the Baseline. With conservation of 300 KAFY, the water surface elevation would decline rapidly for the first 30 years and then decline at a slower rate, finally stabilizing at about -249 ft msl (about 22 feet below its current elevation) toward the end of the modeling period. Use of Fallowing to conserve water would reduce the magnitude of surface water reductions.

Reduced water surface elevations are not expected to adversely affect the availability of foraging habitat for shorebirds. As the water surface elevation falls, mudflats saturated by seepage or inundated by wind-driven tides could dry and be lost as habitat. However, new mudflat habitat would be created at lower elevations. At the south end of the Sea, the amount of mudflat and shallow water habitat would potentially increase. Portions of the south edge of the Sea do not contain shallow water or mudflat habitat since the Sea directly abuts dikes with steep, riprapped sides. Because the bathymetry of the south end of the Sea is shallow, as the water pulls away from the dikes, mudflat and shallow water habitat would be created.

Using bathymetry data from the University of Redlands, the 8 foot decline in the surface water elevation under the Baseline would reduce the perimeter of the Salton Sea from about 100 miles to about 95 miles. The amount of shallow water habitat (< 1 foot deep) would increase under the Baseline with a decline in elevation, from 1,100 acres at an elevation of -227 ft msl to about 3,600 acres at -235 ft msl. The Proposed Project would show a similar pattern. Although the perimeter of the Sea would decrease to 79.5 miles, the amount of shallow water habitat would increase to about 3,000 acres at -249 ft msl. The bathymetry analysis indicates that both the Baseline and Proposed Project would increase the amount of shallow water/mudflat habitat to a similar degree relative to existing conditions.

The IID currently pumps water from drains behind the dikes into the Salton Sea. As the Sea recedes, IID will convert these drains into gravity-flow systems and allow water from the drain to flow naturally to the Sea. The drains likely would create "mini-deltas" at each outlet as the water spreads out and meanders to the Sea. Foraging habitat for shorebirds could improve under this situation by (1) an increase in the amount of shallow water/mudflat habitat and (2) creation and maintenance of lower salinity areas where a greater diversity of invertebrates can persist. This effect also would be expected for drains that discharge to the Sea by gravity flow and the rivers. The rivers could create large mudflat/shallow water areas as the Sea receded beyond the rivers' mouths.

Although shallow water/mudflat habitat likely would be created along the south shore, some habitats could be lost. In areas along the southern portion of the Sea, barnacle bars and other topographic variations back up drainwater and create small, shallow impoundments where shorebirds forage. To the degree that water from the Sea also contributes to determining the extent and depth of these impoundments (i.e., creates a backwater effect), the extent of inundation and characteristics of these areas could change as the Sea recedes. These potential changes would occur under both the Proposed Project and Baseline.

At the north end of the Sea, there could be a net reduction in the amount of shallow water/mudflat habitat. The topography of the seabed is much steeper than at the south end of the Sea. Thus, as the Sea recedes and the total length of shoreline becomes smaller, the amount of mudflat/shallow water habitat would decline. This effect would be greater under the Proposed Project than the Baseline. However, the Whitewater River could create a more extensive delta with greater amounts of shallow water/mudflat habitat as its discharge spreads out as the Sea pulls away from the river mouth.

Under both the Proposed Project and Baseline, shallow water/mudflat habitat could be lost or reduced as the Sea recedes, but under both alternatives, new areas of shallow water/mudflat habitat also would be created as the Sea recedes. Because the magnitude and likelihood of changes in the amount and characteristics of shallow water/mudflat habitat, either positively or negatively, would not differ substantially between the Proposed Project and the Baseline, the Proposed Project would not significantly affect the availability of shallow water/mudflat habitat. (Less than significant.)

Impact BR – 50. Water Quality Changes Could Increase the Incidence of Avian Disease Outbreaks. As described in Section 3.2.3, avian disease outbreaks and die-offs have occurred at the Salton Sea. While pathogens causing avian disease (e.g., botulism) are always present, in recent years, disease outbreaks at the Salton Sea have resulted in large die-offs of some birds (e.g., white pelicans, eared grebes). The relationship between water quality conditions and disease outbreaks is poorly understood. The Salton Sea is warm, shallow, and strongly eutrophic. These conditions, in combination with dense aggregations of water birds that use the Sea, create prime conditions for avian disease outbreaks.

The links between lake enrichment, productivity, and bird disease are weak and ill-defined. Nevertheless, conditions contributing to avian disease outbreaks would persist under both the Baseline and Proposed Project. Relative to the Baseline, the Proposed Project would likely reduce phosphorus and sediment-associated loading, but nitrate loading would increase along with dissolved constituents in general. It is unknown what such a change in the mix of nutrient loads would have on lake productivity. Regardless, the lake is already highly eutrophic, and trophic states are not quantitatively linked to avian disease. As a result, a change in the mix of nutrient loading under the Proposed Project is not expected to increase the incidence of avian disease. (No impact.)

Impact BR – 51. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Desert pupfish inhabit pools formed by barnacle bars in near-shore and shoreline areas of the Salton Sea. Barnacle bars are deposits of barnacle shells on beaches, near-shore, and at the mouths of drains that discharge to the Sea. Pools form behind the barnacle bars. These pools provide habitat for pupfish and allow pupfish movement among drains.

Desert pupfish have a high salinity tolerance. Using 90 g/L as the threshold for when pupfish could no longer move among drains via the Salton Sea (Salton Sea Science Subcommittee 1999), the salinity projections for the Baseline show that salinity of the Sea would not exceed 90 g/L in 75 years. Under the Proposed Project, with conservation of 300 KAFY the salinity of the Sea would exceed 90 g/L in 2022. At this salinity, the Sea could become intolerable to pupfish and prevent them from moving among drains. If the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Small, isolated populations are at risk of extinction because of environmental and genetic stochasticity. Ultimately, this condition also would occur under the Baseline, but at a later time. However, because of the large difference in when pupfish populations could be isolated between the Baseline and Proposed Project, this is a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP component of the Proposed Project would reduce this impact to less than significant. (Less than significant.)

Habitat Conservation Plan (Salton Sea Portion)

The Salton Sea Conservation Strategy of the HCP has several components to address potential impacts to biological resources at the Salton Sea. The strategy generally consists of measures to address the following:

- Effects to piscivorous birds from an accelerated decline in fish abundance
- Effects to nesting/roosting sites from an accelerated decline in water surface elevation

- Effects to species associated with tamarisk scrub from greater magnitude and rate of decline in water surface elevation
- Effects to pupfish from accelerated increase in salinity levels

The effects of implementing the components of the Salton Sea Conservation Strategy on biological resources at the Sea follow.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

As described in Section 2.2.6, Approach 1 to addressing impacts to piscivorous birds, resulting from the accelerated salinization of the Salton Sea under the Proposed Project, consists of first constructing and operating a fish hatchery and subsequently constructing ponds, if necessary. The following describes anticipated effects of following this approach on biological resources.

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4 and, therefore, are not discussed under each alternative.

Impact HCP1-BR – 52. Maintenance of Fish Resources Would Benefit Piscivorous Birds Under this approach, IID would construct and operate a hatchery to produce tilapia or other fish suitable as a forage species for piscivorous birds at the Salton Sea (primarily white pelicans, brown pelicans, black skimmers, and double-crested cormorants). When reproduction by tilapia no longer was supported in the Sea, as determined by annual surveys conducted by CDGF, IID would begin stocking fish into the Sea. IID would continue stocking fish until CDFG determined that fish could no longer survive and grow in the Sea. At this point, IID would construct 5,000 acres of ponds to continue to provide foraging opportunities for piscivorous birds.

Relative to the No Project alternative, this approach would benefit piscivorous birds. The fish stocking component would extend the period of time when fish would be present in the Salton Sea. Juvenile and adult tilapia are capable of withstanding high salinity levels; tilapia have been collected at a salinity as high as 120 g/L. However, the ability of tilapia to reproduce is more sensitive to salinity. At salinity above 60 g/L, tilapia reproduction is predicted to decline (Costa-Pierce and Reidel 2000a). The hatchery under this approach measure is used to replace reproduction of tilapia lost in the sea because of high salinity. Because juvenile and adult tilapia can tolerate higher salinity levels, the hatchery would extend the time the sea supports fish. This extension would have the dual benefit of continuing to support fish as prey for fish-eating birds and providing additional time for implementation of a long-term restoration project.

Under the Baseline, the abundance of tilapia is expected to decline in about 2023, when the salinity of the Sea is projected to exceed 60 g/L. At this point, as described previously under Impact BR – 46, use of the Salton Sea by piscivorous bird would be expected to decline. As noted, tilapia have been collected at a salinity as high as 120 g/L. Assuming that fish could be successfully stocked until the salinity of the Sea surpasses 120 g/L. Approach 1 could maintain tilapia (and therefore use by piscivorous birds) at the Salton Sea until about 2032, about 10 years longer than under the Baseline.

Following the stocking program, IID would construct ponds to continue to provide fish. The ponds would be maintained through the end of the permit term unless a long-term restoration project was implemented. In combination with the fish hatchery, Approach 1 would provide certainty that foraging opportunities would be available at the Sea for 75 years. In contrast, under the Baseline, by the end of the 75-year period, the salinity is projected to be about 86 g/L, and with few fish expected to persist, use of the Salton Sea by piscivorous birds likely would be minimal. Implementation of Approach 1 would ensure that foraging habitat was available throughout the 75-year permit term and benefit piscivorous birds (beneficial impact). The HCP contains a species-by-species evaluation of the effects of Approach 1 on species proposed for coverage under the HCP. (Beneficial impact.)

Impact HCP1-BR – 53. Creation of Nesting/Roosting Islands Would Benefit Gull-Billed Terns, Black Skimmers, and Other Colonial Birds. The Salton Sea represents one of only two nesting locations for gull-billed terns in the United States and one of about six nesting locations for black skimmers. As the water surface elevation of the Salton Sea declines, islands at the Salton Sea currently used by these species would become connected to the mainland so they would be accessible to terrestrial predators and could be subject to human disturbance. As described under Impact BR - 49, the conservation and transfer of 300 KAFY under the Proposed Project would accelerate the rate of decline of surface elevation of the Sea. This acceleration would result in islands used by colonial nesting/roosting birds becoming connected to the mainland several years earlier than under the Baseline.

To offset the potential reduced suitability of nesting and roosting areas, under this approach, IID would create islands and/or berms to provide nesting and roosting opportunities for gull-billed terns and black skimmers. These features would be located so they are not connected to the mainland or otherwise accessible to predators and in areas with minimal levels of human activity. Black skimmers and gull-billed terns currently use berms and dikes at the Salton Sea (Molina 1996) and are known to use dredge spoils for nesting (Layne et al. 1996). Thus, it is reasonable to expect they would exploit additional created features. Other colonial birds also would likely exploit these features.

Under the Baseline, islands currently used by black skimmers, gull-billed terns, and other colonial birds are projected to become connected to the mainland by 2015. The islands created under Approach 1 would be located so they would not become connected to the mainland. Therefore, they would be available to black skimmers, gull-billed terns, and other birds for a longer period of time than under the Baseline, benefiting these species. (Beneficial impact.)

Impact HCP1- BR – 54. Creation of Native Tree Habitat Could Benefit Wildlife Associated with Tamarisk Scrub. As described under Impact BR – 42, there is considerable uncertainty regarding changes in the amount of tamarisk scrub habitat adjacent to the Salton Sea, as the elevation of the Sea declines. To address this uncertainty, under the HCP, IID would monitor the amount of tamarisk scrub adjacent to the Salton Sea. If monitoring shows a net reduction in the amount of tamarisk scrub adjacent to the Sea, IID would create or acquire native tree habitat to replace the net loss of tamarisk. Tamarisk scrub is poor quality habitat, and most of the species associated with tamarisk scrub in the Proposed Project area find optimal habitat in native riparian communities or mesquite bosque. By compensating for net loss in tamarisk scrub with native tree habitat, species associated with tamarisk scrub would benefit from the higher habitat quality of the replacement habitat. (Beneficial impact.)

Impact HCP1-BR – 55. Maintenance of Population Connectivity Would Benefit Desert Pupfish. Desert pupfish occupy the drains that discharge directly to the Sea. Individual pupfish use shoreline pools and the Salton Sea to move among the drains. As the Sea becomes more saline and nears the limit of pupfish tolerance, movement among the drains could cease and isolate populations. Small, isolated populations are more susceptible to problems associated with reduced genetic variability and effects of random environmental events. To avoid the potential for isolating pupfish populations in the drains, under the HCP, IID would ensure continued genetic exchange among populations. When the salinity of the Salton Sea reaches 90 g/L (or lower as determined by the HCP Implementation Team), IID would implement actions agreed to by USFWS and CDFG to ensure genetic interchange among the pupfish populations in the drains. In addition to ensuring connectivity among pupfish populations, IID would contribute to the recovery of desert pupfish by constructing and managing a Tier 3 refugium pond to support a population of pupfish consistent with the goals of the Desert Pupfish Recovery Plan (Marsh and Sada 1993). This pond would increase the overall desert pupfish population and decrease the risk of loss of genetic diversity and extinction. (Beneficial impact.)

HCP (Salton Sea Portion) Approach 2: Use of Conserved Water as Mitigation

Under Approach 2, IID would conserve additional water (beyond that required for transfer) and use it as mitigation water to offset the inflow reduction to the Salton Sea. In this way, IID would avoid any changes in inflow to the Sea from conservation and transfer of water. Thus, changes in the salinity, surface elevation, and surface area of the Sea under Approach 2 would be the same as the No Project alternative. The response of biological resources to change in salinity and surface elevation would be the same as described for the No Project alternative. By avoiding changes in inflow to the Sea from water conservation, this approach would avoid impacts to biological resources of the Sea.

3.2.4.4 Alternative 1: No Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Under the No Project alternative, IID would not conserve and transfer water to the SDCWA service area, CVWD service area, or MWD service area. The IID would continue to divert water from the LCR at Imperial Dam in accord with its water right. River flows between Parker and Imperial Dams would continue to fluctuate in accord with reservoir operations. In this stretch of the river, flows would fluctuate within the existing range of flows. Because flows would remain within the existing range, riparian habitat, backwaters, marshes, or the fish and wildlife species that use these habitats would not change relative to existing conditions.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

No Substantial Changes in Wildlife Habitat Are Anticipated. Flows in the drains and rivers in the IID water service area would be expected to decline because IID's diversions from the LCR would be limited to 3.2 MAFY and surplus flows from the LCR are not expected in the future. Future flow reductions in the drains could be manifested as a total reduction in flow volume, shorter duration of peak flows, and reduced frequency of peak flows. Periods of dryness could increase in frequency and duration, and a potentially a greater number of drains could be dry at any given time. The level of potential flow reduction in the drains is within the historic range of drain flows under which vegetation has colonized and persisted in the drains. As explained for the Proposed Project, potential flow reductions in the drains and rivers under the No Project alternative would not substantially change the amount or species composition of vegetation in the drains.

System-based water conservation measures would not be implemented. Thus, seepage communities along the East Highline Canal would not change. No agricultural land would be taken out of production for the construction of water delivery system improvements, such as reservoirs and lateral interceptors, or for Fallowing. The amount of agricultural land in production in the Imperial Valley would continue to fluctuate in response to economic considerations. The amount or characteristics of wildlife habitats would not substantially change under the No Project alternative.

Under the No Project alternative, vegetative communities and wildlife habitats in the Imperial Valley would not change from existing conditions. Drain vegetation would remain the same and continue to support wildlife use. Seepage communities would not change and would continue to support wildlife use. Tamarisk would continue to be abundant adjacent to the New and Alamo Rivers. Agricultural habitats would continue to provide foraging habitat for numerous wildlife species.

No Substantial Changes in Fish and Aquatic Habitat are Anticipated. Under the No Project alternative, flow levels in the drains and rivers are expected to decline. Aquatic habitats in the drains would continue to be influenced by constant changes in water supply and ongoing maintenance activities. For the same reasons as explained for the Proposed Project, fish and aquatic habitat conditions would not change substantially relative to existing conditions. Flows in drains that discharge directly to the Salton Sea would decline by about 9 percent relative to existing conditions, which would potentially reduce habitat for desert pupfish.

Water Quality Conditions Would Continue to Affect Biological Resources. Water quality constituents (primarily selenium) currently occur at levels that could adversely affect biological resources using the drains and rivers. These conditions would continue under the No Project.

Habitat Conservation Plan

The IID would not implement an HCP under the No Project alternative; it would implement system improvement and modernization programs as needed. For these programs, IID would avoid take of listed species or comply with project-specific consultations for listed species. When conducting drain maintenance activities on the Salton Sea NWR, IID would continue to comply with terms and conditions of the existing Biological Opinion (USFWS 1992) that address Yuma clapper rail and desert pupfish. Because IID would not implement the Proposed Project, the benefits to listed and other special-status species expected from implementation of the HCP would not occur.

SALTON SEA

Water Conservation and Transfer

Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. Under the No Project alternative, the water surface elevation of the Salton Sea is projected to decline. As described for the Proposed Project, a decline in the water surface elevation of the Sea would not affect adjacent wetland areas dominated by cattail/bulrush vegetation. However, the amount of shoreline strand and adjacent wetlands dominated by tamarisk could be influenced by changes in the water surface elevation.

Under the No Project, the water surface elevation would decline most rapidly over the first 30 years but would then decline at a lower rate through the end of the modeling period (Figure 3.2-15). The water surface elevation would reach about -235 ft msl at the end of the modeling period but would not stabilize.

The source of the water supporting the tamarisk adjacent to the Salton Sea is uncertain but could consist of a combination of shallow groundwater and seepage from the Sea. The extent to which the water surface elevation of the Sea contributes to supporting this community is uncertain. Depending on the relationship between the water surface elevation of the Salton Sea and maintenance of the shoreline strand and adjacent wetlands, the decline in water surface elevation under the No Project alternative could change the amount of tamarisk scrub habitat in shoreline strand and adjacent wetland areas. There is, however, uncertainty about the extent of these possible changes. As the Sea recedes, tamarisk could establish at lower elevations, replacing habitat lost at high elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding Sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where drainwater or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas.

Increased Salinity Would Change Invertebrate Resources in the Salton Sea. As the salinity of the Salton Sea increases under the No Project alternative, the species composition and abundance of the invertebrate community would change. Expected changes in the invertebrate community are described under the Proposed Project. These changes would occur under the No Project alternative as well, although at a later date. Figure 3.2-16 shows when the salinity thresholds for selected invertebrates would be exceeded under the Baseline. These results show that pileworms could be lost by 2008. Other invertebrates (e.g., copepods) would persist considerably longer. Ultimately, however, as the salinity thresholds of invertebrates in the Salton Sea are exceeded, the abundance of these species would decline. Concurrently, the abundance of brine flies and brine shrimp would increase. These species are tolerant of high salinities and inhabit the Salton Sea. Brine shrimp and brine flies are the dominant invertebrates at Mono Lake, an inland lake with a salinity of about 100 g/L. These species would increasingly dominate the invertebrate community as the salinity of the Sea increases.

Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. Under the No Project alternative, the abundance and composition of the invertebrate community would change as the salinity of the Salton Sea increases as described. The changes in the abundance and composition of the invertebrate community could alter the suitability of foraging conditions for birds using the Sea. As described for the Proposed Project, the shorebirds using the Salton Sea would exploit brine shrimp and flies as these species become the dominant invertebrate species. Therefore, changes in the invertebrate community under the No Project alternative are not expected to substantially change shorebird populations at the Salton Sea.

Increased Salinity Would Reduce Fish Resources in the Salton Sea. The salinity of the Salton Sea has increased since the Sea was formed and would continue to increase under the No Project alternative. The increased salinity would change fish resources of the Sea. The expected responses of fish resources to increased salinity are described under the Proposed Project. The changes in fish resources described for the Proposed Project also would occur under the No Project, but up to 11 years later, depending on the fish species.

Based on salinity projections, under the No Project, the salinity of the Sea would exceed the level at which sargo, gulf croaker, and tilapia could complete their life cycles in 2008, 2015, and 2023, respectively (Figure 3.2-17). The salinity threshold above which orangemouth corvina cannot complete their life cycle is about 40 g/L. However, young-of-the-year and juvenile corvina have been captured recently in the Salton Sea, indicating successful reproduction (Riedel et al. 2001). The highest catches of corvina were from the river deltas and nearshore areas (Riedel et al. 2001), where salinity levels could be lower and within tolerances of corvina. It is uncertain how much longer corvina will reproduce.

Tilapia abundance would likely decline at a salinity greater than 60 g/L. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas where salinity levels are lower than in the main body of the Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 g/L in the river deltas. Tilapia could persist if the deltas provide lower salinity environments.

The abundance of gulf croaker could decline sooner than discussed if pileworms decline earlier. Pileworms are an important food source for gulf croaker and have a lower salinity tolerance. Pileworms are not expected to survive at a salinity greater than about 50 g/L. This level would be exceeded under the Baseline in 2008. Because tilapia have a diverse diet (Costa-Pierce and Riedel 2000b), they would not be affected by a decline in pileworms.

Reduced Fish Abundance Would Affect Piscivorous Birds. As described, the increasing salinity of the Salton Sea under the No Project alternative would reduce the abundance of fish in the Sea. The level of use of the Salton Sea by piscivorous birds would likely decline concurrently with reduced fish abundance. A decline in the level of use by piscivorous birds would coincide with a decline in the abundance of tilapia, which would occur when the salinity of the Salton Sea reaches about 60 g/L. Under the Baseline, the Sea would reach this salinity in 2023. The response of piscivorous birds to reduced fish abundance expected with increased salinity is described for the Proposed Project. The same response would occur under the No Project alternative.

Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. The Salton Sea provides nest and roost sites for colonial nesting/roosting birds. As described under the Proposed Project, colonial nest/roost sites that are islands or snags surrounded by water are separated from the mainland by only a few feet of water. Under the No Project alternative, the water surface elevation of the Salton Sea would decline, connecting colonial nest and roost sites to the mainland. Under the Baseline, the water surface elevation is projected to fall 3 feet by 2010 and 4 feet by 2015. This reduction in surface elevation would connect sites, including Mullet Island, used by ground-nesting birds for nesting and roosting, to the mainland. Snags used by herons and egrets would no longer be surrounded by water during the same time period (i.e., around 2010). Colonial nesting/roosting birds could abandon islands and snags when they are no longer surrounded by water.

For gull-billed terns and black skimmers, loss of nesting areas at the Salton Sea as the Sea elevation declines could substantially reduce the species' population in the United States. Gull-billed terns nest at only two locations in the U.S., one of which is the Salton Sea. Skimmers nest at several locations along the California Coast, but the Sea supports the largest number of nesting skimmers and is a unique inland nesting location. Great blue heron and great egret rookeries could be abandoned if the snags are not surrounded by water. The colony of double-crested cormorants on Mullet Island could be abandoned. Although the loss of breeding sites for great blue herons, great egrets, and double-crested cormorants could reduce the populations of these species, because they are abundant and widespread species, such a reduction would not adversely affect the long-term persistence of these species.

Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. As described under the Proposed Project, the Salton Sea attracts thousands of migratory shorebirds that forage on mudflats and in shallow water. Under the Baseline, the water surface elevation is projected to decline most rapidly over the first 30 years, but then decline at a lower rate through the end of the modeling period (2077) (Figure 3.2-15). The water surface elevation is projected to reach about -235 ft msl (about 8 feet below its current elevation) at the end of the modeling period, but is not projected to stabilize. Areas of shallow water/mudflat habitat could be lost or reduced as the Sea recedes, but new areas of shallow water/mudflat habitat would be created. The 8-foot decline in the surface water elevation of the Salton Sea under the Baseline would reduce the perimeter of the Sea from about 100 miles to about 95 miles. However, the amount of shallow water habitat (< 1 foot deep) would increase under the Baseline with a decline in elevation from about 1,100 acres at an elevation of -227 ft msl to about 3,600 acres at -235 ft msl, increasing habitat for shorebirds.

Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Desert pupfish inhabit pools formed by barnacle bars in near-shore and shoreline areas of the Salton Sea. Barnacle bars are deposits of barnacle shells on beaches, near-shore, and at the mouths of drains that discharge to the Sea. Pools form behind the barnacle bars. These pools provide habitat for pupfish and allow pupfish movement among drains.

Desert pupfish have a high salinity tolerance. They have been collected at a salinity as high as 90 g/L. Under the Baseline, the salinity of the Salton Sea would not exceed 90 g/L in 75 years. Thus, pupfish would continue to use the Sea to move among drains under the No Project alternative.

Habitat Conservation Plan

The IID would not implement the HCP under the No Project alternative and would not implement actions to maintain fish resources at the Salton Sea over the 75-year project duration. Therefore, fish resources and use of the Sea by piscivorous bird species would decline as the salinity of the Sea increases. Also, no measures would be implemented to maintain nesting sites for black skimmers and gull-billed terns, and breeding by these species at the Sea could be lost as the surface elevation declines.

Because the HCP would not be implemented, IID would not monitor changes in the amount of tamarisk scrub. If the amount of tamarisk scrub declines as the Sea recedes, IID would not create native tree habitat to replace lost habitat value. Thus, this potential benefit of the HCP would not be realized.

3.2.4.5 Alternative 2 (A2): Water Conservation and Transfer of up to 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

Under Alternative 2, IID would conserve 130 KAF of water per year for transfer to SDCWA service area. The conserved water would be diverted at Parker Dam rather than at Imperial Dam, thereby reducing flows between Imperial Dam to Parker Dam. Reduced flow levels would reduce the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. The potential impacts to cottonwood-willow, honey mesquite, and screwbean mesquite along the LCR from changes in surface water and groundwater elevations are discussed subsequently.

Impact A2-BR–1. Reduced Flow Levels in the LCR Could Reduce the Acreage of Cottonwood-Willow Communities. Under Alternative 2, reduced flows in the LCR would qualitatively have the same effects on cottonwood-willow communities as the Proposed Project, but the magnitude of the effect would be lower. Under Alternative 2, 121 acres of habitat would have reduced surface water and groundwater levels, depending on the level of conservation (Table 3.2-36). The actual changes in the cottonwood-willow community that would result from reduced surface water and groundwater elevations cannot be predicted. Nevertheless, up to 121 acres of cottonwood-willow habitat could be impacted. In addition, as under the Proposed Project, development of suitable habitat conditions in the 5,404 acres of cottonwood-willow habitat between Parker and Imperial Dams could be affected by flow reductions. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–2. Reduced Flow Levels in the LCR Could Reduce the Acreage of Honey Mesquite Bosque Communities. As explained for the Proposed Project, honey mesquite bosque could be lost by reduced groundwater levels under Alternative 2, but the relative magnitude of the impact would be less than for cottonwood-willow habitat. Because honey mesquite bosque does not provide primary habitat for special-status species, potential changes in the acreage or structural characteristics of honey mesquite would be a less-than-significant impact. (Less than significant impact.)

Impact A2-BR–3. Reduced Flow Levels in the LCR Could Reduce the Acreage of Screwbean Mesquite Bosque Communities. As explained for the Proposed Project, the amount or structural characteristics of screwbean mesquite bosque could be altered by reduced groundwater levels under Alternative 2. However, because screwbean mesquite bosque does not provide primary habitat for special-status species, these potential changes would be a less-than-significant impact. (Less than significant impact.)

Impact A2-BR–4. Reduced Flow Levels in the LCR Could Reduce the Acreage of Backwater Habitat. Under Alternative 2, the reduced flows in the LCR would have the same qualitative effects on backwater and marsh habitats as the Proposed Project, but the magnitude of the effect would be lower. With conservation of 130 KAFY, 14 acres of backwater habitat (5 acres of open water and 9 acres of marsh) would be affected. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–5. Reduced Acreage of Cottonwood-Willow Vegetation Could Affect Special-Status Species. Based on predicted changes in surface water and groundwater elevations, 121 acres of cottonwood-willow habitat could be affected by Alternative 2. Effects of reduced surface water or groundwater levels could be manifested as reduced total acreage of cottonwood-willow habitat or changes in the species composition or structural characteristics of the habitat. Special-status species associated with cottonwood-willow habitat could be affected by these changes in the same manner as described for the Proposed Project. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–6. Reduced Acreage of Open Water Habitat in Backwaters Could Affect Special-Status Wildlife Species. Special-status wildlife species that could use open water portions of backwater habitat are the:

- Bald eagle
- California brown pelican
- Belted kingfisher
- Several bat species (see Table 3.2-34)
- Sonoran mud turtle

For the same reasons described for the Proposed Project, reductions in the open water portion of backwaters under Alternative 2 would not significantly affect bald eagles, brown pelicans, belted kingfishers, or the species of bats potentially occurring along the LCR. However, because of their dependence on backwater habitat, the reduction in backwater habitat under Alternative 2 could adversely affects Sonoran mud turtles. However, as explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–7. Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species. Up to 9 acres of marsh habitat could be affected by Alternative 2 (Table 3.2-37). Effects to marsh habitat could be manifested as changes in the total acreage of marsh water depths, vegetation structure and composition, water temperature, and other water quality parameters. Special-status species associated with marsh habitat could be adversely affected by these potential changes in marsh habitat along the LCR under Alternative 2. Special-status species associated with marsh habitat along the LCR are the:

- California black rail
- Yuma clapper rail
- American bittern
- Least bittern
- Colorado River toad
- Lowland leopard frog
- Northern leopard frog

The loss of marsh habitat under Alternative 2 would result in potentially significant impacts to these species. However, as explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 8. Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species. As explained under the Proposed Project, backwaters provide key habitat for the razorback sucker and bonytail chub. The 5-acre reduction in open water in backwaters along the LCR and 11-acre reduction of open water habitat in the main channel of the LCR under Alternative 2 would potentially result in adverse effects to razorback suckers and their designated critical habitat. As explained for the Proposed Project, Reclamation would implement conservation measures so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 9. Reduced Diversions from the LCR Could Benefit Special-Status Fish Species. Razorback suckers have the potential to be entrained into canals by water diversion from the LCR. Assuming the potential for entrainment is proportional to the amount of water diverted, Alternative 2 would reduce the potential for entrainment of razorback suckers. Under Alternative 2, the IID water service area would reduce its diversion at Imperial Dam by 130 KAFY. This water would be transferred to the SDCWA service area and would serve as replacement water. The overall amount of water diverted at Parker Dam would not change. However, the reduced diversions by the IID water service area at Imperial Dam would result in a net decrease in the amount of water diverted from the LCR and could reduce the risk of entrainment of razorback suckers. No significant impacts to razorback suckers from entrainment would occur under Alternative 2. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A2-BR – 10. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 2, 130 KAFY would be conserved using on-farm conservation methods. Annual flow in the drains would be reduced by about 12 percent relative to the Baseline. Changes in flow in the drains resulting from Alternative 2 could be manifested as a total reduction in flow volume, shorter duration of peak flows, and reduced frequency of peak flows. Periods of dryness could increase in frequency and duration, and a potentially a greater number of drains could be dry at any given time. For the same reasons as described for the Proposed Project, which would result in greater flow reductions in the drains, changes in drain flows under Alternative 2 would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and the associated wildlife potentially resulting from reduced drain flows would be less than significant. (Less than significant impact.)

Impact A2-BR – 11. Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 2, conservation of 130 KAFY of water through on-farm irrigation system improvements would increase the salinity level in drains. This level of conservation would reduce the acreage of cattail vegetation by about 1 acre and increase the acres of cattail vegetation experiencing stunted growth by 9 acres (Table 3.2-39). Because cattails in the drainage system provide habitat for Yuma clapper rails, the loss of cattail vegetation is a potentially significant impact of the water conservation and transfer component of Alternative 2. However, implementation of the HCP component of Alternative 2 would reduce this potential impact to a less-than-significant level. (Less than significant impact.)

Impact A2-BR – 12. Changes in Water Quality in Drains Could Affect Wildlife. Alternative 2 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation under this alternative. Similar to the Proposed Project, implementation of Alternative 2 would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the Baseline. In addition, Alternative 2 would increase the miles of drains with higher average selenium concentrations (Figures 3.2-18a, b, c).

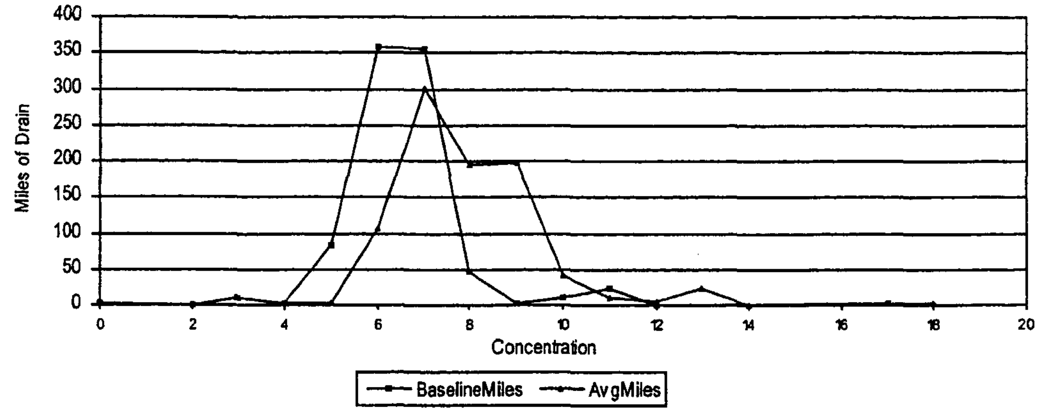
Alternative 2 would increase the miles of drain in which birds could experience selenium-related hatchability effects relative to the Baseline. Conservation of 130 KAFY using on-farm irrigation and system improvements would result in hatchability effects along the equivalent of approximately 50 miles of drain, about 3 more miles than under the Baseline (Table 3.2-40). As under the Proposed Project, potential reductions in reproductive success from increased selenium concentrations constitute a potentially significant impact associated with the water conservation and transfer component of Alternative 2. With implementation of the HCP component of Alternative 2, this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 13. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under Alternative 2, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 130 KAFY would reduce Alamo River discharge to the Sea by about 13 percent and New River discharge to the Salton Sea by about 11 percent (Table 3.2-41). For the same reasons as described for the Proposed Project (see Impact BR-13), which would result in greater flow reductions in the rivers, changes in river flows under Alternative 2 would not substantially change the amount of tamarisk along the New or Alamo Rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. Therefore, impacts to tamarisk along the rivers and wildlife potentially using this habitat would be less than significant. (Less than significant impact.)

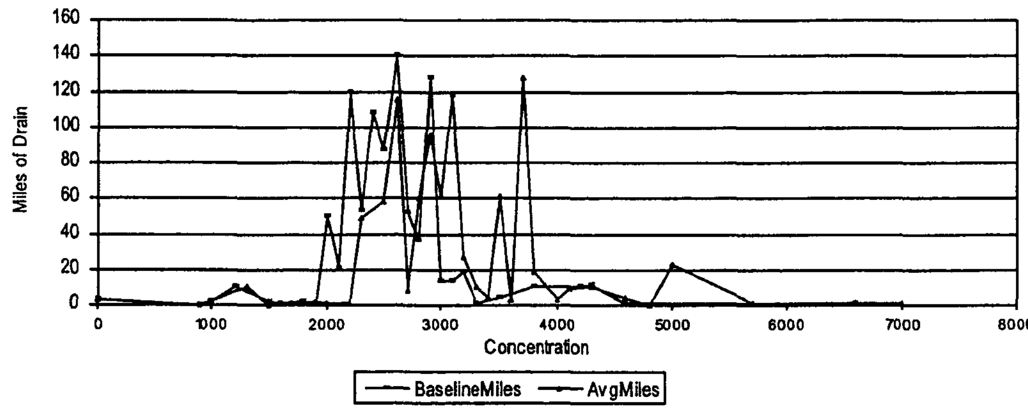
Impact A2-BR – 14. Installation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. Under Alternative 2, potential impacts to agricultural field habitat and wildlife from installation of on-farm irrigation system improvements would be qualitatively the same as under the Proposed Project, but could be of lesser magnitude due

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the Alamo River



TDS IID Surface Drain Discharge to the Alamo River



TSS IID Surface Drain Discharge to the Alamo River

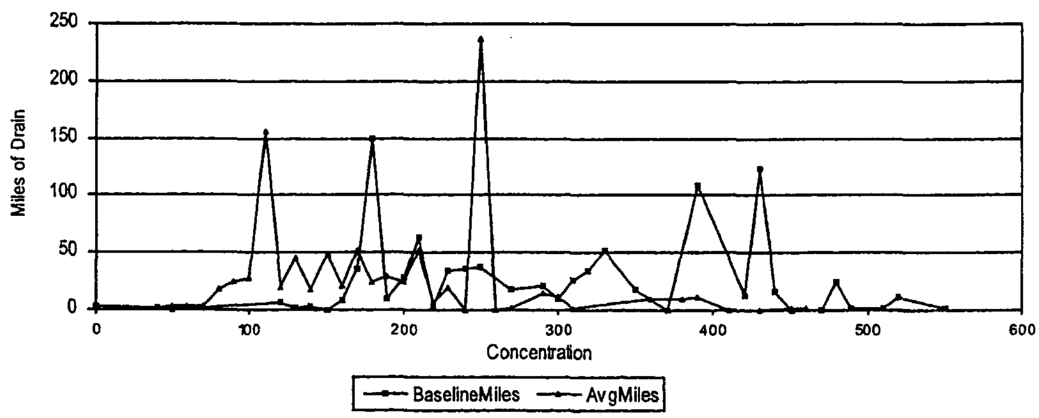


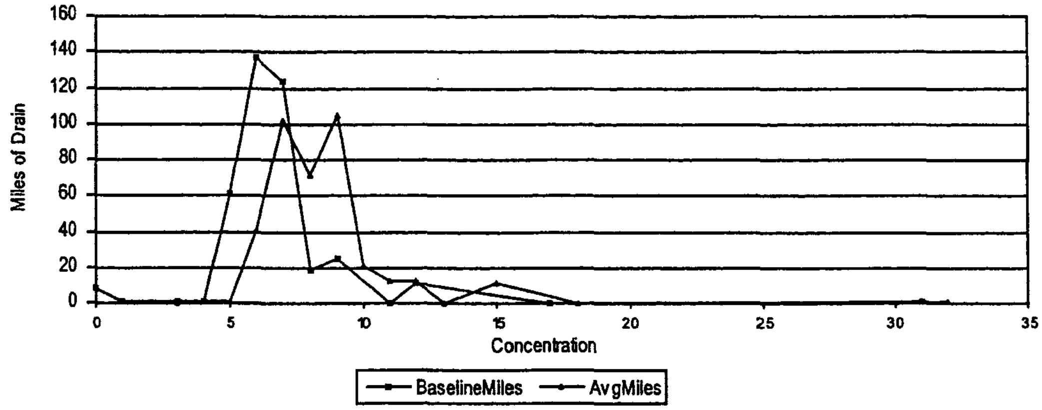
Figure 3.2-18a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 2 for drain discharging into the Alamo River
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_25 (12/18/01)

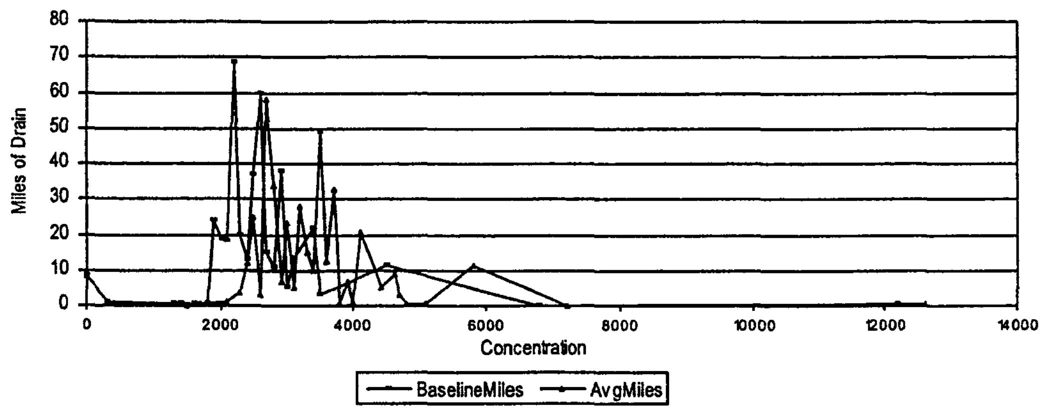
CH2MHILL

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the New River



TDS IID Surface Drain Discharge to the New River



TSS IID Surface Drain Discharge to the New River

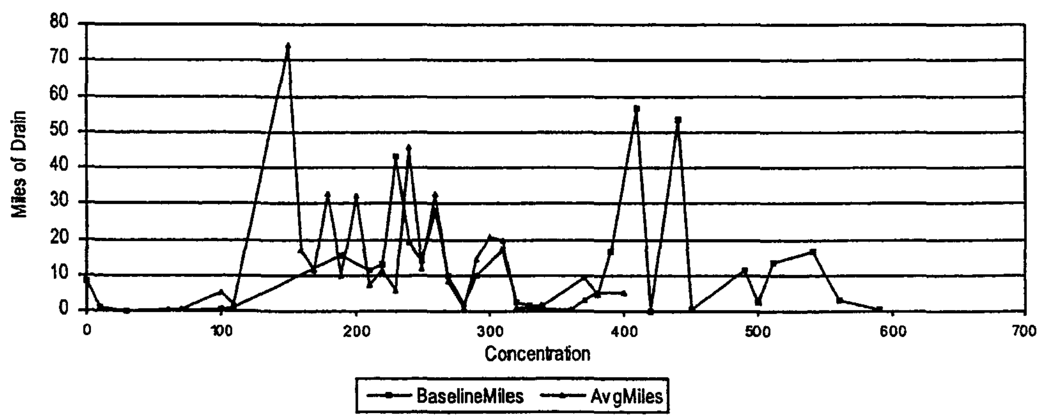


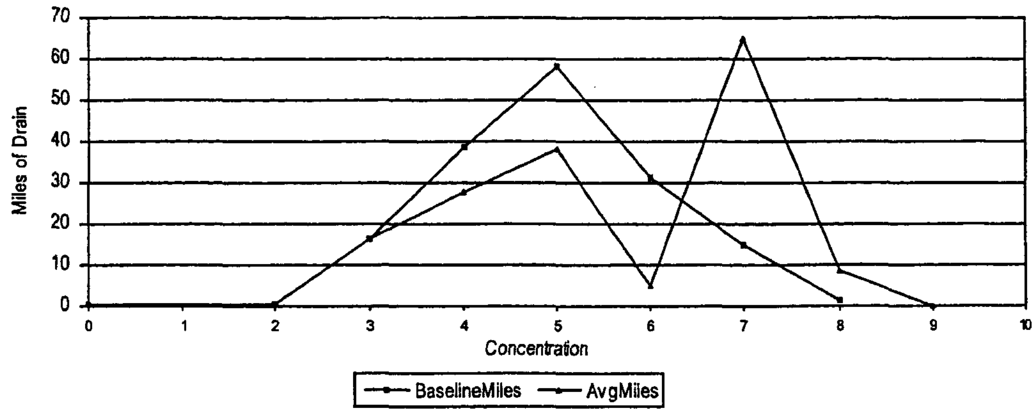
Figure 3.2-18b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 2 for drain discharging into the New River
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_25 (12/18/01)

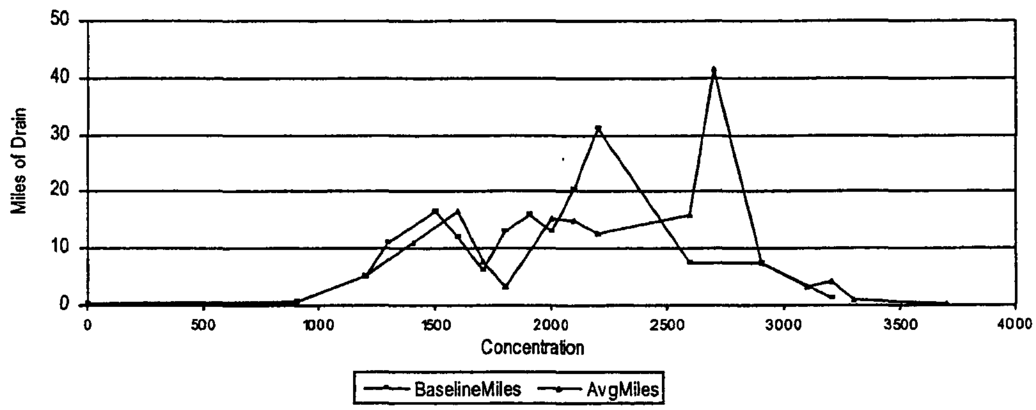
CH2MHILL

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the Salton Sea



TDS IID Surface Drain Discharge to the Salton Sea



TSS IID Surface Drain Discharge to the Salton Sea

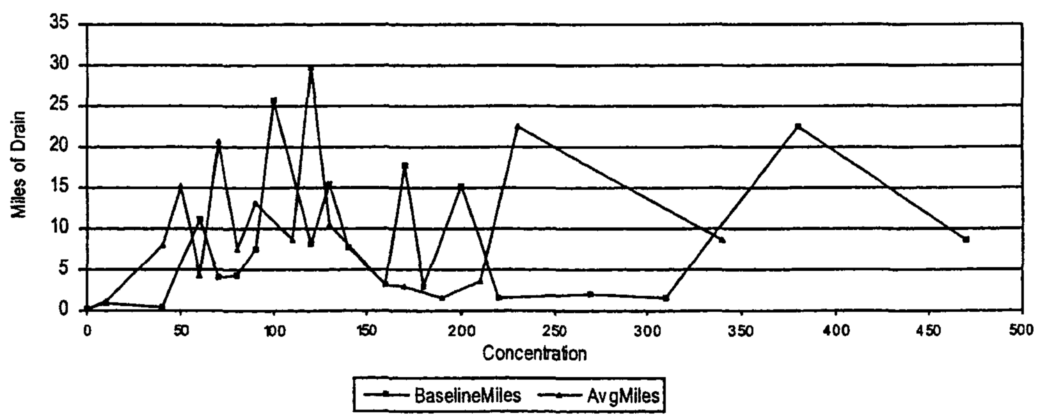


Figure 3.2-18c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 2 for drain discharging into the Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_25 (12/18/01)

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to the lower amount of water conserved. Installation of tailwater return systems could remove some agricultural land from production to accommodate tailwater ponds. Assuming that tailwater return systems can conserve about 0.5 acre-foot of water per acre and an average farm is 80 acres, about 3,250 systems would be needed to achieve 130 KAFY of conservation. Tailwater return ponds are typically 1 to 2 acres. Assuming each pond is 2 acres, up to about 6,500 acres of farmland could be removed from production for these systems. Farmers typically locate tailwater return ponds in the least productive portions of their fields, particularly in areas farmed irregularly, so the actual loss in agricultural field habitat likely would be less than 6,500 acres in the extreme case that only tailwater return systems are used to conserve water under this alternative. Tailwater return systems are installed when no crops are produced, typically during the summer. Because they would be installed when no crops are grown on the field, the potential for disturbance to wildlife would be limited.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, potentially disturbing wildlife. Drip systems would be installed between cultivations; therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

Other on-farm techniques require reconstructing/recontouring an agricultural field. Wildlife using agricultural field habitat could be disturbed during the reconstructing/recontouring. However, because reconstructing/recontouring would be conducted when no crops are grown on the field, the potential for disturbance to wildlife is limited. The amount of agricultural field habitat would not change from reconstructing/recontouring agricultural fields to conserve water.

As described, installation of on-farm irrigation system improvements could reduce a small amount of agricultural field habitat and presents a minor potential for disturbance of wildlife. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land under Alternative 2 is considered a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A2-BR – 15. Operation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. For the same reasons as explained for the Proposed Project (Impact BR-17), implementing on-farm irrigation system improvements would not change the suitability of agricultural fields as foraging habitat for bird species that forage in agricultural fields of the Imperial Valley. (No impact.)

Impact A2-BR – 16. Reduced Flows in Drains Could Affect Fish and Aquatic Habitat. Under Alternative 2, water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Conservation of 130 KAF through on-farm irrigation system improvements would reduce flow in the drains by about 12 percent relative to the Baseline. For the same reasons as described for the Proposed Project (see Impact BR-21), which would result in greater flow reductions in the drains than this alternative, reductions in drain flows under Alternative 2 would have a less-than-significant impact on fish and other aquatic resources in the drains. (Less than significant impact.)

Impact A2-BR – 17. Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat. Alternative 2 would have qualitatively similar effects on water quality as the

Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation. Similar to the Proposed Project, Alternative 2 would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the Baseline. Average salinity concentrations also would increase under Alternative 2 relative to the Baseline. For the same reasons as described for the Proposed Project, the potential for increased selenium or salinity to reduce the reproductive success of fish in the drains and rivers is a less-than-significant impact. Impacts to desert pupfish are addressed under Impact A2-BR-20. (Less than significant impact.)

Impact A2-BR – 18. Reduced Flows in the Rivers Could Affect Fish and Aquatic Habitat. Under Alternative 2, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 130 KAFY would reduce Alamo River discharge to the Sea by about 12 percent and New River discharge to the Salton Sea by about 11 percent. For the same reasons as explained for the Proposed Project, under which flow reductions in the New and Alamo Rivers would be greater than under this alternative, impacts to fish or aquatic resources would be less than significant. (Less than significant impact.)

Impact A2-BR – 19. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Under Alternative 2, conservation of 130 KAFY of water is predicted to reduce flow levels in these drains by about 13 percent relative to the Baseline (Table 3.2-42). This reduction in flows in drains inhabited by pupfish would have the same effects qualitatively as those described for the Proposed Project, but the magnitude of potential effects would be less because of a smaller reduction in drain flows. Also, because water conservation would reduce the contribution of tailwater to the drainage system, water quality conditions in these drains would worsen. Changes in flow and water quality in the drains discharging directly to the Sea and supporting pupfish predicted constitute a potentially significant impact on the water conservation and transfer component of Alternative 2. However, implementation of the HCP component of Alternative 2 would reduce this potential impact to less than significant. (Less than significant impact.)

Impact A2-BR – 20. Water Quality Changes in the Drains Could Affect Special-Status Species. Alternative 2 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of changes in water quality would be proportionately less because of the reduced level of water conservation. Therefore, adverse effects to special-status species inhabiting the drains (e.g., Yuma clapper rails and desert pupfish) would be similar to those described for the Proposed Project, but of slightly lesser magnitude. For the same reasons as described for the Proposed Project, potential impacts to special-status species from changes in water quality under Alternative 2 are a potentially significant impact associated with the water conservation and transfer component of this alternative. Implementation of the HCP component of this alternative would reduce this impact to less than significant. (Less than significant impact.)

Impact A2-BR – 21. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impact A2-BR - 10, reduced flow in the drains would not significantly change the amount or species composition of vegetation in the drains. However, increased salinity of drainwater with water conservation and transfer would reduce cattail vegetation in the drains by a small amount. Cattails are preferred habitat for the Yuma clapper rail, a state- and federal-listed species, and provide habitat for other special-status species potentially using the drains. A reduction in cattails could adversely affect Yuma clapper rails and other special-status species using the drains. This effect constitutes a potentially significant impact of the water conservation and transfer component of Alternative 2.

In addition to changes in physical habitat, increased selenium concentration in the drains under Alternative 2 could adversely affect Yuma clapper rails and other special-status species using the drains. These potential effects are addressed under Impact A2-BR-20. These water quality changes also are a potentially significant impact of the water conservation and transfer component of Alternative 2. However, with implementation of the HCP component of Alternative 2, these potential impacts would be less than significant. (Less than significant impact.)

Impact A2-BR – 22. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Alternative 2 would not change the amount of tamarisk in the Imperial Valley, and no construction in tamarisk would occur that could disturb special-status species. Because there would be no change in the amount of potential habitat, Alternative 2 would not affect special-status species associated with tamarisk scrub habitat. (No impact.)

Impact A2-BR – 23. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Installation of on-farm irrigation system improvements under Alternative 2 would require construction and ground disturbance. Installation of water conservation measures in agricultural fields would not adversely affect special-status species using this habitat because the conservation measures would be installed when crops are not grown, primarily in the summer. Special-status species predominantly occur in the Proposed Project area during the winter or as fall and spring migrants and predominantly use agricultural fields when they are in active production and irrigated.

As explained under Impacts A2-BR-14 and A2-BR-15, installation of on-farm irrigation system improvements would not substantially reduce the availability or crop composition of agricultural lands in the IID water service area. Thus, impacts of Alternative 2 to special-status associated with agricultural fields would be less than significant. (Less than significant impact.)

Impact A2-BR–24. Water Conservation Practices Could Affect Burrowing Owls. Under this alternative, installation of on-farm irrigation system improvements would not significantly adversely affect burrowing owls. Burrowing owls are concentrated in drain and canal embankments, and construction for the on-farm systems would occur primarily in the fields or field margins. Individual burrowing owls could be disturbed by installing new gates in concrete laterals that would be required under the "shorten furrows/border strip improvement" conservation measure. This potential impact is considered less than significant because of the limited area affected and the low number of owls at risk to this impact. In addition, suitable habitat for burrowing owls would remain abundant in the

Proposed Project area as drain and canal embankments, and the Imperial Valley would continue to support high population levels of owls.

The "level basin and shorten furrows/border strip improvement" conservation measures could benefit burrowing owls as these measures include construction of concrete-lined ditches. In the Imperial Valley and elsewhere, burrowing owls often locate their burrows at the base of concrete structures, and additional concrete-lined ditches could increase suitable burrow locations. No significant adverse effects to burrowing owls would occur under Alternative 2, and minor benefits could be realized if additional concrete-lined ditches are constructed that could increase nesting opportunities. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A2-BR–25. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. With conservation of 130 KAFY through on-farm irrigation system improvements and transfer to SDCWA service area, inflow to the Salton Sea would be reduced by the 130 KAFY relative to the Baseline. With this reduced inflow, the water surface elevation of the Sea is projected to decline. Under Alternative 2, the water surface elevation would decline rapidly for the first 30 years, after which the rate of decline would slow. The water surface elevation is projected to reach about -242 feet msl at the end of the modeling period, about 7 feet lower than under the Baseline.

As described for the Proposed Project, there is uncertainty regarding changes in the amount of tamarisk adjacent to the Salton Sea as the water surface elevation declines, and it is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas. Nevertheless, a reduction in the amount of tamarisk would not be a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife, (2) no special-status species depend on tamarisk, and (3) the magnitude of changes would be the same under Alternative 2 and the Baseline because the reduction in surface elevation would be similar under the two alternatives (see Figure 3.2-15). (Less than significant impact.)

Impact A2-BR–26. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. The effects on invertebrate resources in the Salton Sea from increased salinity are described under the Proposed Project. Under Alternative 2, salinity would increase and result in the same effects as described for the Proposed Project and the No Project alternative. The exceedance of salinity thresholds for invertebrates in the Salton Sea under Alternative 2 are shown on Figure 3.2-16. For species with a low salinity tolerance, the species' threshold would be exceeded only 1 year earlier (or less) under Alternative 2 relative to the Baseline (e.g., pileworms and rotifers). For species with higher salinity tolerances, the predicted difference between Alternative 2 and the Baseline increases. For the copepod (*C. dietersi*) with a tolerance of 80 g/L, the difference between Alternative 2 and the Baseline increases to 37 years.

For the same reasons as described for the Proposed Project, the acceleration in the changes in the invertebrate community of the Salton Sea is not a significant impact. Regardless of implementation of Alternative 2, the Salton Sea is naturally transitioning to a more saline system, as has occurred at Mono Lake and the Great Salt Lake. The change in the composition of the invertebrate community in and of itself is not a significant impact, but could significantly affect bird or fish resources through reduced food availability. These potential impacts are addressed separately. (Less than significant impact.)

Impact A2-BR – 27. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. As described for the Proposed Project and No Project alternative, shorebirds using the Salton Sea also use Mono Lake, where brine flies and shrimp provide the primary invertebrate food source. Because shorebirds would exploit brine flies and shrimp at the Salton Sea, the acceleration of the transition to an invertebrate community dominated by these species under Alternative 2 would have a less-than-significant impact on shorebirds. (Less than significant impact.)

Impact A2-BR – 28. Increased Salinity Would Reduce Fish Resources in the Salton Sea. The effects on fish resources in the Salton Sea from increased salinity were described under the Proposed Project. Under Alternative 2, salinity would increase and result in the same effects as described for the Proposed Project and the No Project alternative. Conservation of 130 KAFY of water through on-farm irrigation system improvements and transfer to SDCWA would reduce inflow to the Salton Sea by about 130 KAFY and accelerate the rate of salinization relative to the No Project alternative. With conservation of 130 KAF, the salinity threshold for sargo would be exceeded in 2007, 1 year earlier than it is predicted to be exceeded under the Baseline (Figure 3.2-17). For gulf croaker and tilapia, their reproductive salinity thresholds would be exceeded in 2010 and 2013, respectively, which are 5 and 10 years earlier than under the Baseline. As explained for the Proposed Project, it is uncertain how much longer corvina will reproduce, and gulf croaker could be lost earlier than suggested by the exceedance of their life-cycle salinity tolerance, if pileworm abundance declines.

Under both the Baseline and Alternative 2, the salinity of the Salton Sea would rise and exceed levels at which fish species inhabiting the Sea could reproduce. The thresholds for sargo, gulf croaker, and tilapia could be exceeded 1 to 10 years earlier, respectively, under Alternative 2, resulting in earlier declines in these two species. For the same reasons as described for the Proposed Project, this acceleration is considered a less-than-significant impact to fish resources of the Salton Sea. (Less than significant impact.)

Impact A2-BR – 29. Reduced Fish Abundance Would Affect Piscivorous Birds. Alternative 2 would have the same effects on piscivorous birds as described for the Proposed Project. With 130 KAFY of conservation through on-farm irrigation system improvements, the mean salinity would exceed 60 g/L in 2013, 10 years earlier than under the Baseline. Adverse impacts to piscivorous birds could occur earlier under Alternative 2 relative to the Baseline. Although the projected changes in fish abundance would occur under both Alternative 2 and the No Project alternative, the earlier occurrence of adverse effects to piscivorous birds is considered a potentially significant impact of the water conservation and transfer component of Alternative 2. With implementation of the HCP component of Alternative 2, this potential impact would be reduced to a less-than-significant level. (Less than significant impact.)

Impact A2-BR – 30. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. Alternative 2 would qualitatively have the same effects on selenium loading to the Salton Sea as the Proposed Project. For the same reasons as described for the Proposed Project

(Impact BR-47), Alternative 2 would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact A2-BR – 31. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Under the Baseline, the water surface elevation is projected to fall 3 feet by 2010 and 4 feet by 2015. This reduction in surface elevation would connect islands, including Mullet Island, used by ground-nesting birds for nesting and roosting to the mainland (Figure 3.2-15). Alternative 2 would accelerate this effect slightly. With conservation of 130 KAFY through on-farm irrigation system improvements, the surface water elevation would drop by 3 feet and 4 feet, 3 and 7 years earlier than under the Baseline, respectively. Snags used by herons and egrets would be similarly affected. For the same reasons as described for the Proposed Project, effects to nesting sites of colonial-nesting birds would be less than significant. (Less than significant impact.)

Impact A2-BR – 32. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Alternative 2 would generally have the same effects on mudflat and shallow water habitat for shorebirds as described for the No Project alternative. Under Alternative 2, the water surface elevation would decline rapidly for the first 30 years, after which the rate of decline would slow. The water surface elevation would not stabilize during the 75-year modeling period but would reach about -242 feet msl at the end of the modeling period. The water surface elevation would be about 7 feet lower than the Baseline. The 15-foot decline in water surface elevation predicted under Alternative 2 would reduce the perimeter of the Salton Sea to about 87 miles, but the amount of shallow water habitat (<1 foot deep) would increase to about 3,400 acres from the existing level of about 1,100 acres.

Under both Alternative 2 and the Baseline, existing areas of shallow water/mudflat habitat could be lost or reduced as the Sea recedes, but new areas of shallow water/mudflat habitat would be created. For the same reasons as explained for the Proposed Project, Alternative 2 would not significantly affect the availability of shallow water/mudflat habitat. (Less than significant impact.)

Impact A2-BR – 33. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Under Alternative 2, the salinity of the Salton Sea is projected to exceed 90 g/L in 2060. At this salinity pupfish might not be able to move among drains via the Salton Sea. The salinity of the Sea is not projected to exceed this salinity level in 75 years under the No Project alternative. As explained for the Proposed Project, if the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Although, this condition also would eventually occur under the No Project alternative, but at a later time, the acceleration of the occurrence of the condition by about 40 years is a potentially significant impact of the water conservation and transfer component of Alternative 2. With implementation of the HCP component of Alternative 2, this impact would be less than significant. (Less than significant impact.)

3.2.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up to 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

Water Conservation and Transfer

Under Alternative 3, IID would conserve 230 KAF of water per year for transfer to SDCWA service area, CVWD service area, or MWD service area. Conserved water transferred to the SDCWA service area or MWD service area would be diverted at Parker Dam rather than at Imperial Dam, thereby reducing flows between Imperial Dam to Parker Dam. Reduced flow levels would lower the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. The potential impacts to cottonwood-willow, honey mesquite, and screwbean mesquite along the LCR from changes in the surface water and groundwater elevations are discussed below subsequently.

Impact A3-BR – 1. Reduced Flow Levels in the LCR Could Reduce the Acreage of Cottonwood-Willow Communities. Under Alternative 3, reduced flows in the LCR would qualitatively have the same effects on cottonwood-willow communities as the Proposed Project, but the magnitude of the effects would be lower. If 100 KAFY is transferred to CVWD service area, the flow reduction between Parker and Imperial Dams would be 130 KAFY. If all the 230 KAFY of conserved water is transferred to the SDCWA service area or MWD service area, the flow reduction below Parker Dam would be 230 KAFY. These reductions would affect 121 or 214 acres of cottonwood-willow habitat, respectively (Table 3.2-36). The actual changes in the cottonwood-willow community that would result from reduced surface water and groundwater elevations cannot be predicted. Nevertheless, an estimated 121 to 214 acres of cottonwood-willow habitat occupied by southwestern willow flycatchers could be affected. In addition, as under the Proposed Project, further development of 5,404 acres of cottonwood-willow habitat between Parker and Imperial Dams could be affected by flow reductions under Alternative 3. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant).

Impact A3-BR – 2. Reduced Flow Levels in the LCR Could Reduce the Acreage of Honey Mesquite Bosque Communities. As explained for the Proposed Project, honey mesquite bosque could be affected by reduced groundwater levels under Alternative 3, but the relative magnitude of the impact would be less than for cottonwood-willow habitat. Because honey mesquite bosque does not provide primary habitat for special-status species, potential changes in the acreage or structural characteristics of honey mesquite under Alternative 3 would be a less-than-significant impact. (Less than significant impact.)

Impact A3-BR – 3. Reduced Flow Levels in the LCR Could Reduce the Acreage of Screwbean Mesquite Bosque Communities. As explained for the Proposed Project, the amount or structural characteristics of screwbean mesquite bosque could be altered by reduced groundwater levels under Alternative 3. However, because screwbean mesquite bosque does not provide primary habitat for special-status species, these potential changes under Alternative 3 would be a less-than-significant impact. (Less than significant impact.)

Impact A3-BR – 4. Reduced Flow Levels in the LCR Could Reduce the Acreage of Backwater Habitat. Under Alternative 3, the reduced flows in the LCR would have the same qualitative effects on backwater and marsh habitats as the Proposed Project, but the magnitude of the effect would be lower. With conservation of 230 KAF and transfer to the SDCWA service area, 25 acres of backwater habitat (9 acres of open water and 16 acres of marsh) would be affected. If 100 KAFY of the conserved water is transferred to CVWD service area, 14 acres of backwater habitat (5 acres of open water and 9 acres of marsh) would be affected. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 5. Reduced Acreage of Cottonwood-willow Vegetation Could Affect Special-Status Species. Based on predicted changes in surface water and groundwater elevations, 121 to 214 acres of cottonwood-willow habitat could be affected by Alternative 3, depending on the amount of water transferred out of the basin. Effects of reduced surface water or groundwater levels could be manifested as a reduction in the total acreage of cottonwood-willow habitat or changes in the species composition or structural characteristics of the habitat. Special-status species associated with cottonwood-willow habitat could be affected by these changes in the same manner as described for the Proposed Project. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 6. Reduced Acreage of Open Water Habitat in Backwaters Could Affect Special-Status Wildlife Species. Special-status wildlife species that could use open water habitat in backwaters are the:

- Bald eagle
- California brown pelican
- Belted kingfisher
- Several bat species (see Table 3.2-34)
- Sonoran mud turtle

For the same reasons described for the Proposed Project, reductions in the open water portion of backwaters under Alternative 3 would not significantly affect bald eagles, brown pelicans, belted kingfishers, or the species of bats potentially occurring along the LCR. However, because of their dependence on backwater habitat, the reduction in backwater habitat under Alternative 3 could have adverse effects on Sonoran mud turtles. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 7. Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species. Up to 16 acres of marsh habitat could be affected by Alternative 3 (Table 3.2-36). Effects to marsh habitat could be manifested as changes in the total acreage of marsh water depths, vegetation structure and composition, water temperature, and other water quality parameters. Special-status species associated with marsh habitat could be adversely affected by these potential changes in marsh habitat along the LCR under

Alternative 3. Special-status species associated with marsh habitat along the LCR are the:

- California black rail
- Yuma clapper rail
- American bittern
- Least bittern
- Colorado River toad
- Lowland leopard frog
- Northern leopard frog

The loss of marsh habitat under Alternative 3 could result in significant impacts to these species. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 8. Reduced Acreage of Backwater Habitat Could Affect Special-Status Fish Species. As explained under the Proposed Project, backwaters provide key habitat for the razorback sucker and bonytail chub. If 230 KAFY of water is transferred to the SDWCA service area or MWD service area, 9 acres of open water in back waters along the LCR and 20 acres of open water in the main channel of the LCR could be lost. If 100 KAFY is transferred to the CVWD service area, potential impacts would be reduced to 5 acres of open water in backwaters and 11 acres of open water in the main channel. These reductions would potentially have adverse affects to razorback suckers and their critical habitat. The bonytail chub does not inhabit the mainstem below Parker Dam, but is likely to be introduced in the future, and they could be similarly affected as razorback suckers. However, as explained for the Proposed Project, Reclamation would implement conservation measures for these fish species so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 9. Reduced Diversions from the LCR Could Benefit Special-Status Fish Species. Razorback suckers have the potential to be entrained into canals by water diversion from the LCR. Assuming the potential for entrainment is proportional to the amount of water diverted, Alternative 3 would reduce the potential for entrainment of razorback suckers. Under Alternative 3, the IID would reduce its diversion at Imperial Dam by 130 to 230 KAFY. Water transferred to the SDCWA service area or MWD service area would serve as replacement water for these agencies, and the overall amount of water diverted at Parker Dam would not change. However, the reduced diversions by the IID at Imperial Dam would result in a net decrease in the amount of water diverted from the LCR and could reduce the risk of entrainment of razorback suckers. No significant impacts to razorback suckers from entrainment would occur under Alternative 3. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-BR – 10. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 3, between 130 KAFY and 230 KAFY of water would be conserved using a combination of on-farm irrigation system improvements, water delivery system improvements, and Fallowing. The total flow reduction in the drains would be about 21 percent relative to the Baseline, assuming only on-farm and water delivery measures were used to conserve water. If only Fallowing was used to conserve water, then the percent reduction in flows would be 9 percent. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in drain flows would be between 9 and 21 percent relative to the Baseline. For the same reasons as described for the Proposed Project, which would result in greater flow reductions in the drains, changes in drain flows under Alternative 3 would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and associated wildlife potentially resulting from reduced flows in the drains would be less than significant. (Less than significant impact.)

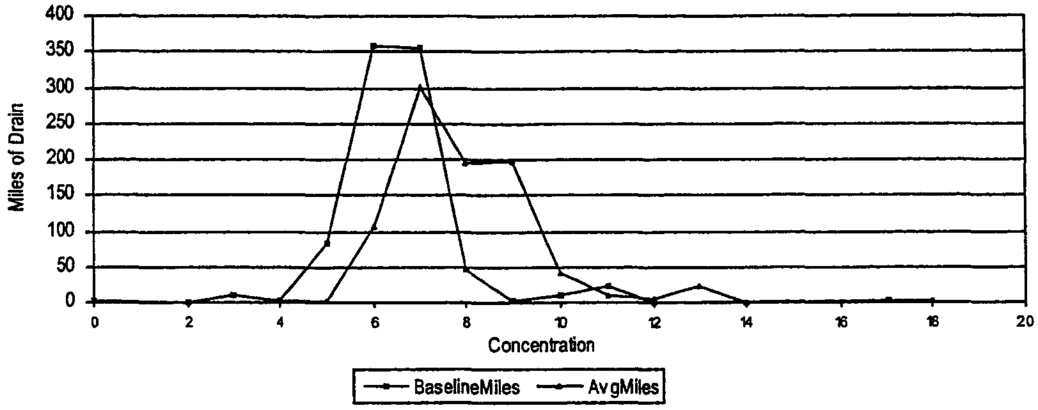
Impact A3-BR – 11. Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 3, conservation of 230 KAFY of water through on-farm irrigation system improvements, water delivery system improvements, and Fallowing would increase the salinity level in drains. Assuming all water is conserved through on-farm and water delivery methods, this level of conservation would reduce the acreage of cattail vegetation by about 4 acres and increase the acres of cattail vegetation experiencing stunted growth by 16 acres (Table 3.2-39). If all Fallowing was used to conserve water, these effects would not occur because there would be no change in salinity. Depending on the amount of Fallowing, effects to cattails would be intermediate to these two situations. Because cattails in the drainage system provide habitat for Yuma clapper rails (a federal and state listed species), the loss of cattail vegetation is a potentially significant impact of Alternative 3. However, implementation of the HCP component of this alternative would reduce this impact to a less-than-significant level. (Less than significant impact.)

Impact A3-BR – 12. Changes in Water Quality in Drains Could Affect Wildlife. Alternative 3 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation under this alternative. Similar to the Proposed Project, implementation of Alternative 3 (assuming water is conserved using on-farm irrigation system and water delivery system improvements) would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the No Project alternative. In addition, Alternative 3 (assuming water is conserved using on-farm irrigation system and water delivery system improvements) would increase miles of drains with higher average selenium concentrations (Figure 3.2-19a,b,c,d,e,f). If all the conserved water was generated with Fallowing, there would be no change in water quality conditions as explained for Alternative 4. Thus, the magnitude of water quality changes under the Proposed Project would depend on the amount of water conserved through Fallowing.

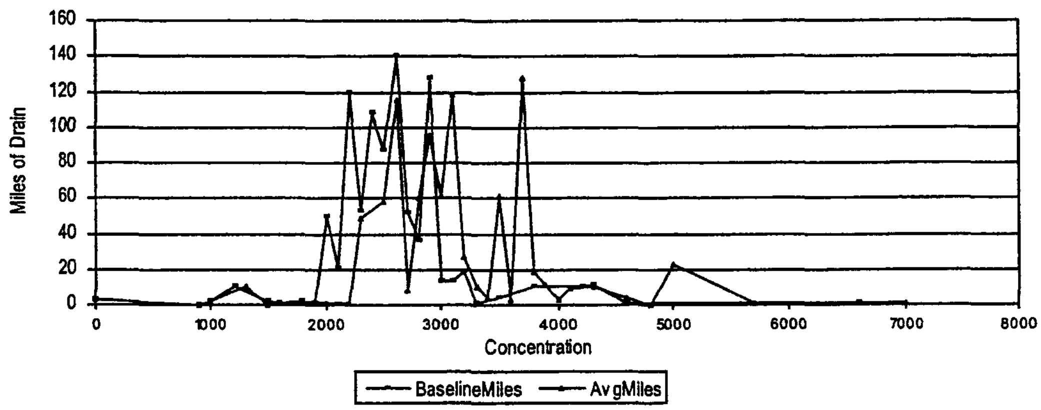
Alternative 3 would increase the miles of drain in which birds could experience selenium related hatchability effects relative to the No Project alternative. Conservation of 230 KAFY using on-farm irrigation system (assumed to be 130 KAFY in this evaluation) and water delivery system improvements (assumed to be 100 KAFY) would result in hatchability effects along the equivalent of approximately 83 miles of drain, about 35 more miles than under the Baseline (Table 3.2-40). As under the Proposed Project, potential reductions in

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the Alamo River



TDS IID Surface Drain Discharge to the Alamo River



TSS IID Surface Drain Discharge to the Alamo River

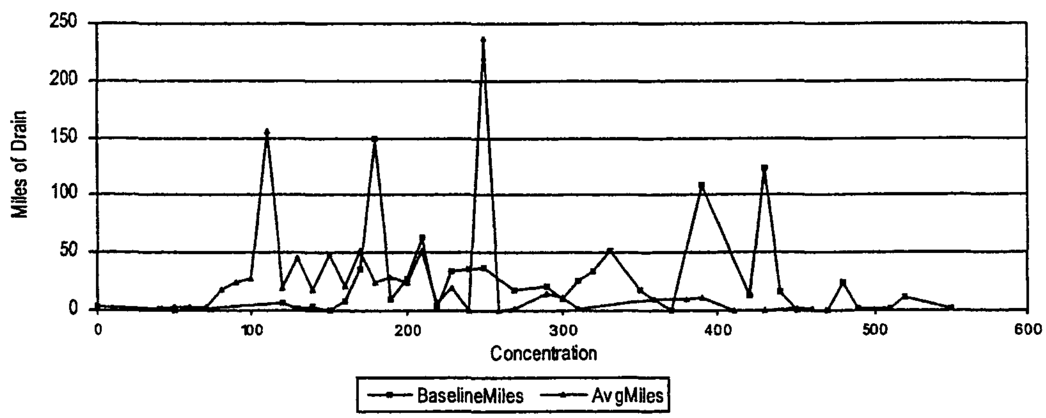


Figure 3.2-19a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3a for drain discharging into the Alamo River
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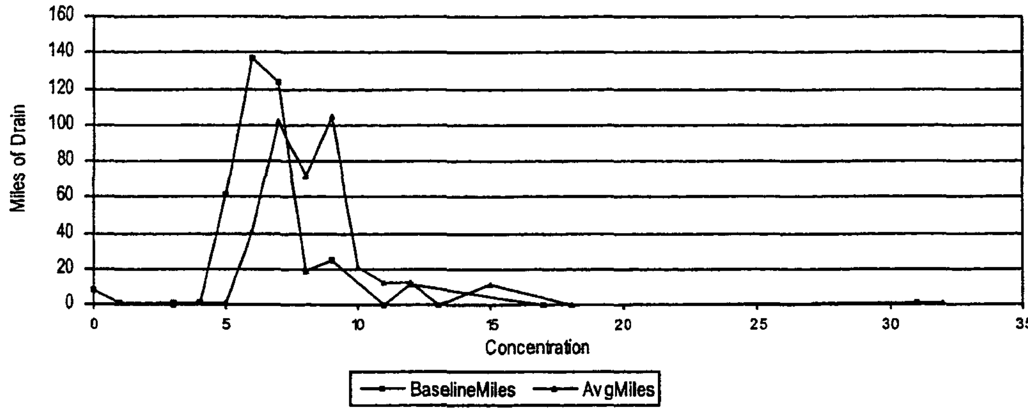
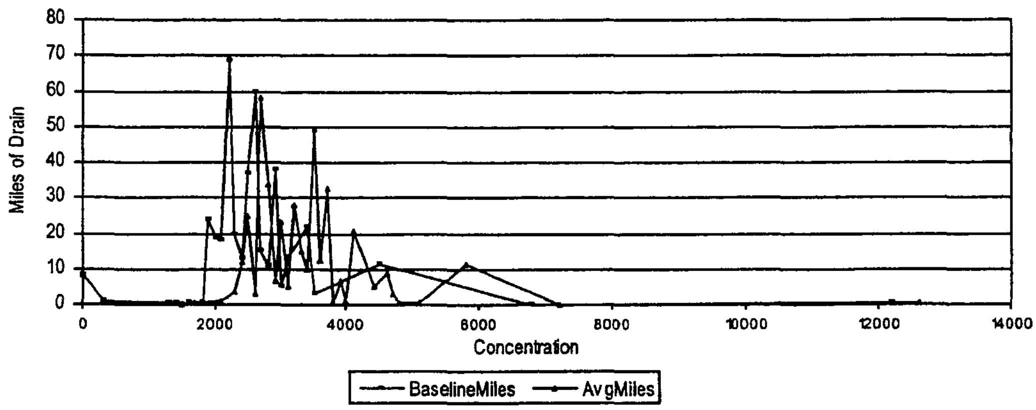
230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the New River



TDS IID Surface Drain Discharge to the New River



TSS IID Surface Drain Discharge to the New River

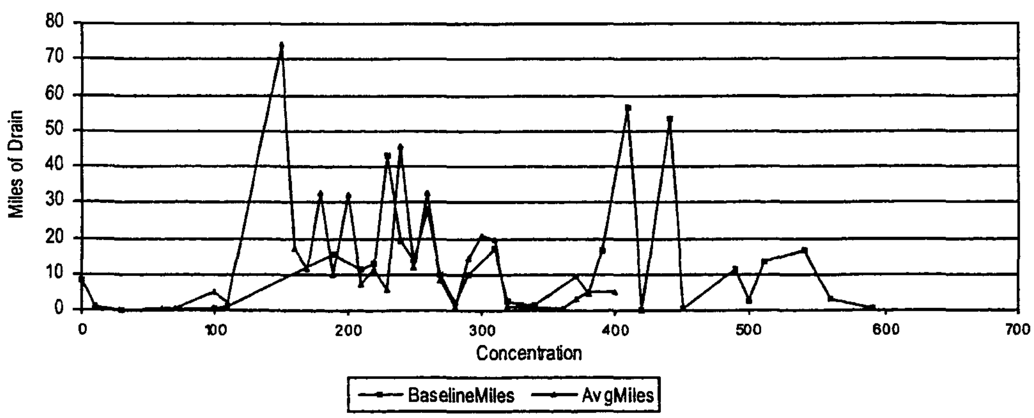


Figure 3.2-19b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3a for drain discharging into the New River
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_26 (12/18/01)

CH2MHILL

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

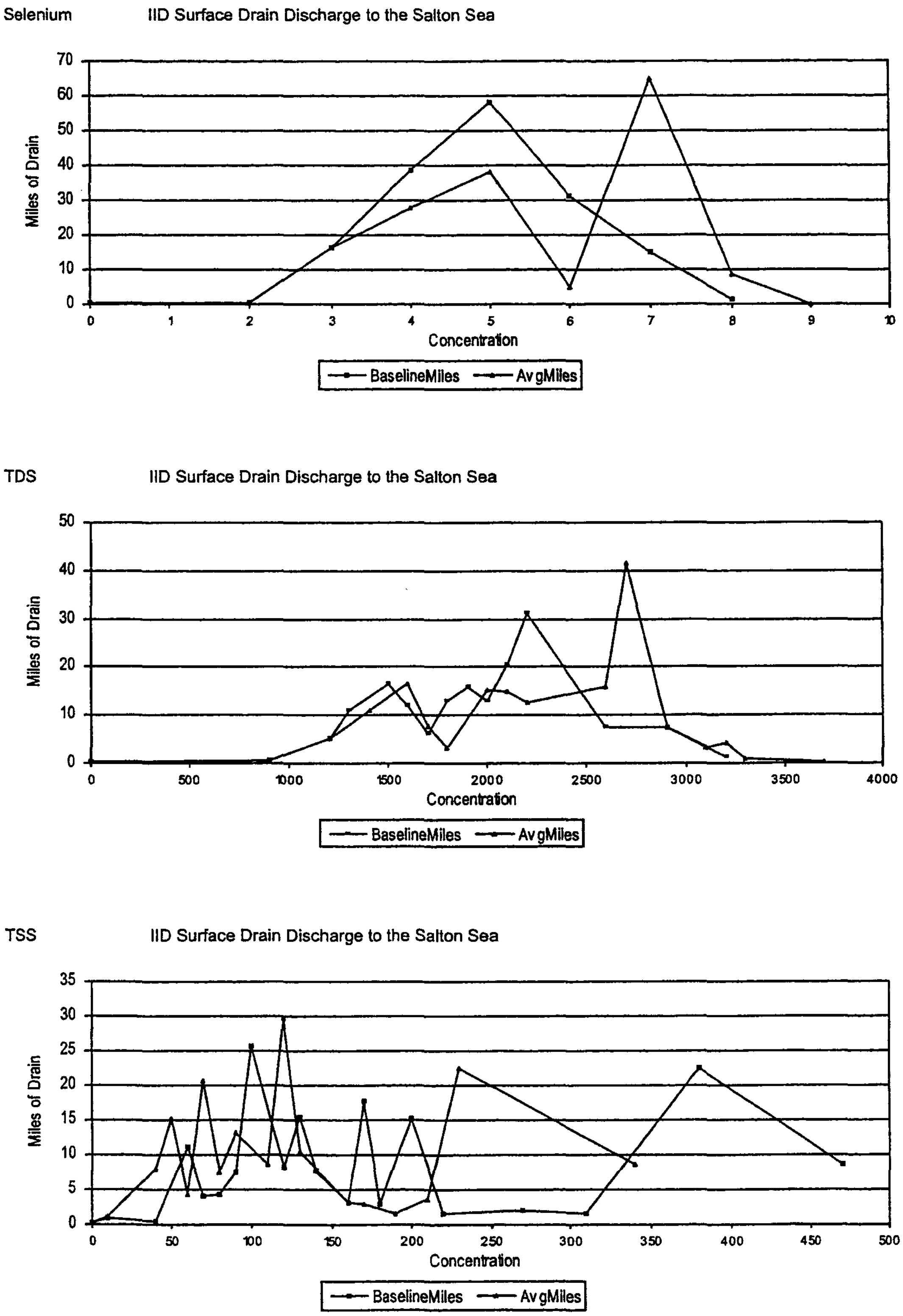


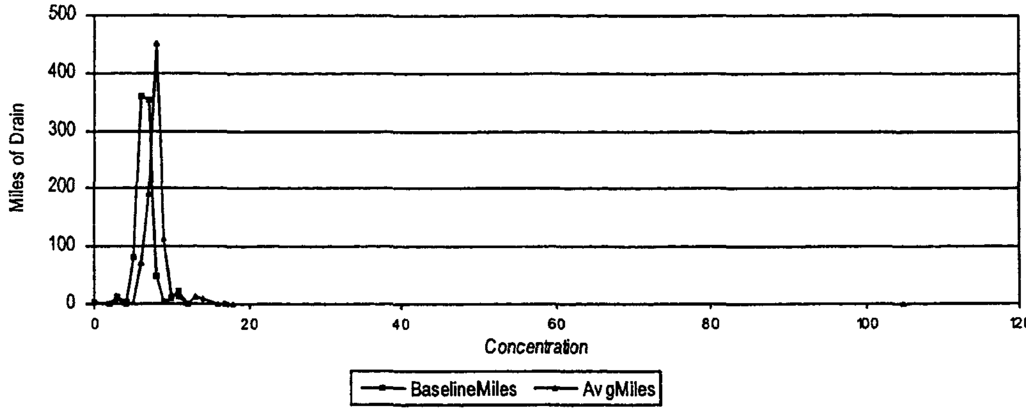
Figure 3.2-19c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3a for drain discharging into the Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_26 (12/18/01)

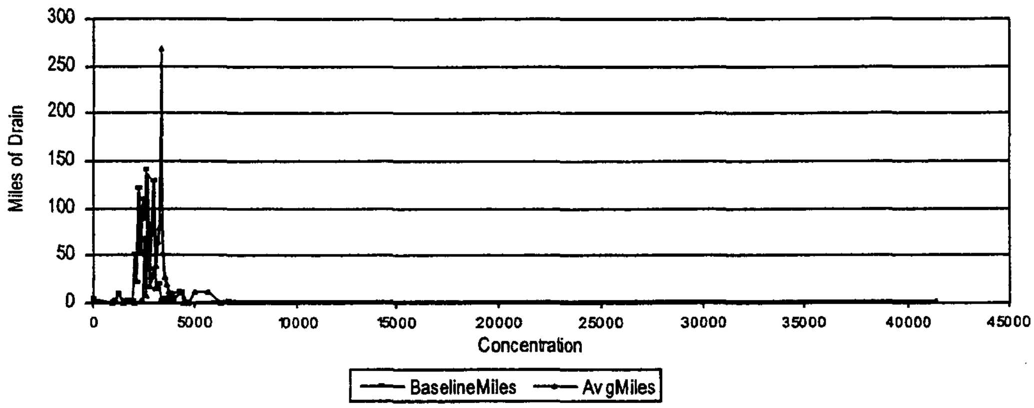
CH2MHILL

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the Alamo River



TDS IID Surface Drain Discharge to the Alamo River



TSS IID Surface Drain Discharge to the Alamo River

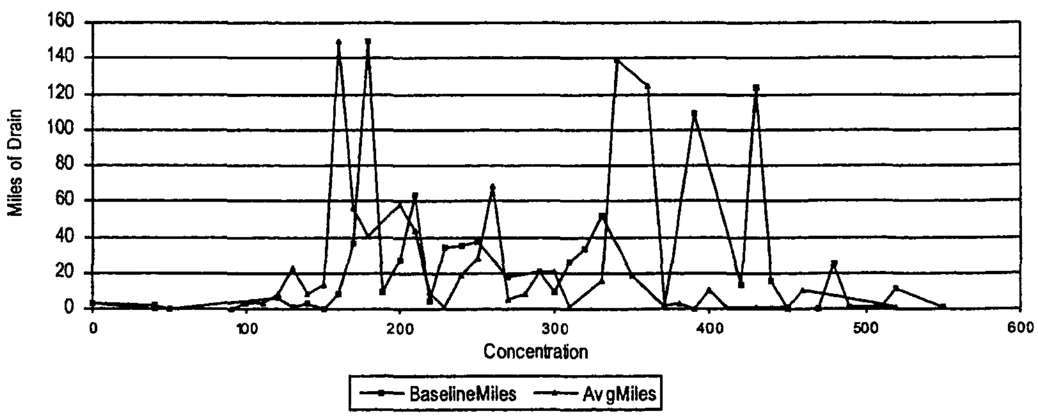
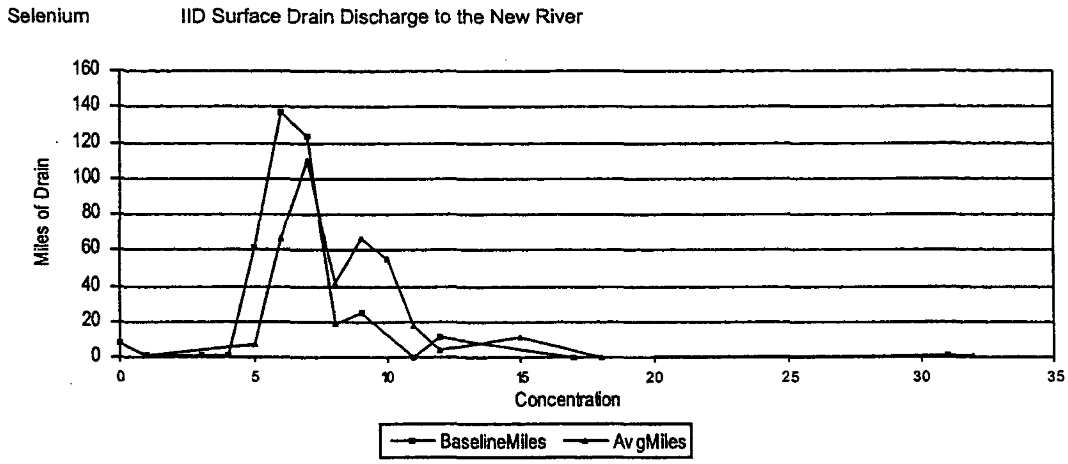


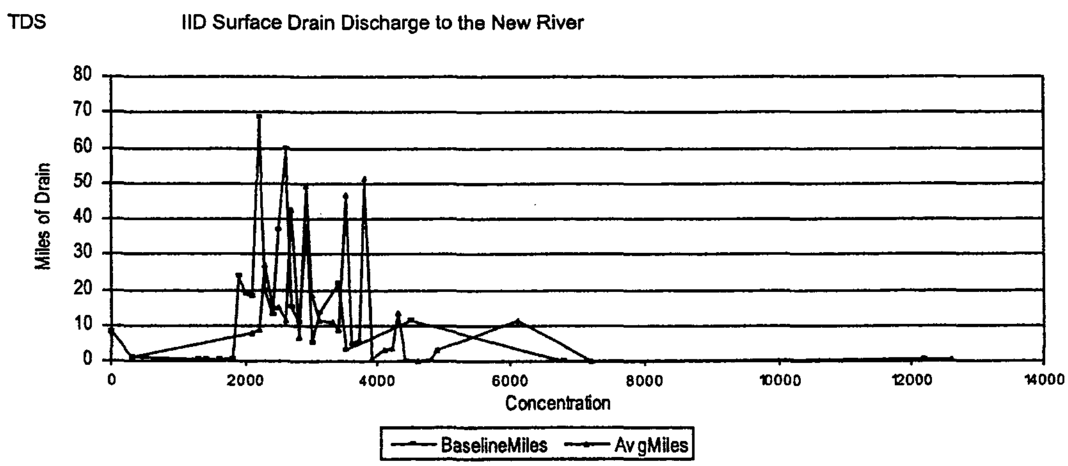
Figure 3.2-19d
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3b for drain discharging into the Alamo River
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_27 (12/18/01)

CH2MHILL

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run





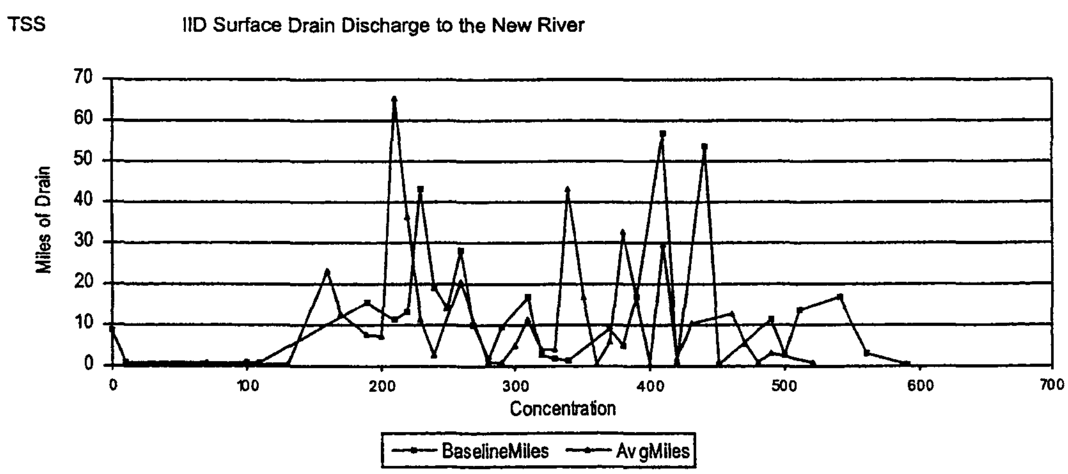


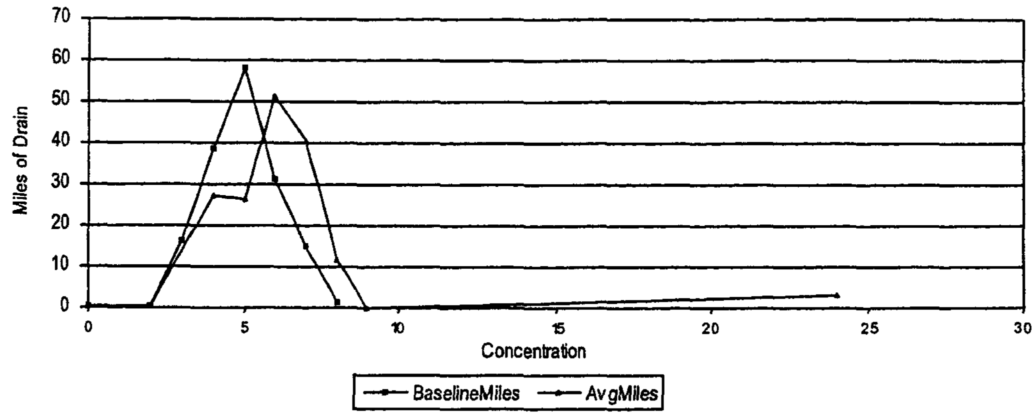
Figure 3.2-19e
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3a for drain discharging into the New River
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_27 (12/18/01)

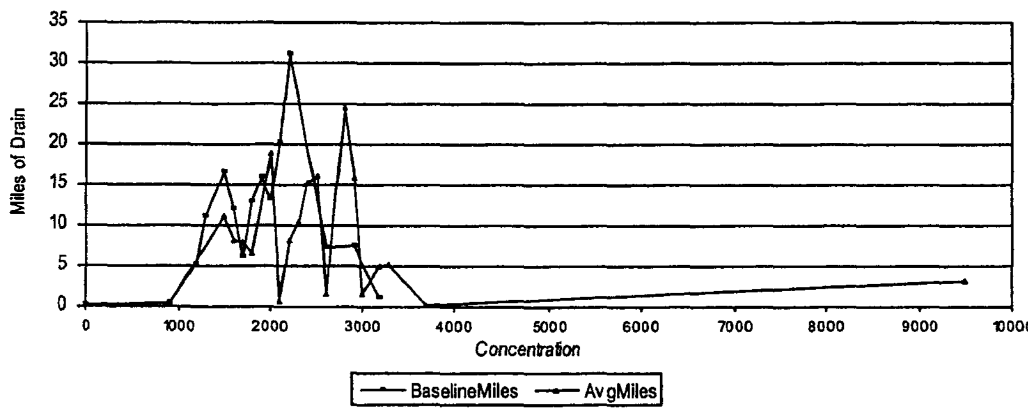
CH2MHILL

230K On-farm COC Concentrations per Miles of Drains in IID, 12-Year Model Run

Selenium IID Surface Drain Discharge to the Salton Sea



TDS IID Surface Drain Discharge to the Salton Sea



TSS IID Surface Drain Discharge to the Salton Sea

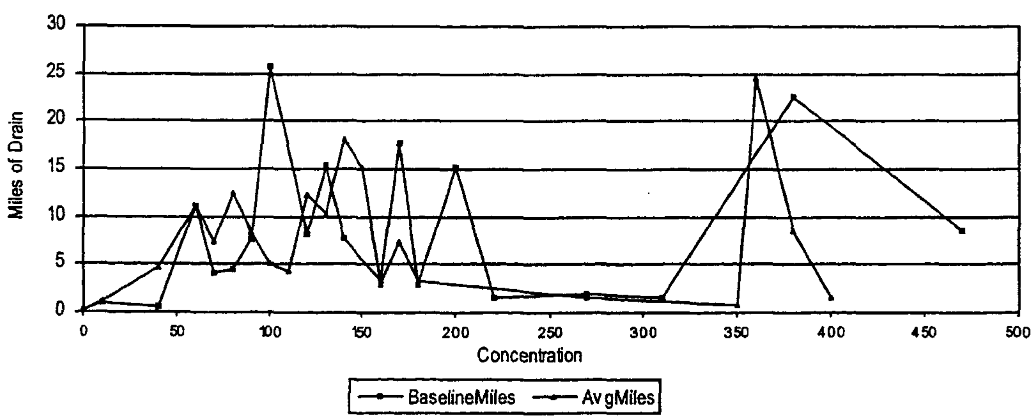


Figure 3.2-19f
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3b for drain discharging into the Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

D112001001RDD_27 (12/18/01)

CH2MHILL

reproductive success from increased selenium concentrations constitute a potentially significant impact associated with the water conservation and transfer component of Alternative 3. With implementation of the HCP component of Alternative 3, however, this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 13. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under Alternative 3, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline condition, conservation of 230 KAF through only on-farm irrigation system and water delivery system improvements would reduce Alamo River discharge to the Sea by about 22 percent and New River discharge to the Salton Sea by about 20 percent (Table 3.2-41). If all Fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in Alamo River flows would be between 10 and 22 and in the New River between 7 and 20 percent relative to the Baseline. For the same reasons as described for the Proposed Project (see Impact BR-13), which would result in greater flow reductions in the rivers, changes in river flows under Alternative 3 would not substantially change the amount of tamarisk along the New or Alamo Rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. Therefore, impacts to tamarisk along the rivers and wildlife potentially using this habitat would be less than significant. (Less than significant impact.)

Impact A3-BR –14. Installation of Seepage Recovery Systems Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under Alternative 3, IID would conserve between 130 KAFY and 230 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, or Fallowing. Potential water delivery improvements include installation of seepage recovery systems along the East Highline Canal. As explained for the Proposed Project (see Impact BR - 14), subsurface recovery systems are proposed along the East Highline Canal where there is not an existing drain adjacent to the canal. About 13.2 miles of pipeline would be necessary if all of subsurface systems under consideration are installed, thus removing about 43 acres of vegetation. This amount constitutes about 10 percent of the estimated 412 acres of tamarisk scrub habitat supported in seepage areas adjacent to the East Highline Canal in the Proposed Project area. As explained for the Proposed Project, the loss of seepage community vegetation is a less-than-significant impact to wildlife habitat and wildlife. This potential effect would not occur if only on-farm irrigation system improvements or Fallowing is used to conserve water under this alternative. (Less than significant impact.)

Impact A3-BR – 15. Reservoir Construction Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under Alternative 3, IID would conserve between 130 KAFY and 230 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, or Fallowing. Potential water delivery measures include installation of lateral interceptors. Locations for 16 lateral interceptor systems have been identified. These systems consist of a canal and a reservoir about 40 surface acres. Some of the reservoirs could be located close to the New or Alamo Rivers, and their construction could remove tamarisk scrub adjacent to these rivers. Up to 15 acres of tamarisk scrub could be removed to construct reservoirs associated with lateral interceptor systems. Tamarisk, a non-native, highly invasive plant, provides poor quality habitat to wildlife and has colonized many areas throughout the Proposed Project area. The small loss of tamarisk from installation of reservoirs would not adversely affect wildlife or wildlife habitat. (Less than significant impact.)

Impact A3-BR – 16. Installation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. Under Alternative 3, potential impacts to agricultural field habitat and wildlife from installation of on-farm Irrigation System Improvements would be similar to those under the Proposed Project. Installation of tailwater return systems could remove some agricultural land from production to accommodate tailwater ponds. Assuming that tailwater return systems can conserve about 0.5 acre-foot of water and an average farm is 80 acres, about 5,750 tailwater return systems would be needed to achieve 230 KAFY. Tailwater return ponds are typically 1 to 2 acres. Assuming each pond is 2 acres, up to about 11,500 acres of farmland could be removed from production for these systems.

Farmers typically locate tailwater return ponds in the least productive portions of their fields, particularly in areas farmed irregularly, so the actual loss in agricultural field habitat likely would be less than 11,500 acres in the extreme case that only tailwater return systems are used to conserve water under this alternative. Tailwater return systems are installed when no crops are produced, typically during the summer. Because they would be installed when no crops are grown on the field, the potential for disturbance to wildlife would be limited.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, potentially disturbing wildlife. Drip systems would be installed between crops; therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

Other on-farm Irrigation System Improvements require reconstructing/recontouring of an agricultural field. Wildlife using agricultural field habitat could be disturbed during the reconstructing/recontouring. However, because reconstructing/recontouring would be conducted when no crops are grown on the field, the potential for disturbance to wildlife is limited. The amount of agricultural field habitat would not change from reconstructing/recontouring agricultural fields to conserve water.

As described, installing an on-farm Irrigation System Improvement could reduce a small amount of agricultural field habitat and presents a minor potential for disturbance of wildlife. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land under Alternative 3 is considered a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A3-BR – 17. Operation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. For the same reasons as explained for the Proposed Project (Impact BR-17), implementing on-farm Irrigation System Improvements would not change the suitability of agricultural fields as foraging habitat for bird species that forage in agricultural fields of the Imperial Valley under Alternative 3. (No impact.)

Impact A3-BR – 18. Installation of Water Delivery System Improvements Could Reduce the Acreage Agricultural Fields and Affect Associated Wildlife. Under Alternative 3, IID would conserve between at least 130 KAFY and 230 KAFY using on-farm irrigation system improvements, water delivery system improvements, or Fallowing. Water delivery system improvements with the potential to eliminate agricultural field habitat are installation of lateral interceptors and construction of new reservoirs. These activities could remove about 8,630 acres of agricultural field habitat. Relative to the entire irrigated area of Imperial Valley that covers about 500,000 acres, this potential loss constitutes about 1.7 percent of the agricultural land. Construction would not occur in agricultural fields under active production, so the potential for disturbance of species using this habitat would be minor. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A3-BR – 19. Fallowing Could Reduce the Acreage Agricultural Fields and Affect Associated Wildlife. Under Alternative 3, between 130 KAFY and 230 KAFY of water would be conserved using on-farm irrigation system improvements, water delivery system improvements, or Fallowing. Fallowing could reduce the acreage of irrigated agriculture available in the IID water service area at any one time. If only Fallowing is used to generate the additional 230 KAFY of conserved water, about 38,300 acres of land would be needed. This acreage represents about 8 percent of the irrigated area in the IID water service area. Even with this reduction, agricultural field habitat would remain abundant in the IID water service area, consisting of about 483,000 acres remaining in agricultural production. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. This potential effect would not occur if only on-farm irrigation system improvements and water delivery system improvements are used to conserve water. (Less than significant impact.)

Impact A3-BR – 20. Fallowing Would not Change the Amount of Desert Habitat. Fallowing could be used to generate some or all conserved water. Fallowing could include land retirement for the entire 75-year project duration or for shorter periods, ranging from a single season to several years. Land removed from agricultural production for a long time could be colonized by desert plants. The likelihood of desert plants becoming reestablished would be influenced by the proximity of the retired land to desert habitat, soil conditions, and rainfall, among others. Land retired for short periods of time probably would not be colonized by desert plants. Some fields in the Imperial Valley that have been out of agricultural production for many years do not support vegetation. The limited amount of vegetation that has developed consists of ruderal species, rather than native desert plant species. Thus, Fallowing would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats. (No impact.)

Impact A3-BR – 21. Reduced Flows in Drains Could Affect Fish and Aquatic Habitat. Under Alternative 3, water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Relative to the Baseline, conservation of 230 KAF through on-farm irrigation system improvements would reduce flow in the drains by about 21 percent. If all Fallowing was used to conserve water, then the percent reduction in flows would be 9 percent. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in drain flows would be between 9 and 21 percent relative to the Baseline. For the same reasons as described for the Proposed Project (see Impact BR-21), which would result in greater flow reductions in the drains than this alternative, reductions in drain flows under

Alternative 3 would have a less-than-significant impact on fish and other aquatic resources in the drains. (Less than significant impact.)

Impact A3-BR – 22. Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat. Alternative 3 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation. Similar to the Proposed Project, if all water was conserved using on-farm irrigation system and water delivery system improvements, Alternative 3 would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the No Project alternative. Average salinity concentrations also would increase under Alternative 3 (assuming all water is conserved using on-farm irrigation system and water delivery system improvements) relative to the No Project alternative. If all the conserved water was generated with Fallowing, there would be no change in water quality conditions as explained for Alternative 4. Thus, the magnitude of water quality changes under Alternative 3 would depend on the amount of water conserved through Fallowing. For the same reasons as described for the Proposed Project, the potential for increased selenium or salinity to reduce the reproductive success of fish in the drains and rivers is a less-than-significant impact. Impacts to desert pupfish are addressed under Impact A3-BR24. (Less than significant impact.)

Impact A3-BR – 23. Reduced Flows in the Rivers Drain Could Affect Fish and Aquatic Habitat. Under Alternative 3, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 230 KAF would reduce Alamo River discharge to the Sea by about 22 percent and New River discharge to the Salton Sea by about 20 percent. If all Fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in Alamo River flows would be between 10 and 22 and in the New River between 7 and 20 percent relative to the Baseline. For the same reasons as explained for the Proposed Project, under which flow reductions in the New and Alamo Rivers would be greater than under this alternative, no significant impacts to fish or aquatic resources would result from flow reductions in these rivers under Alternative 3. (Less than significant impact.)

Impact A3-BR – 24. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Under Alternative 3, conservation of 230 KAFY of water is predicted to reduce flow levels in these drains by 24 percent relative to the Baseline if only on-farm irrigation system and water delivery system improvements were used (Table 3.2-42). If all Fallowing is used to conserve water, then the percent reduction in flows in drains that discharge directly to the Salton Sea from the IID water service area would be 7 percent. Thus, depending on the amount of water conserved through Fallowing, the percent reduction in flows would between 7 and 24. As described for the Proposed Project, transfer of water to CVWD would increase flows in drains discharging directly to the Sea from CVWD's service area. The changes in flows in drains inhabited by pupfish would have the same effects qualitatively as those described for the Proposed Project, but the magnitude of potential effects would be less because of the smaller reduction in drain flows. Also, because water conservation would reduce the contribution of tailwater to the drainage system, water quality conditions in drains from the IID water service area would worsen. Changes in flow and water quality in the drains discharging directly to the Sea and supporting pupfish constitute a potentially significant impact of the water conservation and transfer component of the Alternative 3. However, implementation of the HCP component of Alternative 3 would reduce this potential impact to a less-than-significant level. (Less than significant impact.)

Impact A3-BR – 25. Construction of Water Delivery System Improvements Could Affect Razorback Suckers. As explained for the Proposed Project, reduced flow volumes in the conveyance system would not adversely affect habitat for razorback suckers because the elevation of water in the canals is tightly controlled. However, under the Proposed Project, installation of some water delivery system improvements (e.g., canal lining) under Alternative 3 would require dewatering canals. If razorback suckers are in canals that are dewatered, they could be adversely affected. This is a potentially significant impact of the water conservation and transfer component of Alternative 3. However, implementation of the HCP component of the Alternative 3 would avoid this potential effect. (Less than significant impact.)

Impact A3-BR – 26. Water Quality Changes in the Drains Could Affect Special-Status Species. Alternative 3 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation. Therefore, adverse effects to special-status species inhabiting the drains (e.g., Yuma clapper rails and desert pupfish) would be similar to those described for the Proposed Project, but of slightly lesser magnitude. For the same reasons as described for the Proposed Project, potential impacts to special-status species from changes in water quality under Alternative 3 are a potentially significant impact associated with the water conservation and transfer component of this alternative. However, implementation of the HCP component of this alternative would reduce this impact to a less-than-significant level. (Less than significant impact.)

Impact A3-BR – 27. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impact A3-BR - 10, reduced flow in the drains would not significantly change the amount or species composition of vegetation in the drains. However, increased salinity of drainwater with water conservation and transfer would reduce cattail vegetation in the drains by a small amount. Cattails are preferred habitat for the Yuma clapper rail and provide habitat for other special-status species potentially using the drains. A reduction in cattails could adversely affect Yuma clapper rails and other special-status species using the drains. This effect constitutes a potentially significant impact of the water conservation and transfer component of Alternative 3. In addition to changes in physical habitat, increased selenium concentration in the drains under Alternative 3 could adversely affect Yuma clapper rails and other special-status species using the drains. These potential effects are addressed under Impact A3-BR - 26. The water quality changes also are a potentially significant impact of the water conservation and transfer component of Alternative 3. However, implementation of the HCP component of Alternative 3 would reduce these potential impacts to less than significant levels. (Less than significant impact.)

Impact A3-BR – 28. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Alternative 3 is not expected to substantially reduce the availability of tamarisk scrub supported by the agricultural drains or along the New and Alamo Rivers as a result of changes in flow or water quality. Installation of seepage recovery systems and lateral interceptors could eliminate about 58 acres of tamarisk scrub habitat. This small reduction in tamarisk scrub would not significantly adversely affect special-status species because (1) tamarisk is common and abundant throughout the project area, (2) tamarisk is of limited habitat quality, and (3) none of the special-status species depends on this habitat.

Construction of water delivery system improvements (e.g., reservoirs) has a minor potential to disturb special-status species using tamarisk scrub habitat. This potential disturbance would not significantly affect special-status species because few species breed in the Proposed Project area when disturbance could result in nest abandonment or interfere with care of the young. During other periods, construction activities could flush special-status birds from tamarisk scrub. Because of the availability of other areas of tamarisk, birds flushed by construction could find alternative habitat, and no significant impacts would occur. (Less than significant impact.)

Impact A3-BR – 29. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Installation of on-farm irrigation system improvements implemented under Alternative 3 would require construction and ground disturbance. Installation of water delivery system improvements in agricultural fields would not adversely affect special-status species using this habitat because the conservation measures would be installed when crops are not grown, primarily in the summer. Special-status species predominantly occur in the Proposed Project area during the winter or as fall and spring migrants and predominantly use agricultural fields when they are in active production and irrigated.

As explained under Impacts A3-BR-16, A3-BR-17, A3-BR-18, and A3-BR-19, installation of on-farm irrigation system and water delivery system improvements or Fallowing would not substantially reduce the availability of agricultural lands in the IID water service area. Thus, Alternative 3 would not significantly affect special-status species associated with agricultural fields. (Less than significant.)

Impact A3-BR – 30. Water Conservation Practices Could Affect Special-Status Species Associated with Desert Habitat. In the IID water service area, native desert habitat occurs adjacent to the East Highline, Westside Main, and AAC and portions of the Thistle and Trifolium Extension Canals. These areas represent the only locations where special-status species associated with desert habitat could occur in the Proposed Project area. The only features of the Alternative 3 that could affect desert habitat would be water delivery system improvements potentially involving construction (e.g., canal lining, reservoirs) along the canals adjacent to desert habitat. No regulating reservoirs, mid-lateral reservoirs, or canal lining are proposed along these canals. Seepage recovery systems could be installed along the East Highline Canal, but these systems would be constructed on the agricultural field side of the canal. Thus, no construction activities required for the water delivery system improvements would occur in desert habitat, and no significant impacts to special-status species would occur as a result of the water conservation and transfer component of Alternative 3. (Less than significant impact.)

Impact A3-BR – 31. Water Conservation Practices Could Affect Burrowing Owls. Alternative 3 would have similar effects on burrowing owls as the Proposed Project because similar water conservation practices would be used. For the same reasons as explained for the Proposed Project, Alternative 3 would not significantly affect burrowing owls (less than significant).

Fallowing could be used to generate a portion of the water conserved under Alternative 3. As explained in more detail for Alternative 4 under Impact A4-BR-13, Fallowing could reduce the availability of insects on which burrowing owls prey. If fallowed fields are concentrated in a few areas, some owls could abandon territories adjacent to fallowed fields. Because Fallowing would be only one of many methods used to conserve water under Alternative 3 and because owls are not believed to be limited by prey availability in the Imperial Valley, it is not expected that a large enough acreage of fields would be fallowed to cause large numbers of owls to abandon territories. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A3-BR – 32. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. With conservation of 230 KAFY through on-farm irrigation system and water delivery system improvements, the water surface elevation of the Sea would decline rapidly for the first 30 years. After this period, the water surface elevation would stabilize at about -246 ft msl, about 19 feet below the existing level (Figure 3.2-15). This reduction is similar to that projected under the Proposed Project, under which the water surface elevation would decline by about 22 feet. Thus, as explained for the Proposed Project, potential changes in tamarisk adjacent to the Salton Sea from reduced surface elevations under Alternative 3 would not be a significant impact. (Less than significant impact.)

Impact A3-BR–33. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. The rate of salinization under Alternative 3 would be similar to the Proposed Project, and the effects on invertebrate resources in the Salton Sea from increased salinity would be the same as described under the Proposed Project. The exceedance of salinity thresholds for invertebrates in the Salton Sea under Alternative 3 is shown on Figure 3.2-16. As explained for the Proposed Project, the acceleration in the changes in the invertebrate community of the Salton Sea is not considered a significant impact. (Less than significant impact.)

Impact A3-BR – 34. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. Alternative 3 would have the same effects on shorebirds and other waterbirds as the Proposed Project. As described for the Proposed Project, shorebirds using the Salton Sea also use Mono Lake where brine flies and shrimp provide the primary invertebrate food source. Because shorebirds would exploit brine flies and shrimp, the acceleration of the transition to an invertebrate community dominated by these species under Alternative 3 would have a less-than-significant impact on shorebirds. (Less than significant impact.)

Impact A3-BR – 35. Increased Salinity Would Reduce Fish Resources in the Salton Sea. The effects on fish resources in the Salton Sea from increased salinity are described under the Proposed Project. Under Alternative 3, salinity would increase and result in the same effects as described for the Proposed Project and the No Project alternative. Conservation and transfer of 230 KAFY would reduce inflow to the Salton Sea and accelerate the rate of salinization relative to the No Project alternative. The salinity thresholds for sargo, gulf croaker, and tilapia would be exceeded under this alternative at about the same times as under the Proposed Project (Figure 3.2-17). Therefore, the effects to fish resources would be the same as described for the Proposed Project. (Less than significant impact.)

Impact A3-BR – 36. Reduced Fish Abundance Would Affect Piscivorous Birds. Under Alternative 3, the salinity tolerances of fish would be exceeded in about the same years as the Proposed Project. Therefore, Alternative 3 would have the same effects on piscivorous birds as described for the Proposed Project. (Less than significant impact with implementation of the HCP component.)

Impact A3-BR – 37. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. Alternative 3 would qualitatively have the same effects on selenium loading to the Salton Sea as the Proposed Project. For the same reasons as described for the Proposed Project (Impact BR-47), Alternative 3 would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact A3-BR – 38. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Under Alternative 3, the rate and magnitude of reductions in the water surface elevation of the Salton Sea would be similar to the Proposed Project. Therefore, Alternative 3 would have the same impacts to colonial nest and roost sites as described for the Proposed Project. (Less than significant impact.)

Impact A3-BR – 39. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Under Alternative 3, the rate and magnitude of reductions in the water surface elevation of the Salton Sea would be similar to the Proposed Project. Under Alternative 3, the surface water elevation of the Salton Sea is projected to decline to -246 ft msl. This decline would reduce the perimeter of the Salton Sea from about 100 miles to about 83 miles, but the amount of shallow water habitat would increase from about 1,100 acres to 3,300 acres. Alternative 3 would have the same impacts on mudflat and shallow water habitat for shorebirds as described for the Proposed Project. (Less than significant impact.)

Impact A3-BR – 40. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Under Alternative 3, the mean projections show the salinity of the Salton Sea exceeding 90 g/L in 2029. At this salinity, the Sea could become intolerable to pupfish and prevent them from moving among drains. If the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Small, isolated populations are at risk of extinction because of environmental and genetic stochasticity. Ultimately, this condition also would occur under the No Project alternative, but at a later time. However, because of the large difference in when pupfish populations could be isolated between the No Project alternative (not predicted to occur in the 75-year modeling period) and Alternative 3, this is a potentially significant impact. However, implementation of the HCP component of Alternative 3 would reduce this impact to a less-than-significant level. (Less than significant impact.)

3.2.4.7 Alternative 4 (A4): Water Conservation and Transfer up to 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

Under Alternative 4, IID would conserve 300 KAF of water per year for transfer to the SDCWA service area, CVWD service area, or MWD service area. Water would be conserved only through Fallowing. The water conserved by the IID water service area would be diverted at Parker Dam rather than at Imperial Dam.

This change in the point of diversion from Imperial Dam to Parker Dam would reduce the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. Because the method of water conservation would not influence the flow levels resulting in the LCR, the effects of this alternative on biological resources are the same as for the Proposed Project. As under the Proposed Project, Reclamation would implement conservation measures so impacts to biological resources along the LCR would be less than significant.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A4-BR – 1. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 4, 300 KAFY would be conserved through Fallowing. Flows in the drains would be reduced by about 9 percent relative to the No Project alternative. For the same reasons as described for the Proposed Project, which would result in greater flow reductions in the drains, changes in drain flows under Alternative 4 would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and wildlife using drain habitat would be less than significant. (Less than significant impact.)

Impact A4-BR – 2. No Change in Salinity in the Drains Would Occur. Under Alternative 4, conservation of 300 KAFY of water through Fallowing would not change salinity levels in the drains. Therefore, this alternative would not change the acreage or vigor of cattails in the drains. (No impact.)

Impact A4-BR – 3. No Adverse Effects to Fish or Wildlife in the Drains and Rivers Would Occur from Water Quality Changes. Under Alternative 4, only Fallowing would be used to conserve water for transfer. Fallowing would reduce the overall amount of water in the drains but would not change the relative proportions of tailwater and tilewater. As such, Fallowing would not change or would slightly improve the concentrations of water quality constituents in the drains and rivers relative to the Baseline. Alternative 4 would decrease slightly the miles of drain in which birds could experience selenium-related hatchability effects relative to the Baseline. Conservation of 300 KAFY through Fallowing would result in hatchability effects along the equivalent of approximately 46 miles of drain, about 2 fewer miles than under the Baseline (Table 3.2-40). Therefore, relative to the Baseline, Alternative 4 would not adversely affect biological resources from changes in water quality and could have modest beneficial effects. (No impact.)

Impact A4-BR – 4. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under Alternative 4, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 300 KAFY through Fallowing would reduce Alamo River discharge to the Sea by about 10 percent and New River discharge by about 7 percent

(Table 3.2-41). For the same reasons as described for the Proposed Project (see Impact BR-13, which would result in greater flow reductions in the rivers), changes in river flows under Alternative 4 would not substantially change the amount of tamarisk along the New or Alamo Rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. Therefore, impacts to tamarisk along the rivers and wildlife potentially using this habitat would be less than significant. (Less than significant impact.)

Impact A4-BR – 5. Fallowing Would Not Change the Acreage of Agricultural Fields. Under Alternative 4, 300 KAFY of water would be conserved through Fallowing. Fallowing could reduce the acreage of irrigated agriculture available in the IID water service area at any one time. About 50,000 acres of land would be needed to conserve 300 KAFY of water. This acreage represents about 10 percent of the irrigated area in the IID water service area. Even with this reduction, agricultural field habitat would remain abundant in the IID water service area, consisting of about 450,000 acres remaining in agricultural production. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less-than-significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A4-BR – 6. Fallowing Would Not Change the Amount of Desert Habitat. Under Alternative 4, Fallowing could include land retirement for the entire 75-year project duration or for shorter periods, ranging from a single season to several years. Land taken out of agricultural production for a long time could be colonized by desert plants. The likelihood of desert plants becoming reestablished would be influenced by the proximity of the retired land to desert habitat, soil conditions, and rainfall, among others. Land retired for short periods of time probably would not be colonized by desert plants. Some fields in the Imperial Valley that have been out of agricultural production for many years do not support vegetation. The limited amount of vegetation that has developed consists of ruderal species rather than native desert plant species. Thus, Fallowing would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats. (No impact.)

Impact A4-BR – 7. Reduced Flows in Drains Could Affect Fish and Aquatic Habitat. Under Alternative 4, water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Relative to the Baseline, conservation of 300 KAFY through Fallowing would reduce flow in the drains by about 9 percent. For the same reasons as described for the Proposed Project (see Impact BR-21, which would result in greater flow reductions in the drains than this alternative), reductions in drain flows under Alternative 4 would have a less-than-significant impact on fish and other aquatic resources in the drains. (Less than significant impact.)

Impact A4-BR – 8. Reduced Flows in the Rivers Drain Could Affect Fish and Aquatic Habitat. Under Alternative 4, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 300 KAFY would reduce Alamo River discharge to the Sea by about 10 percent and New River discharge to the Salton Sea by about 7 percent. For the same reasons as explained for the Proposed Project, under which flow reductions in the New and Alamo Rivers would be greater than under this alternative, no significant impacts to fish or aquatic resources would result from flow reductions in these rivers under Alternative 4. (Less than significant impact.)

Impact A4-BR – 9. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Conservation of 300 KAFY of water through Fallowing is predicted to reduce flow levels in these drains in the IID water service area by 7 percent relative to the Baseline (Table 3.2-42). If water is transferred to CVWD, flows in drains inhabited by pupfish would increase in drains in the CVWD service area. The changes in flows in drains inhabited by pupfish would have the same effects qualitatively as those described for the Proposed Project, but the magnitude of potential effects in drains in the IID water service area would be less because of the smaller reduction in drain flows. Changes in flow in the drains in the IID water service area that discharge directly to the Sea and that support pupfish constitute a potentially significant impact of the water conservation and transfer component of Alternative 4. However, implementation of the HCP component of Alternative 4 would reduce this potential impact to a less-than-significant level. (Less than significant impact.)

Impact A4-BR – 10. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impacts A4-BR – 1 and BR-2, Alternative 4 would not significantly change the amount or species composition of vegetation in the drains. Therefore, no significant impacts to special-status species associated with drain habitat would occur under this alternative. (Less than significant impact.)

Impact A4-BR – 11. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Alternative 4 would not change the amount of tamarisk in the Imperial Valley, and no construction in tamarisk would disturb special-status species. Because there would be no change in the amount of potential habitat, Alternative 4 would not affect special-status species associated with tamarisk scrub habitat. (No impact.)

Impact A4-BR – 12. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Fallowing would reduce the amount of agricultural land in active production. As explained under Impact A4-BR-5, Fallowing would not substantially reduce the availability of agricultural lands in the IID water service area. Thus, Alternative 4 would not significantly affect special-status species associated with agricultural fields. (Less than significant impact.)

Impact A4-BR – 13. Water Conservation Practices Could Affect Burrowing Owls. Burrowing owls forage in and adjacent to agricultural fields. Insects are their primary prey, but small mammals are also taken. Fallowing would remove agricultural land from production and could reduce the availability of insects and small mammals in the localized area of the fallowed field. The overall potential effects of Fallowing on burrowing owls are uncertain.

Currently, farmers fallow fields for one or more seasons for a number of reasons such as poor market conditions or to improve the land by removing it temporarily from production. As such, Fallowing is part of the existing condition, and burrowing owls have persisted in the Imperial Valley with Fallowing. However, under Alternative 4, a greater amount of land could be fallowed than is currently fallowed. Burrowing owls are not limited by food availability in the Imperial Valley (Rosenberg and Haley 2001). If fallowed lands are equally distributed throughout the valley so all territories had only a small reduction in potential foraging habitat, Fallowing would not likely reduce prey availability to an extent that would reduce reproductive success or adult survival. If fallowed fields are concentrated in a few areas, some burrowing owls would potentially abandon territories near the fallowed fields, if alternative foraging areas are not available.

If burrows are limited, and Fallowing reduces prey availability to a degree that causes owls to abandon territories, some owls might not reestablish a territory elsewhere. Whether or not burrows are a limited resource for owls in the Imperial Valley is uncertain. Although the potential effects of Fallowing on owls are unclear, for this evaluation, the potential loss of territories is considered a potentially significant impact of the water conservation and transfer component of the Alternative 4. Under the HCP, IID would conduct a demographic study and long-term relative abundance monitoring, which would allow a determination of the trajectory of burrowing owl population. If the population was found to be declining, measures would be implemented to address this decline. Thus, with implementation of the HCP component of Alternative 4, this potential impact would be less than significant. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A4-BR – 14. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. With conservation of 300 KAFY under Alternative 4, the water surface elevation of the Salton Sea would decline and stabilize after about 30 years at about -240 ft msl, about 5 feet lower than under the No Project alternative. As described for the No Project alternative, there is uncertainty regarding changes in the amount of tamarisk adjacent to the Salton Sea as the water surface elevation declines, and it is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas. Although it is not possible to predict the magnitude of change in the amount of tamarisk adjacent to the Salton Sea under Alternative 4, a reduction in the amount of tamarisk would not be a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife, (2) no special-status species are dependent on tamarisk, and (3) the magnitude of changes would be the same under Alternative 4 and the No Project alternative because the reduction in surface elevation would be similar under the two alternatives. (Less than significant impact.)

Impact A4-BR – 15. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. The effects on invertebrate resources in the Salton Sea from increased salinity were described under the Proposed Project. Under Alternative 4, salinity would increase and result in the same effects as described for the Proposed Project and the No Project alternative. The exceedance of salinity thresholds for invertebrates in the Salton Sea under Alternative 4 is shown on Figure 3.2-16. Under Alternative 4, the salinity thresholds for rotifers and pileworms would be exceeded in the same years as under the No Project alternative. For the copepods and barnacles, the thresholds would be exceeded 6 to 28 years earlier (Figure 3.2-16). For the same reasons described for the Proposed Project, the acceleration in the changes in the invertebrate community of the Salton Sea is not considered a significant impact. (Less than significant impact.)

Impact A4-BR – 16. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. As described for the Proposed Project and No Project alternative, shorebirds using the Salton Sea also use Mono Lake, where brine flies and shrimp provide the primary invertebrate food source. Because shorebirds would exploit brine flies and shrimp, the acceleration of the transition to an invertebrate community dominated by these species under Alternative 4 would have a less-than-significant impact on shorebirds. (Less than significant impact.)

Impact A4-BR – 17. Increased Salinity Would Reduce Fish Resources in the Salton Sea. The effects on fish resources in the Salton Sea from increased salinity are described under the Proposed Project. Under Alternative 4, salinity would increase and result in the same effects as described for the Proposed Project and the No Project alternative. With conservation of 300 KAFY through Fallowing, sargo would be exceeded in 2008, the same year it is predicted to be exceeded under the Baseline (Figure 3.2-17). For gulf croaker and tilapia, their reproductive salinity thresholds would be exceeded in 2012 and 2017, respectively. Relative to the No Project alternative, the threshold for croaker would be exceeded 3 years earlier, and for tilapia 6 years earlier. As explained for the Proposed Project, it is uncertain how much longer corvina will reproduce, and gulf croaker could be lost earlier than suggested by the exceedance of their life cycle salinity tolerance, if pileworm abundance declines.

Under both the No Project alternative and Alternative 4, the salinity of the Salton Sea would rise and exceed levels at which fish species inhabiting the Sea could reproduce. For gulf croaker and tilapia, the thresholds could be exceeded 3 to 6 years earlier under Alternative 4 resulting in earlier declines in these two species. For the same reasons as described for the Proposed Project, this acceleration is a less-than-significant impact to fish resources of the Salton Sea. (Less than significant impact.)

Impact A4-BR – 18. Reduced Fish Abundance Would Affect Piscivorous Birds. Alternative 4 would increase the rate of salinization relative to the No Project alternative and the occurrence of the resultant effects to fish resources and piscivorous birds. The exceedances of salinity thresholds for fish in the Salton Sea under Alternative 4 are shown on Figure 3.2-17. With 300 KAFY of conservation through Fallowing, the mean salinity would exceed 60 g/L in 2017, 6 years earlier than under the No Project alternative. Adverse impacts to piscivorous birds would therefore occur earlier under Alternative 4 relative to the No Project alternative. The earlier occurrence of adverse effects to piscivorous birds is considered a potentially significant impact of the water conservation and transfer component of the Proposed Project. With implementation of the HCP component of the Proposed Project, however, this impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 19. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. Alternative 4 would have similar qualitative effects on selenium loading to the Salton Sea as the Proposed Project. For the same reasons as described for the Proposed Project (Impact BR-47), Alternative 4 would have no effect on exposure of fish and birds to selenium in the Salton Sea . (No impact.)

Impact A4-BR – 20. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Under the No Project alternative, the water surface elevation is projected to fall 3 feet by 2010 and 4 feet by 2015. This reduction in surface elevation would connect islands —including Mullet Island, used by ground-nesting birds for nesting and roosting —to the mainland (Figure 3.2-15). Alternative 4 would accelerate this effect by a few years. With conservation of 300 KAFY through Fallowing, the surface water elevation would drop by 3 feet and 4 feet, 2 and 4 years earlier than under the No Project alternative, respectively. Snags used by herons and egrets would be similarly affected. For the same reasons as described for the Proposed Project, effects to nesting sites of colonial-nesting birds would be less than significant. (Less than significant impact.)

Impact A4-BR – 21. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Alternative 4 would have the same effects on mudflat and shallow water habitat for shorebirds as described for the No Project alternative. Under Alternative 4, the water surface elevation would decline rapidly for the first 30 years after which the rate of decline would slow. The water surface elevation would reach about -240 feet msl at the end of the modeling period, about 5 feet lower than the Baseline. This decline would reduce the perimeter of the Salton Sea from about 100 miles to about 87.5 miles as compared to 95 miles projected to occur under the No Project alternative. The amount of shallow water habitat would increase under Alternative 4 from about 1,100 acres to 4,900 acres. Alternative 4 would have similar effects on shallow water/mudflat habitat as described for the Proposed Project. (Less than significant impact.)

Impact A4-BR – 22. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Under Alternative 4, the salinity of the Salton Sea is projected to exceed 90 g/L in 2051. At this salinity, pupfish might not be able to move among drains via the Salton Sea. The salinity of the Sea is not projected to exceed this salinity level in 75 years under the No Project alternative. As explained for the Proposed Project, if the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Although, this condition also would eventually occur under the No Project alternative, but at a later time, the acceleration of the occurrence of the condition by at least 25 years is a potentially significant impact of the water conservation and transfer component of Alternative 4. With implementation of the HCP component of Alternative 2, this impact would be less than significant. (Less than significant impact.)

3.3 Geology and Soils

3.3.1 Introduction and Summary

Table 3.3-1 summarizes the geology and soils impacts for the Proposed Project and alternatives.

TABLE 3.3-1
Summary of Geology and Soils Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.
IID WATER SERVICE AREA AND AAC				
GS-1: Soil erosion from construction of conservation measures: Less than significant impact.	Continuation of existing conditions.	**A2-GS-1: Soil erosion from construction of conservation measures:** Less than significant impact.	**A3-GS-1: Soil erosion from construction of conservation measures:** Less than significant impact.	**A4-GS-1: Soil erosion from fallowing:** Less than significant impact with mitigation.
GS-2: Soil erosion from operation of conservation measures: Less than significant impact.	Continuation of existing conditions.	No impact.	**A3-GS-2: Soil erosion from operation of conservation measures:** Less than significant impact.	No impact.
GS-3: Reduction of soil erosion from reduction in irrigation: Beneficial impact.	Continuation of existing conditions.	**A2-GS-2: Reduction of soil erosion from reduction in irrigation:** Beneficial impact.	**A3-GS-3: Reduction of soil erosion from reduction in irrigation:** Beneficial impact.	No impact.
GS-4: Ground acceleration and shaking: Less than significant impact.	Continuation of existing conditions.	**A2-GS-3: Ground acceleration and shaking:** Less than significant impact.	**A3-GS-4: Ground acceleration and shaking:** Less than significant impact.	No impact.
GS-5: Soil Erosion from compliance with the IOP: Less than significant impact.	Continuation of existing conditions.	**Same as GS-5.**	**Same as GS-5.**	**Same as GS-5.**

TABLE 3.3-1
Summary of Geology and Soils Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-GS-6: Soil erosion from construction of HCP components: Less than significant impact.	Continuation of existing conditions.	**Same as HCP-GS-6.**	**Same as HCP-GS-6.**	**Same as HCP-GS-6.**
HCP2-GS-7: Soil erosion from construction of HCP Approach 2 components: Less than significant impact.	Continuation of existing conditions	**Same as HCP-GS-7.**	**Same as HCP-GS-7.**	**Same as HCP-GS-7.**
SALTON SEA				
GS-8: Potential for increased soil erosion along exposed playa of Salton Sea: Less than significant impact.	Continuation of Baseline conditions.	**A2-GS-5: Potential for increased soil erosion along exposed playa of Salton Sea:** Less than significant impact.	**A3-GS-5: Potential for increased soil erosion along exposed playa of Salton Sea:** Less than significant impact.	**A4-GS-2: Potential for increased soil erosion along exposed playa of Salton Sea:** Less than significant impact.
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.3.2 Regulatory Framework

Alquist-Priolo Earthquake Fault Zone Act. The Alquist-Priolo Earthquake Fault Zone Act (Public Resources Code Sections 2621 *et seq.*) was passed in 1972 to prevent buildings from being constructed astride active faults. The act was prompted by damage attributable to surface faulting in the 1971 San Fernando earthquake and the lack of geologic information.

The act is designed to mitigate surface fault rupture by preventing construction of buildings for human occupancy across an active fault. It requires state zoning of active faults, and local review and regulation of development within the zones. The act does not address power lines, water lines, or roads unless there are associated structures for human occupancy that would exceed 2,000 person hours per year (Bryant 2001).

Several of the fault zones in Southern California are considered active by the California Department of Conservation Division of Mines and Geology (CDMG). Alquist-Priolo special study zones (A-P zones) have been established for the majority of these faults and fault zones in accordance with the Alquist-Priolo Special Studies Zones Act of 1972 (CDMG 1983). A-P zones are areas established along and parallel to the traces of active faults. The delineation of A-P zones on topographic maps is the responsibility of CDMG. The purpose of A-P zones is to prohibit the location of structures on the traces of active faults, thereby mitigating potential damage from fault surface rupture.

Seismic Hazards Mapping Act. The Seismic Hazards Mapping Act and related regulations establish a statewide minimum public safety standard for mitigation of earthquake hazards (CDMG 1994). According to this act, the minimum level of mitigation for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but, in most cases, not to a level of no ground failure at all. Nothing in the act precludes public agencies from enacting more stringent requirements, or from requiring a higher level of performance.

Local Regulations and Standards. Imperial County and Riverside County general plans contain goals and policies for protection of geologic features, soil resources, and avoidance of geologic hazards. Additionally, building codes and grading ordinances establish specific regulations for construction procedures, including erosion control measures.

3.3.3 Existing Setting

3.3.3.1 Lower Colorado River

GEOLOGY

The LCR geographic subregion exists within the Sonoran Desert of the basin and range geomorphic province, which is characterized by barren, rugged mountains separated by broad, desert alluvial basins. Landforms in the area are grouped as mountains and hills, piedmont slopes and dissected uplands, sand dunes, and river floodplains (Ratdke et al. 1988). In the LCR geographic subregion, the Colorado River channel cuts undivided Quaternary alluvium; mostly well-consolidated Oligocene sandstone, shale, and conglomerate; a variety of undivided pre-Cenozoic metasedimentary and metavolcanic rocks; Tertiary sandstone, shale, conglomerate, and breccia; Tertiary pyroclastic, volcanic flow, and volcanic mudflow deposits; Tertiary intrusives; Mesozoic and Paleozoic schists; and Precambrian basement rock (Jennings et al. 1991).

SOILS

Soils along the LCR vary from excessively-drained to well-drained fine sand loam, silty clay loam, loamy fine sand, fine sand, gravelly loamy sand, and very fine sand loam that have formed in alluvium deposited by the Colorado River, in alluvium on valley floors, and on old alluvial fans. The following soil associations are present along the LCR: Gilman-Rositas-Indio, Gunsight-Rillito-Chuckwalla, and Badlands-Rositas-Beeline (University of Redlands 1999).

SEISMICITY/GEOLOGIC HAZARDS

Seismogenic sources in Imperial and Riverside Counties include the San Andreas, San Jacinto, Imperial, and Cerro Prieto fault zones and the Mojave shear zone, which are located in the western Mojave Desert (Bausch and Brumbaugh 1996, 1997).

Ground Acceleration and Ground Shaking. Ground acceleration is an estimation of the peak bedrock or ground motion associated with a specific earthquake and is expressed in terms of a percentage of gravitational acceleration. The level of destruction of an earthquake at a particular location is commonly reported using a seismic intensity scale. Because seismic intensities are based on past reports of ground shaking and damage, they are subjective classifications. The commonly used Modified Mercalli Intensity (MMI) scale has 12 levels of intensity (I through XII). The higher the number, the greater the ground-shaking intensity and/or damage. Earthquakes have only one magnitude, but they have variable intensities that generally decrease with increasing distance from the source. Additionally, other factors, such as building type, shallow groundwater, and local geology, affect the intensities of earthquakes at a particular location.

The San Andreas, San Jacinto, Imperial, and Cerro Prieto fault zones, as well as the Mojave shear zone, represent the greatest ground-shaking hazard to the LCR geographic subregion. The 1940 Imperial Valley earthquake resulted in shaking effects in La Paz County, Arizona, including MMI VI and V effects at Parker and Quartzsite, respectively. In Yuma, Arizona, MMI X effects were noted approximately 50 miles from the epicenter (Bausch and Brumbaugh 1996, 1997).

Fault Rupture. Fault rupture refers to the physical displacement of surface deposits in direct response to movement along a fault. As described above, several fault and shear zones could contribute to ground-shaking hazards along the LCR; however, the LCR is not underlain by a potentially active fault or shear zone such that fault rupture would be likely to occur (see Figure 3.3-1) (Bausch and Brumbaugh 1997).

Liquefaction. Liquefaction occurs when earthquake vibrations cause loose, granular silts or sands that are saturated with groundwater to transform from a solid into a liquid state.

Areas along the LCR 100-year floodplain and stream valleys that are underlain by relatively unconsolidated soil and shallow groundwater could be susceptible to liquefaction-induced ground failure in an earthquake. Low-lying irrigated regions, such as the Parker Valley, are especially vulnerable (Bausch and Brumbaugh 1996, 1997). Bausch and Brumbaugh did not report historic liquefaction occurring within La Paz County, but they did report liquefaction in the Yuma Valley south and east of the LCR geographic subregion, buckled bridges and flumes, and rupturing of the extensive canal network.

Landslides. Potential areas of slope instability have been identified in areas along the LCR. The failure mechanism(s) are not understood at this time (Bausch and Brumbaugh 1996, 1997).

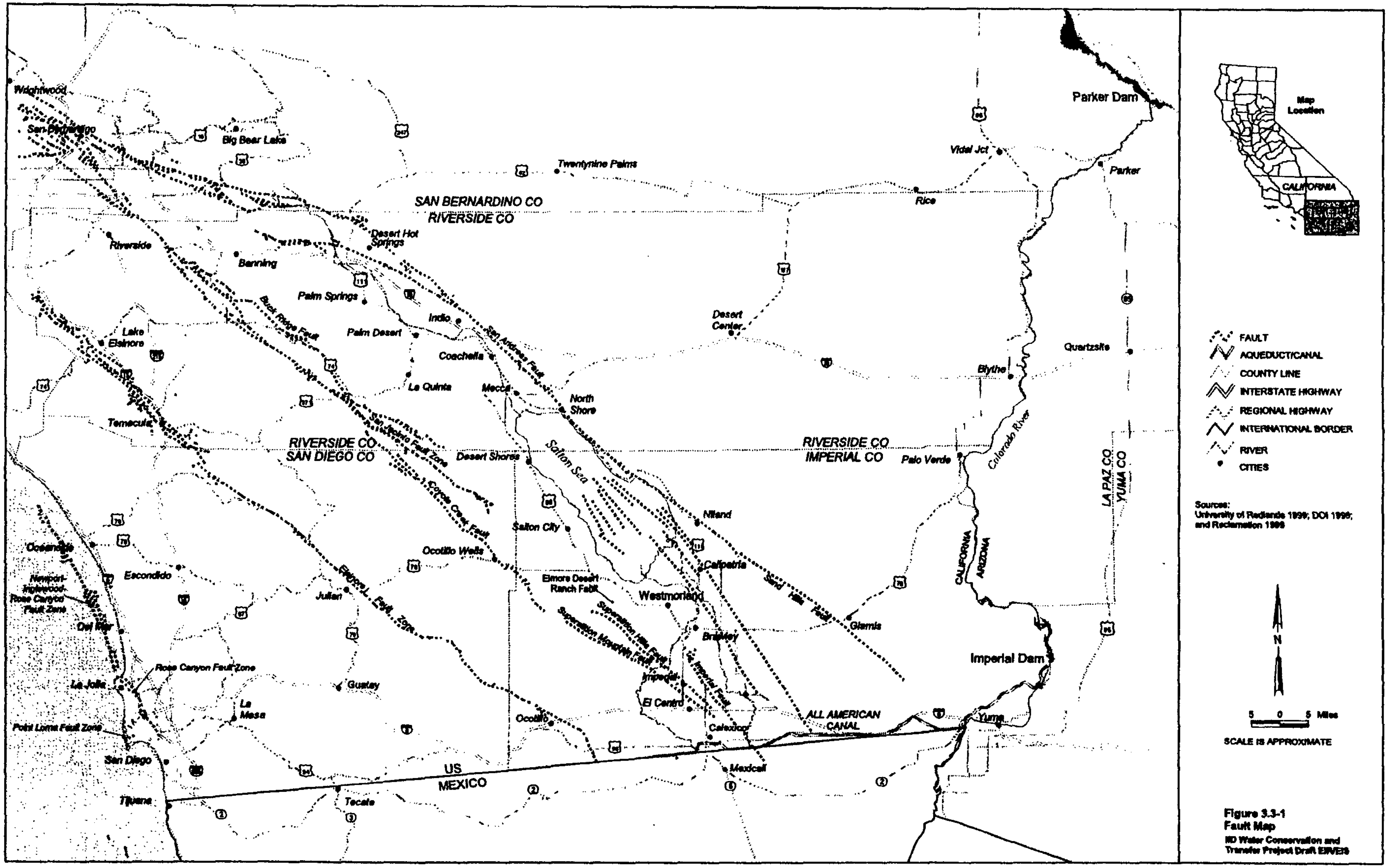


Figure 3.3-1
Fault Map
IID Water Conservation and Transfer Project Draft EIR/EIS

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Seiches. A seiche is an earthquake-induced wave occurring in any confined body of water, such as a reservoir. No seiches occurring in the Parker Dam to Imperial Dam reach have been reported in the reservoirs (Reclamation 1997).

3.3.3.2 IID Water Service Area and AAC

GEOLOGY

The entire Imperial Valley Basin lies within the Salton Basin Region of the Salton Trough, a large, sediment-filled topographical depression and seismically active valley that is approximately 130 miles long and as much as 70 miles wide. The Salton Basin Region includes sub-basins and portions of sub-basins (i.e., Imperial Valley and other nearby sub-basins) within the Salton Trough that drain directly into the Salton Sea. The Salton Basin is bordered on the north by the Salton Sea, on the northeast by the Chocolate Mountains, on the southeast by the Sand Hills and Cargo Muchacho Mountains, on the west by the Vallecito and Jacumba Mountains, and on the south by the northern Mexicali Valley and International Boundary (see Figure 3.1-22 in Section 3.1, Hydrology and Water Quality).

Topographically, the Salton Trough is a broad, flat alluviated valley with an area of about 6,000 square miles. The entire valley lies below 500 feet above sea level, except for its rise into San Gorgonio Pass. More than 3,000 of its 6,000 square miles are below sea level (from the city of Indio to below the International Boundary). The lowest elevation point in the Salton Trough is 273 feet below sea level, which is the deepest point in the Salton Sea (Singer 1998).

The Salton Trough is filled with approximately 21,000 feet of Cenozoic sediments derived predominantly from the Colorado River, which emptied into the Gulf of California during the Cenozoic period. The sediments formed a delta that spread and eventually separated the Salton Basin Region from the Gulf of California. The Sand Hills are windblown sand deposits that form a 40-mile-long by 5-mile-wide belt of sand dunes extending along the east side of the Coachella Canal from the International Boundary. Within Coachella and Imperial Valleys, an old lake shoreline has been identified by the presence of lacustrine deposits. It is estimated that Lake Coachella covered an area approximately 117 miles long and 30 miles wide. The Imperial Formation, which is marine in origin, underlies the sequence of sedimentary layers within the Salton Basin Region. The Imperial Formation is underlain by igneous and metamorphic basement rocks.

SOILS

In the dry climate of Imperial County, soils, unless irrigated, have no potential for farming and very limited potential for wildlife habitat (County of Imperial 1997a). Lacustrine basin soils in the IID water service area formed on nearly level old lake beds in the area of ancient Lake Cahuilla. These soils generally consist of silty clays, silty clay loams, and clay loams; are deep and highly calcareous; and usually contain gypsum and soluble salts. The central areas in the IID water service area generally have fine-textured silts, which are primarily used for crops. Continued agricultural use of soils within the IID water service area required installation of subsurface tile drains to carry away water and salts that would have otherwise built up in the soils and prevented crop growth. Tile drains discharge this flow to surface drains (IID 1994). Sandy soils, typical of the deserts in the Southwest US, are predominant at higher elevations, such as the East and West Mesas, and are generally used for recreation and desert wildlife habitat.

Detailed descriptions of the major soil associations, series, and classes in Imperial County can be obtained from the 1981 soil survey of Imperial County (Natural Resources Conservation Service [NRCS] 1981). NRCS' soil survey identified 10 major soil associations that can be generally grouped into two categories based on landscape: well-drained to poorly-drained soils, predominantly in the lacustrine basin (irrigated area); and well-drained and somewhat excessively well-drained soils of the mesas, alluvial fans, terraces, and mountains rimming the basin (NRCS 1981). The distribution of soil associations within the Salton Trough is shown in Figures 3.3-2A and 3.3-2B.

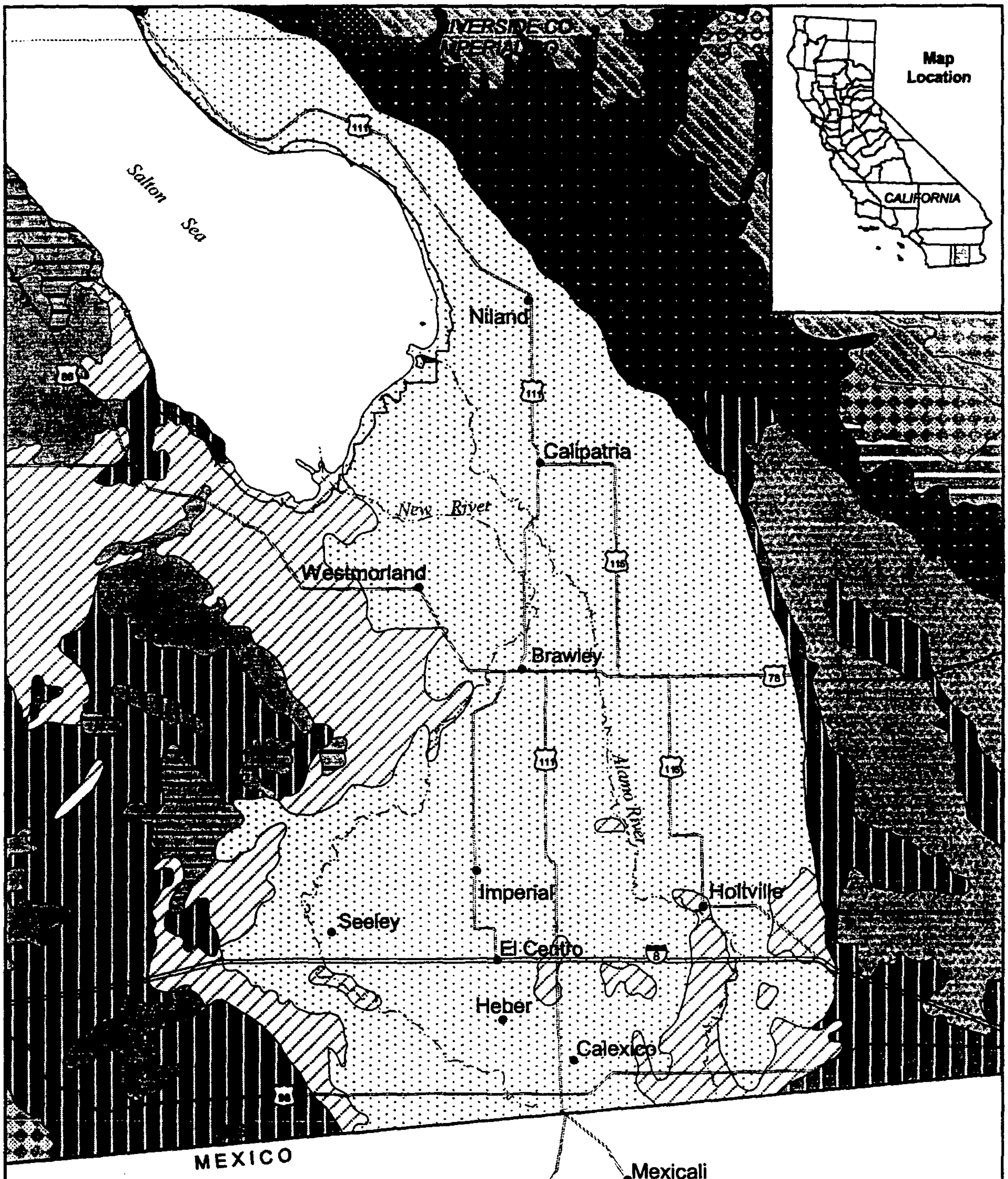
The IID water service area is generally flat, with low levels of natural erosion. Erosion is dependent on texture (i.e., clay, sand, or silt content), moisture content, and agronomic practices (i.e., cropped, fresh-tilled, or fallow). Figure 3.3-3 illustrates erosion activity throughout Imperial County.

SEISMICITY/GEOLOGIC HAZARDS

The IID water service area is a flat, broad, alluviated area that lies partly below sea level and is located within the Salton Trough, one of the most tectonically active regions in the U.S. The San Jacinto-Coyote Creek and Elsinore-Laguna Salada fault zones form the western boundary of the Salton Trough. Branches of the San Andreas fault zone (see Figure 3.3-1) form the eastern boundary. The Salton Trough is characterized by northwest southeast-trending transform fault zones with several crustal rift areas between them. The Salton Trough is the northern extension of the Gulf of California rift zone. Consequently, the IID water service area is subject to potentially destructive earthquakes.

Within the Salton Trough, there are numerous major and several less extensive active fault zones that contain a number of individual fault traces. The active and potentially active major faults within the Salton Trough are presented in Figure 3.3-1 and Table 3.3-2. A potentially active fault shows evidence of displacement within the last 1.6 million years; an active fault is one that has experienced surface displacement within the last 11,000 years.

The major fault zones in the area - San Andreas, San Jacinto, and Elsinore (see Figure 3.3-1) - are characterized by right lateral movement. The Brawley fault, and its associated zone of seismicity, includes much of the southeastern portion of the Salton Sea in the northern Salton Trough. During the 1979 Imperial Valley earthquake, surface rupture occurred along several miles of the Brawley fault zone. The Elmore Ranch fault is a relatively short structure that experienced minor surface rupture associated with the 1987 Superstition Hills-Elmore Ranch earthquake sequence. The Elmore Ranch fault, with a mapped length of only about 5 miles, appears to be the western end of a zone of seismicity termed the Elmore Ranch seismic zone, which extends across nearly the entire southern end of the Salton Sea.



BADLAND-BEELINE-RILLITO
BADLAND-BITTERWATER-CAJON
GILMAN-INDIO-COACHELLA
GUNSIGHT-RILLITO-CHUCKWALLA
IMPERIAL-GLENBAR-GILMAN
MELOLAND-VINT-INDIO
ROCK OUTCROP-HYDER-LOMITAS
ROCK OUTCROP-LAPOSA-QUILOTOSA
ROCK OUTCROP-LITHIC TORRIOTHENTS-OMSTOTT
ROCK OUTCROP-TECOPA-LITHIC TORRIOTHENTS
ROSITAS-CARRIZO-ORITA
ROSITAS-CARSITAS-DUNE LAND
SHEEPHEAD-ROCK OUTCROP-BANCAS

COUNTY LINE
INTERSTATE HIGHWAY
REGIONAL HIGHWAY
RIVER
CITIES

N

3 0 3 Miles

SCALE IS APPROXIMATE

Sources:
University of Redlands 1999; DOI 1999; and Reclamation 1999

Figure 3.3-2A
Soil Associations
Imperial Valley
IID Water Conservation and Transfer Project Draft EIR/EIS

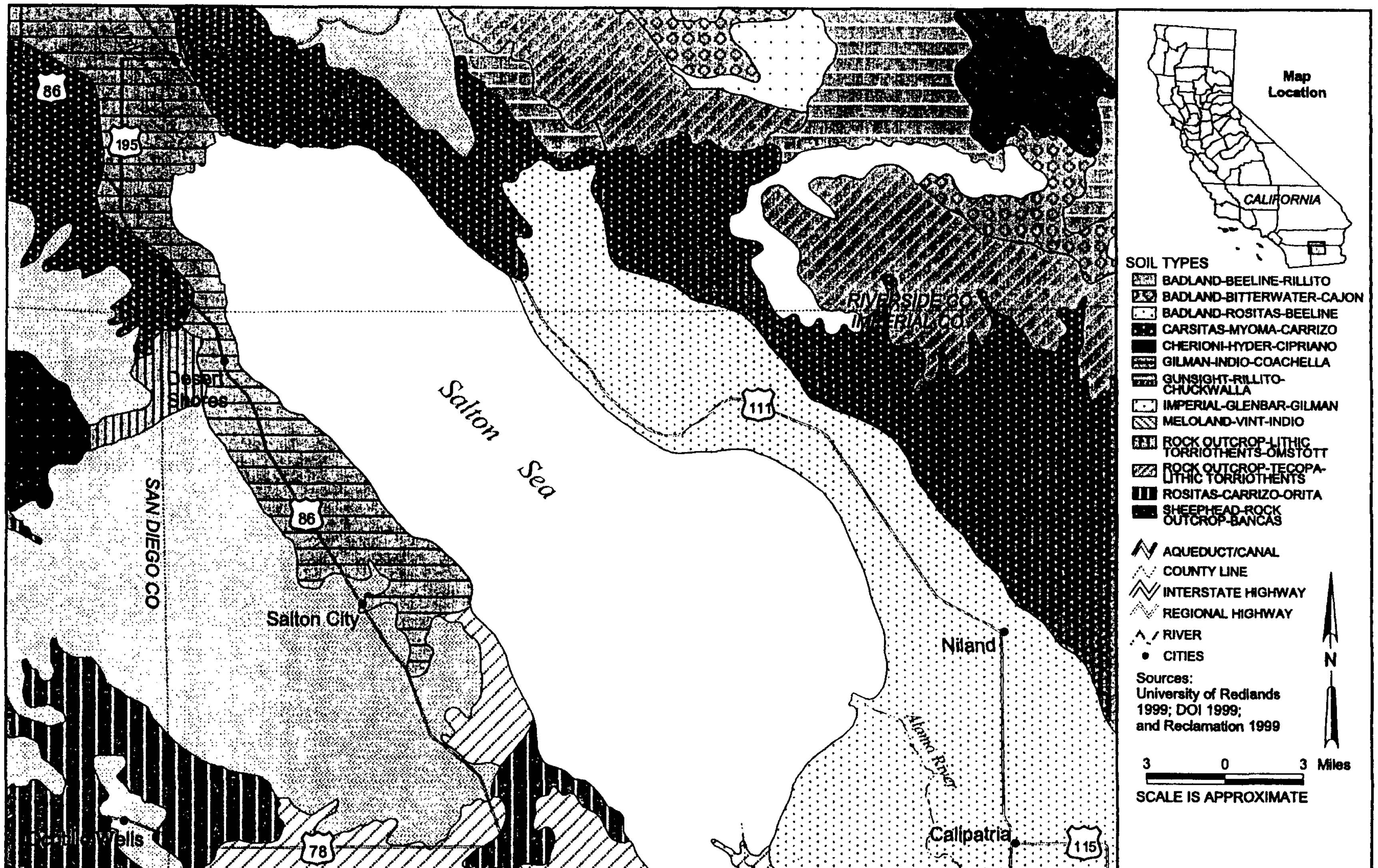


Figure 3.3-2B
Soil Associations
Salton Sea Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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TABLE 3.3-2
Salton Trough Fault Characteristics

Fault	Maximum Credible Earthquake	Estimated Peak Ground Acceleration	Estimated Repeatable High Ground Acceleration	Estimated Maximum Mercalli Scale Intensity
Active Faults				
San Andreas	7.5	0.275	0.180	VIII
Brawley	7.0	0.290	0.190	VIII
Imperial	7.2	0.275	0.180	VIII
Superstition Hills (Elmore Ranch)	7.0	0.60	0.40	IX
San Jacinto (Coyote Creek)	7.2	0.310	0.20	VIII
Elsinore	7.5	0.210	0.210	VIII
Potentially Active Faults				
Calipatria	7.5	0.290	0.190	VIII
Sand Hills	7.5	0.150	0.150	VII
Superstition Mountain	7.0	0.360	0.234	VIII-IX
Laguna Salada	7.25	0.175	0.175	VII-VIII

Source: SSA and Reclamation 2000

Ground Acceleration and Ground Shaking. More small to moderate earthquakes have occurred in the IID water service area than along any other section of the San Andreas fault system. The IID water service area has experienced 11 earthquakes of magnitude 6.0 or greater on the Richter Scale during the past century; the strongest was a magnitude 7.1 on the Imperial fault in 1940. The 7.1 Imperial Valley earthquake on May 18, 1940 caused MMI X ground shaking in the epicenter region.

Typically, some part of Imperial County is affected by a minor earthquake (less than magnitude 3.5) every few months. Every 5 years, the county might experience a moderately damaging event (magnitude of 5.5 or greater). At least once every 50 years, there is likely to be a major earthquake (magnitude of 6.8 or greater). Microseismicity (magnitude of less than 2.0) occurs almost continuously in the county, often with dozens and sometimes hundreds of events per day (County of Imperial 1997a).

Fault Rupture. Extensive fault rupture has occurred in the past in the IID water service area. The 1940 Imperial fault earthquake ruptured the ground for 40 miles, from Volcano Lake in Baja, California, to a point near the city of Imperial, California. Horizontal displacement across the completed, but unfilled, AAC was 14 feet 10 inches, and the International Boundary was permanently changed. Earthquakes have also caused abrupt elevation changes across fault lines in excess of 1 foot (County of Imperial 1997a). Zones with mapped surface rupture are shown in Figure 3.3-4.

Liquefaction. The IID water service area is especially susceptible to liquefaction where the soil is generally saturated. Liquefaction and related loss of foundation support are common hazards (County of Imperial 1997a).

Landslides. The potential for landslides in Imperial County is low to moderate along the western edge of the county, parallel to the Coast Range Mountains. Other areas in the county subject to landslides include the IID water service area between East Highline Canal

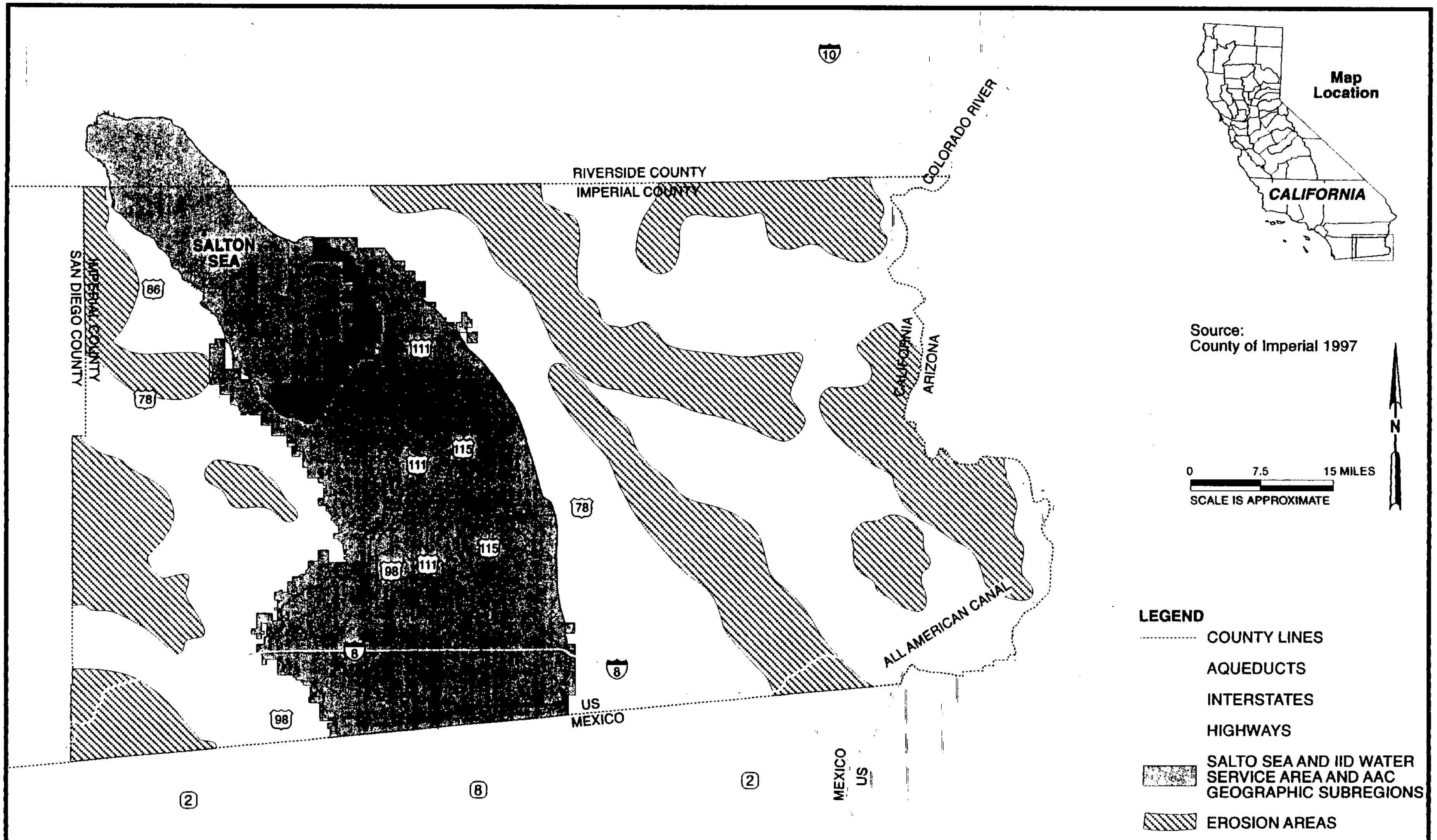

Figure 3.3-3
Erosion Activity within Imperial County
IID Water Conservation and Transfer Project Draft EIR/EIS

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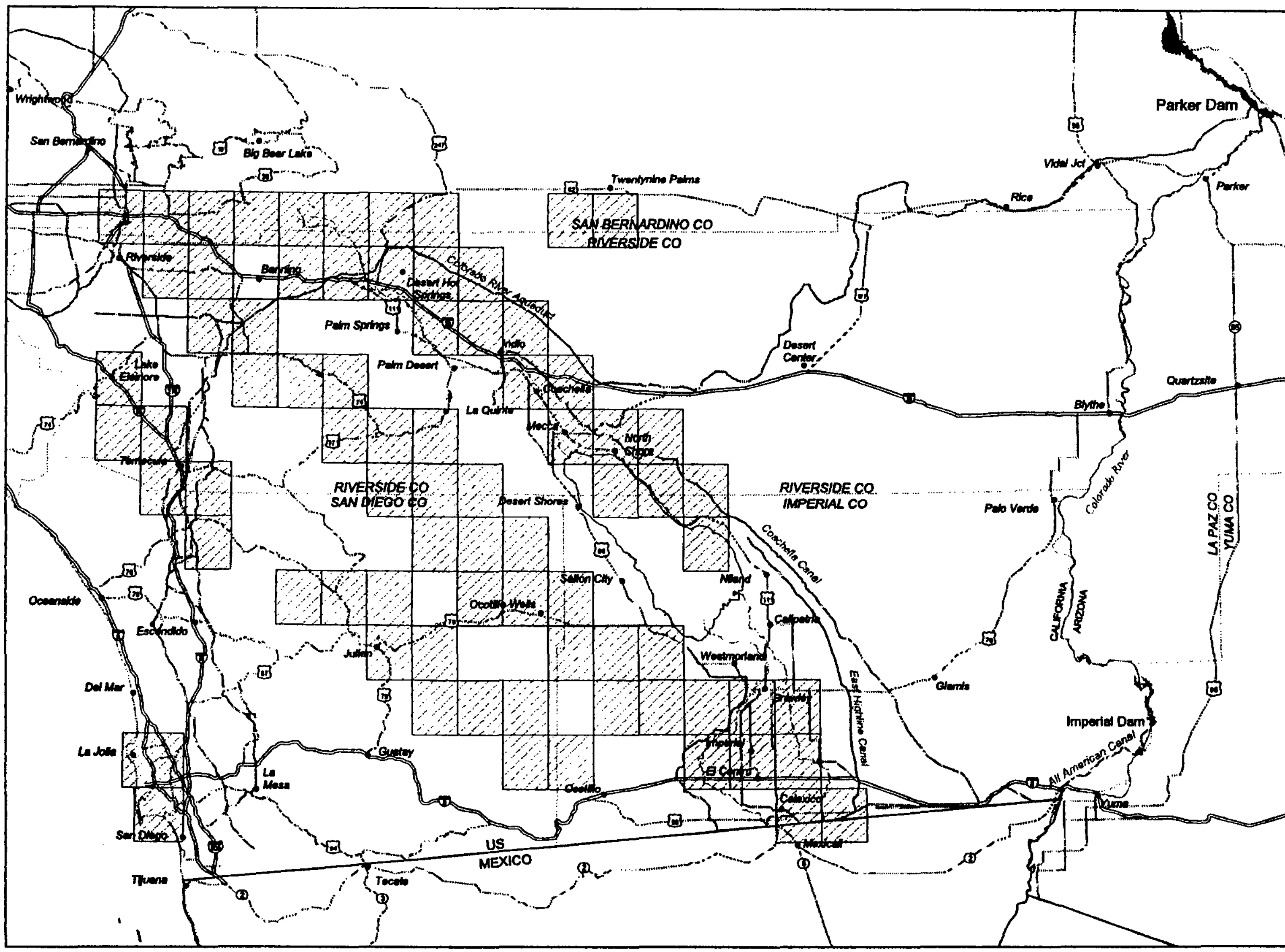

Figure 3.3-4
Fault Rupture Hazard Zones
IID Water Conservation and Transfer Project Draft EIR/EIS

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and Westside Main Canal and the bluffs adjacent to the AAC, Coachella Canal, New River, Alamo River, and LCR (see Figure 3.3-5) (County of Imperial 1997a).

Seiches. The most likely location for a significant seiche to occur is in the Salton Sea. No record of seiches in the Salton Sea exists although there have been a number of seismic events since the formation of the Sea (County of Imperial 1997a).

Flooding. Imperial County is subject to various degrees of flooding in the form of flash floods or slow floods caused by heavy precipitation. Flash flooding could also occur in desert areas. Flooding could occur either in floodplains or floodways. Floodplains are generally located adjacent to rivers and other bodies of water and in low-lying areas near a water source. The boundary of a floodplain is defined by the predicted extent of inundation.

Defined by discernible drainage channels, floodways are more hazardous because of the anticipated velocities of the floodwaters and expected damage to life and property. Figure 3.3-6 illustrates the areas in the county that are at risk for flooding.

OTHER GEOLOGIC RESOURCES

Other geologic resources in the IID water service area and AAC geographic subregion include: mineral resources—rock and stone, sand, gravel, clay, and gypsum; metals—gold, silver, nickel, and lead; radioactive elements; and geothermal areas. Geothermal resource areas and sources of sand and gravel are generally located along the southern border of the Salton Sea; other resources are found in the surrounding hills. Six known geothermal resource areas (KGRAs) cover approximately 254,827 acres in Imperial County: the Dunes KGRA, East Mesa KGRA, Glamis KGRA, Heber KGRA, Brawley KGRA, and Salton Sea KGRA. In both Imperial and Riverside Counties, sand and gravel are significant economic resources. Most of these materials are derived from shoreline deposits from ancient Lake Cahuilla. Additional sources of lower quality sand and gravel are found in alluvial fan deposits.

3.3.3.3 Salton Sea

GEOLOGY

The Salton Sea is in the northern portion of the Salton Trough. The geology of the Salton Trough is discussed in Section 3.3.3.2.

SOILS

Soil associations within the Salton Trough are discussed in Section 3.3.3.2.

SEISMICITY/GEOLOGIC HAZARDS

The Salton Sea regularly experiences earthquake swarms of detectable and perceptible large-scale seismic events. Situated in the Salton Trough, the Salton Sea is located in one of the most active seismic areas in the world. The seismicity and geologic hazards in Imperial and Riverside Counties, including the Salton Trough, are discussed in Sections 3.3.3.1 and 3.3.3.2.

Ground Acceleration and Ground Shaking. Ground acceleration and ground shaking in Imperial and Riverside Counties, including the Salton Trough, are discussed in Sections 3.3.3.1 and 3.3.3.2.

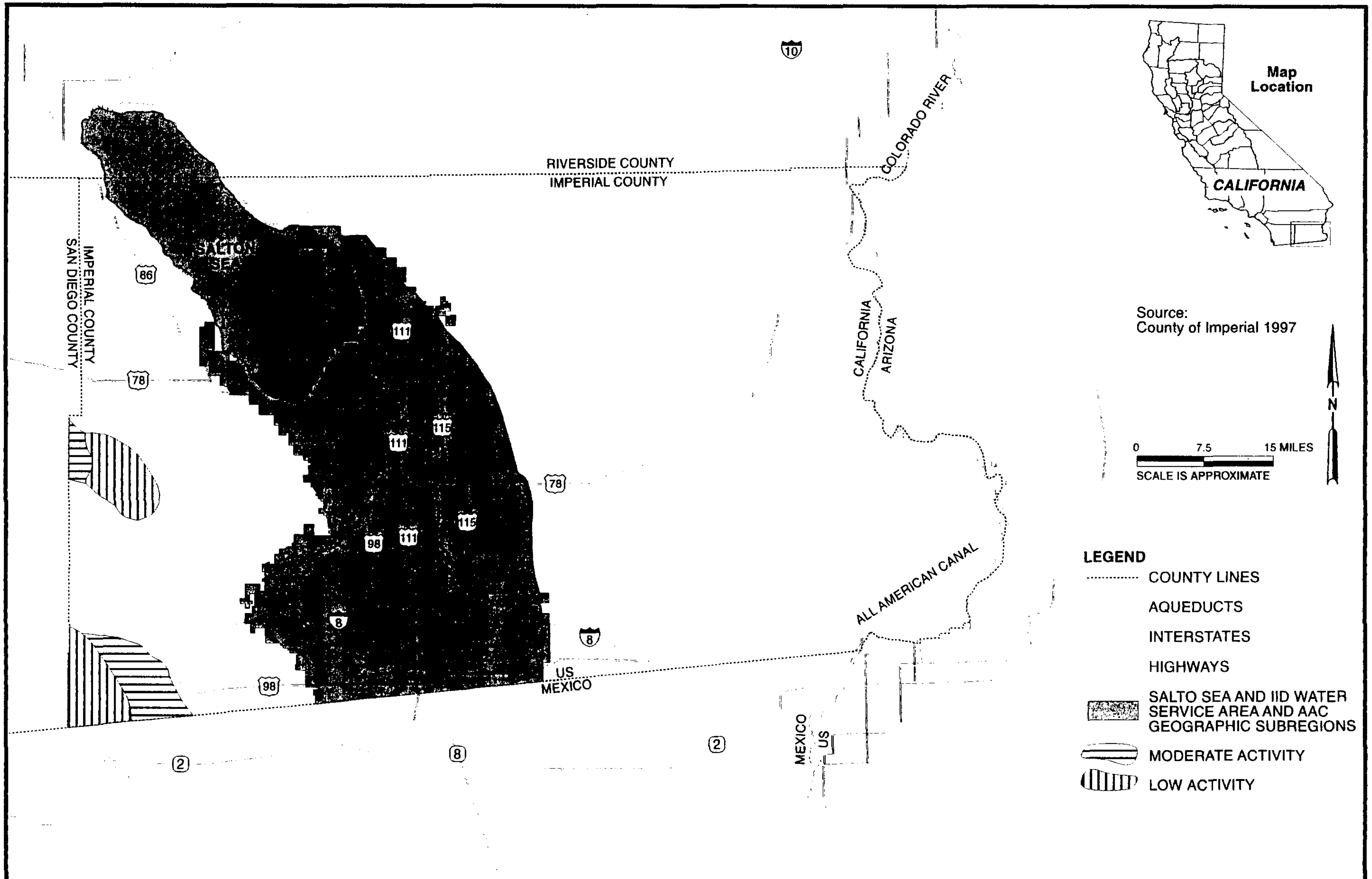

Figure 3.3-5
Landslide Activity within Imperial County
IID Water Conservation and Transfer Project Draft EIR/EIS

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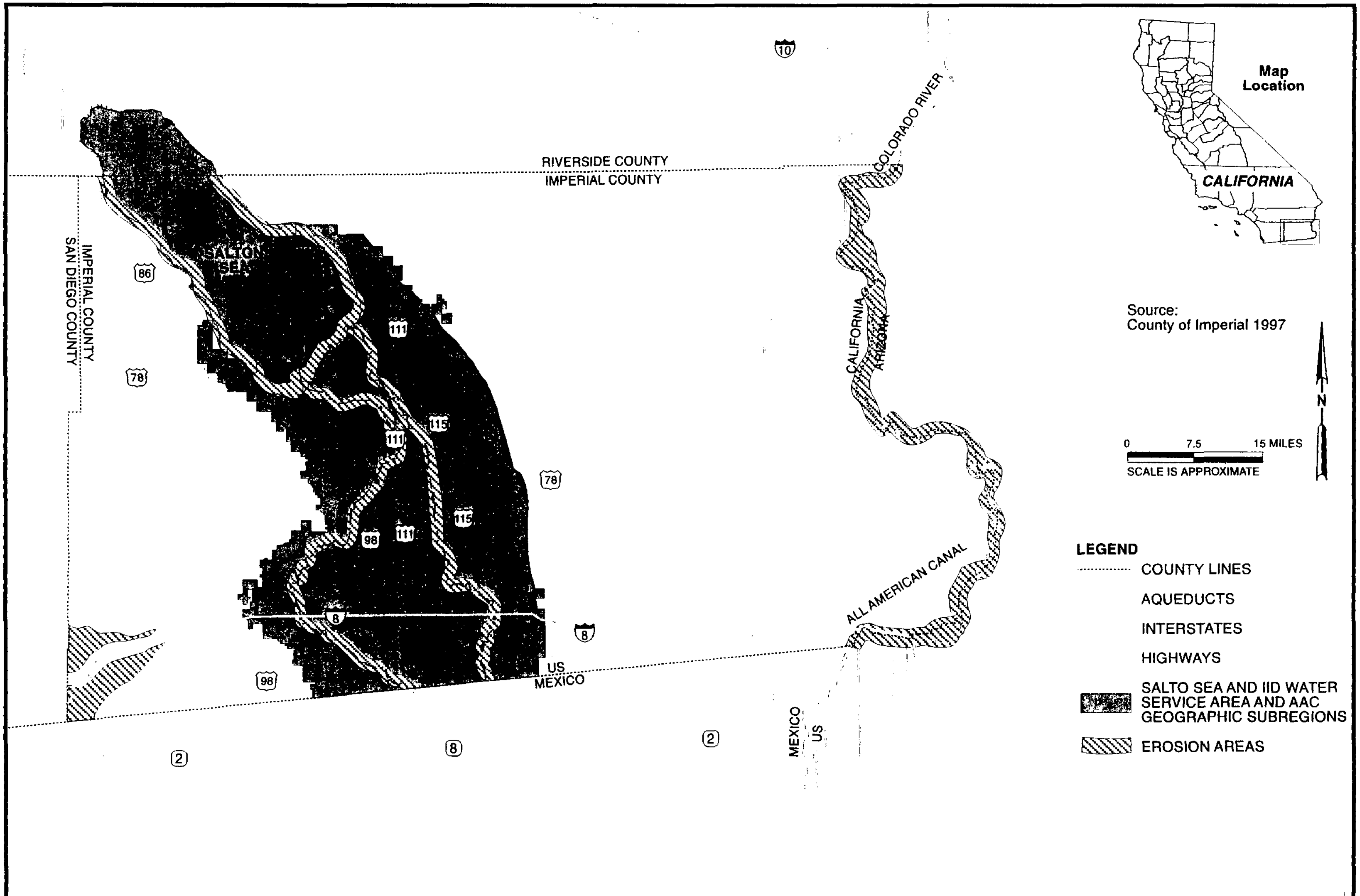

Figure 3.3-6
Areas of Imperial County at Risk for Flooding
IID Water Conservation and Transfer Project Draft EIR/EIS

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Fault Rupture. Throughout the Salton Trough, a number of fault-rupture hazard zones have been identified (see Figure 3.3-4). The potential for fault ruptures is discussed in Sections 3.3.3.1 and 3.3.3.2.

Liquefaction. The geologically young, unconsolidated sediments of the Salton Trough are subject to failure during earthquakes. Liquefaction and related loss of foundation support are common hazards (County of Imperial 1997a). These seismic hazards are discussed in Sections 3.3.3.1 and 3.3.3.2.

Landslides. The potential for landslides within the Salton Trough is discussed in Sections 3.3.3.1 and 3.3.3.2.

Seiches. The potential for seiches is discussed in Sections 3.3.3.1 and 3.3.3.2.

OTHER GEOLOGIC RESOURCES

Other geologic resources in Imperial and Riverside Counties are discussed in Sections 3.3.3.1 and 3.3.3.2.

3.3.4 Impacts and Mitigation Measures

3.3.4.1 Methodology

The impact assessment methodology used to support the geology and soils analysis presented in this chapter is based on the proximity of active faults, frequency and types of seismic events, existing ground acceleration data and models, and the type of existing soils. In addition, the Project and/or Project alternatives' susceptibility and/or contribution to geotechnical hazards are described in terms of their potential impact on the public or geological resources.

Severity of Seismic Events. Earthquakes are normally classified as to severity according to their magnitude. Magnitude is usually classified using the Richter scale, a logarithmic scale used to measure the maximum motions of the seismic waves as recorded by a seismograph. A magnitude 8 (Richter) earthquake is not twice as large as a magnitude 4 earthquake; it is 10,000 (i.e., 10^4) times larger.

The level of destruction of an earthquake at a particular location is commonly reported using a seismic intensity scale. Based on reports of ground shaking and damage caused by past earthquakes, seismic intensities are subjective classifications. The commonly used Modified Mercalli Intensity scale has 12 levels of intensity; the higher the number, the greater the ground-shaking intensity and/or damage. Earthquakes have only one magnitude, but they have variable intensities that generally decrease with increasing distance from the source. Additionally, other factors, such as building type, shallow groundwater, and local geology, affect the intensities of earthquakes at a location.

Subregions Excluded From Impact Analysis. No impacts to geology and soils would occur in the LCR subregion or SDCWA service area because construction of new facilities or changes in operation of existing facilities would not occur in those subregions; therefore, those areas are not discussed in the impact discussions for each alternative below.

3.3.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant impact on geology and soils if they:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving any of the following circumstances:
  - Fault rupture
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or loss of topsoil, degradation of soils or farmland, changes in topography, or unstable soil conditions.
- Are located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Are located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (International Conference of Building Officials 1994), creating substantial risks to life or property.
- Place septic tanks or alternative wastewater disposal systems on soils incapable of adequately supporting these systems where sewers are not available for the disposal of wastewater.
- Result in the loss of a known mineral resource of value to the region and the residents of the state.
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

3.3.4.3 Proposed Project

LOWER COLORADO RIVER

Biological Conservation Measures in USFWS Biological Opinion

Implementation of the biological conservation measures may result in temporary impacts to geology and soils through physical activities such as dredging, removal of salt cedar by mechanical or other means, and conversion of agricultural lands to native habitat. Reclamation will conduct subsequent environmental analysis, as appropriate, prior to implementation of the biological conservation measures.

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact GS-1: Soil erosion from construction of conservation measures. If methods requiring construction were implemented, construction of conservation measures could require removal of existing vegetation, excavation, regrading, and temporary soil stockpiling. The potential for soil erosion and deposition from stormwater and wind activity could increase as a result of these measures. The extent of soil erosion, however, would depend on the degree of slope, the total exposed area, and the amount of wind and rainfall. IID currently obtains a Stormwater Pollution and Prevention Plan (SWPPP) for Individual Permits issued by the CRB RWQCB, which includes best management practices (BMPs) for site-specific construction activities occurring within the IID water service area. All construction of conservation measures resulting in the disturbance of more than 5 acres would require compliance with a site-specific Individual Permit and SWPPP, which would require implementation of BMPs; therefore, the potential for erosion would be a less than significant impact. In addition, potential erosion impacts would be short-term. (Less than significant impact.)

Impact GS-2: Soil erosion from operation of conservation measures. Operation of the conservation measures could increase the potential for soil erosion. Wind and water erosion could occur within the new, unlined interceptor laterals/canals and the 5- to 10-acre reservoirs. The new interceptors/canals and reservoirs, however, represent minor additional components of an already extensive, existing canal/drain system within the Imperial Valley. The additional components would represent a minor extension of the existing system. (Less than significant impact.)

Impact GS-3: Reduction of soil erosion from reduction in irrigation. Soil erosion from irrigation water applied to the fields could be reduced upon implementation of the Proposed Project. The Proposed Project would reduce the amount of tailwater entering the drains, which could potentially diminish the amount of soil removed from each field. This decreased erosion could represent a beneficial impact to the geology and soils of the IID water service area. (Beneficial impact.)

Impact GS-4: Ground acceleration and shaking. The IID water service area could be subjected to seismic ground acceleration and ground shaking during the life of the Proposed Project. Large earthquakes along major faults, such as the San Andreas and Imperial faults, could produce potentially destructive ground shaking in the Salton Trough. Estimated maximum Mercalli intensities for faults within the Salton Trough range from VII to IX . At these intensities, damage could occur to specially designed structures and underground pipes. Ground acceleration as intense as 0.6 g near Westmorland has been projected for a magnitude 7.0 earthquake along one of the Superstition Hills faults (SSA and Reclamation 2000).

Additionally, extensive fault rupture along known faults within the Salton Trough (*e.g.*, horizontal displacement of 14 feet, 10 inches along the AAC in 1940) is known to occur.

Fault rupture hazard zones within the Salton Trough are shown in Figure 3.3-4. In the IID water service area subregion, the Proposed Project could include the construction of on-farm irrigation system improvements and water delivery system improvements. These measures could be subject to seismic activity. Because these measures would be placed in underdeveloped, largely unpopulated rural areas, the public safety impacts would be less than significant impact. (Less than significant impact.)

Inadvertent Overrun and Payback Policy (IOP)

Impact GS-5: Soil erosion from compliance with the IOP. Conservation of the average 59 KAFY required for the IOP can be accomplished via fallowing or other measures. The potential for erosion from additional conservation measures would be similar to, and in addition to the erosion described in Impacts GS-1, 2 and 6. The amount of erosion would depend on the conservation measures selected to generate the average 59 KAFY required for the IOP. If fallowing is selected, about 9,800 additional acres would be required. Fallowing is not anticipated to be a source of erosion. As described in Impact GS-1, construction of conservation resulting in the disturbance of more than 5 acres would require compliance with a site-specific Individual Permit and SWPPP, which would require implementation of BMPs; therefore, the potential for erosion would be a less than significant impact. (Less than significant impact.)

Impacts resulting from compliance with the IOP in would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-GS-6: Soil erosion from construction of HCP components. Construction of the ponds and managed marsh could cause minor short-term degradations in environmental values as a result of construction and operation of the HCP. Specifically, construction would result in temporary increases in soil erosion potential. Implementation of the HCP could cause temporary adverse impacts on soil resources and erosion potential as a result of construction. However, construction of the HCP would require a site-specific Individual Permit and a SWPPP to be issued by the CRB RWQCB. This permit and SWPPP would require implementation of BMPs during construction, thereby reducing this short-term, potentially significant impact to a less than significant level as part of the Project. (Less than significant impact.)

HCP (Salton Sea Portion) Approach 1 (HCP1): Hatchery and Habitat Replacement

Construction of the ponds and hatchery could cause minor short-term degradations in environmental values as a result of construction and operation of the HCP. Specifically, construction would result in temporary increases in soil erosion potential. Implementation of the HCP could cause temporary adverse impacts on soil resources and erosion potential as a result of construction. However, construction of the HCP would require a site specific Individual Permit and a SWPPP to be issued by the CRB RWQCB. This permit and SWPPP would require implementation of BMPs during construction that would reduce this short-term, potentially significant impact to a less than significant level.

Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-GS-7: Soil erosion from construction of HCP Approach 2 components. Impacts from construction of HCP Approach 2 components would be of similar nature to those described above for the Proposed Project. The extent of potential erosion would depend on the type of conservation measure selected to generate conserved water. Construction of additional conservation measures would result in a greater potential for erosion, whereas additional fallowing would minimize erosion. Impacts would be as described in Impacts GS-1 and GS-2. (Less than significant impact.)

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Impact GS-8: Potential for increased soil erosion along exposed playa of Salton Sea. During operation of the Proposed Project, there might be an increased potential for impact from soil erosion in the Salton Sea area. Implementation of the Proposed Project would result in a decrease in the elevation of the Salton Sea, exposing up to 50,000 acres (over the life of the project) of previously inundated area (compared to the Baseline condition). (For information on the Baseline condition of the Salton Sea, see the discussion on the Development of the Baseline in the Introduction to Chapter 3.0 Environmental Analysis.) The newly exposed shoreline could be subject to wind and water erosion. However, the high salt content of the Salton Sea and the soils underlying the Sea cause a crust to form on the soils as they dry, which minimizes both wind and soil erosion. Additional information regarding the content of the soils is included in Section 3.7, Air Quality. (Less than significant impact.)

3.3.4.4 Alternative 1: No Project

IID WATER SERVICE AREA

Water Conservation and Transfer

Implementation of the No Project alternative would result in the continuation of current agricultural and water conservation practices. No additional impacts would occur.

SALTON SEA

Water Conservation and Transfer

Implementation of the No Project alternative would also result in a decline of the elevation of the Salton Sea, resulting in a potential for impact from soil erosion in the Salton Sea area. Baseline conditions of the Salton Sea, which are the same as the No Project alternative, are described in the discussion on the Development of the Baseline in the Introduction to Chapter 3.0 Environmental Analysis. The No Project alternative would result in the exposure of 16,000 acres (over a 75-year period) of previously inundated area (compared to the existing condition). The newly exposed shoreline could be subject to wind and water erosion. However, the high salt content of the Salton Sea and the soils underlying the Sea cause a crust to form on the soils as they dry, which minimizes both wind and soil erosion. Additional information regarding the content of the soils is included in Section 3.7, Air Quality. (Less than significant impact.)

3.3.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

IID WATER SERVICE AREA

Impact A2-GS-1: Potential increase in soil erosion from construction of conservation measures. The potential for an increase in soil erosion would be similar to that for the Proposed Project, but would likely be of smaller magnitude because only 130 KAFY would be conserved in Alternative 2. However, in Alternative 2, on-farm irrigation system improvements are required to be constructed, whereas in the Proposed Project, other conservation measures, including fallowing, could be implemented instead. Nonetheless, the potential for erosion would be expected to be reduced when compared to the Proposed Project. See Impact GS-1 for more details. (Less than significant impact.)

Soil erosion from operation of conservation measures. Increased erosion is not anticipated from the operation of the conservation measures for Alternative 2.

Impact A2-GS-2: Reduction of soil erosion from reduction in irrigation: Similar to the effects of Proposed Project, soil erosion from irrigation water applied to the fields could be reduced with implementation of Alternative 2. This alternative would also reduce the amount of tailwater entering the drains, which could diminish the amount of soil removed from each field. This decreased erosion could represent a beneficial impact to the geology and soils of the IID water service area; however, the beneficial impact would be greater with the Proposed Project because the reduction in irrigation would be greater. (Beneficial impact.)

Impact A2-GS-3: Ground acceleration and shaking: The potential impacts from ground acceleration and shaking would be similar to those for the Proposed Project but potentially of smaller magnitude because Alternative 2 does not include construction of water delivery system based improvements. However, the Proposed Project could also exclude construction of water delivery system improvements if other conservation measures are selected for implementation. See Impact GS-4 for more details on the potential impacts associated with ground acceleration and shaking. Because these measures would be placed in underdeveloped, largely unpopulated rural areas, the public safety impacts would be less than significant. (Less than significant impact.)

SALTON SEA

<u>Water Conservation and Transfer</u>

Impact A2-GS-4: Soil erosion along exposed playa of Salton Sea. The potential for soil erosion along the exposed playa of the Salton Sea would be similar to that of the Proposed Project but would be of smaller magnitude. Implementation of Alternative 2 would result in a decrease in the elevation of the Salton Sea, exposing 22,000 acres (over the life of the Project) of previously inundated area (compared to the Baseline condition). Baseline conditions of the Salton Sea are described in the discussion on the development of the Baseline in the introduction to Chapter 3.0, Environmental Analysis. See Impact GS-6 for more details. (Less than significant impact.)

3.3.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

IID WATER SERVICE AREA AND AAC

Impact A3-GS-1: Soil erosion from construction of conservation measures. The potential impacts would be similar to those of the Proposed Project, but would likely be of lesser magnitude because only 230 KAFY would be conserved in Alternative 3. See Impact GS-1 for details. (Less than significant impact.)

Impact A3-GS-2: Soil erosion from operation of conservation measures. The potential impacts from soil erosion from the operation of the conservation measures would be similar to those of the Proposed Project but likely would be of lesser magnitude because only 230 KAFY would be conserved in Alternative 3. If water delivery system based improvements are implemented, wind and water erosion could occur within the new, unlined interceptor laterals/canals and the 5- to 10-acre reservoirs. However, the new interceptors/canals and reservoirs represent minor additional components of an already extensive, existing canal/drain system within the IID water service area. The additional components could represent a minor extension of the existing system. (Less than significant impact.)

Impact A3-GS-3: Reduction of soil erosion from reduction in irrigation: Similar to the results of Proposed Project, soil erosion from irrigation water applied to the fields could be reduced with implementation of Alternative 2. This alternative would also reduce the amount of tailwater entering the drains, which could diminish the amount of soil removed from each field. This decreased erosion could represent a beneficial impact on the geology and soils of the IID water service area. (Beneficial impact.)

Impact A3-GS-4: Ground acceleration and shaking: The potential impacts from ground acceleration and shaking would be similar to those of the Proposed Project. There is a potential that the magnitude of impact would be less with Alternative 3 because only 230 KAFY would be conserved, requiring fewer conservation measures. However, because both the Proposed Project and Alternative 3 could be implemented with any combination of conservation measures, the risk of damage from ground acceleration and shaking would be greatest for whichever alternative, when implemented, included the most constructed facilities. More importantly, because these measures would be placed in underdeveloped, largely unpopulated rural areas, the public safety impacts would be less than significant. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A3-GS-5: Soil erosion along exposed playa of Salton Sea. The potential for soil erosion along the exposed playa of the Salton Sea would be similar to that of the Proposed Project but would be of lesser magnitude. Implementation of Alternative 3 would result in a decrease in the elevation of the Salton Sea, exposing 39,000 acres (over the life of the project) of previously inundated area (compared to the Baseline condition). Baseline conditions of the Salton Sea are described in the discussion on the development of the Baseline in the introduction to Chapter 3.0, Environmental Analysis. See Impact GS-6 for more details. (Less than significant impact.)

3.3.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

No construction of conservation measures would occur in the IID water service area with the implementation of Alternative 4.

<u>Water Conservation and Transfer</u>

Impact A4-GS-1: Potential soil erosion from fallowing. Implementation of Alternative 4 would result in the fallowing of up to 50,000 acres of previously irrigated area within the IID water service area, to conserve 300 KAFY. There would be no application of water to the fallowed areas. The potential for wind erosion of these areas is discussed in Section 3.7, Air Quality. No water erosion of soils would occur. (Less than significant impact.)

SALTON SEA

<u>Water Conservation and Transfer</u>

Impact A4-GS-2: Potential for increased soil erosion along exposed playa of Salton Sea. The potential for soil erosion along the exposed playa of the Salton Sea would be significantly reduced in Alternative 4 compared to that of the Proposed Project. Implementation of Alternative 4 would result in a decrease in the elevation of the Salton Sea, exposing 16,000 acres (over the life of the project) of previously inundated area (compared to the Baseline condition). Baseline conditions of the Salton Sea are described in the discussion on the development of the Baseline in the introduction to Chapter 3.0, "Environmental Analysis." See Impact GS-6 for more details. (Less than significant impact.)

3.4 Land Use

3.4.1 Introduction and Summary

TABLE 3.4-1
Summary of Land Use Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.
IID WATER SERVICE AREA AND AAC				
HCP-LU-1: Conversion of agricultural land for HCP (IID Water Service Area Portion). Less than significant impact.	Continuation of existing conditions.	**Same as HCP-LU-1.**	**Same as HCP-LU-1.**	**Same as HCP-LU-1.**
SALTON SEA				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.
SDCWA SERVICE AREA				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.4.2 Regulatory Framework

3.4.2.1 Federal Regulations and Standards

The California Desert Conservation Area (CDCA) Plan of 1980 (CDCA plan) and as amended in 1999 addresses land use for the 25-million-acre CDCA, which includes more than 12 million acres of public lands. The CDCA plan establishes goals for the protection and use of the public lands within the CDCA through designation of distinct multiple-use classes. The CDCA plan also addresses areas of critical environmental concern (ACECs) and special areas. The Federal Land Policy and Management Act (FLPMA), in Section 103(a), defines an ACEC as an area "...within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."

Other areas that possess rare, unique, or unusual qualities of scientific, educational, cultural, or recreational significance are designated as special areas. Through the designation of the multiple-use classes and management programs described above, the goal of the CDCA plan is to "provide for the use of the public lands, and resources of the CDCA, including economic, educational, scientific, and recreational uses, in a manner which enhances wherever possible—and does not diminish, on balance—the environmental, cultural, and aesthetic values of the Desert and its productivity."

The Salton Sea and IID water service area and AAC geographic subregions are within the CDCA. These areas are designated as "private, state, or other Federally managed lands" and are considered unclassified land within the context of the CDCA plan. In addition, no ACECs or special areas are designated within these geographic subregions.

3.4.2.2 State Regulations and Standards

All cities and counties in California are required by the state legislature to adopt general plans (California Government Code §65300 *et seq.*). General plans are required to be comprehensive, long-term guides for the physical development of a county or city and any land outside a city or county boundary that is relevant to its planning decisions.

3.4.2.3 Local Regulations and Standards

REGIONAL PLANS

Southern California Association of Governments. The Southern California Association of Governments (SCAG) conducts regional planning for land use and other activities within the IID water service area in association with local cities and counties of southern California. In 1996, SCAG adopted a Regional Comprehensive Plan and Guide (RCPG) to help keep communities informed of other communities' land use decisions and broader regional trends.

The RCPG also compiles several planning documents from participating agencies and sets goals for initiatives related to the well-being of communities. Use of the information in local planning decisions is voluntary. A goal related to water supply notes that the use of reclamation, conservation, and water transfers for ensured supply is necessary to ensure a high standard of living and quality of life for communities in Southern California (SCAG 1996).

In addition to providing information that local communities can voluntarily use for land use decisionmaking, SCAG is the authorized regional agency for intergovernmental review of programs proposed for federal financial assistance and direct development activities. Additionally, SCAG reviews EIRs of projects of regional significance for consistency with regional plans.

San Diego Association of Governments. The San Diego Association of Governments (SANDAG) serves as a forum for regional decisionmaking for 18 cities and counties in the San Diego Area. SANDAG's mission is to build consensus, make strategic plans, obtain and allocate resources, and provide information on a broad range of topics pertinent to the region's quality of life. SANDAG facilitates regional planning efforts in the areas of transportation, energy, land use planning, growth, the environment, and economic development.

LOCAL PLANS

Lower Colorado River. Land use and development decisions within county and city jurisdictions along the LCR are guided by their respective general plans. Indian reservation lands are sovereign nations and are not subject to local land use controls (CVWD et al. 2002).

Imperial County General Plan. The Land Use Element of the Imperial County General Plan is the primary policy statement for implementing development policies in the unincorporated portions of the county (County of Imperial 1997a). The goals and policies in the Land Use Element promote the economic prominence of agricultural enterprises, determine appropriate urban development centers and encourage their economic development, protect the existing character of rural and recreational communities and areas, and preserve the unique natural and cultural resources of the Imperial Valley (County of Imperial 1997a).

Land Use Classifications. The Imperial County General Plan includes nine land use classifications that group similar types of land uses (see Figure 3.4-1):

- Classification I: Agriculture
- Classification II: Community Area
- Classification III: Government/Special Public
- Classification IV: Industry Area
- Classification V: Recreation/Open Space
- Classification VI: Rural Residential
- Classification VII: Special Purpose Facility
- Classification VIII: Specific Plan
- Classification VIII: Urban Area

The plan also specifies permitted uses and standards for each classification.

Salton Sea. The Imperial County General Plan sets forth land use and planning guidance for the portion of the Salton Sea located in Imperial County (i.e., the southern two-thirds of the Sea). This plan is described above, under the LCR local plans. As shown in Figure 3.4-1, the area surrounding the southern two-thirds of the Salton Sea contains the following land use classifications: Agricultural, Urban Area, Community Area, and Rural Residential (County of Imperial 1997a).

Riverside County Comprehensive General Plan and Eastern Coachella Valley Plan. Both the Riverside County Comprehensive General Plan (Riverside County 1984) and the Eastern Coachella Valley Plan (ECVP) (Riverside County 1985) apply to the northern third of the Salton Sea and its surrounding area (i.e., the portion of the Salton Sea located within the jurisdiction of Riverside County). The Riverside County Comprehensive General Plan is the primary policy statement of goals and policies for guiding land use and development in the county through 2010.

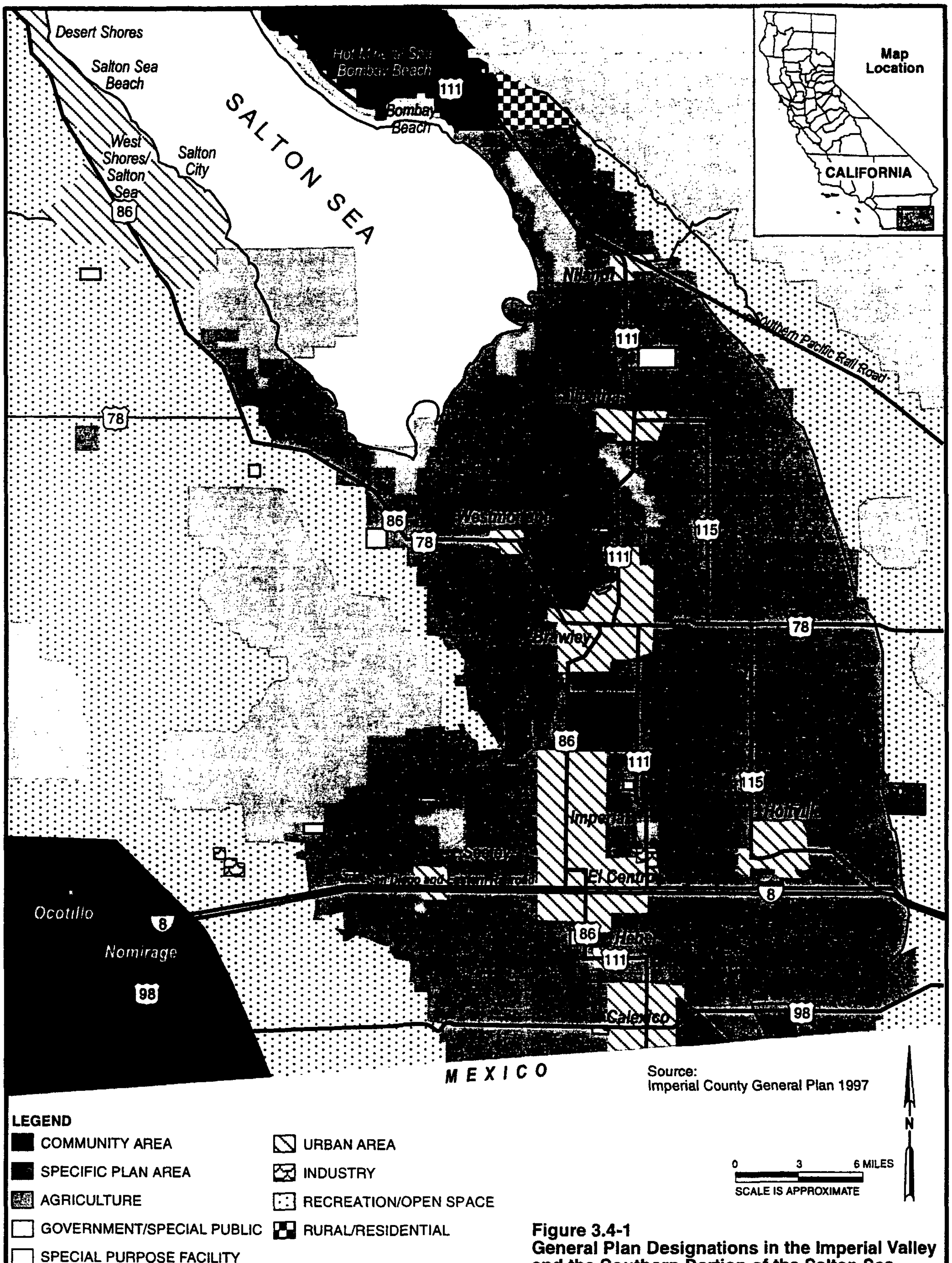

Figure 3.4-1
General Plan Designations in the Imperial Valley and the Southern Portion of the Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

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The Riverside County Comprehensive General Plan Land Use Element describes and implements the Land Use Determination System, which contains policies, procedures, and standards that describe the general distribution and general location and extent of land uses in the county (Riverside County 1984). The Land Use Determination System contains the following land use categories:

- Category I: Heavy Urban
- Category II: Urban
- Category III: Rural
- Category IV: Outlying Area
- Category V: Planned Community

The northern third of the Salton Sea and its surrounding area are located in the Lower Coachella Valley Planning Area. The predominant land use within this area is agriculture, including both dry farming and citriculture. A large portion of the Lower Coachella Valley Land Use Planning Area is vacant, nonirrigated desert (Riverside County 1984).

As shown in Figure 3.4-2, the northern third of the Salton Sea and surrounding area contains the following "Open Space and Conservation" classifications: Water Resources, Agriculture, and Parks/Forests. The area also contains the following land use classifications: Urban Residential and Commercial. The permitted uses and applicable policies for each classification are specified in the Riverside County Comprehensive General Plan and the ECVP.

3.4.3 Existing Setting

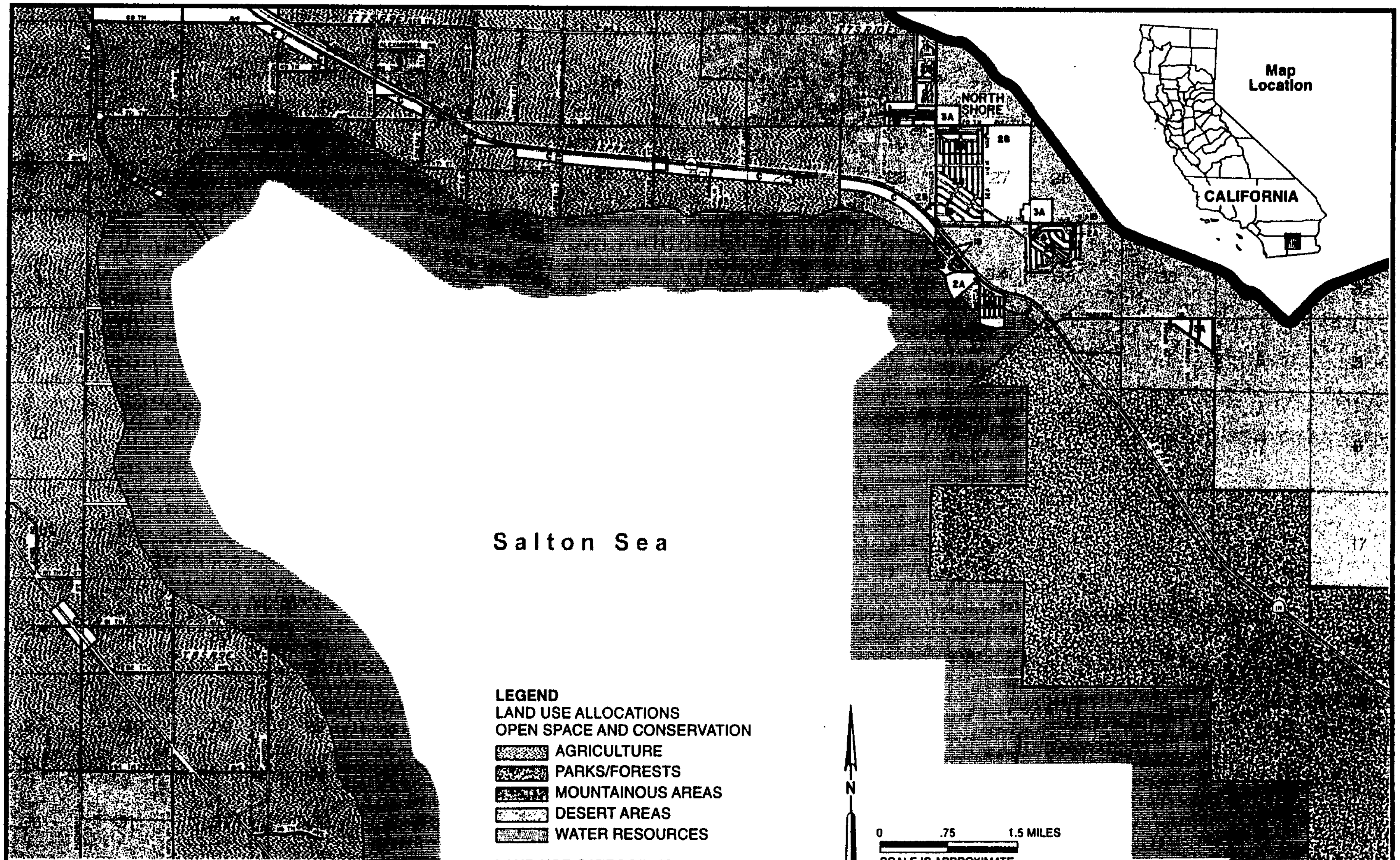
3.4.3.1 Lower Colorado River

The LCR geographic subregion is located within San Bernardino, Riverside, and Imperial Counties in California. The majority of the subregion is undeveloped, with scattered suburban and rural development (CVWD et al. 2002). Population along the LCR exists in small clusters within the town sites of Palo Verde and Winterhaven. Flood control facilities located along the LCR include Laguna Dam, Imperial Dam, Senator Wash Dam, and Parker Dam (see Section 3.12 for further discussion of public facilities along the LCR). The LCR also supports water-related recreational resources and wildlife habitat for many native and migratory fish species. Recreation and wildlife habitat along the LCR are further discussed in Sections 3.6 and 3.2, respectively.

Land uses within the LCR geographic subregion are controlled by a number of jurisdictions, among them several Indian reservations (including the Fort Mohave Indian Reservation, Chemehuevi Indian Reservation, Colorado River Indian Reservation, and Yuma Project Reservation Division); BLM; the Counties of San Bernardino, Riverside, and Imperial in California; and several municipalities in California, including the cities of Needles and Blythe (CVWD et al. 2002).

3.4.3.2 IID Water Service Area and AAC

The IID water service area is and historically has been a predominantly agricultural area. Table 3.4-2 shows the existing land uses in the IID water service area in 2000.



LEGEND
LAND USE ALLOCATIONS
OPEN SPACE AND CONSERVATION
AGRICULTURE
PARKS/FORESTS
MOUNTAINOUS AREAS
DESERT AREAS
WATER RESOURCES

LAND USE CATEGORIES

1B	8-14 DWELLING UNITS PER ACRE
2A	5-8 DWELLING UNITS PER ACRE
2B	2-5 DWELLING UNITS PER ACRE
3A	1-2 DWELLING UNITS PER ACRE
C	COMMERCIAL

Source:
Eastern Coachella Valley Plan 1985

Figure 3.4-2
General Plan Designations in the Northern Portion of the Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

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TABLE 3.4-2
Existing Land Uses within IID Boundaries, 2000

Land Use	Acreage in 2000
Net Irrigated Area (includes cropland and reclaimed land)	462,137 acres
Area Farmable but not Farmed During the Year (fallowed land)	16,863 acres
Total Area Farmable	**479,000 acres**
Area of Farms in Homes, Feedlots, Corrals, Cotton Gins, Experimental Farms, and Industrial Areas	16,346 acres
Area in Cities, Towns, Airports, Cemeteries, Fairgrounds, Golf Courses, Recreational Parks, Lakes, and Rural Schools	26,013 acres
Total Area Receiving Water	**521,359 acres**
Area in Drains, Canals, Reservoirs, Rivers, Railroads, and Roads	73,650 acres
Area below -230 Salton Sea Reserve Boundary and Area Covered by Salton Sea, Less Area Receiving Water	40,150 acres
Area in Imperial Unit not Entitled to Water	63,933 acres
Undeveloped area of Imperial, West Mesa, East Mesa and Pilot Knob Units	277,629 acres
Total Acreage Included – All Units	**976,721 acres**
Acreage Not Included – All Units*	**84,916 acres**
Total Gross Acreage Within IID Boundaries	**1,061,637 acres**

Source: IID 2000b
*Acreage within IID boundaries that is not included in IID

The majority of the land in the IID water service area is irrigated and farmable area. The developed area includes incorporated cities, unincorporated communities, and supporting facilities. The seven incorporated cities within the IID water service area are Calexico, Brawley, Calipatria, El Centro, Holtville, Imperial, and Westmorland. These areas contain approximately 75 percent of Imperial County's population and are characterized by a full range of urban services - in particular, public water and sewer systems - as well as relatively broad range of residential, commercial, and industrial uses (County of Imperial 1997a). Agriculture-related communities in the IID water service area include the towns of Heber, Niland, and Seeley.

Most of the IID water service area is zoned for general agriculture. The unincorporated urban areas are zoned for residential, commercial, manufacturing, government, and open space/preservation land uses. Most of the area in the northernmost portion of the IID water service area, along the southern shore of the Salton Sea, is zoned "Open Space/ Preservation" (Zone S-1). According to Imperial County's Title 9 Land Use Ordinance (County of Imperial 1998), "the purpose of the S-1 Zone is to designate areas that recognize the unique Open Space and Recreational character of Imperial County, including the deserts, mountain, and water front areas. Primarily the S-1 Zone is characterized by low-intensity human utilization and small-scale recreation related uses."

As shown in Figure 3.4-3, land ownership by parcel in the IID water service area is in a checkerboard pattern. Landowners generally include Native American tribes, local municipalities, DPR, USFWS, BLM, NPS, CDFG, and the US military.

3.4.3.3 Salton Sea

The Salton Sea is located in both Riverside and Imperial Counties. One of the major functions of the Salton Sea is to serve as a sump for agricultural wastewater for the Imperial and Coachella Valleys. Executive Order of Withdrawal (Public Water Reserve No. 114, California No. 26), signed in 1928, designated lands within the Salton Basin below elevation 220 feet below msl as storage for wastes and seepage from irrigated lands in the Imperial Valley. The Sea is also a recreational resource for the region and state of California and a biological resource for fish and wildlife.

Urban land uses surrounding the Salton Sea consist primarily of unincorporated communities adjacent to the Sea or in the Coachella and Imperial Valleys (Salton Sea Authority [SSA] and Reclamation 2000). Mecca and North Shore are unincorporated communities located on the north side of the Salton Sea in Riverside County. Mecca and North Shore consist of scattered single-family homes, recreational vehicle (RV) parks, beaches, a marina, and scattered commercial uses (SSA and Reclamation 2000).

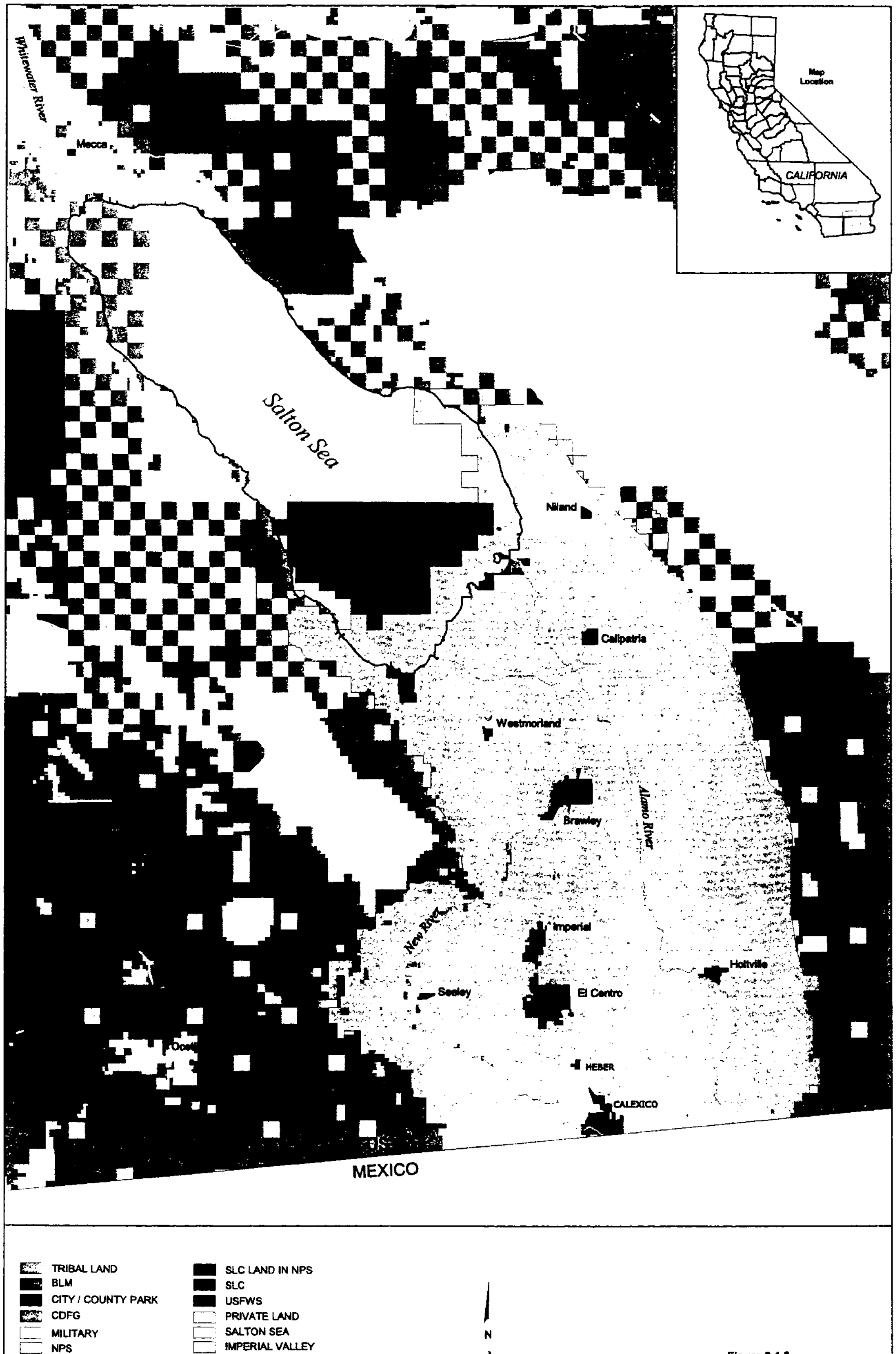
The West Shores/Salton City area in Imperial County extends along the western shore from the northern Imperial County line to the Salton Sea Test Base. Within this area are several unincorporated communities, such as Salton City, Vista Del Mar, Salton Sea Beach, and Desert Shores. These communities consist mostly of single-family homes, RV and trailer parks, marinas, and community services. Although a significant amount of the land area is subdivided, most of the residential lots are undeveloped (SSA and Reclamation 2000).

Hot Mineral Spa/Bombay Beach is an unincorporated community that extends along the east shore of the Sea, from the northern Imperial County line to Bombay Beach. Most urban land uses in this area are single-family homes and RV parks. Recreational facilities include a marina, campground, and mineral spas (SSA and Reclamation 2000). Commercial uses in the Salton Sea geographic subregion mostly provide services for tourists and area residents. Industrial uses mostly consist of geothermal power production.

As shown in Figure 3.4-3, the area within and surrounding the Salton Sea is owned by diverse private and public entities. Most of this land is privately held and is urban commercial, agricultural, or desert land. Federal, state, and local agencies administer the balance of the geographic subregion. In addition, formation of the Sea resulted in the inundation of approximately 190,000 acres of public and private lands. Inundated lands have a checkerboard pattern of ownership (SSA and Reclamation 2000).

The United States Bureau of Land Management (BLM) is the principal federal landholder, administering approximately 68,000 dry-land acres. Military land withdrawals comprise approximately 7,945 dry-land acres and 13,642 in-Sea acres. The USFWS administers approximately 53,000 acres in and around the Salton Sea. The majority of inundated lands are federal lands administered by BLM or withdrawn by Reclamation. Additional inundated lands are public lands held as public water reserves (SSA and Reclamation 2000).

Privately owned lands comprise the majority of the area around the Sea (approximately 220,000 acres). These lands are owned by numerous individual entities, including IID and the Torres Martinez band of the Cahuilla Desert Indian Tribe. The Torres Martinez Tribe holds approximately 13,000 acres of land north and west of the Sea. These holdings are



- TRIBAL LAND
- BLM
- CITY / COUNTY PARK
- CDFG
- MILITARY
- NPS
- CA DEPT P&R
- SLC LAND IN NPS
- SLC
- USFWS
- PRIVATE LAND
- SALTON SEA
- IMPERIAL VALLEY
- URBAN AREA
- RIVER

Sources:
University of Redlands, 1999;
DOI 1999; and Reclamation, 1999

Figure 3.4-3
Land Ownership by Parcel in the Imperial Valley and Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

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interspersed with private holdings and BLM land and are held in trust by the US Bureau of Indian Affairs (BIA). The Sea also submerges approximately 10,000 acres of tribal lands. IID and other private entities also own substantial areas of inundated land (SSA and Reclamation 2000).

3.4.4 Impacts and Mitigation Measures

3.4.4.1 Methodology

All alternatives were compared against existing land use to assess consistency with general land use patterns. Additionally, the Proposed Project and alternatives were compared with the existing land use plans, policies, and controls outlined above in Section 3.4.3 to identify any potential inconsistencies. Because the construction aspects of the Proposed Project and alternatives are consistent with existing on-farm operations in the Imperial Valley, use of land during construction has not been analyzed.

Subregions Excluded From Impact Analysis. It is assumed that within the SDCWA service area, no land use impacts would occur because no new facilities would be constructed and the transfer would not conflict with any land use plans or affect zoning.

3.4.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant impact on land use if they:

- Physically divide an established community.
- Conflict with any applicable land use plan or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable HCP or natural community conservation plan.

3.4.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

No land use impacts would occur in the LCR subregion as a result of the water conservation and transfer.

Biological Conservation Measures in USFWS' Biological Opinion

Implementation of the biological conservation measures, although they would increase habitat for the listed species, may also result in temporary impacts on vegetation, fish, and wildlife species through physical activities such as dredging, removal of salt cedar by mechanical or other means, and conversion of agricultural lands to native habitat. These impacts are addressed at a general level in the Draft IA EIS because specific areas where these conservation measures would occur have not been identified. Site-specific studies and subsequent environmental documentation would be conducted as needed and mitigation measures identified prior to the actual implementation of the conservation measures (Reclamation 2001c).

Impacts resulting from implementation of the biological conservation measures would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Use of Agricultural Land for Conservation via On-farm Irrigation and Water Delivery System Measures. The Proposed Project would be consistent with adopted land use plans and policies. The Project would maintain agricultural land use in the region, a goal of both the Land Use and Agricultural Elements of the Imperial County General Plan (Goal 1 of both elements). One objective of the Proposed Project for IID is to protect its historic Colorado River water rights, which provide the essential resource required for agricultural production. Changes in land use within these areas, such as temporary construction of conservation facilities within the IID water service area, would not conflict with the management and protection goals of the CDCA plan. Construction of some water conservation measures, such as reservoir and lateral interceptors, might require conversion of some farmland to accommodate the facilities, but the amount of agricultural land required would be minimal. Agricultural zoning would be maintained.

Use of Agricultural Land for Conservation via Fallowing. Under the Proposed Project, fallowing could be implemented as a conservation measure. If fallowing were the sole conservation measure implemented, up to 50,000 acres could be fallowed to conserve water for transfer. If fallowing were implemented in combination with other conservation measures, the acreage fallowed would be less, in proportion to the amount of water conserved by this method.

Fallowed acreage is not expected to be permanently taken out of production and could be rotated back into production; however, permanent fallowing of agricultural land could be used to conserve water for transfer. Regardless of the specific fallowing method, no land use impacts would occur because the Proposed Project would not change agricultural zoning and, therefore, it would not conflict with an adopted, local land use plan. Fallowing land would also not divide an established community because fallowed land is consistent with surrounding agricultural land uses. Agricultural impacts associated with fallowing are also discussed in Section 3.5, Agricultural Resources.

Inadvertent Overrun and Payback Policy (IOP)

Conversion of Agricultural Land for IOP Payback. Conservation of 59 KAFY for the IOP can be accomplished via fallowing or other conservation measures. This conservation would be in addition to the (up to) 300 KAFY proposed for transfer under the Project. If fallowing were the sole conservation measure implemented, about 9,800 acres would be required in addition to the maximum of 50,000 acres required for conservation for transfer. As described above, fallowed acreage is not expected to be permanently taken out of production and could be rotated back into production; however, permanent fallowing of agricultural land could be used to conserve water for transfer. Regardless of the specific fallowing method, no land use impacts would occur because the Proposed Project would not change agricultural zoning and, therefore, it would not conflict with an adopted, local land use plan. Fallowing land would also not divide an established community because fallowed land is consistent with surrounding agricultural land uses.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-LU-1: Conversion of Agricultural Land for HCP (IID Water Service Area Portion). The Proposed HCP includes provisions for creating new drainage canals, managed marsh habitat, and native forest habitat. These activities could potentially involve up to approximately 700 acres for the term of the Project. If these HCP components were located on federal property, no change in land use or zoning would need to occur. However, if the components were located on existing farmland, the zoning may need to change to Recreational/Open Space. This change would represent a less than significant land use impact because a managed marsh is by and large consistent with agricultural land uses. (Less than significant impact.)

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Implementation of this HCP approach could require up to 5,000 acres of agricultural lands to create the ponds to support fish and provide a forage base for piscivorous birds. An additional up to about 50 acres would be required for the hatchery. The lands would be taken out of agricultural production for the majority of the permit term; however, if a Salton Sea restoration project were implemented at any time during the term of the permit, IID would contribute the remaining funding committed to Approach 1 to the Salton Sea restoration project. At the end of the permit period or when a Salton Sea restoration project is implemented, the agricultural lands used for the HCP approach would be returned to agricultural use. This approach might require subsequent environmental documentation to evaluate impacts once details for water supply, etc. have been identified.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Conversion of Agricultural Land for HCP Approach 2. Up to an additional 25,000 acres could be taken out of active production to implement this HCP approach if fallowing is used as the sole conservation measure. In addition to fallowing, other conservation measures could be implemented to conserve water for mitigation. However, 25,000 acres is the maximum amount of fallowing that would be required for HCP Approach 2. If all fallowing were implemented for the Proposed Project and the IOP and HCP Approach 2, a total of 84,800 acres would be fallowed.

Fallowed acreage is not expected to be permanently taken out of production and could be rotated back into production; however, permanent fallowing of agricultural land could be used to conserve water for transfer. Regardless of the specific fallowing method, no land use impacts would occur because the Proposed Project would not change agricultural zoning and, therefore, it would not conflict with an adopted, local land use plan. Fallowing land would also not divide an established community because fallowed land is consistent with surrounding agricultural land uses..

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Conversion of Land Use from Decline in Salton Sea Elevation. Existing land use around the Sea is designated as open space, agricultural, or rural residential. Some of the lands surrounding the Sea are specifically designated for recreational purposes (such as fishing and birdwatching). Over the term of the Proposed Project, these activities may decline (as compared to the Baseline) as water quality in the Sea changes and the shoreline recedes. Table 3.4-3 shows the anticipated decline in elevation and surface area for the Baseline, Proposed Project, and alternatives. These fluctuations in elevation would expose areas of the Seabed in the north and south shores (Figure 3.6-4 in Section 3.6, Recreation, illustrates the extent of receding shoreline resulting from full-term implementation of the Proposed Project). No conflicts with adopted land use plans would occur as a result of the decline in the Sea's elevation because the Proposed Project does not include the rezoning of the exposed Seabed. Also, the exposed Seabed would remain a recreational amenity.

TABLE 3.4-3
Projected Surface Area and Elevation of the Salton Sea for the Baseline and Alternatives

	Proposed Project		Baseline and Alternative 1 No Project		Alternative 2 130 KAFY On-farm Irrigation System Improvements Only		Alternative 3 230 KAFY All Conservation Measures		Alternative 4 300 KAFY Fallowing Only	
Project Year	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)
2002	-228	233/364	-228	233/364	-228	233/364	-228	233/364	-228	233/364
2077	-250	167/261	-235	217/339	-242	195/305	-247	178/278	-241	201/314

Source: Reclamation 2001b

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Implementation of this approach will mitigate impacts to the Salton Sea. However, the components of the approach (i.e., ponds and hatchery) will likely be located within the IID water service area subregion. Therefore, no land use impacts in the Salton Sea subregion would occur.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Implementation of this approach will fully mitigate environmental impacts to the Salton Sea. However, the components of the approach will be implemented within the IID water service area subregion. Therefore, no land use impacts in the Salton Sea subregion would occur.

Implementation of HCP approaches 1 and 2 would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

3.4.4.4 Alternative 1: No Project Alternative

LOWER COLORADO RIVER

The No Project alternative would maintain current land uses in the LCR subregion over the projected period of analysis, thereby avoiding conflicts with adopted, local land use plans. No water conservation and transfer, biological conservation measures, or IOP would be implemented.

IID WATER SERVICE AREA AND AAC

The No Project alternative would maintain current land use practices in the IID water service area subregion, thereby avoiding conflicts with adopted, local land use plans.

SALTON SEA

In the Salton Sea subregion, the Sea's water elevation would decline as shown in Table 3.4-3 above. The decline may affect recreational land uses currently occurring in the subregion.

3.4.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up to 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Water conservation and transfer for Alternative 2 would not result in any impacts to land use. On-farm irrigation system improvements would be implemented to conserve up to 130 KAFY. No conflicts with adopted, local land use plans would occur and the conservation facilities would not divide any established communities.

SALTON SEA

Water Conservation and Transfer

Conversion of Land Use from Decline in Salton Sea Elevation. Table 3.4-3 shows the decline of the Sea's elevation under this alternative as compared to the Baseline. These fluctuations in elevation would expose areas of the Seabed in the north and south shores (Figure 3.6-4 in Section 3.6, Recreation, illustrates the extent of receding shoreline resulting from full-term implementation of the Proposed Project). No conflicts with adopted land use plans would occur as a result of the decline in the Sea's elevation because the Proposed Project does not include the rezoning of the exposed Seabed. Also, the exposed Seabed would remain a recreational amenity.

3.4.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Conversion of Agricultural Land for Conservation: As with the Proposed Project, fallowing could constitute none or all of the conservation implemented. If the maximum amount of fallowing were implemented, there would be no impact to land use as there would be no conflict with adopted plans and policies.

SALTON SEA

Water Conservation and Transfer

Conversion of Land Use from Decline in Salton Sea Elevation. Table 3.4-3 shows the decline of the Sea's elevation under this alternative as compared to the Baseline. These fluctuations in elevation would expose areas of the Seabed in the north and south shores (Figure 3.6-4 in Section 3.6, Recreation, illustrates the extent of receding shoreline resulting from full-term implementation of the Proposed Project). No conflicts with adopted land use plans would occur as a result of the decline in the Sea's elevation because the Proposed Project does not include the rezoning of the exposed Seabed. Also, the exposed Seabed would remain a recreational amenity.

3.4.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA

Water Conservation and Transfer

Conversion of Agricultural Land for Conservation. Alternative 4 would remove up to 50,000 acres of land from active agricultural production. As described under the Proposed Project, fallowed acreage is not expected to be permanently taken out of production and could be rotated back into production; however, permanent fallowing of agricultural land could be used to conserve water for transfer. Regardless of the specific fallowing method, no land use impacts would occur because the Proposed Project would not change agricultural zoning and, therefore, it would not conflict with an adopted, local land use plan. Fallowing land would also not divide an established community because fallowed land is consistent with surrounding agricultural land uses. Agricultural impacts associated with fallowing are also discussed in Section 3.5, Agricultural Resources.

SALTON SEA

Water Conservation and Transfer

Conversion of Land Use from Decline in Salton Sea Elevation. Table 3.4-3 shows the decline of the Sea's elevation under this alternative as compared to the Baseline. These fluctuations in elevation would expose areas of the Seabed in the north and south shores (Figure 3.6-4 in Section 3.6, Recreation, illustrates the extent of receding shoreline resulting from full-term implementation of the Proposed Project). No conflicts with adopted land use plans would occur as a result of the decline in the Sea's elevation because the Proposed Project does not include the rezoning of the exposed Seabed. Also, the exposed Seabed would remain a recreational amenity.

3.5 Agriculture Resources

3.5.1 Introduction and Summary

This section describes the environmental setting and impacts related to agricultural land uses for the following geographic subregions: LCR and IID water service area and AAC. The regulatory framework for agricultural land uses is provided. Because the majority of known physical activities associated with the Proposed Project and alternatives would occur within the IID water service area, the IID water service area and AAC geographic subregion is discussed in greater detail than the LCR geographic subregion. Table 3.5-1 summarizes the impacts of the Proposed Project and alternatives on the agricultural resources of the LCR, IID water service area and AAC, Salton Sea, and SDCWA service area geographic subregions.

TABLE 3.5-1
Summary of Agricultural Resources Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.
IID WATER SERVICE AREA AND AAC				
AR-1: Reclassification of up to 50,000 acres of prime farmland or farmland of statewide importance: Significant, unavoidable impact.	Continuation of existing conditions.	No impacts.	**A3-AR-1: Reclassification of up to 38,300 acres of prime farmland or farmland of statewide importance:** Significant, unavoidable impact.	**A4-AR-1: Reclassification of up to 50,000 acres of prime farmland or farmland of statewide importance:** Significant, unavoidable impact.
Impact HCP-AR-2 Conversion of agricultural lands from implementation of the HCP: Significant, unavoidable impact.	Continuation of existing conditions.	**Same as HCP-AR-2.**	**Same as HCP-AR-2.**	**Same as HCP-AR-2.**
SALTON SEA				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.
SDCWA SERVICE AREA				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impacts.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.5.2 Regulatory Framework

This section describes the regulations, plans, and standards applicable to agriculture resources within the four geographic subregions

3.5.2.1 Federal Regulations and Standards

The Farmland Protection Policy Act of 1981 (FPPA) requires federal agencies to minimize the extent to which federal programs contribute to unnecessary and irreversible conversion of farmland to nonagricultural uses. Farmland subject to FPPA requirements does not have to be currently used for cropland. Areas under protection include forestland, pastureland, cropland, or other land, but not bodies of water or urban, developed land.

FPPA requirements apply to projects that could irreversibly convert (directly or indirectly) farmland (as defined above) to nonagricultural use, and are completed by a federal agency or completed with the assistance (e.g., financial assistance) of a federal agency. Projects that are not subject to the FPPA include projects on land already developed for urban uses, land used for water storage, and land used for the construction of on-farm structures needed for farm operations (Natural Resources Conservation Service [NRCS] 2000).

3.5.2.2 State Regulations and Standards

State regulations and standards that apply to the IID water service area and AAC geographic subregion include the following:

California Land Conservation Act of 1965 (Williamson Act). The California Land Conservation Act of 1965 (Williamson Act) enables private landowners to enter into contracts with local governments to restrict specific parcels of land for agricultural use. The Williamson Act was adopted to provide agricultural landowners on the urban fringe, who were under pressure to convert their lands to urban use, with a financially viable alternative to conversion. Under the Williamson Act, agricultural landowners can receive property tax assessments that are much lower than other landowners because the assessments are based on generated agricultural income rather than on market (i.e., development) potential. In return, the landowners enter into contracts committing to maintain their lands for agricultural use. Approximately one-half of the state's agricultural lands (approximately 16 million acres) are subject to Williamson Act contracts.

The minimum term for a Williamson Act contract is 10 years, with automatic renewal at the end of each term. At that time, contracts can be terminated by the landowner or local government, which initiates the process of "nonrenewal." If a property is designated for contract nonrenewal, property tax rates gradually increase during the remainder of the contract term until they reach market (i.e., non-restricted) levels. Williamson Act contracts can also be cancelled without completing the non-renewal process. Contract cancellation, however, involves a comprehensive review and approval process and the payment of fees by the landowner equal to 12 percent of the full market value of the property.

Farmland Mapping and Monitoring Program. The purpose of the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP) is to provide jurisdictional agencies with information on farmland resources. Imperial County's FMMP information is incorporated into the Imperial County General Plan (see Section 3.4), and is available for land use decisions and to determine acceptable uses for farmlands.

3.5.3 Environmental Setting

3.5.3.1 Lower Colorado River

A number of irrigation and water districts that provide water to agricultural fields border the LCR geographic subregion. The irrigated agricultural areas are in Riverside and Imperial Counties in California, and in La Paz and Yuma Counties in Arizona. Figure 3.5-1 shows the location of these agricultural areas.

Palo Verde Irrigation District (PVID) and Cibola Irrigation District (CID) are in the vicinity of Blythe, California. United States Department of Interior Bureau of Reclamation (Reclamation)'s Yuma and Gila Projects deliver water from the Colorado River to eight districts, divisions, or units in California and Arizona.

- The Yuma Project delivers water to the following Arizona and California entities:
  - Bard Water District
  - Indian Unit
  - Valley Division
  - Yuma Auxiliary, Unit "B" Irrigation and Drainage District
- The Gila Project delivers water to the following Arizona irrigation districts:
  - Yuma-Mesa Irrigation and Drainage District
  - Yuma Irrigation District
  - North Gila Valley Irrigation District
  - Wellton Mohawk Irrigation and Drainage District

Although some of these irrigation districts are not within the identified geographic boundaries for the Proposed Project, they all divert water from the Colorado River at, or upstream of, Imperial Dam. As such, impacts to the LCR resulting from the Proposed Project have the potential to occur in these areas of irrigated agriculture.

Table 3.5-2 shows the total irrigated acres, gross revenues, and predominant crops grown by each of the major irrigation districts that divert water from the LCR within the LCR geographic subregion. Alfalfa hay, wheat, cotton, and lettuce are generally the predominant crops.

3.5.3.2 IID Water Service Area and AAC

The IID water service area is located entirely in Imperial County and contains over 90 percent of the irrigated cropland within the county. Imperial County is an important California agricultural region ranking in the top five, in terms of value of production among California counties for 24 agricultural commodities. Imperial County ranks Number 1 among California counties in value of production for alfalfa hay, onions, wheat, sugar beets, carrots, sweet corn, watermelon, and sudan grass hay (California Agricultural Statistical Service 1999).

The IID water service area is characterized by a mild climate that allows year-round agricultural production of a wide variety of commodities. The soils found in the geographic subregion are the result of centuries of deposits by the Colorado River and, as a result, are naturally saline. Agricultural production is made possible only through the delivery of irrigation water from the Colorado River, and the availability of the Salton Sea as a repository for agricultural drainage.

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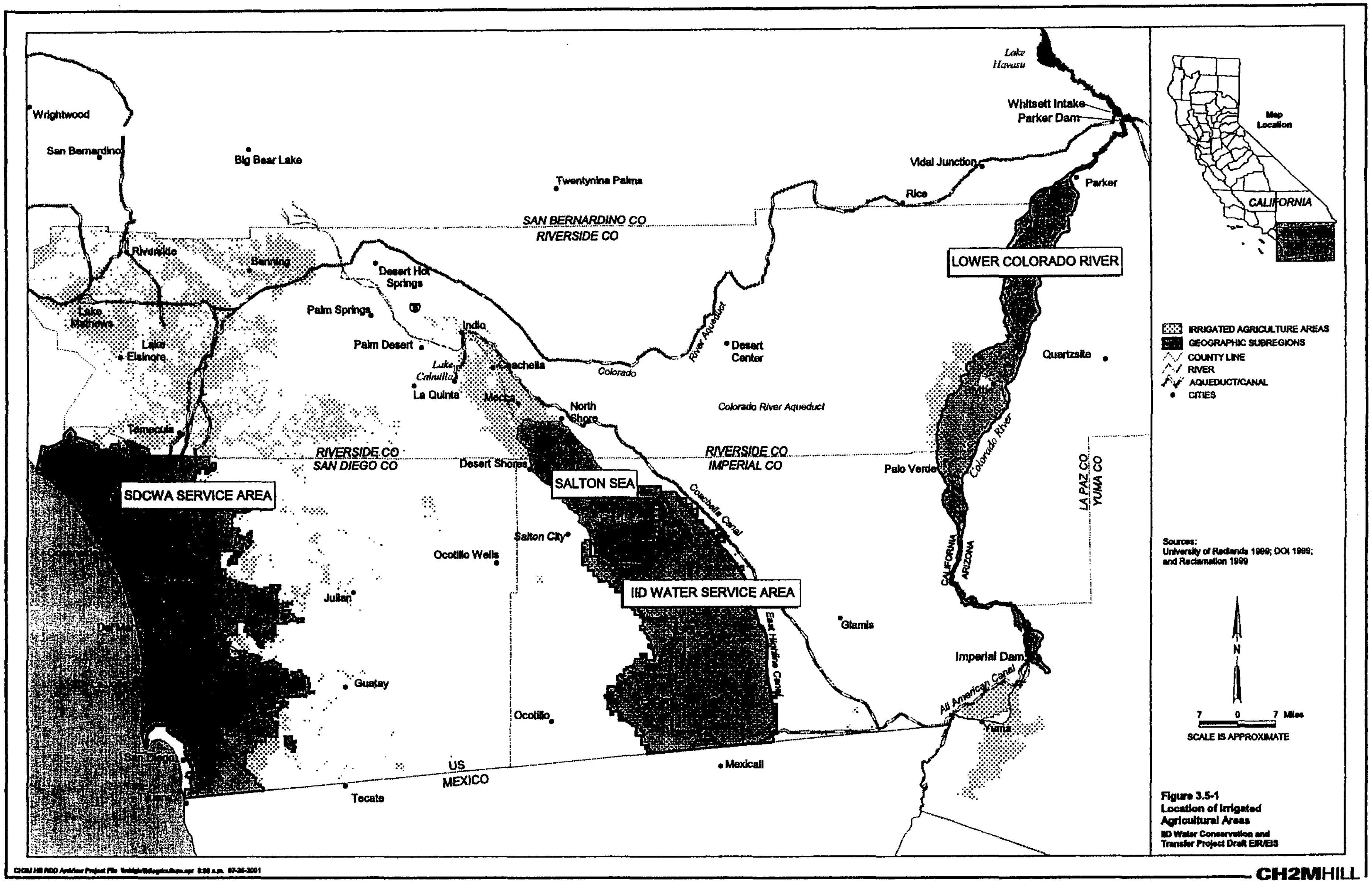

Figure 3.5-1
Location of Irrigated Agricultural Areas
IID Water Conservation and Transfer Project Draft EIR/EIS

TABLE 3.5-2
Agriculture Resources in the LCR Geographic Subregion, 1998

Irrigation/Water District	Irrigated Acres	Gross Value of Production (Thousands of Dollars)	Predominant Crops
Palo Verde Irrigation District	109,688	92,012[1]	Alfalfa hay, cotton, wheat, melons, sudan grass
Cibola Irrigation District	5,059	2,542	Alfalfa hay, cotton
Yuma Project:			
Bard Water District	6,880	52,257	Wheat, lettuce, citrus, dates
Indian Unit	7,956	15,460	Wheat, lettuce
Valley Division	53,450	229,612	Wheat, sudan grass, cotton, citrus
Yuma Auxiliary "Unit B" Irrigation and Drainage District	3,400	3,412	Alfalfa hay, citrus
Gila Project:			
Yuma-Mesa Irrigation and Drainage District	20,230	25,207	Alfalfa seed, citrus
Yuma Irrigation District	10,600	75,060	Wheat, lettuce
North Gila Valley Irrigation District	6,587	42,311	Wheat, cotton, lettuce, broccoli
Wellton Mohawk Irrigation and Drainage District	62,744	300,269	Wheat, alfalfa hay, cotton, lettuce

Source: Reclamation 1998
[1] Riverside County Agricultural Commissioner 1998

FARMLAND CLASSIFICATIONS

Under the FMMP, an analysis of agricultural land use and changes in land use throughout California is conducted every other year. Figure 3.5-2 shows a map of IID water service area farmlands, designated by farmland classifications as described below. A more detailed explanation of the classifications can be found in "A Guide to the Farmland Mapping and Monitoring Program" (CDOC 2000).

Prime Farmland. Prime farmland represents the best combination of physical attributes leading to the production of agricultural commodities. Such land is characterized by the combination of favorable soil, geographic and climatic characteristics, and a reliable water supply to sustain long-term, high-yield agricultural production. For classification as prime farmland, the area must have been used in irrigated production at some time during the past 4 years.

Farmland of Statewide Importance. Farmland of statewide importance has characteristics similar to prime farmland; however, it is not of the highest quality. For instance, soils could have a slightly lower capacity for holding water or greater slope.

Unique Farmland. Unique farmland does not meet the qualifications for classification as prime or statewide importance; however, it is used in the production of high-value crops.

Farmland of Local Importance. A local advisory committee in Imperial County, which is generally composed of local agricultural and business interests, environmental groups, city and county planners, NRCS representatives, and university cooperative extension staff, provides recommendations to the Imperial County Board of Supervisors regarding farmlands to be designated as locally important. The Imperial County Board of Supervisors has the authority to adopt, or make changes to, farmlands of local importance within the county. Farmland of local importance does not meet the qualifications for designation as unique according to FMMP standards; however, these lands have been identified by the local advisory committee as economically important because of their productivity or value.

AGRICULTURAL PRODUCTION

From 1987 to 1999, the net farmable area within the IID water service area remained fairly constant. at approximately 484,000 acres. Of this total area, each year, on average, 22,000 farmable acres are left out of production (i.e., fallowed) and 2,000 acres leached of salts, leaving an annual net area in agricultural production of approximately 460,000 acres. Over the past 10 years, there has been a slight increase in harvested acres. The increase appears to be the result of an increase in the number of acres that are multi-cropped. This results in a total annual harvested acreage of 160 acres from a single 80-acre field. As a result of multi-cropping, the average harvested acreage in the IID water service area is consistently greater than the net acreage in production.

During 1987 to 1999, harvested acres averaged approximately 536,000 acres, while the total area in production averaged 460,000 acres. Figure 3.5-3 shows how total harvested acres, net acres farmed, and fallowed acres varied from 1987 to 1999.

Within Imperial County, the mix of crops remained relatively constant from 1987 to 1999, particularly when crops were reported as aggregate groups. IID groups the crops grown in the IID water service area into one of three crop groups: garden crops, field crops, or permanent crops.

Permanent crops are those crops, such as tree fruits, that are planted once and then grown and harvested over multiple years. Garden and field crops are generally planted during each growing season. The wide variety of fruits and vegetables grown in the IID water service area are generally categorized as garden crops. Field crops include an assortment of other crops, such as alfalfa hay, cotton, and sugar beets.

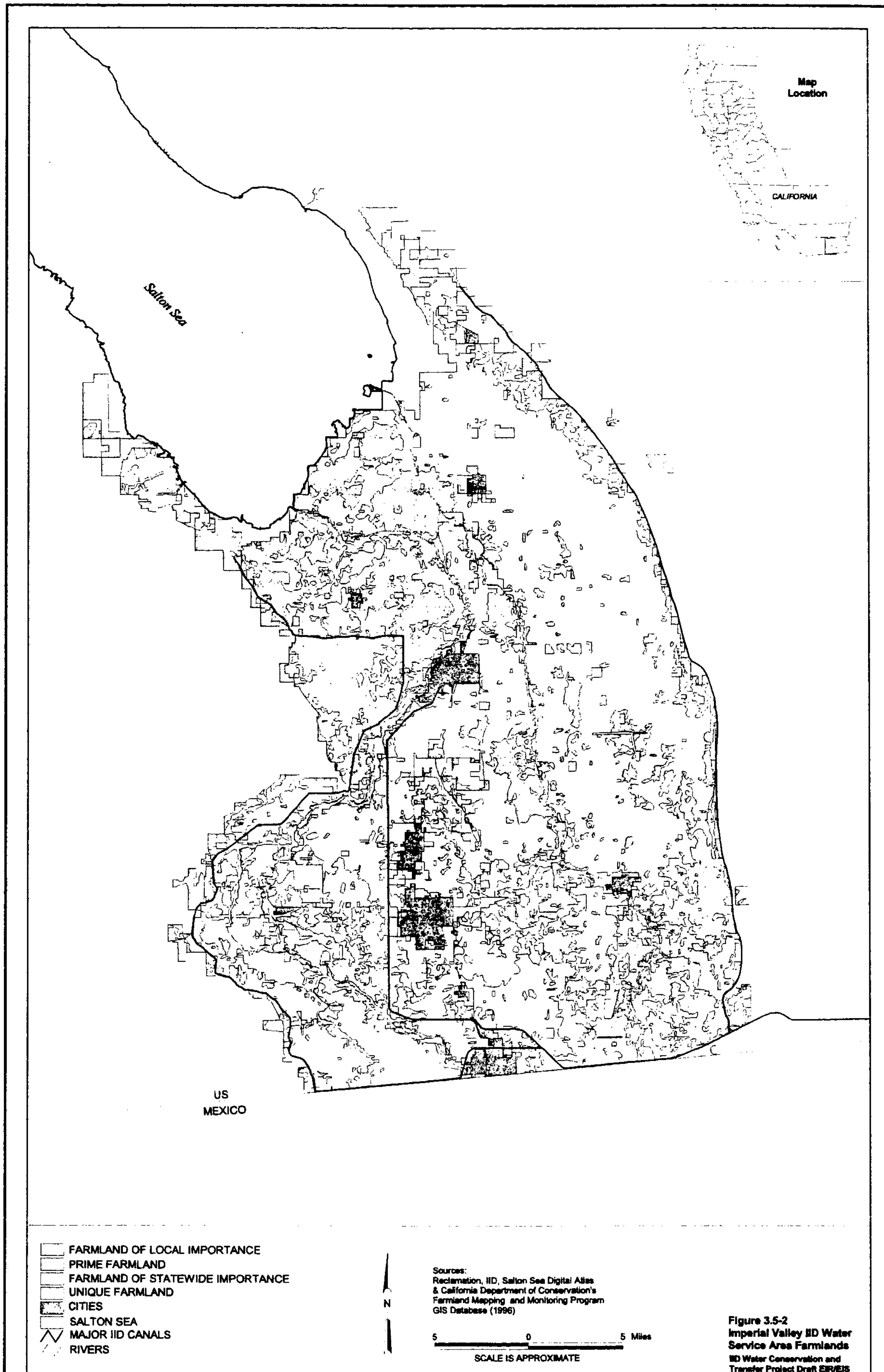

Figure 3.5-2
Imperial Valley IID Water Service Area Farmlands
IID Water Conservation and Transfer Project Draft EIR/EIS

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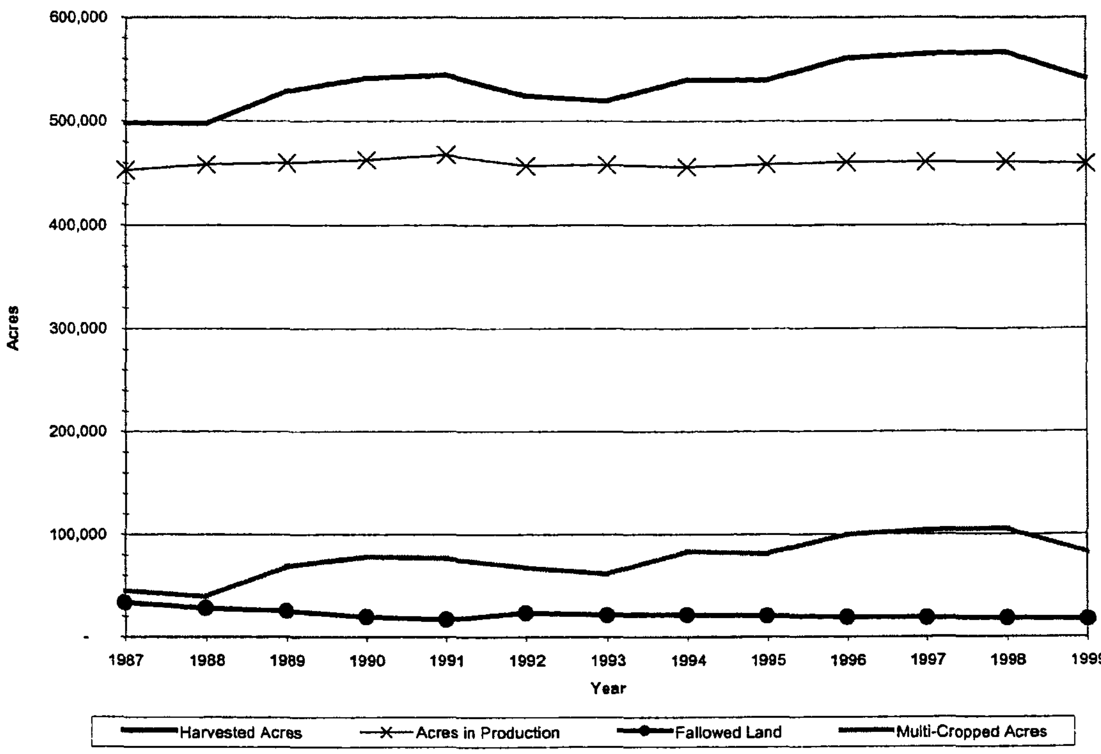
FIGURE 3.5-3
Comparison of the Use of Farmland in the IID Water Service Area, 1987-1999

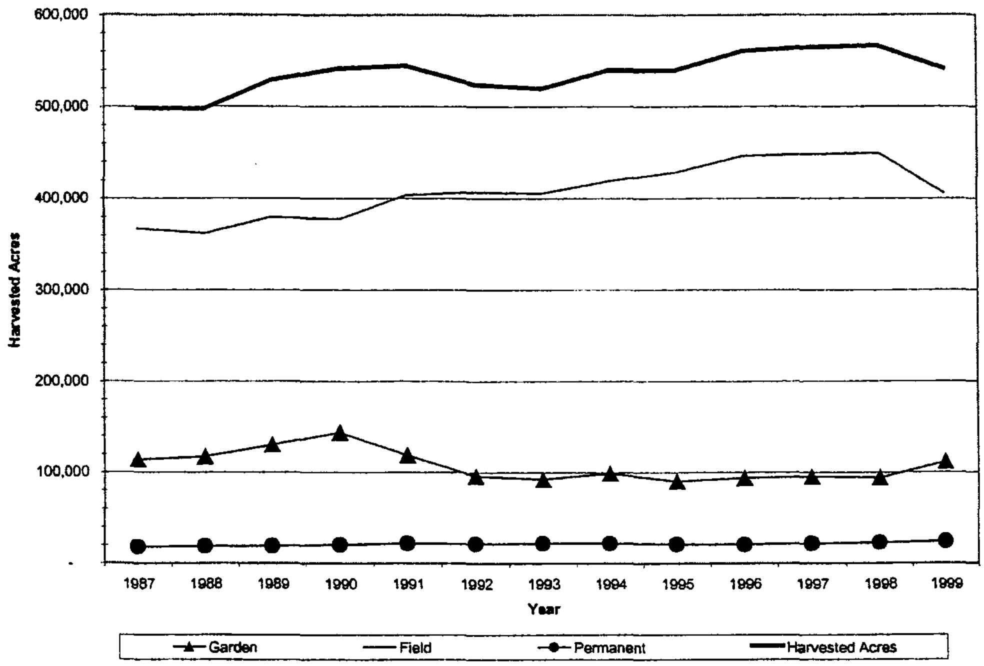


Source: IID 1987- 1999

Figure 3.5-4 presents the harvested acreage by crop group from 1987 to 1999. With the exception of permanent crops for which substantial amounts of time and money are invested to establish productive stands, farmers base their cropping decisions on short-term, anticipated market conditions.

Table 3.5-3 shows the total acres harvested and value of production by crop classification for 1998, along with the predominant crops within each classification. Consistent with the historical data presented above, harvested acreage reported by Reclamation shows field crops as the largest crop group within the IID water service area, accounting for approximately 408,000 acres. A large portion of the field crop acreage is devoted to alfalfa hay, which helps support Imperial County's livestock industry. The next largest Reclamation crop classification, in terms of acreage, is vegetables, with just under 100,000 acres harvested in the IID water service area. In terms of gross value of production, vegetables are the dominant crop classification, with an average of $478 million, compared to $270 million for field crops.

FIGURE 3.5-4
Harvested Acres by Crop Group in the IID Water Service Area, 1987-1999



Source: IID 1987- 1999

TABLE 3.5-3
Acreage and Value of Production by Crop Groups in the IID Water Service Area, 1998

Crop Group	Harvested Acres	Gross Value of Production (Millions of Dollars)	Predominant Crops
Field Crops	408,432	$270.7	Alfalfa hay, other hay (sudan grass), wheat, sugar beets
Vegetable and Nursery	97,120	$478.4	Lettuce, carrots, melons, onion, broccoli, asparagus
Seed	44,726	$44.0	Grass, alfalfa, onion
Fruits and Nuts	5,984	$22.9	Citrus, other fruits, dates, pecans
Total	**556,262**	**$815.6**	

Source: Reclamation 1998

IRRIGATION PRACTICES

Gravity irrigation methods, such as furrow and border irrigation, account for the vast majority of irrigation application methods within the IID water service area. Recently, a few farmers have switched to level basin irrigation, and some farms have installed tailwater return systems (TRSs). Sprinkler irrigation is sometimes used in conjunction with gravity irrigation methods, in which seedbeds are irrigated by sprinklers until germination. At that point, a transition to furrow or border irrigation occurs.

Other than for seed germination, sprinkler technologies, such as linear move, center pivot, or solid set, are seldom used within the IID water service area. Reasons for this include the need to pressurize the water supply, and the incompatibility of some sprinkler systems with the area's predominately clay soils. Drip irrigation is used on a limited basis, generally on permanent or highly valued crops. Because of the salinity levels of the soil and the irrigation water under all irrigation technologies, fields generally require irrigation applications in excess of crop production needs to leach salts out of the root zone.

3.5.4 Impacts and Mitigation Measures

3.5.4.1 Methodology

The conservation program would be voluntary and, as such, the exact location of participating fields and the type of actual conservation measures employed could not be accurately predicted for this analysis. The alternatives were formulated to provide a range of different conservation volumes and conservation methods and thus to allow the assessment of a range of possible impacts.

Depending on the location of specific improvements, the construction of on-farm or water delivery system improvements could convert lands within the IID water service area that historically have been in crop production to reservoirs, canals or other uses in support of on-farm irrigation system improvements or water delivery system improvements. Such changes in land use would not result in a classification change from agricultural to something other than agricultural. The changes would, therefore, not result in an impact to agricultural resources.

If fallowing were implemented as a conservation measure, land would be taken out of crop production on a rotational short-term basis, a long-term basis or even permanent fallowing. Conserving water by fallowing could result in, or increase the probability of, agricultural land being converted to something other than agricultural production. To a great extent, the likelihood of fallowed land being converted to urban land use or other non-agricultural land uses would depend on the land's location and length of time it remains fallowed. Lands close to the boundaries of lands currently zoned for urban uses would have a higher probability of converting to non-agricultural land uses. Additionally, lands fallowed for extended periods of time would have a higher probability of being converted to something other than agricultural land use in part because of the cost off reclaiming crop lands that have not been cultivated or irrigated for extended periods. While proximity to urban land used or extended fallowing could make fallowed lands more attractive to development, conversion to a non-agricultural land use would require local approval of the change in zoning and is not part of the Proposed Project.

IID has indicated that there is the possibility that a fallowing program to conserve water for transfer could be implemented that would include permanent fallowing of crop lands, and that fallowing for mitigation and or to conserve water to meet IOP obligations would be limited to rotational fallowing. In this analysis rotational fallowing indicates that a particular parcel of land would be removed from crop production for no more than three consecutive years. To identify the maximum potential impact to agricultural resources, the analysis assumes the worst-case scenario that all lands fallowed to conserve water for transfer would be permanently fallowed. To determine the maximum amount of impacted acreage for a voluntary program such as the Proposed Project, an average level of conservation (i.e., amount of water conserved) per fallowed acre is used. The per-acre conservation rate used in this analysis is 6 AF per fallowed acre.

The analysis of agricultural resources included the review of standards, regulations, and plans applicable to agricultural resources in the IID water service area. The potential for the Proposed Project and alternatives to result in changes to land use patterns of categorized and other farmland was evaluated to identify impacts.

Subregions Excluded from Impact Analysis. The Proposed Project and alternatives would not result in impacts to agricultural resources in either the Salton Sea subregion or the SDCWA subregion. Therefore, these subregions are not included in the impact discussion below.

3.5.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant impact on agricultural resources if they

- Convert prime farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency to non-agricultural use.
- Conflict with existing zoning for agricultural use or a Williamson Act contract.
- Involve other changes in the existing environment, which, because of their location or nature, could individually or cumulatively result in substantial loss of farmland to non-agricultural use.

3.5.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

With the exception of the actions listed below under "Biological Conservation Measures in USFWS' Biological Opinion," none of the actions associated with the conservation and transfer of water will have any direct or indirect impact on the agricultural resources of the LCR geographic subregion.

Biological Conservation Measures in USFWS' Biological Opinion

Biological conservation measures would only have the potential to affect agricultural lands that are adjacent to the Colorado River mainstem. If the creation of backwaters or cottonwood-willow habitat occurred on Prime or Unique Farmland or Farmland of Statewide Importance, this would result in the removal of this land from agricultural production. The acreage proposed for habitat restoration is relatively small (up to 1,116 acres) as is the amount proposed for backwater creation (44 acres) and would not result in substantial reduction in agricultural production within California, Arizona, or Nevada. Williamson Act contract lands may also be affected. No lands would be converted to urban use (Reclamation 2002).

These impacts are addressed at a general level in the Draft IA EIS because specific areas where these conservation measures would occur have not been identified. Site-specific studies and subsequent environmental documentation would be conducted as needed and mitigation measures identified prior to the actual implementation of the conservation measures.

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact AR-1: Reclassification of up to 50,000 acres of prime farmland or farmland of statewide importance. With implementation of the Proposed Project, up to a total of 300 KAFY could be conserved for transfer through one or more conservation measures, including fallowing. If fallowing were used as a conservation measure, it could be either rotational fallowing or permanent fallowing or a combination of the two. Rotational fallowing would be consistent with planned land uses and would not result in the reclassification of any prime or statewide important farmlands; therefore, no impact to agricultural resources would occur. However, permanent fallowing of agricultural land could be used to conserve water for transfer; therefore, the worst case impact of the Proposed Project would be the permanent fallowing of up to about 50,000 acres of land. This represents up to about 11 percent of the total net acreage in agricultural production within the IID water service area. Assuming all acreage included in the water conservation program was permanently fallowed, this would represent a significant, unavoidable impact to the agriculture resources of the IID water service area. (Significant, unavoidable impact.)

Mitigation Measure AR-1: The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under the Proposed Project. Otherwise, no mitigation measures have been proposed to avoid or minimize this impact.

Inadvertent Overrun and Payback Policy (IOP)

To conserve 59 KAFY to comply with the IOP, up to 9,800 acres could be fallowed in the IID water service area. This would represent 2 percent of the total annual net acreage in agricultural production within the IID water service area. IID has indicated that if fallowing were to be used to conserve water for the IOP, it would be rotational fallowing, whereby lands are not kept out of production for no more than three consecutive years. Implemented under these conditions, fallowing would not result in the reclassification of prime or statewide important farmland or conflict with existing zoning.

These impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-AR-2 Conversion of Agricultural Lands from Implementation of the HCP. The Proposed HCP includes provisions for creating new drainage canals, managed marsh habitat, and native forest habitat. These activities could potentially involve up to approximately 700 acres for the term of the Project. For this analysis, the worst case has been assessed by assuming that the approximately 700 acres of drains and wildlife habitat would be located on agricultural lands.

The worst -case impacts to agricultural resources from the implementation of these components of the Proposed HCP would result in approximately 700 acres of agricultural lands converted to marsh habitat, native forest habitat, or new drainage channels to the Salton Sea. This represents less than 0.5 percent of the average annual net acreage in agricultural production within the IID water service area. However, if these lands are located on prime farmland or farmland of statewide importance, implementation of the HCP (IID Water Service Area Portion) would result in a significant, unavoidable impact to agricultural resources. (Significant, unavoidable impact.)

Mitigation Measure HCP-AR-2: The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under the HCP (IID Water Service Area Portion). Otherwise, no mitigation measures have been proposed to avoid or minimize this impact.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

The selection of HCP (Salton Sea Portion) Approach 1 could result in the conversion of 5,000 acres of land to create ponds to support fish and provide a forage base for piscivorous birds. If all 5,000 acres of ponds were constructed on lands zoned and used for agricultural production, this would represent a decrease in lands available for agricultural production within the IID water service area of about 1 percent. If additional water is necessary to operate and maintain the ponds, agricultural lands would likely be fallowed on a rotational basis to generate such water supplies. If additional supplies are necessary, the impacts of generating that water would be evaluated in subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

The selection of HCP (Salton Sea Portion) Approach 2 could result in the fallowing of up to 25,000 acres of agricultural lands within the IID water service area. This would represent approximately 5 percent of the net acres in production in the IID water service area. Fallowing to conserve water for mitigation would be limited to rotational fallowing where lands are not fallowed for more that three consecutive years. Implemented under these conditions, fallowing would not convert farmland or lead to the rezoning of agricultural lands to non-agricultural uses. (Less than significant impact.)

This impacts resulting from implementation of the HCP would be the same for Alternative 2, 3, and 4; therefore, they are not discussed under each alternative.

3.5.4.4 Alternative 1: No Project

Implementation of the No Project alternative would maintain existing agricultural conditions in the geographic subregions discussed in this analysis, including the average amount of fallowing in the IID water service area of approximately 20,000 acres per year.

3.5.4.5 Alternative 2 (A2): Water Conservation and Transfer of 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

<u>Water Conservation and Transfer</u>

With the exception of the actions listed under "Biological Conservation Measures in USFWS' Biological Opinion," none of the actions associated with the conservation and transfer of water will have any direct or indirect impact on the agricultural resources of the LCR geographic subregion.

IID WATER SERVICE AREA AND AAC

<u>Water Conservation and Transfer</u>

Implementation of on-farm irrigation system improvements to conserve water would not result in the conversion of agricultural lands to other uses, conflict with existing agricultural zoning or result in the reclassification of prime or statewide important farmland. Therefore, there would not be any impact to the agricultural resources in the IID water service area.

3.5.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up to 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

<u>Water Conservation and Transfer</u>

With the exception of the actions listed under "Biological Conservation Measures in USFWS' Biological Opinion," none of the actions associated with the conservation and transfer of water will have any direct or indirect impact on the agricultural resources of the LCR geographic subregion.

IID WATER SERVICE AREA AND AAC

<u>Water Conservation and Transfer</u>

Impact A3-AR-1: Reclassification of up to 38,300 acres of prime farmland or farmland of statewide importance. Alternative 3 includes the conservation of up to 230 KAFY for transfer through one or more conservation measures, including fallowing. If fallowing were used as a conservation measure, it could be either rotation fallowing, permanent fallowing or a combination of the two. Rotational fallowing would be consistent with existing land uses and would not result in the reclassification of any prime or statewide important farmlands; therefore, no impacts to agriculture resources would occur. However, permanent fallowing could be used to conserve water for transfer; therefore, the worst-case impact of the Alternative 3 would be the permanent fallowing of up to 38,300 acres of land. This represents up to 8 percent of the total net acreage in agricultural production within the IID water service area. Assuming all acreage was permanently fallowed this would represent a significant, unavoidable impact to the agriculture resources in the IID water service area. (Significant, unavoidable impact.)

Mitigation Measure A3-AR-1: The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under this alternative. Otherwise, no mitigation measures have been proposed to avoid or minimize this impact.

3.5.4.7 Alternative 4: Water Conservation and Transfer of Up to 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

With the exception of the actions listed under "Biological Conservation Measures in USFWS' Biological Opinion," none of the actions associated with the conservation and transfer of water will have any direct or indirect impact on the agricultural resources of the LCR geographic subregion.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A4-AR-1: Reclassification of up to 50,000 acres of prime farmland or farmland of statewide importance. Alternative 4 includes conservation of up to 300 KAFY for transfer using fallowing as the exclusive conservation measure. Fallowing could be either rotational fallowing or permanent fallowing or a combination of the two. Rotational fallowing would be consistent with existing agricultural land uses and would not result in the reclassification of any prime or statewide important farmlands; therefore there would not be any impact to agriculture resources. However, permanent fallowing could be used to conserve water for transfer; therefore, the worst case impact of the Proposed Project would be the permanent fallowing of up to 50,000 acres of land. This represents up to 11 percent of the total net acreage in agricultural production within the IID water service area. Assuming all acreage was permanently fallowed this would represent a significant, unavoidable impact to the agriculture resources in the IID water service area. (Significant, unavoidable impact.)

Mitigation Measure A4-AR-1: The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under this alternative. Otherwise, no mitigation measures have been proposed to avoid or minimize this impact.

3.6 Recreation

3.6 Recreation

3.6.1 Introduction and Summary

This section describes the environmental setting and impacts related to recreation in the following geographic subregions: LCR, IID water service area and AAC, and the Salton Sea. A 0.5-mile buffer surrounding the Salton Sea is included in the discussion to include recreation-related facilities and activities surrounding the Sea.

A variety of recreation-related facilities are located within the geographic subregions. Within the LCR geographic subregion, recreation-related facilities include large BLM-operated recreation areas. Recreation-related facilities within the IID water service area and AAC geographic subregion are generally limited to a county park and state recreation areas. The Salton Sea geographic subregion supports a state recreation area (SRA). The SDCWA service area includes parks and reservoirs. A summary of the impacts on recreation in the four geographic subregions as a result of implementation of the Proposed Project and its alternatives is presented in Table 3.6-1.

TABLE 3.6-1
Summary of Recreation Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
R-1: Reduction of opportunity for sport fishing in canals from system improvements: Less than significant impact.	Continuation of existing conditions.	No impact.	**A3-R-1: Reduction of opportunity for sport fishing in canals from system improvements:** Less than significant impact.	No impact.
R-2: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation: Less than significant impact.	Continuation of existing conditions.	**A2-R-1: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation:** Less than significant impact.	**A3-R-2: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation:** Less than significant impact.	**A4-R-1: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation:** Less than significant impact.
HCP-R-3: Construction of marsh and tree habitat: Less than significant impact.	Not applicable.	**Same as HCP-R-3.**	**Same as HCP-R-3.**	**Same as HCP-R-3.**

TABLE 3.6-1
Summary of Recreation Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-R-4: The presence of marsh and tree habitat improves aesthetics and wildlife viewing: Beneficial impact.	Not applicable.	**Same as HCP-R-4.**	**Same as HCP-R-4.**	**Same as HCP-R-4.**
SALTON SEA				
R-5: Reduction in amount of Salton Sea area available for water-related recreation: Less than significant impact.	Reduction in Salton Sea area available for water-related recreation.	**A2-R-2: Reduction in amount of Salton Sea area available for water-related recreation:** Less than significant impact.	**A3-R-3: Reduction in amount of Salton Sea area available for water-related recreation:** Less than significant impact.	**A4-R-2: Reduction in amount of Salton Sea area available for water-related recreation:** Less than significant impact.
R-6: Increase in exposed playa that could be used as additional recreation area: Less than significant impact.	Increase in exposed playa that could be used as additional recreation area.	**A2-R-3: Increase in exposed playa that could be used as additional recreation area:** Less than significant impact.	**A3-R-4: Increase in exposed playa that could be used as additional recreation area:** Less than significant impact.	**A4-R-3: Increase in exposed playa that could be used as additional recreation area:** Less than significant impact.
R-7: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable: Less than significant impact with mitigation.	Reduction in Salton Sea elevation would leave boat launching and mooring facilities inoperable.	**A2-R-4: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable:** Less than significant impact with mitigation.	**A3-R-5: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable:** Less than significant impact with mitigation.	**A4-R-4: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable:** Less than significant impact with mitigation.
R-8: Reduced sport fishing opportunities: Significant, unavoidable impact.	Reduced sport fishing opportunities.	**A2-R-5: Reduced sport fishing opportunities:** Significant, unavoidable impact.	**A3-R-6: Reduced sport fishing opportunities:** Significant, unavoidable impact.	**A4-R-5: Reduced sport fishing opportunities:** Significant, unavoidable impact.
R-9: Reduced opportunity for bird watching and waterfowl hunting: Less than significant impact with mitigation.	Reduced opportunity for bird watching and waterfowl hunting.	**A2-R-6: Reduced opportunity for bird watching and waterfowl hunting:** Less than significant impact with mitigation.	**A3-R-7: Reduced opportunity for bird watching and waterfowl hunting:** Less than significant impact with mitigation.	**A4-R-6: Reduced opportunity for bird watching and waterfowl hunting:** Less than significant impact with mitigation.

TABLE 3.6-1
Summary of Recreation Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
R-10: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities. Less than significant impact with mitigation.	Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities.	**A2-R-7: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities.** Less than significant impact with mitigation.	**A3-R-8: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities.** Less than significant impact with mitigation.	**A4-R-7: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities.** Less than significant impact with mitigation.
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.6.2 Regulatory Framework

The Federal Water Project Recreation Act of 1965 (16 USC 4601-12 *et seq.*), states that federal agencies must consider potential outdoor recreational opportunities and potential fish and wildlife enhancement when planning navigation, flood control, reclamation, hydroelectric, or multipurpose water resource projects. However, recreational resources are primarily governed by local jurisdictions. The 1997 General Plan for Imperial County, Conservation and Open Space Element, contains goals and policies for the protection of recreational resources:

> *Open Space Conservation Policies and Programs*
>
> "The County shall take a pro-active role in working with local, state, and federal agencies to maintain and develop lands for outdoor recreation."

3.6.3 Environmental Setting

3.6.3.1 Lower Colorado River

The LCR geographic subregion encompasses the southeastern corner of California, from Parker Dam south to Imperial Dam. Several developed recreational sites, managed by BLM, can be found along the east and west banks of the LCR north of Winterhaven. Figure 3.6-1 illustrates the locations of these areas. Recreational opportunities offered include camping, swimming, fishing, and boating (BLM 2000a).

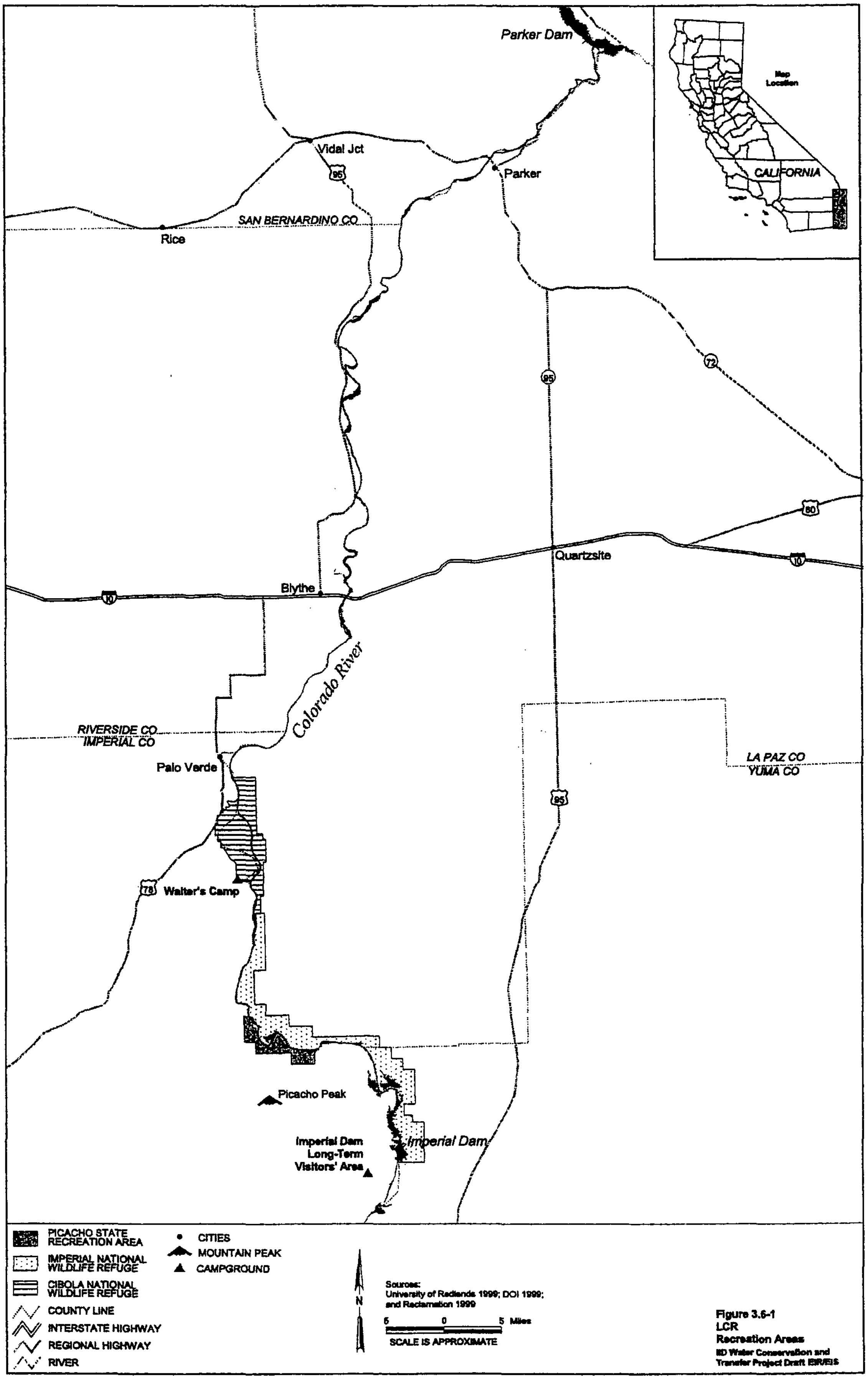


Figure 3.6-1
LCR
Recreation Areas
IID Water Conservation and Transfer Project Draft EIR/EIS

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The Picacho Peak area, located 20 miles north of Winterhaven along the western bank of the river, offers camping, hiking, rock hounding, and photographic opportunities. Picacho Peak is a 1,500-foot volcanic outcrop that dominates the southernmost end of the Chocolate Mountains. The Picacho SRA, located to the north of Picacho Peak, is part of the California state park system and offers a developed campground, boating, and fishing on the Colorado River (BLM 2000a).

Located adjacent to the Picacho SRA, the Imperial NWR was established in 1941 to protect and preserve plant and animal life found along the LCR. Recreational opportunities include hiking, boating, fishing, and hunting. The Imperial Dam Long-Term Visitation Area (LTVA), located near Imperial Dam, provides long-term camping opportunities (BLM 2000a). A BLM concession, Walters Camp, is located along the Colorado River approximately 25 miles north of Blythe along State Route (SR) 78. Walters Camp provides a popular starting point for fishing, boating, hunting, and canoeing trips (BLM 2000b). Cibola NWR, located north of Imperial NWR, was established in 1964 to preserve and enhance wintering grounds for waterfowl and other migratory birds. Recreational opportunities include fishing, hunting, boating, and wildlife viewing (BLM 2000b).

3.6.3.2 IID Water Service Area and AAC

PARKS, OFF-ROAD VEHICLE AREAS, AND FISHING

Recreational opportunities within the IID water service area are rather limited because much of the land is designated for agricultural use. A consistent grid of roads and irrigation canals separating low field crops extends from the southern tip of the Salton Sea, south to the International Boundary (SSA and Reclamation 2000). Figure 3.6-2 illustrates recreational sites within and adjacent to the IID water service area.

Recreational facilities within the IID water service area include the Weist Lake County Park and Heber Dunes State Vehicular Recreation Area (SVRA). Located along the Alamo River, Weist Lake County Park facilities offer boating, fishing, and waterfowl hunting (SSA and Reclamation 2000). Off-highway vehicle (OHV) recreation is provided by the Heber Dunes SVRA, located 8 miles east of Heber, south of El Centro and I-8. The Heber Dunes SVRA consists of 343 acres, which were previously part of the Imperial County park system. Formed by sand deposits from the Old Alamo Riverbed, the Heber Dunes SVRA offers picnicking, camping, and baseball, in addition to OHV routes (California State Parks 2000). Additional recreational activities in Imperial County include the utilization of various canals (including the AAC, East Highline Canal, and Westside Main Canal) for recreational fishing (Reclamation and IID 1994) for species such as channel catfish, bass, and sunfish.

IMPERIAL WMA

The Imperial Wildlife Management Area (WMA) Finney-Ramer unit is also located within the IID water service area, just south of the Salton Sea. The Imperial WMA consists of two sites: the Finney-Ramer unit, located south of the Salton Sea near the Alamo River, and the Wister unit, located along the southern end of the Salton Sea. The units are primarily composed of low-lying marshland, which provides habitat for migratory waterfowl and serves to reduce depredation of surrounding agricultural lands. The Finney-Ramer unit was originally established by Reclamation as a duck refuge. The unit includes four lakes preserved in natural habitat, totaling 2,047 acres. The Wister unit, operated by CDFG,

Figure 3.8-2
IID Water Service Area
Recreation Areas
IID Water Conservation and Transfer Project Draft EIR/EIS

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consists of 5,243 acres of marshland (County of Imperial 1997a), preserved in natural habitat. The unit has been maintained as a hunting, fishing, and passive recreation use area for almost 50 years. Public use information for the unit has been recorded since 1961. Because of constraints on CDFG time and resources, information regarding use of the area for hunting, camping, fishing, nature study, and bird watching was limited to the period from 1990 to the present. Information about the use of the area is presented in Table 3.6-2.

TABLE 3.6-2
Imperial Wildlife Area (Wister Unit) Public Use Profile, 1990 to Present

Period	Fishing	Camping	Nature Study	Bird Watching	Sightseeing	Hunting/ Other	TOTALS
1990-91[1]	1,300	300	168	516	360	7,405	**10,049**
1991-92[2]	3,140	868	408	2,848	1,452	8,685	**17,401**
1992-93[3]	1,836	696	408	2,180	1,228	5,789	**12,137**
1993-94	1,772	556	341	1,580	598	6,562	**11,409**
1994-95	2,260	472	344	1,512	1,216	8,951	**14,755**
1995-96	2,408	357	295	2,031	1,301	9,287	**15,679**
1996-97	3,353	323	382	2,064	1,479	10,136	**17,737**
1997-98	1,852	280	292	2,784	1,248	9,961	**16,417**
1998-99	2,080	292	316	1,948	1,082	8,473	**14,191**
1999-2000	1,768	408	304	1,996	1,132	7,311	**12,919**
TOTALS	**21,769**	**4,552**	**3,258**	**19,459**	**11,096**	**82,560**	**142,694**

Source: CDFG Public Recreation Use Survey 1990-2000.

Notes:

[1] Public use data from January 1990 to June 1990 are unavailable.

[2] Public use data for September 1991 are unavailable.

[3] Public use data from July, August, and September 1992 are unavailable.

3.6.3.3 Salton Sea

The Salton Sea is the largest inland body of water in California. It occupies an area of land that was once part of ancient Lake Cahuilla, spanning an area approximately 40 miles long and 10 to 15 miles wide. At its deepest point, the Sea is approximately 50 feet deep (BLM 2000c). Visitors travel to the Salton Sea year-round for recreational opportunities. In recent decades, recreational activities in the area of the Salton Sea have moved away from direct water/body contact activities, such as swimming and water skiing, to indirect water/body contact activities, such as sport fishing and boating. This shift in recreational use is directly related to reduced water quality and fluctuating surface elevation (SSA and Reclamation 2000). In addition to water-related recreation, the Salton Sea and surrounding areas provide other popular recreational activities, such as bird watching, wildlife observation, camping, hiking, picnicking, hunting, boating, and fishing. Figure 3.6-3 illustrates recreational sites in and around the Salton Sea.

The Salton Sea SRA has been operated by the DPR since 1955 and is located along 15 miles of the northeastern shoreline of the Salton Sea. The Salton Sea SRA is a popular site for campers and boaters, offering five campgrounds with approximately 1,400 campsites. There are boat launching and mooring facilities at each of the five campgrounds, swimmers and waterskiers, and anglers also use the recreational opportunities provided (Salton Sea SRA

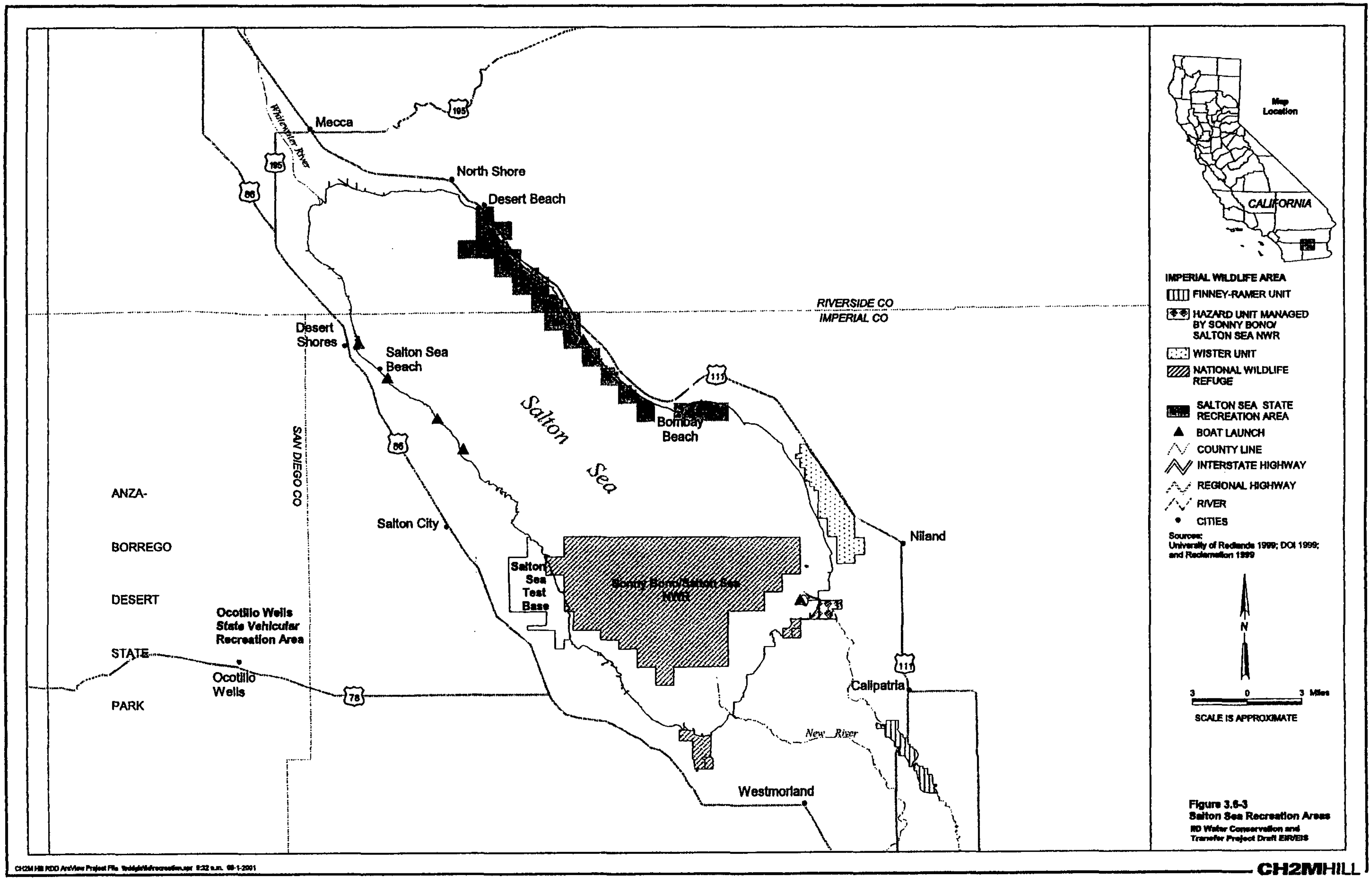

Figure 3.6-3
Salton Sea Recreation Areas
IID Water Conservation and Transfer Project Draft EIR/EIS

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2000). Total visitor use of the Salton Sea SRA has been recorded since 1972; however, specific recreation types have not been categorized. Prior to official records, Salton Sea SRA staff estimate that peak seasonal use occurred at the Sea during 1961-62, with approximately 660,000 visitors. Table 3.6-3 presents visitation data from 1972 to the present.

The Sonny Bono Salton Sea NWR was established in 1930 as a refuge and breeding ground for wildlife. It is operated by USFWS and is located in the southeastern portion of the Salton Sea, with 35,484 acres of salt marsh habitat and open water as well as 2,000 acres of pasture and freshwater marsh (L.L. Bean 2000). An important part of the Pacific Flyway, the Sonny Bono Salton Sea NWR is considered one of the premier bird-watching locations in the nation. Other recreational activities offered include wildlife observation, photography, picnicking, and nature trails (BLM 2000). An additional 535 acres along the southeastern portion of the Sea, known as the Hazard unit, is leased to USFWS and managed along with the Sonny Bono Salton Sea NWR (County of Imperial 1997a). USFWS does not regularly collect and catalogue visitor use information. However, an employee estimated that visitor use at the NWR from 1970 to 1990 averaged 20,000 persons per year; use since 1990 has averaged 32,000 persons per year (Bye 2000).

In addition to the Salton Sea SRA and Sonny Bono NWR, the Salton Sea provides diverse public and private water-related recreation along each of the four shore areas (north, south, east, and west shores). Several boat-launching facilities are located along these shore areas, as illustrated in Figure 3.6-3.

The north shore provides limited shore-related recreational use. The nearly flat land along the north shore is predominantly privately owned, with few public access routes to the Sea. Recreational uses associated with this area include hunting at private duck ponds in the delta region of the Whitewater River, and offshore fishing and boating (SSA and Reclamation 2000).

The nearly flat land along the south shore is fairly evenly divided between public and private ownership. Public lands include the Sonny Bono NWR and the inactive Salton Sea Test Base; recreation along the south shore is primarily linked to the wildlife values of these two areas. Recreational opportunities include hunting, fishing, boating, and wildlife viewing (SSA and Reclamation 2000). The Sonny Bono NWR has no boat docks of its own; however, visitors often use the nearby launching facilities at Redhill Marina (CVWD et al. 2002).

The east shore of the Sea extends from the community of Desert Beach to just south of the community of Bombay Beach. The relatively undifferentiated topography and low-growing desert scrub vegetation of the east shore afford the best views of the Salton Sea. Resort facilities along the east shore are in various stages of disrepair because of increasing water elevations during the late 1970s. Increased water levels during this time inundated between one-quarter and one-half of the Salton Sea SRA and caused problems with paving, picnic tables, and landscaped areas of the North Shore Yacht Club and Marina. The boat launching facility at North Shore Marina is nonoperational. Three operational boat-launching facilities exist along the east shore, including one at the Salton Sea SRA (Reclamation 2002). Recreational uses along the east shore include camping, power boating, sailing, personal watercraft racing, windsurfing, fishing, and sunbathing. General public access to the Salton

Sea along the east shore is primarily provided via the Salton Sea SRA (SSA and Reclamation 2000).

TABLE 3.6-3
Salton Sea SRA Visitation Data, 1972 to Present

Fiscal Year	Annual Visitation
1972-73	180,086
1973-74	179,304
1974-75	228,204
1975-76	174,156
1976-77	221,454
1977-78	207,149
1978-79	214,141
1979-80	209,724
1980-81	330,828
1981-82	394,552
1982-83	382,441
1983-84	328,902
1984-85	232,691
1985-86	261,889
1986-87	276,401
1987-88	160,285
1988-89	183,359
1989-90	175,368
1990-91	134,779
1991-92	114,297
1992-93	90,996
1993-94	87,369
1994-95	87,586
1995-96	139,013
1996-97	203,272
1997-98	247,342
1998-99	227,509
1999-2000	236,321

Sources: SSA and Reclamation 2000h; Imhoff 2000.

Recreational uses along the west shore include recreational rental housing, RV camping, shore fishing, boating (boat launching at four facilities), sport fishing, sunbathing, hiking, and bird watching. A majority of the land along the west shore is privately owned, and a number of resorts and restaurants in this area are closed and/or dilapidated. Several dirt roads provide public access to the shore; however, the majority of recreationists use boat ramps in the communities of Salton City, Salton Sea Beach, and Desert Shores (SSA and Reclamation 2000).

As described in Section 3.1, Hydrology and Water Quality, the Baseline condition for the Salton Sea is projected to result in an increase in salinity and a decrease in elevation and surface area of the Sea. During the Baseline period, which extends to the year 2077, the elevation of the Sea is predicted to decline by 7 feet, the surface area will decrease by 25 square miles, and the salinity will increase to 86 mg/L.

3.6.4 Impacts and Mitigation Measures

3.6.4.1 Methodology

The analysis of potential impacts on recreation describes the decrease in quality or availability of recreational resources in each of the four geographic areas but concentrates on impacts from the reduction of surface water elevation and surface area in the Salton Sea. While a number of recreation resources exist along the LCR and in the IID water service area and SDCWA service area, the discussion of recreational impacts in those areas is qualitative in nature because no significant impacts with respect to recreation are anticipated.

The discussion of impacts at the Salton Sea is based in part on visitor use numbers for the three major recreational facilities at the Salton Sea (Sonny Bono Salton Sea NWR, Salton Sea SRA, and Imperial Wildlife Area [IWA] - Wister unit). Visitor use estimates for the Salton Sea range from 200,000 visitors per year (as reported by visitor use data collected from the Salton Sea SRA, Sonny Bono Salton Sea NWR, and Imperial Wildlife Area (Wister unit) from 1990 to the present) to 750,000 visitors per year (as reported by the Administrative Draft Program EIR for the Water Management Plan [CVWD 2000b]). For the purposes of this analysis, the mean between these two numbers (475,000 visitors) will be used for calculations involving visitor use at the Salton Sea. In addition, specific use information collected was categorized only for the Wister unit, identifying 15 percent of the total use (142,694 visitors) of the unit for sport fishing. The Administrative Draft Program EIR for the Water Management Plan reported different information concerning the percentage of total recreation at the Salton Sea for sport fishing. Of the 750,000 visitors reported, approximately 400,000 of them were identified as coming to the area specifically for fishing (53 percent). To capture all potential impacts to sport fishery at the Salton Sea, the more conservative number of 400,000 visitors coming to the Salton Sea for fishing will be used when addressing sport fishery impacts.

In addition to being based on historical visitor use, impacts to recreation at the Salton Sea are based on the results of modeling conducted by Reclamation (see Section 3.1.4.1). The modeling predicts the salinity, elevation and surface area of the Salton Sea for the Baseline and for the Proposed Project and alternatives, as shown in Table 3.6-4. As noted in Section 3.1, Hydrology and Water Quality, the elevations and surface area of the Salton Sea are projected to decline with or without the Proposed Project. The Baseline is essentially the same as Alternative 1, No Project, in terms of elevations and surface area, as shown in Table 3.6-4. The Proposed Project and its alternatives are compared against the Baseline to determine impacts on recreation at the Salton Sea.

Potential recreational impacts are closely linked to the quality and physical character of the aquatic environment within each subregion; therefore, the discussion of impacts is related to those in the biological resources and water quality and hydrology sections. Additionally, aesthetic values, such as visual quality and occurrence of odors, could impact recreational resources. Therefore, the discussion of impacts is also related to the aesthetic impact assessment. Furthermore, potential impacts to recreation would indirectly affect the economic health of the project region of influence, linking this section to the socioeconomic impact assessment.

Subregions Excluded from Impact Analysis. No impacts to recreation will occur in the SDCWA service area geographic subregion because no construction of new facilities or changes in operation of existing facilities would occur in the SDCWA subregion that would result in physical changes or impacts to recreation. Therefore, the SDCWA service area subregion is not discussed.

3.6.4.2 Significance Criteria

Implementation of the Proposed Project or its alternatives would result in significant impacts if they:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Cause a direct, substantial physical degradation of either public recreation uses or public recreational facilities.
- Require the construction or expansion of recreational facilities that could result in an adverse physical effect on the environment.

TABLE 3.6-4
Projected Surface Area and Elevation of the Salton Sea for the Baseline and Alternatives

	Proposed Project: 300 KAFY All Conservation Measures		Baseline and Alternative 1: No Project		Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only		Alternative 3: 230 KAFY All Conservation Measures		Alternative 4: 300 KAFY Fallowing Only	
Project Year	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)	Elevation (MSL)	Surface Area (K acres/ sq miles)
2002	-228	233/364	-228	233/364	-228	233/364	-228	233/364	-228	233/364
2077	-250	167/261	-235	217/339	-242	195/305	-247	178/278	-241	201/314

Source: Reclamation 2001b

3.6.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Reduction of Flow between Parker Dam and Imperial Dam. Diversion and transfer of 300 KAFY at Parker Dam would decrease flow and water levels between Parker Dam and Imperial Dam. Reclamation has modeled the potential decreases in LCR water levels at various locations along the LCR in that River section (Reclamation 2002). The minimum reduction in River elevation is anticipated to be 0.02 foot; the maximum reduction in elevation is not anticipated to exceed 0.28 foot. The reductions in elevation under the Proposed Project are within historical elevation changes for the LCR (as described in Section 3.1, Hydrology and Water Quality) and would neither be visibly noticeable nor indirectly affect recreational activities such as power boating, jet skiing, kayaking, or other water-oriented activities. For a more complete description of water elevation and flow on the LCR as a result of the Proposed Project, see Section 3.1, Hydrology and Water Quality.

The reduction in water levels on the LCR would not affect water-oriented recreational facilities, such as the existing launch ramps and boat docks currently used to access the LCR, or the navigability of waters currently used for boating. Furthermore, the creation of sandbars, gravel bars, and unstable riverbanks and increases in the amount of floating or submerged debris potentially affecting the safety of boating are not anticipated to occur as a result of the Proposed Project.

Potential Reduction of backwater elevation from change in point of diversion on LCR. The reduction in flow between Parker Dam and Imperial Dam would result in a slight reduction in elevation of backwaters fed by the LCR, but the change would be within the normal range of variability. Access to those backwaters that fishermen, hunters, and other recreationists currently use is expected to continue unimpeded. Biological conservation measures to be implemented as a result of USFWS' Biological Opinion will mitigate impacts to backwaters resulting from decrease in elevation of the LCR.

Biological Conservation Measures in USFWS' Biological Opinion

These measures would primarily affect recreation opportunities that are physically located near the Colorado River. Establishing additional habitat along the River would have a beneficial effect on passive recreation activities because it would add to the total acreage of wildlife and fish habitat along the Colorado River mainstem. The other measures would not be likely to affect recreational resources (Reclamation 2002).

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

All conservation systems constructed within the IID water service area would be built in the IID water service area away from existing recreational areas and would not be highly visible to the public. The majority of recreational opportunities identified in the affected environment are located in areas outside the IID water service area. These opportunities would not be impacted during construction. Recreation areas within the irrigated portion of the Imperial Valley are not located near the farm areas where temporary construction is proposed. Therefore, no impacts to recreational resources within the IID water service area would be anticipated during temporary construction of the Proposed Project.

All conservation activities within the IID water service area would result in impacts to water quantity and quality, as discussed in Section 3.1, Hydrology and Water Quality. Reductions would occur in both the quantity and quality of water discharged to Imperial Valley drains, the New River and Alamo River, and, ultimately, the Salton Sea. However, use of Imperial Valley drains for recreational purposes is not allowed because they are located on farmland and considered private property. Although the New River and Alamo River are recognized by the Imperial County General Plan (1997) as potential recreational resources for water activities, recreational use is not encouraged by the county because it could jeopardize public health and safety. Therefore, no indirect impacts to recreation are anticipated as a result of reduced water quantity and quality.

Impact R-1: Reduction of opportunity for sport fishing in canals from system improvements. Conservation of additional water through water delivery system improvements to IID canals, such as conveyance lining, would impact the amount of available aquatic habitat for fish, as discussed in Section 3.2, Biological Resources, Impact BR-21. Aquatic habitat in the drains is of poor quality due to silty substrates, poor water quality, and shallow depth. The availability of aquatic habitat in drains is dependent on drainwater from agricultural fields. As a result, the amount of water (and aquatic habitat) in the drains varies throughout the year in response to the level of irrigation. When the agricultural fields discharging into a drain are not being irrigated, the drains dry out and do not provide aquatic habitat. Under existing conditions, volumes in drains fluctuate because of seasonal cropping patterns with some drains or because portions of drains dry out at times.

The quality of aquatic habitat in the drains also could be affected through changes in the drain's vegetation, which supports fish and aquatic invertebrates. Because of the artificial nature of the drain's plant communities and the probable lack of substantial changes in drain plant communities from the Proposed Project's water conservation program, the potential impacts to aquatic communities would be less than significant.

The most pronounced impact to aquatic habitat as a result of canal lining would be the reduction of several cover-oriented fish species, such as largemouth bass, green sunfish, longear sunfish, and flathead catfish. As described in Section 3.2, Biological Resources, channel catfish numbers might decrease, but the overall dominance of channel catfish within the canal system would likely continue. All of these fish species are important to sport fishery within the Imperial Valley, and reductions in numbers could impact recreation. The severity of the impact would depend on the extent of lining of the canals. Lining of the canals is only one of the water delivery system improvement options and would likely be implemented in conjunction with other water conservation measures.

Because canal lining would be limited to certain sections of the canals only and because recreational fishermen would have other fishing areas available to them (e.g., the Imperial WMA), the impact to recreational fishing would be less than significant. (Less than significant impact.)

Impact R-2: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation. Water transfers under the Proposed Project are not anticipated to change water levels within IID water service area irrigation delivery canals. Current water levels in the AAC, East Highline Canal, and Westside Main Canal are kept as high as possible to maximize power generation from the hydropower facilities on these canals. Little change in water levels would occur with the flow reductions anticipated under the Proposed Project; therefore, impacts to fish and, as a result, impacts to recreational fishing, are anticipated to be minimal. For additional information on impacts to fish inhabiting the IID canal system, refer to Section 3.2, Biological Resources. (Less than significant impact.)

Inadvertent Overrun and Payback Policy (IOP)

Compliance with IOP would require conservation of an additional 59 KAFY, which would be accomplished via fallowing or other conservation measures. This additional conservation would not result in recreation impacts in the IID water service area subregion.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-R-3: Construction of marsh and tree habitat. Construction of the marsh and tree habitats would be temporary, localized activities within or near the IID water service area. The habitats would be created in areas that are either removed from, or adjacent to, recreation areas. Because of the temporary, localized nature of the construction, this potential impact is considered less than significant. (Less than significant impact.)

Impact HCP-R-4: The presence of marsh and tree habitat improves aesthetics and wildlife viewing. As noted in Section 3.2, Biological Resources, implementation of the HCP would involve construction of marsh and management of tamarisk or creation of native tree areas that would readily attract waterfowl, wading and probing shorebirds, mammals and amphibians. Furthermore, the vegetation would provide visual contrast and color to the aesthetic resources of the landscape. Implementation of the HCP would benefit the biological resources of the region and would consequently potentially attract additional, non-consumptive use such as wildlife observation, bird watching, and hiking. The impact is considered beneficial. (Beneficial impact.)

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Implementation of this approach would result in the permanent fallowing of 5K acres for the creation of ponds. An additional 50 acres would be required for the hatchery. The construction and operation of these facilities are not anticipated to result in impacts to recreation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

The use of conserved water as mitigation would result in the implementation of additional conservation or fallowing on agricultural lands in the IID water service area. This action would not impact recreation in this subregion.

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

The Proposed Project does not include the construction of new facilities or the improvement of existing facilities in the Salton Sea area. Therefore, no direct and indirect impacts to recreation in the Salton Sea area would be anticipated during construction of the Proposed Project.

Impact R-5: Reduction in amount of Salton Sea area available for water-related recreation. Implementation of the Proposed Project would result in potential impacts to the water quantity and quality in IID water service area drains and rivers, and, ultimately, to the Salton Sea (as discussed in Section 3.1, Hydrology and Water Quality). With the Proposed Project, the elevation of the Sea is anticipated to decline to -250 feet msl, and the surface area would be reduced to 167,000 acres (261 square miles) by the year 2077. This would be a decrease of 15 feet in elevation and 78 square miles in surface area compared to the Baseline. This decline in the Salton Sea is the worst-case scenario for the Proposed Project and assumes a maximum level of conservation of 300 KAFY accomplished via on-farm irrigation improvements and water delivery system improvements with no fallowing. This scenario also includes the additional 59 KAFY conservation required to comply with the IOP. As described in Chapter 2, the Proposed Project could be implemented with fallowing and less conservation, both of which would result in fewer impacts to the Salton Sea.

The reductions in surface area would reduce the amount of total water area available for recreation on the Salton Sea. Public recreation use information for the Salton Sea reflects a mean visitor use of 475,000 people annually (approximately 1,301 visitors per day). A calculation of the total number of visitors per day divided by the total number of square miles available under existing conditions yields a current (2002) use density of the Salton Sea of about 3.6 people per square mile. Under the Baseline, the use density would be about 3.8 people per square mile. Assuming visitor use numbers remained somewhat constant in the future, calculations of the reduced surface area show that implementation of the Proposed Project would result in an increase from the Baseline density of 3.8 to a density of 5.0 people per square mile. This increase in density of slightly more than one person per square mile of lake area would not significantly impact recreational use on the Sea. Table 3.6-5 presents calculated increases in density for visitor usage of the Salton Sea under the Proposed Project, and the Project alternatives. (Less than significant impact.)

TABLE 3.6-5
Impacts of Reduced Surface Area to Water-Related Visitor Usage at the Salton Sea

	Surface Area (square miles)	Density (visitors per square mile)
Baseline	339	3.8
Proposed Project (2077)	261	5.0
Alternative 1 (No Project)	339	3.8
Alternative 2 (130 KAFY)	305	4.3
Alternative 3 (230 KAFY)	278	4.7
Alternative 4 (300 KAFY Fallowing)	314	4.1

Impact R-6: Increase in exposed playa could be used as additional recreation area. Reduced water areas would result in increased amounts of exposed playa surrounding the Salton Sea. These areas could provide more area for land-based recreation activities, including camping and picnicking. This could be viewed as a potential beneficial impact to land-based recreation at the Salton Sea. (It should be noted, however, that use of exposed playa for off-road vehicles recreation would significantly increase the potential of fugitive dust. For additional information on air quality as a result of exposed playa, refer to Section 3.7, Air Quality.)

The estimated additional area available for recreation would be nearly 78 square miles, (compared to the Baseline). However, not all of this area would be accessible for recreation because of lack of access roads, for example, or access limitations by the property owners.

As the Salton Sea surface area declines (as described under Impact R-5 above) the shoreline, becomes exposed. Implementation of the Proposed Project accelerates shoreline exposure. The recreational impacts of acceleration of shoreline exposure would be minimal. Therefore, although exposure of the shoreline could be beneficial for land-based recreation, it is considered a less than significant impact. (Less than significant impact.)

Impact R-7: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable. The decline in Salton Sea elevation and surface area as a result of the Proposed Project would impact operational boat launching and mooring facilities that provide access to the Salton Sea for recreational boating. The Sea would recede from boating facilities gradually as inflows decline. Figure 3.6-4 illustrates the extent of receding shoreline resulting from full-term implementation (75 years) of the Proposed Project, and the locations of operational boat launching and mooring facilities. Operational boat launching and mooring facilities currently extend an average of 20 to 30 feet from the existing shoreline and would be impacted if the shoreline of the Salton Sea receded beyond the extent of these facilities. This impact is anticipated when the elevation of the Salton Sea reaches -230 feet msl. Reduced inflows would result in areas of exposed playa primarily along the northern and southern shores of the Salton Sea where slope changes are gradual; however, areas of playa would also be exposed along the eastern and western shores where slope change is severe.

The Proposed Project would be expected to reduce the elevation of the Sea to -230 feet msl by 2007, at which point all operational boat launching and mooring facilities would become nonoperational. By comparison, under the Baseline, the elevation of the Sea would decline to -230 feet msl by 2010. The Proposed Project would accelerate the occurrence of the impact by 3 years. In addition to accelerating the time when the boat launches are stranded in their existing location, the Proposed Project would result in an ultimate elevation of the Sea of approximately -250 feet msl compared to the Baseline, which results in an ultimate elevation of the Sea of approximately -235 feet msl. (Significant impact.)

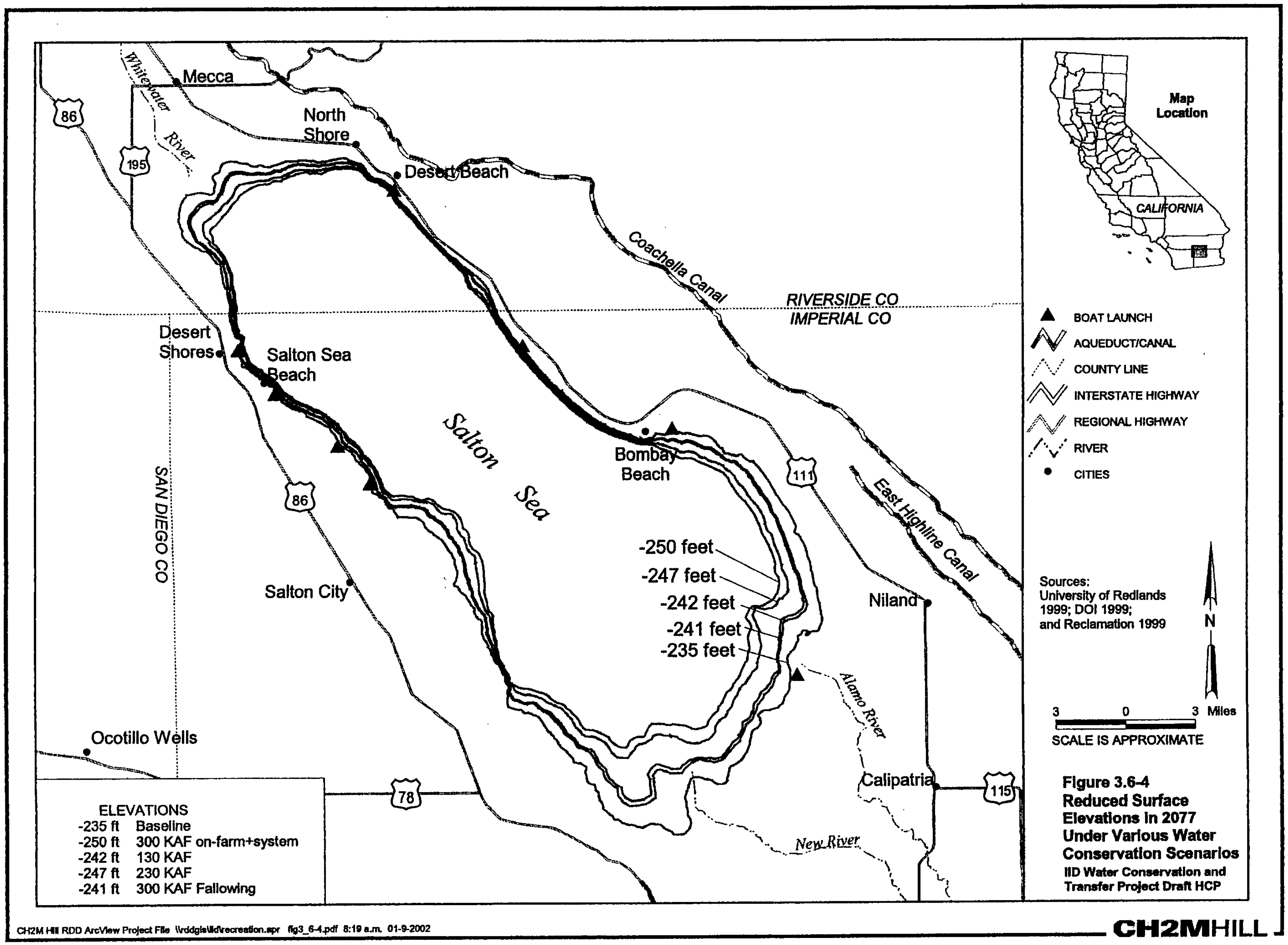

Figure 3.6-4
Reduced Surface Elevations in 2077 Under Various Water Conservation Scenarios
IID Water Conservation and Transfer Project Draft HCP

19317

Mitigation Measure R-7: Implement one of the following two mitigations:

1) Select HCP (Salton Sea Portion) Approach 2. If Approach 2 is selected, impacts on elevation are avoided, and no impacts to boat launching facilities occur.

OR

2) If HCP (Salton Sea Portion) Approach 1 is selected, impacts to the boat launching facilities would occur, so boat launching facilities and access to them must be relocated as the Sea declines to provide ongoing boat launching opportunities. The relocation of these facilities may be temporary and ongoing until the Sea reaches its minimum and stable elevation, at which point permanent facilities must be provided.

(Less than *significant impact with mitigation.*)

Impact R-8: Reduced sport fishing opportunities. As discussed in Section 3.1, Hydrology and Water Quality, reduced inflow regimes from the Proposed Project would result in an accelerated increase in salinity in the Salton Sea. Impacts to fisheries, including sport fish and aquatic habitat, potentially would result from an accelerated decrease in the number of fish that inhabit the Salton Sea, as described in Section 3.2, Biological Resources. A reduction in the number of sport fish in the Salton Sea would potentially impact sport-fishing opportunities, as measured by a reduction in the number of visitor use days. While the Proposed Project would result in increasing salinity, salinity levels under the Baseline would also continue to rise. Habitat would be impaired, impacting fisheries, including sport fish, and aquatic resources.

The Salton Sea Restoration Project Draft EIS/EIR (SSA and Reclamation 2000) states that significant impacts to Salton Sea fisheries, specifically the orangemouth corvina, began in the year 2000. Additional species of fish would be expected to be significantly impacted as salinity increases. Under the Baseline, salinity levels in the Salton Sea would be projected to exceed the maximum salinity (Reclamation 2002) at which sargo, gulf croaker, and tilapia could complete their life cycles in 2008, 2015, and 2023, respectively. The increase in salinity would be expected to reduce the abundance of tilapia but would not extirpate tilapia from the Salton Sea. Tilapia would be expected to persist in lower-salinity habitat supported at the New River and Alamo River deltas. As discussed in Section 3.2, Biological Resources, relative to the Baseline, the maximum level of conservation (300 KAFY for transfer plus 59 KAFY for the IOP), if achieved through on-farm and system-based measures, would increase the salinity threshold for gulf croaker 5 years earlier (in 2010) and would increase the salinity threshold for tilapia 11 years earlier (in 2012). Salinities detrimental to the ability of sargo to complete its life cycle would be exceeded in 2007, one year earlier than the Baseline. The fisheries decline at the Salton Sea under currently existing conditions has already affected the number of available sport fishery visitor use days at the Salton Sea. The acceleration in fisheries decline at the Salton Sea under the Proposed Project would reduce the number of available sport fishery visitor use days at the Salton Sea at a faster pace.

Approximately 400,000 visitors use the Salton Sea for sport fishing every year (CVWD et al. 2002). Available information does not specify anglers' preferences for individual species of sport fish; therefore, no preferences are assumed for the purposes of this analysis. Anglers' ability to catch sargo would be impacted 1 year earlier (2007) when compared to the Baseline, while gulf croaker and tilapia would no longer be fishable 5 and 11 years earlier, respectively, if the Proposed Project were implemented. More details on the impact of increased salinity on the fishery population are included in Section 3.2, Impact BR-45 and in Figure 3.2-19. Acceleration of the decline of sport fisheries would be considered a less than significant biological impact; however, it is a significant impact to recreation because it substantially decreases the opportunity for sport fishing by accelerating the decline projected under the Baseline. (For information on socioeconomic impacts to the Salton Sea as a result of the Proposed Project, refer to Section 3.14, Socioeconomics.) (Significant, unavoidable impact.)

Mitigation Measure R-8: To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation via fallowing or other methods in the IID water service area to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea associated with reduced flow: increased salinity leading to elimination of the sport fishery, elevation decline, and decreased surface area. Additional details of Approach 2 can be found in Chapter 2, Project Description.

With implementation of HCP Approach 2, this impact would be avoided; otherwise, the impact remains significant and unavoidable. Until an HCP Approach for the Salton Sea is selected, this impact will remain significant and unavoidable. (Significant, unavoidable impact.)

Impact R-9: Reduced opportunity for bird watching and waterfowl hunting. As discussed in Section 3.1, Hydrology and Water Quality, reduced inflow to the Salton Sea resulting from implementation of the Proposed Project would accelerate the increase in salinity in the Sea. Many avian species rely on the aquatic resources of the Salton Sea for food and habitat. Increasing salinity at the Sea would have the following results:

- Decreased food supply for fish-eating birds because the reproductive ability of fish would decline (as discussed under Impact R-10 above).
- Increased disease, resulting in direct mortality of avian species, as well as a loss of habitat for avian nesting and foraging sites.

Details of the biological impacts to birds are described in Section 3.2, Biological Resources, Impacts BR-44, 46, and 47. However, avian habitat and hunting opportunities provided by managed wetlands in the vicinity of the Sea (including the Sonny Bono Salton Sea NWR and IWA – Wister unit) would not be directly impacted by loss of habitat because the wetlands and fowl management areas are hydraulically separate from the Salton Sea and because the facilities are managed independently. Therefore, impacts to hunting would be less than significant.

Loss of habitat through a reduction in water level at the Salton Sea would not occur at the managed wetlands. However, the quality of bird viewing at the Salton Sea would decrease, and the ability of visitors to view wildlife might decline. The effect of the Proposed Project would be to accelerate changes in fish abundance and the subsequent response of piscivorous birds by about 11 years compared to the Baseline. The earlier occurrence of adverse effects to piscivorous birds and thus to recreation opportunities associated with bird viewing is considered a significant impact of the Proposed Project. (Significant impact.)

Mitigation Measure R-9: As described in Chapter 2, Project Description, and in Section 3.0, Introduction, there are two approaches under consideration for implementation of the Salton Sea Portion of the HCP. Implementation of each of these approaches would mitigate impacts to bird-viewing opportunities at the Salton Sea. HCP (Salton Sea Portion) Approach 1 would create a fish hatchery and 5K acres of ponds that would be maintained for the duration of the project and provide piscivorous birds with a food source to replace the Salton Sea fishery. The ponds would be accessible to the public for bird watching. This approach would mitigate the impact to bird watching to less than significant.

HCP (Salton Sea Portion) Approach 2 would include additional conservation via fallowing or other methods in the IID water service area to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea associated with the reduced flow: increased salinity leading to elimination of sportfishery, elevation decline, and decreased surface area. Implementation of this approach would avoid impacts to bird watching. Additional details of Approach 2 can be found in Chapter 2, Project Description. (Less than significant impact with mitigation.)

Impact R-10: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities. When water levels at the Salton Sea SRA drop to 230 feet below msl, it would be necessary to relocate facilities, such as Varner Harbor and campgrounds, that are now located near the water. It also would be necessary to re-establish existing roads and trails that lead to the water, particularly in areas such as Mecca Beach, Sneaker Beach, and Old Camp. Decreasing water levels would expose footings and other remnants of the campgrounds that were covered when the water elevation increased during the late 1970s. These would have to be removed for safety and aesthetic considerations. Implementation of the Proposed Project would result in the elevation of the Salton Sea reaching -230 feet msl by the year 2007, compared to the Baseline under which the -230 feet msl elevation is predicted to be reached by 2010 - a 3-year acceleration by the Proposed Project. In addition to accelerating the time when campgrounds are stranded from their existing location, the Proposed Project would result in an ultimate elevation of the Sea of approximately -250 feet msl compared to the Baseline which results in an ultimate elevation of the Sea of approximately -235 feet msl. (Significant impact.)

Mitigation Measure R-10: Implement one of the following two mitigations:

1) Select HCP (Salton Sea Portion) Approach 2. If Approach 2 is selected, impacts to the elevation are avoided, and no impacts to camping and ancillary facilities occur.

OR

2) If HCP (Salton Sea Portion) Approach 1 is selected, impacts to the camping facilities would occur, so these must be relocated as the Sea declines to provide ongoing camping opportunities. The relocation of these facilities may be temporary and ongoing until the Sea reaches its minimum, stable elevation, at which point permanent facilities must be provided.

(Less than significant impact with mitigation.)

3.6.4.4 Alternative 1: No Project

Implementation of the No Project alternative would largely maintain Baseline conditions with regard to recreation in the LCR and IID water service area. The following would occur in the Salton Sea geographic subregion.

Reduction in Salton Sea area available for water-related recreation. Under the No Project alternative, Salton Sea elevation and surface area would drop to approximately -235 feet msl and 339 square miles, respectively, after 75 years (Reclamation 2001b), the same as for the Baseline. A more detailed description of elevation change at the Salton Sea over time is presented in Section 3.1, Hydrology and Water Quality.

The reductions in surface area would reduce the amount of total water area available for recreation on the Salton Sea. Public recreation use information for the Salton Sea reflects a mean visitor use of 475,000 people annually (approximately 1,301 visitors per day). A calculation of the total number of visitors per day, divided by the total number of square miles available under the Baseline, yields a use density for the Salton Sea of about 3.8 people per square mile, assuming visitor use numbers remained somewhat constant 75 years in the future. Use density under Alternative 1, No Project, would be the same as for the Baseline.

Increase in exposed playa that could be used as additional recreation area. Under the Baseline and the No Project alternative, the reduction of surface area of the Salton Sea would result in an equivalent increase of exposed playa surrounding the Salton Sea, i.e., 25 square miles would become exposed over the next 75 years (Reclamation 2001b). These areas could provide more area for land-based recreation activities, including camping and picnicking. However, not all of this area would be accessible for recreation because of lack of access roads or limited access through private property, for example.

Reduction in Salton Sea elevation would leave boat launching and mooring facilities inoperable. Reductions in Salton Sea surface area, under both the Baseline and the No Project alternative, would also impact the number of operational boat launching and mooring facilities that provide access to the Salton Sea for recreational boating. Operational boat launching and mooring facilities extend an average of 20 to 30 feet from the existing shoreline and would be impacted if the shoreline of the Salton Sea receded beyond the extent of these facilities. The degree to which the shoreline would recede would be the same for the Baseline and the No Project alternative; the effect would be more severe along the northern and southern shores where slope changes are gradual.

Reduced sport fishing opportunities. As discussed in Section 3.1, Hydrology and Water Quality, salinity in the Salton Sea is increasing, jeopardizing the quality of the Salton Sea as habitat for fish. Impacts to fisheries, including sport fish, and aquatic habitat potentially would result from a decrease in the number of fish that inhabit the Salton Sea, as described in Section 3.2, Biological Resources.

The Salton Sea Restoration Project EIS/EIS (Reclamation and SSA 2000) states that significant impacts to Salton Sea fisheries, specifically the orangemouth corvina, began in 2000. Additional species of fish would be expected to be significantly impacted as salinity increases. With the Baseline and the No Project alternative, salinity levels in the Salton Sea would be projected to exceed the maximum salinity (Reclamation 2001b) at which sargo, gulf croaker, and tilapia can complete their life cycles in 2008, 2015, and 2023, respectively.

The increase in salinity would be expected to reduce the abundance of tilapia but would not extirpate tilapia from the Salton Sea. Tilapia would be expected to persist in lower-salinity habitat supported at the New River and Alamo River deltas. The fisheries decline at the Salton Sea under existing conditions has affected the number of available sport fishery visitor use days at the Salton Sea since 2000.

Reduced opportunity for bird watching and waterfowl hunting. Many avian species rely on the aquatic resources of the Salton Sea for food and habitat. Increasing salinity at the Sea would result in increased disease, leading to direct mortality of avian species, as well as a loss of habitat for avian nesting and foraging sites. However, avian habitat provided by managed wetlands in the vicinity of the Sea (including the Sonny Bono Salton Sea NWR and IWA - Wister unit) would not be directly impacted by loss of habitat because they are hydraulically separate from the Salton Sea, and the facilities are managed independently. In other areas, the quality of bird viewing and waterfowl hunting at the Salton Sea would decrease, and the number of visitors for bird viewing and wildlife hunting might decline; the impact of the No Project alternative would be the same as under the Baseline.

3.6.4.5 Alternative 2: Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements As Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

As described under the Proposed Project, changing the diversion point from Imperial to Parker Dam would decrease flow and water levels in that River section. The reduction in flow would not be visibly noticeable, and they would not indirectly affect recreational activities, such as powerboating, jet skiing, kayaking, or other water-oriented activities. In addition, the reduction in flow would not affect the elevation of the water levels in the LCR backwaters.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A2-R-1: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation. Water transfers under Alternative 2 are not anticipated to change water levels within Imperial Valley irrigation delivery canals. Current water levels in the AAC, East Highline Canal, and Westside Main Canal are kept as high as possible to maximize power generation from the hydropower facilities on these canals. Little change in water levels would occur with the flow reductions anticipated under Alternative 2; therefore, impacts to fish and consequent impacts to recreational fishing would be anticipated to be minimal. For additional information on impacts to fish inhabiting the IID canal system, refer to Section 3.2, Biological Resources. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A2-R-2: Reduction in amount of Salton Sea area available for water-related recreation. Although Alternative 2 includes a reduced amount of conserved water compared to the Proposed Project, impacts to the water quantity and quality of IID water service area drains and rivers, and, ultimately, to the Salton Sea, would still occur (as discussed in Section 3.1, Hydrology and Water Quality). As shown in Table 3.6-4, Baseline conditions in 2077 would be a Salton Sea elevation of -235 feet msl and a surface area of 339 square miles. Implementation of Alternative 2 would result in a Salton Sea elevation of -242 feet msl (a decline of 7 feet) and a surface area of 305 square miles, a reduction of 34 square miles, as compared to the Baseline.

The reduction in surface area would reduce the amount of total water area available for recreation on the Salton Sea, increasing the visitor use density from 3.8 people per square mile under the Baseline to 4.3 people per square, an increase of only 0.5 people per square mile. This small increase in density would not be anticipated to significantly impact the ability of Salton Sea visitors to recreate at the Salton Sea. (Less than significant impact.)

Impact A2-R-3: Increase in exposed playa that could be used as additional recreation area. Reduced water area would result in increased amounts of exposed playa surrounding the Salton Sea. These areas could provide more area for land-based recreation activities, including camping and picnicking, which could be viewed as a potential beneficial impact to land-based recreation at the Salton Sea. The estimated additional area available for recreation would be about 34 square miles in year 2077 compared to the Baseline. However, not all of this area would be accessible for recreation because of lack of access roads or limited access through private property, for example. As the Salton Sea surface area declines, as described under Impact R-7 above, the shoreline becomes exposed. Implementation of Alternative 2 accelerates shoreline exposure compared to the Baseline. Therefore, although the benefit could be beneficial for land-based recreation, it would be considered less than significant. (Less than significant impact.)

Impact A2-R-4: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable. The elevation and surface area of the Salton Sea would also decline with implementation of Alternative 2. This decline would impact operational boat launching and mooring facilities that provide access to the Salton Sea for recreational boating. Figure 4.11-1 illustrates the extent of the receding shoreline resulting from full-term implementation (after 75 years) of Alternative 2 and the locations of operational boat launching and mooring facilities. Operational boat launching and mooring facilities extend an average of 20 to 30 feet from the existing shoreline and would be impacted if the shoreline of the Salton Sea receded beyond the extent of these facilities. These facilities are anticipated to be impacted when the elevation of the Sea reaches -230 feet msl. Reduced inflows would result in areas of exposed playa, primarily along the northern and southern shores of the Salton Sea where slope changes are gradual; however, areas of playa would also be exposed along the eastern and western shores where slope change is severe.

Water conservation of 130 KAFY in Alternative 2 is expected to reduce the elevation of the Sea to -230 feet msl by 2007, at which point all operational boat launching and mooring facilities would become nonoperational. Although elevation declines in the Salton Sea and impacts to boat launching and mooring facilities would result by 2010 under the Baseline, Alternative 2 would accelerate the occurrence of the impact by 3 years. (Significant impact.)

Mitigation Measure A2-R-4: See Mitigation R-7. (Less than significant impact with mitigation.)

Impact A2-R-5: Reduced sport fishing opportunities. Impacts from Alternative 2 would be similar to those of the Proposed Project; however, Alternative 2 would exceed the salinity threshold for gulf croaker in 2010 and the salinity threshold for tilapia in 2013, 5 and 10 years earlier, respectively, than under the Baseline. Alternative 2 would reduce impacts to tilapia by 1 year compared to the Proposed Project. Salinities detrimental to the ability of sargo to complete its life cycle would be exceeded in 2007, one year earlier than the Baseline.

The fisheries decline at the Salton Sea under existing conditions has already affected the number of available sport fishery visitor use days at the Salton Sea. The acceleration in fisheries decline at the Salton Sea under Alternative 2 would reduce the available number of sport fishery visitor use days at the Salton Sea at a faster pace.

Approximately 400,000 visitors use the Salton Sea for sport fishing every year (CVWD et al. 2002). Available information does not specify anglers' preferences for individual species of sport fish; therefore, no preferences are assumed for the purposes of this analysis. Under Alternative 2, anglers' ability to catch sargo would be impacted 1 year earlier, compared to Baseline conditions; however, gulf croaker and tilapia would be unavailable or less available for sport fishing 5 and 10 years earlier, respectively, if this alternative were implemented. More details on the impact of increased salinity on fish populations are included in Section 3.2, Impact BR-45, and Figure 3.2-19. Acceleration of the decline of sport fisheries is considered a less than significant biological impact; however, it is a significant impact to recreation because it substantially decreases the opportunity for sport fishing. (Significant and unavoidable impact.)

Mitigation Measure A2-R-5: See Mitigation Measure R-8. (Significant and unavoidable impact.)

Impact A2-R-6: Reduced opportunity for bird watching and waterfowl hunting. The general effects of Alternative 2 on bird watching and waterfowl hunting would be similar to those described for the Proposed Project. Alternative 2 would accelerate the occurrence of changes in fish abundance and the subsequent response of piscivorous birds by about 10 years compared to the Baseline. The earlier occurrence of adverse effects to piscivorous birds and, thus, to recreation opportunities associated with bird viewing and waterfowl hunting is considered a significant impact of this Alternative. (Significant impact.)

Mitigation Measure A2-R-6: See Mitigation Measure R-9. (Less than significant impact with mitigation.)

Impact A2-R-7: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities. When water levels at the Salton Sea SRA drop to -230 feet msl, it would be necessary to relocate facilities, such as Varner Harbor and campgrounds that are now located near the water. It also would be necessary to re-establish existing roads and trails that lead to the water, particularly in areas such as Mecca Beach, Sneaker Beach, and Old Camp. Decreasing water levels would expose footings and other remnants of the campgrounds that were covered when the water elevation increased during the late 1970s. These would have to be removed for safety and aesthetic considerations. Implementation of Alternative 2 would result in the elevation of the Salton Sea reaching -230 feet msl by the year 2007, compared to Baseline, under which the -23 feet msl elevation is predicted to be reached by 2010, a 3-year acceleration by Alternative 2. (Significant impact.)

Mitigation Measure A2-R-7: See Mitigation Measure R-10. (Less than significant impact with mitigation.)

3.6.4.6 Alternative 3: Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

Water Conservation and Transfer

As described under the Proposed Project, changing the diversion point from Imperial to Parker Dam would decrease flow and water levels in that River section. The reduction in flow would not be visibly noticeable, and they would not indirectly affect recreational activities, such as powerboating, jet skiing, kayaking, or other water-oriented activities. In addition, the reduction in flow would not affect the elevation of the water levels in the LCR backwaters.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-R-1: Reduction of opportunity for sport fishing in canals because of system improvements. Conservation of additional water through water delivery system improvements to IID water service area irrigation canals, such as conveyance lining, would impact the amount of available aquatic habitat for fish, as discussed in Section 3.2, Biological Resources. The most pronounced impact to aquatic habitat as a result of canal lining, without mitigation, would be the reduction of several cover-oriented fish species, such as largemouth bass, green sunfish, longear sunfish, and flathead catfish. Channel catfish numbers may decrease, but the overall dominance of channel catfish within the canal system would likely continue. These fish are important to the sport fishery within the Imperial Valley, and reductions in numbers could impact recreation. The severity of the impact depends on the extent of lining of the canals. Lining of the canals is only one of the water delivery system improvement options and would likely be implemented in conjunction with other water conservation measures. Because canal lining would be limited to certain sections of the canals only and because recreational fishermen would have other fishing areas available to them (e.g., the Imperial WMA), the impact to recreational fishing would be considered less than significant. (Less than significant impact.)

Impact A3-R-2: Reduction of opportunity for sport fishing in canals from change in delivery canal elevation. Water transfers under Alternative 3 are not anticipated to change water levels within IID water service area irrigation delivery canals. Current water levels in the AAC, East Highline Canal, and Westside Main Canal are kept as high as possible to maximize power generation from the hydropower facilities on these canals. Little change would occur in water levels with the flow reductions anticipated under this alternative; therefore, impacts to fish and consequent impacts to recreational fishing would be anticipated to be minimal. For additional information on impacts to fish inhabiting the IID canal system, refer to Section 3.2, Biological Resources. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A3-R-3: Reduction in amount of Salton Sea area available for water-related recreation. Although Alternative 3 includes reduced water conservation compared to the Proposed Project, impacts to the water quantity and quality of IID water service area drains and rivers, and, ultimately, the Salton Sea would still occur (as discussed in Section 3.1, Hydrology and Water Quality). As shown on Table 3.6-4, Baseline conditions in 2077 would be a Salton Sea elevation of -235 feet msl and a surface area of 339 square miles. Implementation of Alternative 3 would result in a Salton Sea elevation of -247 feet msl (a decline of 12 feet) and a surface area of 278 square miles, a reduction of 61 square miles, compared to the Baseline.

The reduction in surface area would reduce the amount of total water area available for recreation on the Salton Sea, resulting in an increase in the visitor use density from 3.8 people per square mile under the Baseline to 4.7, an increase of less than one person per square mile. This small increase in density is not anticipated to significantly impact the ability of Salton Sea visitors to recreate at the Salton Sea. (Less than significant impact.)

Impact A3-R-4: Increase in exposed playa that could be used as additional recreation area. Reduced water area would increase the amount of exposed playa surrounding the Salton Sea. These areas could provide more area for land-based recreation activities, including camping and picnicking. This could be viewed as a potential beneficial impact to land-based recreation at the Salton Sea. The estimated additional area available for recreation would be about 61 square miles in year 2077, compared to Baseline. However, not all of this area would be accessible for recreation because of lack of access roads or limited access of private property, for example. As the Salton Sea surface area declines, the shoreline becomes exposed. Implementation of Alternative 3 would accelerate shoreline exposure compared to the Baseline. Therefore, although the benefit could be beneficial for land-based recreation, it would be considered less than significant. (Less than significant impact.)

Impact A3-R-5: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable. As described in Impact R-7 under the Proposed Project, the decline in the elevation of the Salton Sea and the surface area would also occur with implementation of Alternative 3. The declined elevation would impact operational boat launching and mooring facilities that provide access to the Salton Sea for recreational boating. Figure 4.11-1 illustrates the extent of the receding shoreline resulting from full-term implementation (after 75 years) of Alternative 3, and the locations of operational boat launching and mooring facilities. Operational boat launching and mooring facilities extend an average of 20 to 30 feet from the existing shoreline and would be impacted if the shoreline of the Salton Sea receded beyond the extent of these facilities. These facilities would be anticipated to be impacted when the elevation of the Sea reaches -230 feet msl. Reduced inflows would result in areas of exposed playa, primarily along the northern and southern shores of the Salton Sea where slope changes are gradual; however, areas of playa would also be exposed along the eastern and western shores where slope change is severe.

Water conservation of 230 KAFY in Alternative 3 would be expected to reduce the elevation of the Sea to -230 feet msl by 2007, at which point all operational boat launching and mooring facilities would become nonoperational. Although elevation declines of the Salton Sea and impacts to boat launching and mooring facilities would be expected to result with the Baseline, Alternative 3 would accelerate the occurrence of these impacts by 3 years. (Significant impact.)

Mitigation Measure A3-R-5: See Mitigation Measure R-7. (Less than significant impact with mitigation.)

Impact A3-R-6: Reduced sport fishing opportunities. Alternative 3 would exceed the salinity threshold for gulf croaker in 2010, and the salinity threshold for tilapia in 2012, 5 and 11 years earlier, respectively, than under the Baseline. This is the same impact as under the Proposed Project. Salinities detrimental to the ability of sargo to complete its life cycle would be exceeded in 2006, two years earlier than under the Baseline.

The fisheries decline at the Salton Sea under existing conditions has already affected the available sport fishery visitor use days at the Salton Sea. The acceleration in fisheries decline at the Salton Sea under this alternative would reduce available sport fishery visitor use days at the Salton Sea at a faster pace.

Approximately 400,000 visitors use the Salton Sea for sport fishing every year (CVWD et al. 2002). Available information does not specify anglers' preferences for individual species of sport fish; therefore, no preferences are assumed for the purposes of this analysis. Under Alternative 3, anglers' ability to catch sargo would be impacted 2 years earlier (2006) compared to Baseline conditions, while gulf croaker and tilapia would not be available for sport fishing 5 and 11 years earlier, respectively, if this alternative were implemented. More details on the impact of increased salinity on the fishery population are included in Section 3.2, Impact BR-45, and Figure 3.2-19.

Acceleration of the decline of sport fisheries would be considered a less than significant biological impact; however, it is a significant impact to recreation because it substantially decreases the opportunity for sport fishing. (Significant and unavoidable impact.)

Mitigation Measure A3-R-6: See Mitigation Measure R-8. (Significant and unavoidable impact.)

Impact A3-R-7: Reduced opportunity for bird watching and waterfowl hunting. The general effects of Alternative 3 on bird watching and water fowl hunting would be similar to those described for the Proposed Project.

Alternative 3 would accelerate the occurrence of changes in fish abundance and the subsequent response of piscivorous birds by about 11 years compared to the Baseline. The earlier occurrence of adverse effects to piscivorous birds and, thus, to recreation opportunities associated with bird viewing and waterfowl hunting would be considered a significant impact of the Proposed Project. (Significant impact.)

Mitigation Measure A3-R-7: See Mitigation Measure R-9. (Less than significant impact with mitigation.)

Impact A3-R-8: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities. When water levels at the Salton Sea SRA drop to -230 feet msl, it would be necessary to relocate facilities, such as Varner Harbor and campgrounds that are now located near the water. It also would be necessary to re-establish existing roads and trails that lead to the water, particularly in areas such as Mecca Beach, Sneaker Beach, and Old Camp. Decreasing water levels would expose footings and other remnants of the campgrounds that were covered when the water elevation increased during the late 1970s. These would have to be removed for safety and aesthetic considerations. Implementation of Alternative 3 would result in the elevation of the Salton Sea reaching -230 feet msl by the year 2007, compared to the Baseline, under which the -230 feet msl elevation is predicted to be reached by 2010, a 3-year acceleration by Alternative 3. (Significant impact.)

Mitigation Measure A3-R-8: See Mitigation Measure R-10. (Less than significant impact with mitigation.)

3.6.4.7 Alternative 4: Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

As described under the Proposed Project, changing the diversion point from Imperial to Parker Dam would decrease flow and water levels in that River section. The reduction in flow would not be visibly noticeable, and they would not indirectly affect recreational activities, such as powerboating, jet skiing, kayaking, or other water-oriented activities. In addition, the reduction in flow would not affect the elevation of the water levels in the LCR backwaters.

IID WATER SERVICE AREA AND AAC

Under Alternative 4, fallowing would be implemented within the IID water service area to conserve water. No construction is required; therefore, no impacts would result from construction. Impacts to recreation would occur indirectly as a result of direct impacts to water resources and biological resources. Use of IID water service area drains for recreational purposes is not allowed because they are located on farmland and considered private property. Therefore, impacts to recreation along the drains would not be anticipated.

Impact A4-R-1: Reduction of the number of sport fish in canals from change in delivery canal elevation. Fallowing would require diversion of water at Parker Dam and, thus, result in the same less than significant impacts to fishing along the canals, as described under Impact R-2 above. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Impact A4-R-2: Reduction in amount of Salton Sea area available for water-related recreation.

Although the use of fallowing in Alternative 4 allows for more drain water to continue to flow to the Salton Sea from the IID water service area (compared to flows under the Proposed Project), impacts to the water quantity and quality of IID water service area drains and rivers, and, ultimately, the Salton Sea, would still occur (as discussed in Section 3.1, Hydrology and Water Quality). Changes to the Baseline Salton Sea elevation of -235 feet msl and surface area of 339 square miles are anticipated. Implementation of Alternative 4 would result in a decrease in elevation of the Sea to -241 feet msl (a decline of 6 feet) and a decrease in surface area to 314 square miles (a reduction of 25 square miles) compared to the Baseline.

The reduction in surface area would reduce the amount of total water area available for recreation on the Salton Sea only slightly, resulting in the same visitor use density as under the Baseline. (Less than significant impact.)

Impact A4-R-3: Increase in exposed playa that could be used as additional recreation area. Reduced water area would result in increased amounts of exposed playa surrounding the Salton Sea. These areas could provide more area for land-based recreation activities, including camping and picnicking. This could be viewed as a potential beneficial impact to land-based recreation at the Salton Sea. The estimated additional area available for recreation with the implementation of Alternative 4 would be about 25 square miles in year 2077, compared to Baseline. However, not all of this area would be accessible for recreation because of lack of access roads or limited access through private property, for example. As the Salton Sea surface area declines, as described under Impact R-7 above, the shoreline becomes exposed. Implementation of Alternative 4 accelerates shoreline exposure compared to the Baseline. Therefore, although the benefit could be beneficial for land-based recreation, it would be considered less than significant. (Less than significant impact.)

Impact A4-R-4: Reduction in Salton Sea elevation would render boat launching and mooring facilities inoperable. As described in Impact R-7 for the Proposed Project, the decline in the Salton Sea elevation and surface area would also occur with implementation of Alternative 4 and would impact operational boat launching and mooring facilities that provide access to the Salton Sea for recreational boating. Figure 4.11-1 illustrates the extent of receding shoreline resulting from full-term implementation (after 75 years) of Alternative 4 and the locations of operational boat launching and mooring facilities.

Operational boat launching and mooring facilities extend an average of 20 to 30 feet from the existing shoreline and would be impacted if the shoreline of the Salton Sea receded beyond the extent of these facilities. These facilities are anticipated to be impacted when the elevation of the Sea reaches -230 feet msl. Reduced inflows would result in areas of exposed playa, primarily along the northern and southern shores of the Salton Sea where slope changes are gradual; however, areas of playa would also be exposed along the eastern and western shores where slope change is severe.

Water conservation of 300 KAFY in Alternative 4 would reduce the elevation of the Sea to -230 feet msl by 2008, at which point all operational boat launching and mooring facilities would become nonoperational. Although declines in elevation of the Salton Sea and impacts to boat launching and mooring facilities would be expected to result with the Baseline, Alternative 4 would accelerate the occurrence of these impacts by 2 years. (Significant impact.)

Mitigation Measure A4-R-4: See Mitigation Measure R-7. (Less than significant impact with mitigation.)

Impact A4-R-5: Reduced sport fishing opportunities. Alternative 4 would exceed the salinity threshold for gulf croaker in 2012 and the salinity threshold for tilapia in 2017 approximately 3 and 6 years earlier, respectively, than under the Baseline. This would significantly reduce impacts compared to the Proposed Project. Salinities detrimental to the ability of sargo to complete its life cycle would be exceeded in 2008, the same year as under the Baseline. The fisheries decline at the Salton Sea under existing conditions has already affected the available sport fishery visitor use days at the Salton Sea. The acceleration in fisheries decline at the Salton Sea under this alternative would reduce available sport fishery visitor use days at the Salton Sea at a faster pace.

Approximately 400,000 visitors use the Salton Sea for sport fishing every year (CVWD 2000). Available information does not specify anglers' preferences for individual species of sport fish; therefore, no preferences are assumed for the purposes of this analysis. No change would occur to the anglers' ability to catch sargo compared to the Baseline; however, gulf croaker and tilapia would no longer be available for sport fishing 3 and 6 years earlier, respectively, if this alternative were implemented. More details on the impact of increased salinity on the fishery population are included in the Section 3.2, Impact BR-45, and Figure 3.2-19. Acceleration of the decline of sport fisheries would be a less than significant biological impact; however, it would be a significant impact to recreation because it would substantially decrease the opportunity for sport fishing. (Significant and unavoidable impact.)

Mitigation Measure A4-R-5: See Mitigation Measure R-8. (Significant and unavoidable impact.)

Impact A4-R-6: Reduced opportunity for bird watching and waterfowl hunting. The general effects of Alternative 4 on bird watching and waterfowl hunting would be similar to those described for the Proposed Project. Alternative 4 would accelerate the occurrence of changes in fish abundance and the subsequent response of piscivorous birds by about 6 years compared to those under the Baseline. The earlier occurrence of adverse effects to piscivorous birds and, thus, to recreation opportunities associated with bird viewing and waterfowl hunting, would be a significant impact of the Proposed Project. (Significant impact.)

Mitigation Measure A4-R-6: See Mitigation Measure R-9. (Less than significant impact with mitigation.)

Impact A4-R-7: Reduction in Salton Sea elevation could impact campgrounds and ancillary facilities. When water levels with the Salton Sea SRA drop to -230 feet msl, it would be necessary to relocate facilities, such as Varner Harbor and campgrounds that are now located near the water. It also would be necessary to re-establish existing roads and trails that lead to the water, particularly in areas such as Mecca Beach, Sneaker Beach, and Old Camp. Decreasing water levels would expose footings and other remnants of the campgrounds that were covered when the water elevation increased during the late 1970s. These would have to be removed for safety and aesthetic considerations. Implementation of Alternative 4 would result in the elevation of the Salton Sea reaching -230 feet msl by the year 2008 compared to the Baseline, under which the -230 feet msl elevation is predicted to be reached by 2010, a 2-year acceleration by Alternative 4. (Significant impact.)

Mitigation Measure A4-R-7: See Mitigation Measure R-10. (Less than significant impact with mitigation.)

19331

3.7 Air Quality

3.7.1 Introduction and Summary

This section describes the environmental setting and impacts related to air quality in the following geographic subregions: LCR, IID water service area and AAC, and Salton Sea. Regional air quality designations, ambient pollutant concentrations, and meteorological conditions, project-related sources of air pollutant emissions, and potential air quality impacts are discussed.

Air quality impacts associated with the Proposed Project and alternatives would result from the construction and operation of new systems and facilities, and from the potential wind erosion of soil from fallowed fields and/or shoreline sediments exposed by lowered water levels in the Salton Sea. The pollutants of greatest concern are ozone and the ozone precursors, nitrogen oxides (NO_x) and volatile organic compounds (VOC), primarily from equipment exhaust, and fine particulate matter (PM_{10} and $PM_{2.5}$) from soil disturbance and wind erosion (fugitive dust). The main impacts would occur in the IID water service area because of construction activities and land fallowing, and in the Salton Sea subregion from exposure of the shoreline.

Neither LCR nor the SDCWA service area is expected to experience significant air quality impacts as a result of implementation of the Proposed Project or its alternatives. Because construction and operation of the on-farm and water delivery system conservation measures and treatment facilities would not occur in the LCR or SDCWA areas, there would be no significant air quality impacts associated with construction or operation of the Proposed Project in these subregions. Due to decreased water levels in the Colorado River between Parker Dam and Imperial Dam, there is some potential for increased fugitive dust emissions from exposed shoreline. However, the amount of land exposed by decreased water levels is relatively small, and some of the area will become re-vegetated. Backwaters would be replaced. The potential increase in windblown dust from exposed areas along the Colorado River would be minimal.

A summary of the impacts to air quality in the four geographic subregions as a result of implementation of the Proposed Project or its alternatives is presented in Table 3.7-1.

3.7.2 Regulatory Framework

Regulatory programs have been established at the national, state, and local levels to address air quality. These programs are intended to protect air quality in areas of attainment and to improve air quality in areas where pollutant concentrations exceed health-based criteria.

Air quality regulatory programs characterize the concentration of pollutants within their area of jurisdiction, and implement emissions limitations for stationary sources and other mitigation measures necessary to achieve or maintain healthy air quality.

TABLE 3.7-1
Summary of Air Quality Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
AQ-1: Fugitive dust from exposed riverbank and de-watered backwaters: Less than significant impact.	Continuation of existing conditions.	**Same as AQ-1.**	**Same as AQ-1.**	**Same as AQ-1.**
IID WATER SERVICE AREA AND AAC				
AQ-2: Emissions from construction and operation of on-farm and delivery system conservation measures from water conservation program: Less than significant impact.	Continuation of existing conditions.	**A2-AQ-1: Emissions from construction and operation of on-farm conservation measures from water conservation program:** Less than significant impact.	**A3-AQ-1: Emissions from construction and operation of on-farm and delivery system conservation measures from water conservation program:** Less than significant impact.	No impact.
AQ-3: Windblown dust from fallowed land: Less than significant impact with mitigation.	Continuation of existing conditions.	No impact.	**A3-AQ-2: Windblown dust from fallowed land:** Less than significant impact with mitigation.	**A4-AQ-1: Windblown dust from fallowed land:** Less than significant impact with mitigation.
AQ-4: Emissions from construction and operation of on-farm and delivery system conservation measures for compliance with the IOP: Less than significant impact with mitigation.	Not applicable.	**Same as AQ-4.**	**Same as AQ-4.**	**Same as AQ-4.**
HCP-AQ-5: Emissions from construction of managed marsh and native tree habitat: Less than significant impact.	Not applicable.	**Same as HCP-AQ-5.**	**Same as HCP-AQ-5.**	**Same as HCP-AQ-5.**

TABLE 3.7-1
Summary of Air Quality Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP2-AQ-6: Windblown dust from fallowing as well as emissions resulting from construction and operation of on-farm and water delivery system conservation measures for HCP Approach 2: Less than significant with mitigation.	Not applicable.	**Same as HCP-AQ-6.**	**Same as HCP-AQ-6.**	**Same as HCP-AQ-6.**
SALTON SEA				
AQ-7: Indirect air quality impacts due to the potential for windblown dust from exposed *shoreline*: Potentially significant unavoidable impact.	Continuation of Baseline conditions.	**A2-AQ-2: Indirect air quality impacts due to the potential for windblown dust from exposed *shoreline*:** Potentially significant unavoidable impact.	**A3-AQ-3: Indirect air quality impacts due to the potential for windblown dust from exposed *shoreline*:** Potentially significant unavoidable impact.	**A4-AQ-2: Indirect air quality impacts due to the potential for windblown dust from exposed *shoreline*:** Potentially significant unavoidable impact.
AQ-8: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea: Less than significant impact.	Continuation of Baseline conditions.	**A2-AQ-3: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea:** Less than significant impact.	**A3-AQ-4: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea:** Less than significant impact.	**A4-AQ-3: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea:** Less than significant impact.
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.7.2.1 Federal Regulations and Standards

NATIONAL AMBIENT AIR QUALITY STANDARDS

National air quality policies are regulated through the federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 amendments. Pursuant to the CAA, USEPA has established National Ambient Air Quality Standards (NAAQS) for six air pollutants: CO, O_3, NO_2, SO_2, PM_{10}, and lead. These pollutants are referred to as criteria pollutants because numerical health-based criteria have been established for each pollutant, which define acceptable levels of exposure. USEPA has revised the NAAQS several times since their original implementation and will continue to do so as the health effects of exposure to pollution are better understood. NAAQS, and the California ambient air quality standards, (CAAQS) (see Section 3.7.2.2), are summarized in Table 3.7-2.

The standards in Table 3.7-2 reflect recent changes to the ozone and PM_{10} standards, and the new $PM_{2.5}$ standard. The federal 1-hour ozone standard will remain in effect until USEPA formally implements the 8-hour ozone standard.

AIR QUALITY DESIGNATIONS

Under the 1977 amendments to the CAA, states with air quality that did not achieve the NAAQS were required to develop and maintain state implementation plans (SIPs). These plans constitute a federally enforceable definition of the state's approach (or "plan") and schedule for the attainment of the NAAQS. Air quality management areas are designated as attainment, nonattainment, or unclassified for individual pollutants depending on whether or not they achieve the applicable NAAQS and CAAQS for each pollutant. In addition, California can also designate areas as transitional. It is important to note that because the NAAQS and CAAQS differ in many cases, it is possible for an area to be designated as attainment by USEPA (meets the NAAQS) and nonattainment by the California Air Resources Board (CARB) (does not meet the CAAQS) for the same pollutant. Also, an area can be designated as attainment for one pollutant (e.g., NO_2) and nonattainment for others (e.g., ozone and PM_{10}).

Areas that were designated as attainment in the past, but have since achieved the NAAQS, are further classified as attainment-maintenance. The maintenance classification remains in effect for 20 years from the date that the area is determined by USEPA to meet the NAAQS. There are numerous classifications of the nonattainment designation, depending on the severity of nonattainment. For example, the ozone nonattainment designation has seven subclasses: transitional, marginal, moderate, serious, severe-15, severe-17, and extreme. Areas that lack monitoring data are designated as unclassified areas. Unclassified areas are treated as attainment areas for regulatory purposes. Air quality designations for each county comprising the geographic subregions are provided in Table 3.7-3.

TABLE 3.7-2
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS[1]	NAAQS[2] Primary[3]	NAAQS[2] Secondary[3]
Ozone (O_3)[4]	1-hour	0.09 ppm (180 μg/m^3)	0.12 ppm (235 μg/m^3)	0.12 ppm (235 μg/m^3)
	8-hour (new)	-	0.08 ppm (157 μg/m^3)	0.08 ppm (157 μg/m^3)
Coarse	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
particulate matter	Annual AM	-	50 μg/m^3	50 μg/m^3
(PM_{10})	Annual GM	30 μg/m^3	-	-
Fine particulate	24-hour (new)	-	65 μg/m^3	65 μg/m^3
Matter ($PM_{2.5}$)[4]	Annual AM (new)	-	15 μg/m^3	15 μg/m^3
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	-
	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	-
Nitrogen dioxide (NO_2)	1-hour	0.25 ppm (470 μg/m^3)	-	-
	Annual AM	-	0.053 ppm (100 mg/m^3)	0.053 ppm (100 mg/m^3)
Lead (Pb)	30-day	1.5 μg/m^3	-	-
	Calendar Quarter	-	1.5 μg/m^3	1.5 μg/m^3
Sulfur dioxide (SO_2)	1-hour	0.25 ppm (655 μg/m^3)	-	-
	3-hour	-	-	0.5 ppm (1,300 μg/m^3)
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	-
	Annual AM	-	0.03 ppm (80 μg/m^3)	-
Visibility Reducing Particles	8-hour (10 am to 6 pm)	Extinction Coeff. = 0.23/km @ < 70% RH	-	-
Sulfates	24-hour	25 μg/m^3	-	-
Hydrogen Sulfide (H_2S)	1-hour	0.03 ppm (42 μg/m^3)	-	-

Source: ARB Fact Sheet 39 (11/91), SCAQMD Bulletin (8/97), and www.arb.ca.gov

Notes:
1 California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and visibility reducing particles are values not to be exceeded.
2 National standards (other than O_3, PM_{10}, and those based on annual periods) are not to be exceeded more than once per year. The new ozone standard is based on a 3-year average of the fourth highest 8-hour concentrations in each year. For PM, the 24-hour standard is based on 99 percent (PM_{10}) or 98 percent ($PM_{2.5}$) of the daily concentrations, averaged over 3 years.
3 Equivalent units given in parenthesis are based upon reference conditions of 25°C and 760 mm mercury.
4 USEPA promulgated new federal 8-hour O_3 and $PM_{2.5}$ standards on July 18, 1997. The federal 1-hour O_3 standard continues to apply in areas that remain in violation of that standard.

TABLE 3.7-3
Federal and California Air Quality Attainment Status Designations by County and Area

County	Area	Pollutant	Federal Status	California Status
Imperial	Calexico	Carbon monoxide	Unclassifiable	Nonattainment
	All Other Areas		Unclassifiable	Unclassified
	All Areas	Ozone (1-hour)	Nonattainment (Transitional)	Nonattainment
	Imperial Valley[1]	PM_{10}	Nonattainment (Moderate)	Nonattainment
	All Areas	Nitrogen dioxide	Unclassifiable	Attainment
	All Areas	Sulfur dioxide	Attainment	Attainment
Riverside	Salton Sea Air Basin	Carbon monoxide	Unclassifiable/Attainment	Attainment
	Salton Sea Air Basin - Coachella Valley[2]	Ozone (1-hour)	Nonattainment (Severe-17)	Nonattainment
	Salton Sea Air Basin	PM_{10}	Nonattainment (Serious)	Nonattainment
	All Areas	Nitrogen dioxide	Unclassifiable/Attainment	Attainment
	All Areas	Sulfur dioxide	Unclassifiable/Attainment	Attainment
San Diego	All Areas	Carbon monoxide	Attainment	Attainment
	All Areas	Ozone (1-hour)	Nonattainment (Serious)	Nonattainment
	All Areas	PM_{10}	Unclassifiable	Nonattainment
	All Areas	Nitrogen dioxide	Attainment	Attainment
	All Areas	Sulfur dioxide	Attainment	Attainment

Notes:
[1]The Imperial Valley covers the western two-thirds of Imperial County.
[2]The Coachella Valley is located immediately north of the Salton Sea and is within the Salton Sea Air Basin (SSAB) in western Riverside County.
Source: USEPA 1998a, 1998b, 1999a, 1999b.

FEDERAL GENERAL CONFORMITY REQUIREMENTS

The CAA (1977 amendments) (42 USC 7401 *et seq.*) state that the federal government is prohibited from engaging in, supporting, providing financial assistance for, licensing, permitting, or approving any activity that does not conform to an applicable SIP. Federal actions related to transportation plans, programs, and projects developed, funded, or approved under 23 USC or the Federal Transit Act (49 USC 1601 et seq) are covered under separate regulations for transportation conformity.

In the 1990 CAA amendments, USEPA included provisions requiring federal agencies to ensure that actions undertaken in nonattainment or attainment-maintenance areas are consistent with applicable SIPs. The process of determining whether or not a federal action is consistent with applicable SIPs is called conformity.

The USEPA General Conformity Rule applies only to federal actions that result in emissions of "nonattainment or maintenance pollutants", or their precursors, in federally designated nonattainment or maintenance areas. The USEPA General Conformity Rule establishes a process to demonstrate that federal actions would be consistent with applicable SIPs and would not cause or contribute to new violations of the NAAQS, increase the frequency or severity of existing violations of the NAAQS, or delay the timely attainment of the NAAQS. The emission thresholds that trigger requirements of the conformity rule for federal actions emitting nonattainment or maintenance pollutants, or their precursors, are called *de minimis* levels. The general conformity *de minimis* thresholds are defined in 40 CFR 93.153(b).

The federal General Conformity Rule does not apply to federal actions in areas designated as nonattainment of only the CAAQS.

PREVENTION OF SIGNIFICANT DETERIORATION/NEW SOURCE PERFORMANCE STANDARDS

The CAA and amendments also include regulations intended to "prevent significant deterioration" (PSD) of air quality and to establish emissions performance standards for new stationary sources or New Source Performance Standards (NSPSs). Federal PSD and NSPS regulations generally apply to major (very large) stationary sources of emissions, and would not apply to the Proposed Project or alternatives.

3.7.2.2 State Regulations and Standards

CALIFORNIA AMBIENT AIR QUALITY STANDARDS

CARB administers the air quality policy in California. CAAQS were established in 1969 pursuant to the Mulford-Carrell Act. These standards, included with the NAAQS in Table 3.7-2, are generally more stringent and apply to more pollutants than the NAAQS. In addition to the criteria pollutants, CAAQS have been established for visibility-reducing particulates, hydrogen sulfide, and sulfates. The California Clean Air Act (CCAA), which was approved in 1988, requires each local air district in the state to prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. These AQMPs also serve as the basis for preparation of the SIP for the State of California.

CARB establishes policy and statewide standards and administers the state's mobile source emissions control program. In addition, CARB oversees air quality programs established by state statute, such as Assembly Bill (AB) 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987.

3.7.2.3 Local Regulations and Standards

AIR QUALITY PROGRAMS

In California, regional air pollution control districts have been established to oversee the attainment of air quality standards within air basins, as defined by the state. The districts have permitting authority over all stationary sources of air pollutants within their district boundaries, and act as the primary reviewer of environmental documents associated with air quality issues.

Each district has developed its own program and regulations to attain and maintain air quality standards, while integrating federal and state requirements. In addition, the South

Coast Air Quality Management District (SCAQMD) has developed specific guidelines and criteria for compliance with CEQA.

The following is a list of the air districts associated with each geographic subregion:

- *Lower Colorado River.* The LCR falls under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD) and the Imperial County Air Pollution Control District (ICAPCD). Both agencies have developed rules for implementing federal and state air quality objectives within their jurisdictions.
- *IID Water Service Area and AAC.* This area is under the jurisdiction of the ICAPCD.
- *Salton Sea.* Both the ICAPCD and the SCAQMD have jurisdiction over portions of the Salton Sea geographic subregion.
- *SDCWA Service Area.* The San Diego Air Pollution Control District (SDAPCD) regulates this area.

3.7.3 Existing Setting

ATTAINMENT STATUS DESIGNATIONS

California and federal attainment status designations are listed in Table 3.7-3 for the counties making up the four geographic subregions. Attainment status designations are not listed in Table 3.7-3 for the new federal 8-hour ozone and $PM_{2.5}$ standards because sufficient ambient monitoring data are not yet available, pending formal USEPA implementation of these standards. Federal O_3, PM_{10}, and CO attainment classifications are illustrated in Figures 3.7-1, 3.7-2, and 3.7-3, respectively. Each figure shows nonattainment areas for NAAQS and the classification of each nonattainment area.

3.7.3.1 Lower Colorado River

The LCR geographic subregion encompasses the LCR and its 100-year floodplain from Parker to Imperial Dams, including the full pool elevation of Lake Havasu. This area falls under the jurisdiction of the MDAQMD and the ICAPCD. Both agencies have developed rules for implementing federal and state air quality objectives within their jurisdictions. Only minimal impacts to air quality from the Proposed Project or alternatives would occur in the LCR geographic subregion (see Section 3.7.4, Reclamation 2002). Therefore, information on existing air quality and meteorological conditions in this subregion is not provided.

3.7.3.2 IID Water Service Area and AAC

The following three geographic subregions are located within the SSAB and the San Diego Air Basin (SDAB): IID water service area and AAC, Salton Sea, and SDCWA service area. The three geographic subregions are also under the jurisdiction of the following three regional regulatory agencies: ICAPCD, SCAQMD, and SDAPCD. Each district develops its own program to attain and maintain air quality standards while integrating federal and state requirements. Figure 3.7-4 shows the location of each geographic subregion with respect to air basin and political boundaries.

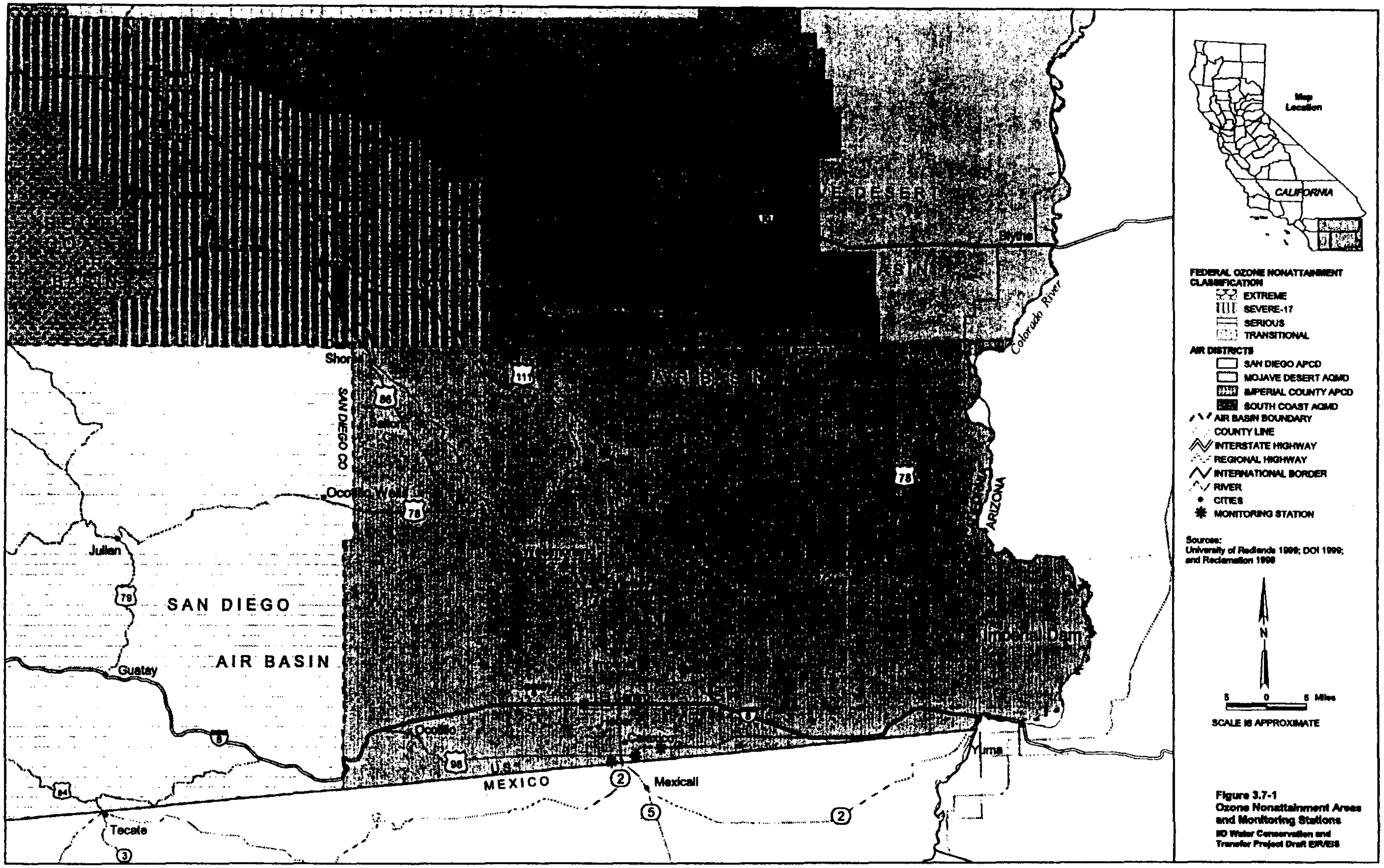

Figure 3.7-1
Ozone Nonattainment Areas and Monitoring Stations
IID Water Conservation and Transfer Project Draft EIR/EIS

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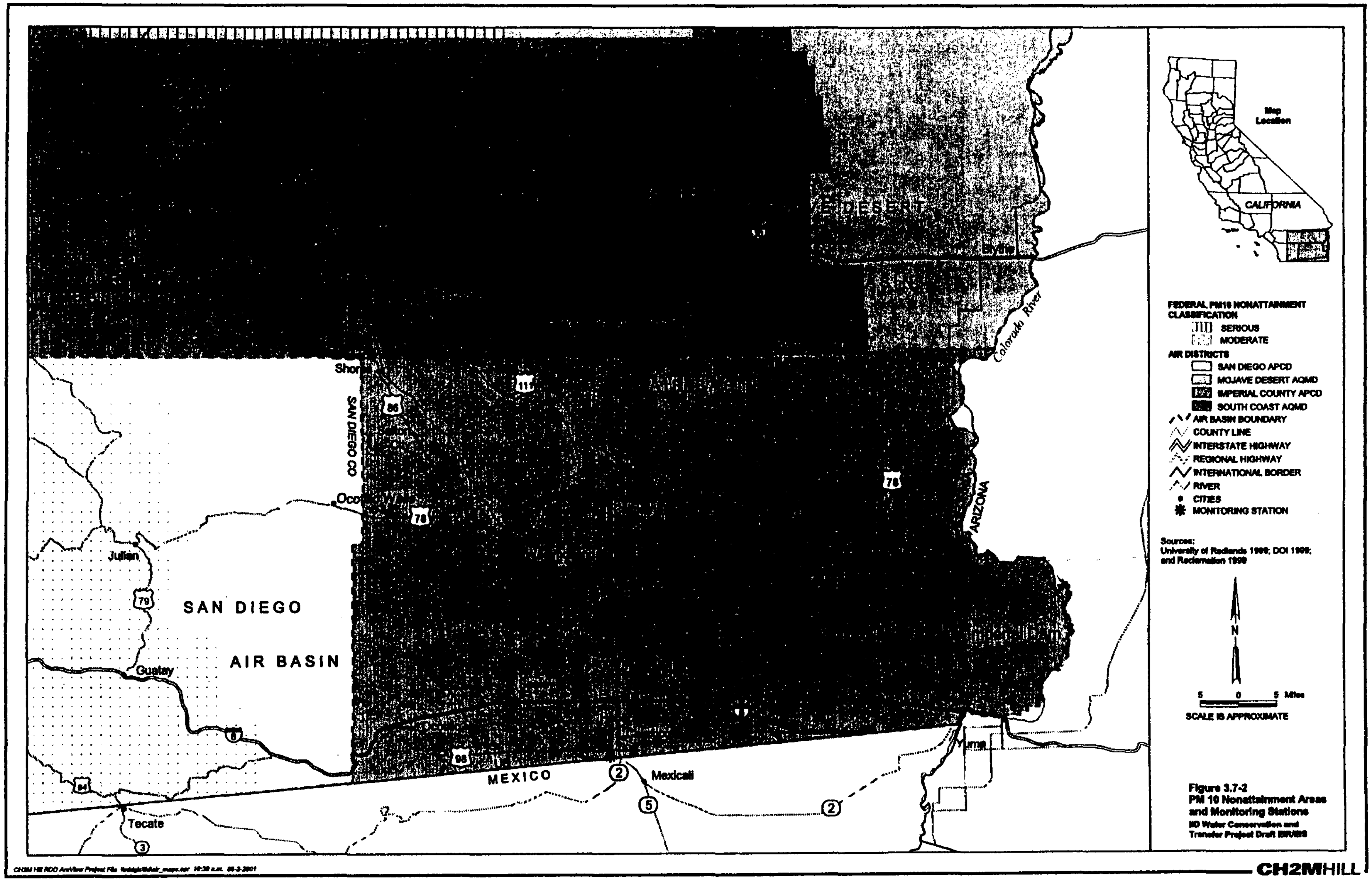

Figure 3.7-2
PM 10 Nonattainment Areas and Monitoring Stations
IID Water Conservation and Transfer Project Draft EIR/EIS

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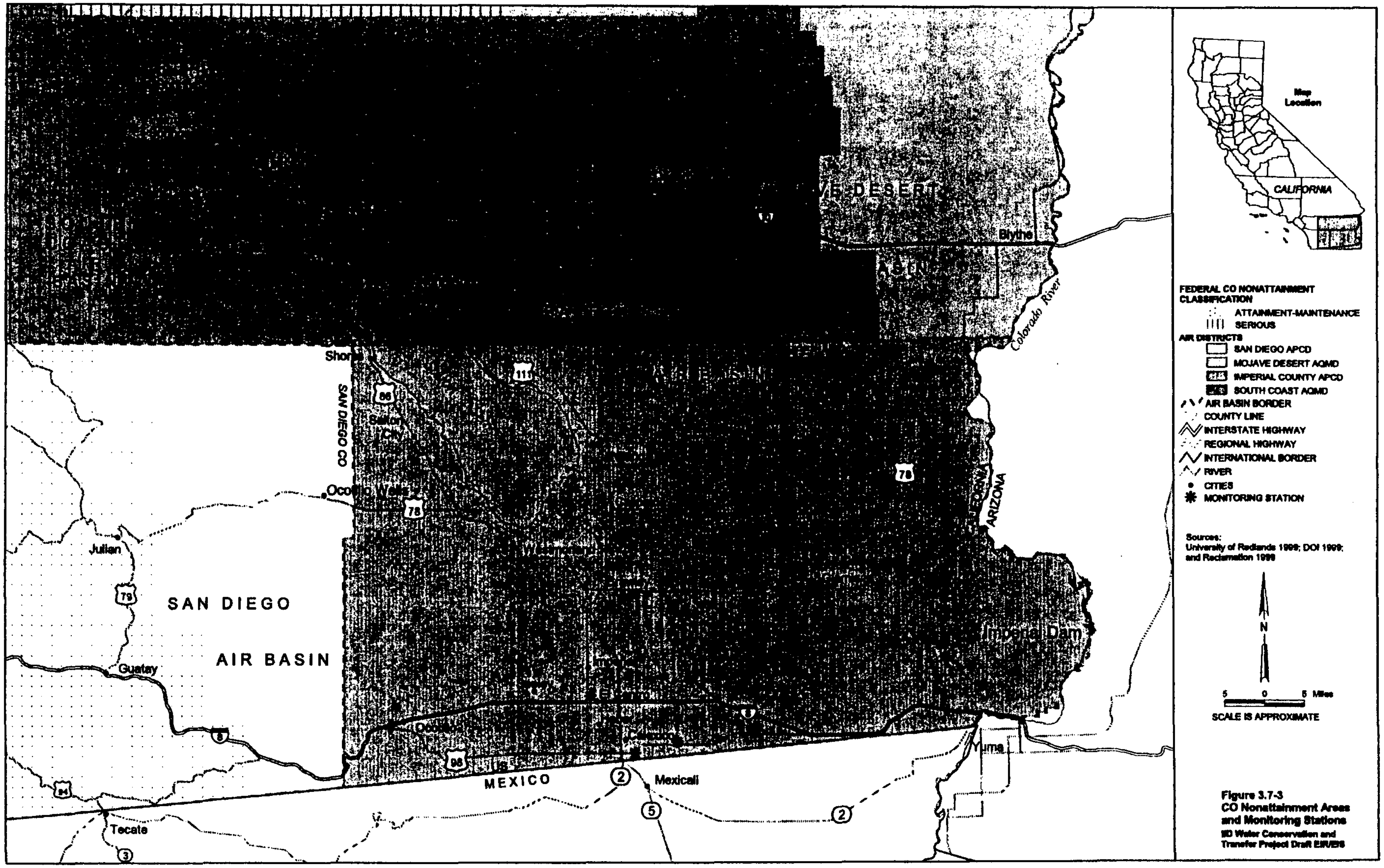

Figure 3.7-3
CO Nonattainment Areas and Monitoring Stations
IID Water Conservation and Transfer Project Draft EIR/EIS

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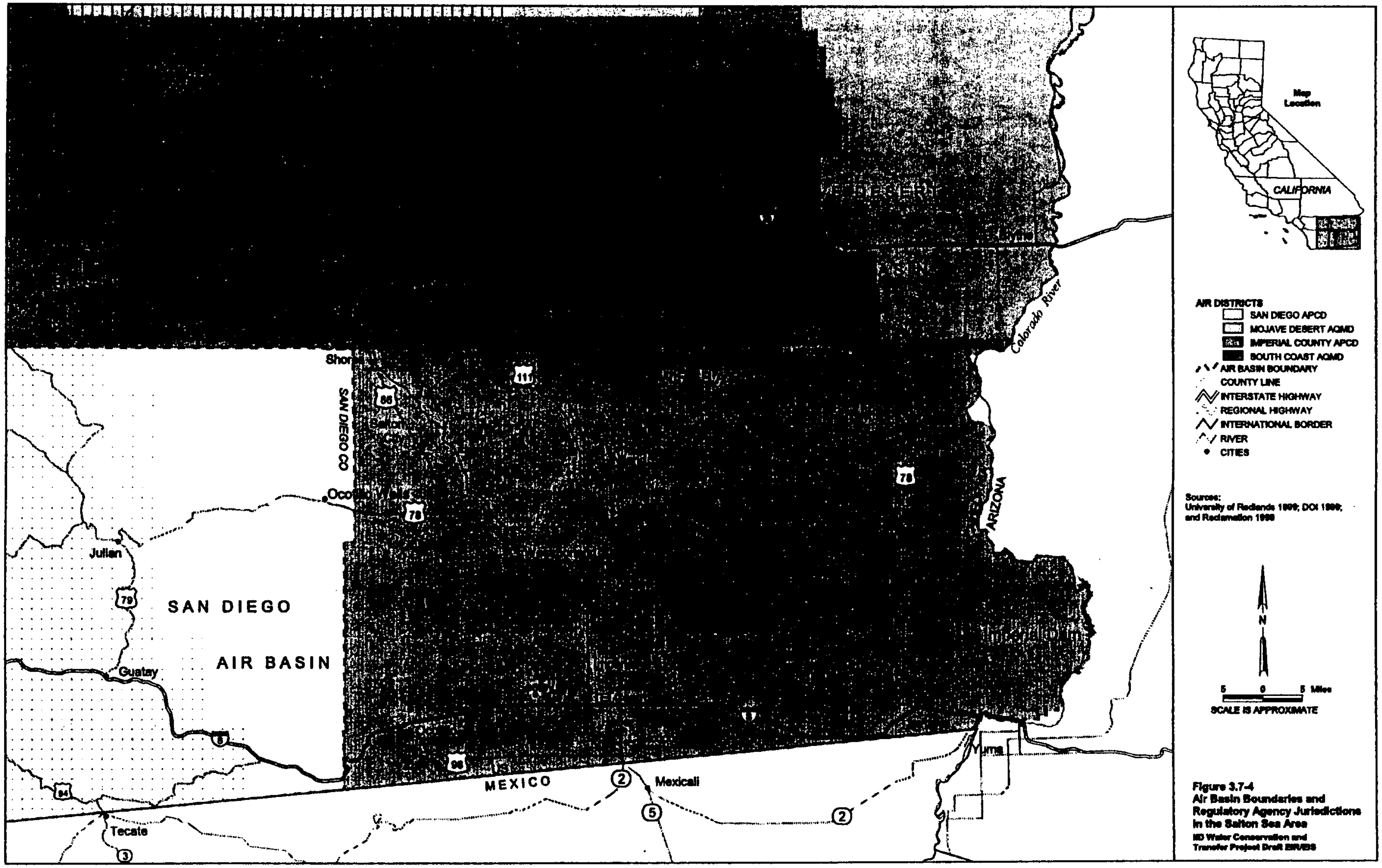

Figure 3.7-4
Air Basin Boundaries and Regulatory Agency Jurisdictions in the Salton Sea Area
IID Water Conservation and Transfer Project Draft EIR/EIS

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For the purpose of assessing existing conditions of air quality, the IID water service area and AAC geographic subregion are defined as the portion of the SSAB within Imperial County. This geographic subregion is under the jurisdiction of ICAPCD.

ATTAINMENT STATUS

Imperial County is designated as a federal transitional nonattainment area for ozone, and the IID water service area portion of the county is designated as a federal moderate nonattainment area for PM_{10}. All areas of the county are designated as attainment for NAAQS for CO, NO_2, and SO_2.

Imperial County is designated as a state nonattainment area for O_3 and PM_{10}. In addition, the City of Calexico is designated as nonattainment for the state CO standard. The remainder of the county is designated as unclassified for the state CO standard, and the entire county is designated as attainment for the remaining CAAQS.

The most prevalent airborne pollutant in the SSAB is PM in the form of fugitive dust (IID 1994). In the SSAB, fugitive windblown dust, wind erosion of exposed soil (from agricultural fields and the desert), and vehicle travel over unpaved roads are the major sources of PM_{10}. Table 3.7-4 summarizes the estimated annual average emissions (in tons per day) for the SSAB for each of the major PM_{10} emission source categories. Imperial County and Riverside County contributions are shown.

TABLE 3.7-4
Estimated 2000 Annual Average PM_{10} Emissions in the SSAB (tons/day)

PM10 Emission Source	Imperial County	Riverside County	Total SSAB
Farming Operations	26.66	1.48	28.14
Paved Road Operations	3.67	5.82	9.5
Unpaved Road Dust	38.92	11.16	50.09
Fugitive Windblown Dust	173.35	2.35	175.7
Other Sources	9.51	8.43	17.92
Total All Sources in Basinwide Inventory	252.11	29.24	281.35

Source: 2000 Estimated Basin Data, http://www.arb.ca.gov/emisinv/maps/basins/abssmap.htm

As a result of the area's designation as a federal moderate nonattainment area for PM_{10}, the ICAPCD has published a *State Implementation Plan for PM-10 in the Imperial Valley* (ICAPCD, 1993), and according to District staff, this document is currently being updated (Romero 2001). The ICAPCD has also promulgated Rule 800, Fugitive Dust Requirements for Control of Fine Particulate Matter (PM_{10}), to reduce the amount of PM_{10} entrained in ambient air by requiring actions to prevent, reduce, or mitigate PM_{10} emissions. However, the rule specifically exempts agricultural operations.

The SSAB also has elevated concentrations of ground-level ozone, which is transported into the basin from urban areas to the west and northwest.

METEOROLOGICAL CONDITIONS

The climate of the IID water service area is typical of a desert regime, with large daily and seasonal fluctuations and an annual average temperature of 71 degrees Fahrenheit (°F). The temperature exceeds 100°F more than 100 times a year. During the winter, temperatures can drop below freezing. Throughout the year, average daily relative humidity is low, ranging from 28 percent to 52 percent. The average rainfall is less than 3 inches a year.

Wind speed and directional frequency data were obtained from the California Irrigation Management Information System (CIMIS), which operates two meteorological stations near the Salton Sea. Station 154 is near Bombay Beach (along the northeast shoreline), and Station 127 is near the boat ramp north of Salton City (along the southwest shoreline). Prevailing winds during the winter, spring, and fall are from the northwest. During the summer, winds shift and are more frequently from the northeast.

A windrose diagram of conditions at Station 154 is provided in Figure 3.7-5. This diagram summarizes wind conditions during 1998 and 1999, which are the only two years of available data. Measurements were obtained for 84.5 percent of all hours during this period. West-southwest to north-northwest winds were the most frequent at this station, with high wind events usually from the west-southwest to northwest. The windrose diagram indicates that wind speed measurements were below 7 meters per second for all hours.

A windrose diagram of conditions at Station 127 is provided in Figure 3.7-6. This diagram summarizes wind conditions from 1995 through 1999, which are the only 5 years for which data are available. Measurements were obtained for 83.1 percent of all hours during this period. West to east-northeast winds were the most frequent at this station, although east-southeast winds were also common. High wind events were usually from the west-southwest to northwest. The windrose diagram indicates that wind speed measurements were below 7 meters per second for all hours.

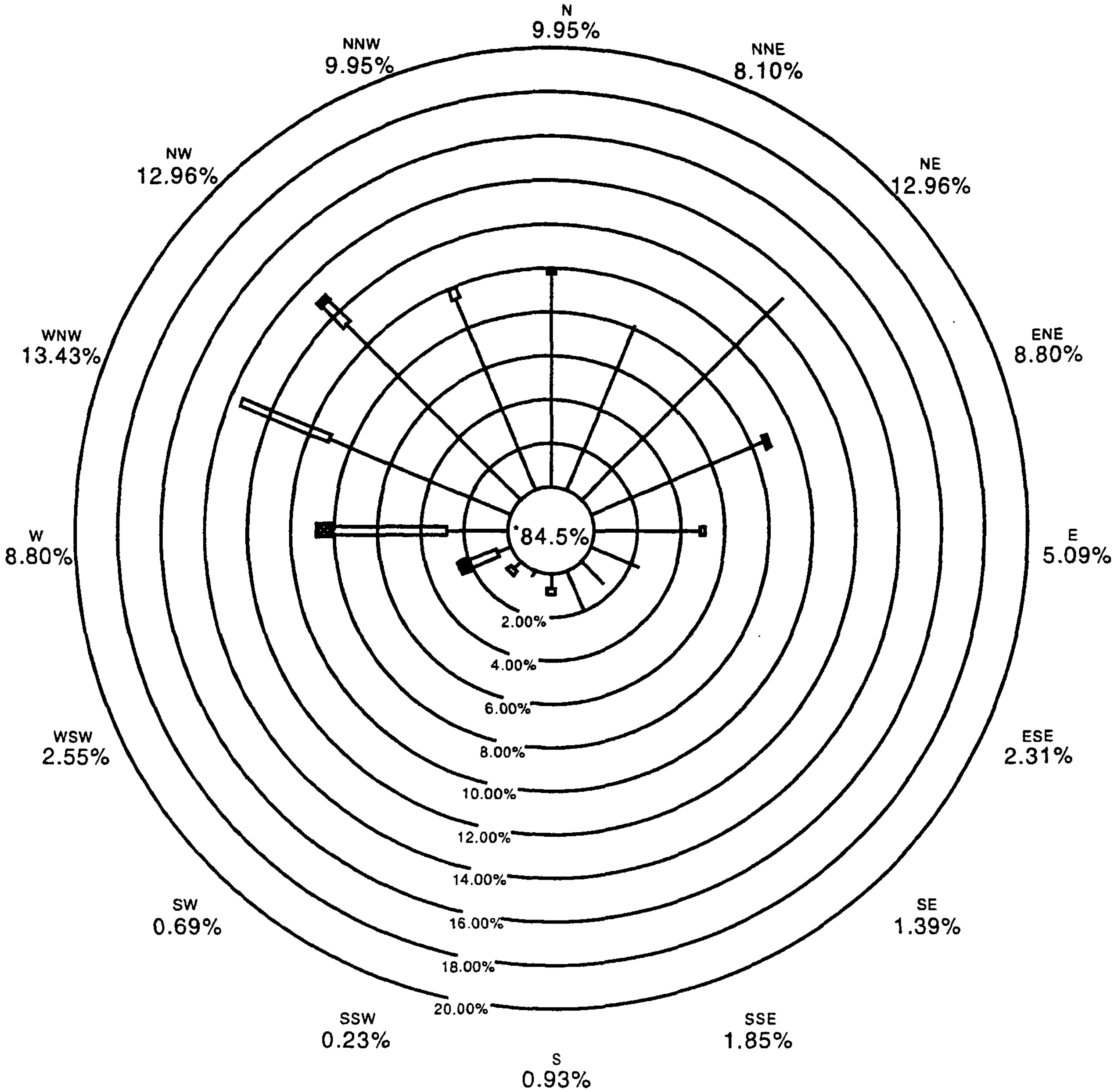
3.7.3.3 Salton Sea

The Salton Sea geographic subregion, which is also within the SSAB, is located in both Imperial and Riverside Counties. For the purposes of this section of the Draft EIR/EIS, the Salton Sea geographic subregion consists of the Salton Sea plus a 0.5-mile strip of land extending out from the shoreline.

The portion of the Salton Sea geographic subregion within Imperial County is under the jurisdiction of ICAPCD. The remaining portion of this geographic subregion in western Riverside County is under the jurisdiction of SCAQMD.

ATTAINMENT STATUS

The western Riverside County portion of the SSAB is designated as a federal severe-17 nonattainment area for O_3 and a federal serious nonattainment area for PM_{10}. All other areas of Riverside County are in attainment of NAAQS. The entire county is designated as a state nonattainment area for both O_3 and PM_{10}. All areas of the county are designated as being in attainment for the remaining CAAQS.



HOURLY AVERAGE SURFACE WINDS
PERCENTAGE FREQUENCY OF OCCURRENCE

STABILITY CLASS. ALL

STATION LOCATION: #154 SALTON SEA NORTH

* CALMS PLUS LOWEST VELOCITY CLASS

INCLUSIVE DATES: 1998-1999

Figure 3.7-5
Windrose Diagram of Conditions at Station 154
IID Water Conservation and Transfer Project Draft EIR/EIS

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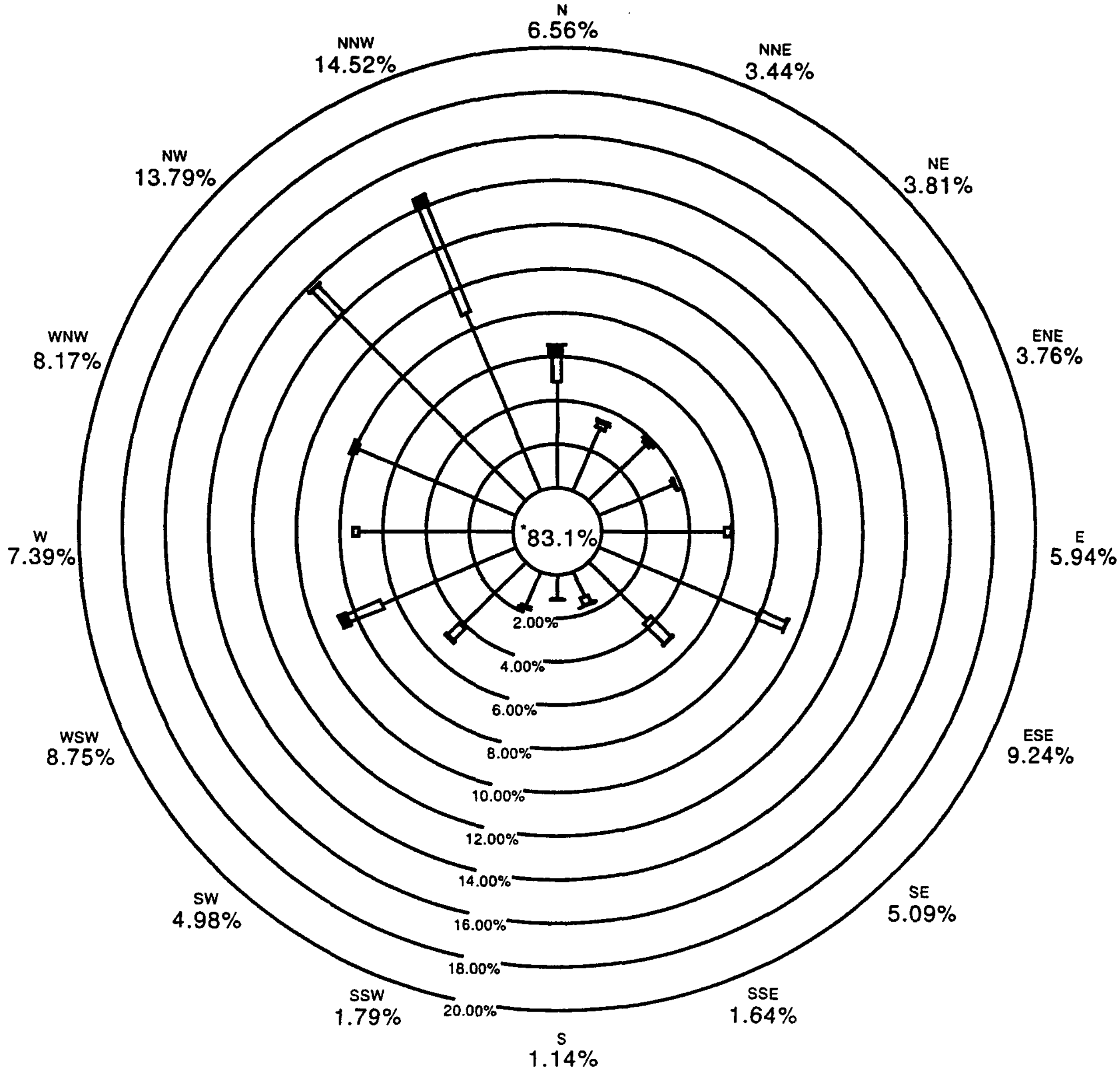

HOURLY AVERAGE SURFACE WINDS
PERCENTAGE FREQUENCY OF OCCURRENCE

STABILITY CLASS: ALL

STATION LOCATION: #127 SALTON SEA WEST

INCLUSIVE DATES: 1995-1999

* CALMS PLUS LOWEST VELOCITY CLASS

Figure 3.7-6
Windrose Diagram of Conditions at Station 127
IID Water Conservation and Transfer Project Draft EIR/EIS

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METEOROLOGICAL CONDITIONS

Discussion of meteorological conditions for the SSAB, provided below, was obtained from the Imperial County General Plan (County of Imperial 1997). The climate of the Salton Sea geographic subregion is characterized as a desert regime with a wide range in temperature fluctuations, low humidity, and thermally driven wind patterns.

Temperature patterns are similar throughout the SSAB. The climatic condition of the area is governed by large-scale warming and sinking of air in the semi-permanent subtropical high-pressure center over the Pacific Ocean. The high-pressure ridge blocks most mid-latitude storms, except in the winter when the high-pressure ridge is weakest and farthest south. The coastal mountains prevent the intrusion of the cool, damp air found in the California coastal regions (IID 1994).

The flat terrain and strong temperature differentials created by intense heating and cooling patterns produce moderate winds and deep thermal circulation systems. Thus, even though the summers are hot, the general dispersion of local air pollution is greater than in the coastal basins where polluted inversion layers may remain for long periods (IID 1994).

Daily temperature fluctuations and seasonal variations are generally extreme. Clear skies and rapid heating and cooling of desert soils create high temperatures by day and quick cooling by night. Daily temperatures range from the mid-40s to low-70s°F during winter, and from the low-70s to mid-100s°F during summer. The average annual rainfall is about 3 inches, and the average annual air temperature is about 72°F (IID 1994).

Wind patterns in the area generally align with the long axis of the Salton Sea. The prevailing wind direction during all seasons is from the northwest. During the spring and summer, winds from the east and southeast become a secondary component, while during the fall and winter, the secondary component is from the west and southwest. Wind speeds are generally moderate throughout the geographic subregion.

3.7.3.4 Ambient Air Quality Monitoring Data

Numerous air quality monitoring stations are located throughout the Project region of influence. Monitoring stations are operated and maintained by local air districts (see Figure 3.7-4).

Imperial County operates and maintains air quality monitoring stations in Brawley, Calexico (3), El Centro, Niland, Westmorland, and Winterhaven. Riverside County operates and maintains air quality monitoring stations in the Coachella Valley in Indio and Palm Springs. San Diego County operates and maintains 10 monitoring stations throughout the western two-thirds of the county. Monitoring data from San Diego County are included to allow comparison of pollutant concentrations measured throughout the study region.

OZONE

Ozone air quality monitoring data from 1994 through 1999 are summarized in Table 3.7-5. Imperial County is a federal and state nonattainment area for ozone. The number of violations of the state and federal ozone standards has decreased since 1994. The increased stringency of the new 8-hour federal ozone standard is shown by the increased number of days during which this standard would have been exceeded relative to the 1-hour ozone standard. The state ozone standard, which is more stringent, was exceeded more frequently than the federal 8-hour standard. The fourth highest ozone concentration during the 3-year period from 1996 and 1998 is listed as 0.14 ppm, which is slightly above the federal 1-hour ozone standard of 0.12 ppm.

TABLE 3.7-5
Ozone Data Summary for Monitoring Stations in Imperial, Riverside (Indio), and San Diego Counties, 1994-1999

	Number of Days Standard Exceeded			Ozone Concentrations in ppm				
				1-hour			8-hour	
Year	State 1-hour	Federal 1-hour	Federal 8-hour	Maximum	3 Year 4th High	EPDC	Maximum	3 Year Average 4th High
CAAQS	—	—	—	—	—	—	0.090	—
NAAQS	—	—	—	—	0.120	—	—	0.080
Imperial County								
1998	40	3	16	0.14	0.14	0.142	0.104	0.093
1997	69	10	50	0.16	0.16	0.157	0.120	0.103
1996	69	10	34	0.18	0.18	0.155	0.117	0.103
1995	83	22	49	0.23	0.18	0.163	0.116	0.105
1994	75	8	47	0.18	0.15	0.154	0.116	0.104
Riverside County (Indio: Jackson Street)								
1998	16	2	12	0.134	NA	NA	0.115	NA
1997	0	0	0	0.102	NA	NA	0.070	NA
1996	NA	0	NA	0.118	NA	NA	NA	NA
1995	25	3	17	0.142	NA	0.127	0.111	NA
1994	NA	0	NA	0.124	NA	NA	NA	NA
San Diego County								
1998	47	9	33	0.16	0.14	0.135	0.141	0.102
1997	43	1	16	0.14	0.14	0.132	0.112	0.099
1996	51	2	31	0.14	0.14	0.142	0.117	0.104
1995	96	12	48	0.16	0.15	0.148	0.122	0.108
1994	79	9	46	0.15	0.15	0.147	0.121	0.109

Note: EPDC = expected peak day concentration
NA = not available
ppm = parts per million
Source: CARB 1999b.

Values shown for Riverside County were obtained from an Indio (Jackson Street) monitoring station. Violations of the state and federal ozone standards were measured in 1995 and 1998, but not in 1997. The state standard was violated most frequently at this station. Three-year ozone concentrations for comparison to the federal 8-hour standard were not available from USEPA's AIRS database. The CARB database also lacked data for 1996 from this station. CARB data indicate that 8-hour ozone concentrations remain above the state standard at this station. Data are also available for the Palm Springs Fire Station monitoring station in Riverside County, but this station is farther from the Project region of influence than the Indio station. Higher ozone concentrations were measured at the Palm Springs station.

The number of ozone violations in San Diego County is similar to the number of ozone violations in Imperial County. Transport from the South Coast Air Basin accounts for approximately 75 percent of the ozone violations in San Diego County. The highest ozone concentrations in San Diego County typically occur following mild Santa Ana meteorological conditions and are associated with transport of pollution from the SCAQMD. High concentrations are typically observed first at the Oceanside and Del Mar monitoring stations in northern San Diego County, and later at the Escondido and Alpine monitoring stations in the foothills of the mountains.

PM_{10}

PM_{10} air quality monitoring data from 1994 through 1999 are summarized in Table 3.7-6. Values shown for Riverside County were obtained from the Indio Monitoring Station. Violations of the state 24-hour PM_{10} standard occurred during this period in all three counties. Imperial and Riverside Counties are also in violation of the federal 24-hour PM_{10} standard, and the number of violations appears to be increasing. The number of violations of the state and federal 24-hour PM_{10} standards in San Diego County has remained relatively constant during the same time period. All of the highest PM_{10} concentrations in San Diego County were measured at the Otay Mesa monitoring station, and all of the highest PM_{10} concentrations in Imperial County were measured at the three monitoring stations in Calexico.

CO, NO_2, and SO_2.

CO, NO_2, and SO_2 air quality monitoring data from 1994 through 1999 are summarized in Table 3.7-7. These data were obtained from USEPA's AIRS Database. In Imperial County, concentrations of CO have exceeded the state 1-hour standard and both the state and federal 8-hour standards. In addition, concentrations of NO_2 appear to be increasing and exceeded the state 1-hour standard in 1998 and 1999. Annual NO_2 and all SO_2 concentrations remain below state and federal standards.

Ambient concentrations of CO, NO_2, and SO_2 remain well below all standards at the Palm Springs Monitoring Station in Riverside County and at all monitoring stations in San Diego County.

3.7.4 Impacts and Mitigation Measures

3.7.4.1 Methodology

Methods used to quantify potential air quality impacts attributable to implementing the Proposed Project and alternatives are described in this section.

Separate analysis of potential impacts from construction and operation is necessary because the nature and duration of emissions from these activities are different.

The methods used to quantify emissions and characterize the significance of impacts from construction activities, subsequent on-going operations, and windblown dust are presented below.

Construction Methodology

Construction activities result in pollutant emissions from mobile construction equipment and soil disturbance activities. Emission sources include engine exhaust from construction equipment, dust generated from the movement of construction equipment, and dust generated from soil disturbance activities.

TABLE 3.7-6
PM10 Data Summary for Monitoring Stations in Imperial, Riverside (Indio), and San Diego Counties, 1994-1999

	% of Samples Above 24-hour Standard		PM_{10} Concentration in μg/m³				
Year	State > 50 μg/m³	Federal > 150 μg/m³	Maximum 24-hour	Maximum AGM	Maximum AAM	Max EPDC	Maximum 99th Percentile
Imperial County[1]							
1999	NA	11	291	NA	140.5	NA	NA
1998	NA	19	287	NA	90.7	NA	NA
1997	77	11	199	76.9	86.8	228.6	532
1996	79	22	441	90.3	109.8	223.0	441
1995	71	5	229	59.6	72.0	166.8	229
1994	71	5	258	106.8	120.2	168.5	258
Riverside County (Indio: Jackson Street)[1]							
1999	NA	0	119	NA	54.5	NA	NA
1998	NA	0	114	NA	47.2	NA	NA
1997	46	4	144	46.4	49.7	208.5	182
1996	52	3	215	48.3	53.6	168.8	215
1995	44	2	133	47.2	49.7	134.7	199
1994	37	0	97	45.3	48.3	117.3	97
San Diego County (Otay Mesa)[1]							
1999	NA	0	121	NA	47.0	NA	NA
1998	NA	0	89	NA	42.8	NA	NA
1997	26	0	125	41.9	46.6	134.7	125
1996	18	0	93	38.9	42.9	148.6	93
1995	27	0	121	39.8	47.1	160.9	121
1994	29	0	129	45.2	50.8	79.5	129

Notes: AAM = annual arithmetic mean
AGM = annual geometric mean
EPDC = expected peak day concentration
NA = not available
Source: CARB 1999c.

μg/m³ = micrograms per cubic meter
[1]CARB monitoring data missing for 1998 and 1999.

Air quality impacts from construction activities are difficult to quantify because they occur on a temporary basis, are mobile, and fluctuate in relative strength. To the extent possible, air quality impacts from construction activities have been quantified according to the methodology presented below. Construction emissions are compared to the appropriate air quality significance criteria.

Exhaust emissions occur from the operation of mobile construction equipment at each work site, such as tractors, bulldozers, and backhoes. Emissions are proportional to the amount of work performed by each piece of equipment; therefore, emissions were calculated by multiplying emission factors by the number of hours of operation, and average operating load for each piece of equipment. For the system measures, emissions estimated for construction of the 15 potential lateral interceptor systems varied somewhat due to different sizes for the various Proposed Project components. Because of this variation, estimated emissions were averaged to simplify the analysis.

TABLE 3.7-7
Ambient CO, NO_2, and SO_2 Concentrations in Imperial, Riverside (Palm Springs), and San Diego Counties, 1994-1999

	Concentrations in ppm							
	CO		NO_2		SO_2			
Year	2nd Maximum 1-hour	2nd Maximum 8-hour	Maximum 1-hour	AAM	Maximum 1-hour	2nd Maximum 3-hour	2nd Maximum 24-hr	AAM
CAAQS[1]	20	9.0	0.25	-	0.25	-	0.04	-
NAAQS[2]	35	9	-	0.053	-	0.5	0.14	0.030
Imperial County								
1999	20.6	13.3	0.286	0.016	0.027	0.022	0.013	0.003
1998	19.0	13.3	0.257	0.014	0.035	0.025	0.017	0.003
1997	21.8	16.7	0.128	0.015	0.040	0.023	0.011	0.002
1996	26.2	14.1	0.164	0.014	0.036	0.028	0.013	0.003
1995	29.8	19.7	0.217	0.016	0.039	0.024	0.017	0.005
1994	25.7	12.9	0.227	0.015	0.060	0.028	0.017	0.006
Riverside County (Palm Springs)								
1999	2.4	1.6	0.065	0.016	0.034	0.015	0.009	0.001
1998	2.5	1.7	0.070	0.016	0.031	0.015	0.009	0.002
1997	2.4	1.3	0.069	0.015	0.036	0.010	0.005	0.001
1996	3.0	1.3	0.080	0.020	0.010	0.006	0.004	0.001
1995	3.1	1.5	0.082	0.021	0.012	0.007	0.004	0.001
1994	3.5	1.7	0.080	0.021	0.017	0.010	0.004	0.001
San Diego County								
1999	9.2	4.5	0.133	0.021	0.084	0.047	0.016	0.002
1998	9.8	4.7	0.132	0.023	0.149	0.059	0.016	0.003
1997	9.3	4.9	0.142	0.024	0.081	0.042	0.016	0.004
1996	11.1	6.0	0.124	0.022	0.087	0.053	0.017	0.004
1995	9.9	5.5	0.140	0.026	0.081	0.048	0.015	0.003
1994	11.0	7.0	0.157	0.024	0.098	0.044	0.015	0.003

[1]CAAQS are not to be exceeded.
[2]NAAQS are not to be exceeded more than once per year (except for annual standards).
AAM = annual arithmetic mean
Source: CARB 2000b.

Based on the estimated annual incremental increase in conservation and transfer rate of 20 KAFY, approximately 470 80-acre farms (average size) per year would be needed to construct and implement some form of conservation measure. Lists of the types of equipment required and estimates of the length of time the equipment would need to operate to construct the various on-farm and water delivery system conservation measures were developed based on experience with construction of similar systems at other locations (Mattingly 2000). Emission factors from the SCAQMD CEQA *Air Quality Handbook* were used to estimate exhaust emissions associated with operation of the construction equipment (SCAQMD 1993).

Soil disturbance activities, such as soil grading, excavation, and equipment and vehicle travel on unpaved roads, represent sources of windblown dust. Construction emission estimates prepared for this air quality analysis did not include fugitive dust emissions associated with soil disturbance, because normal operations at farms involve so much soil disturbance that installation of the conservation measures is assumed to be within the range of typical activities. Nor did this air quality impact analysis include exhaust emissions for employees commuting to the farms for construction of the on-farm measures. Again, normal operations at farms involve employee and owner vehicle commute activities not substantively different than those proposed for construction of the on-farm measures. For both the on-farm and system conservation measures, this analysis assumed that any construction-related increases in emissions of fugitive dust and exhaust from employee commute vehicles would be temporary and localized.

Operation Methodology

Operational impacts include emissions from new stationary sources, operation of mobile equipment, and increased potential for suspension of dust from agricultural areas. Lists were developed of the types of equipment and labor required, and estimates of the length of time the equipment or laborers would need to work to operate and maintain the various on-farm and water delivery, system conservation measures, based on experience with O&M of similar systems at other locations (Mattingly 2000).

Operation of the on-farm and delivery system conservation measures would occur over the lifetime of the Proposed Project, up to 75 years, depending on when the measures are constructed. The O&M activities expected for the on-farm conservation measures range from an increase in labor over existing practices for narrow border strips and drip irrigation systems, to some minor amount of equipment use periodically (e.g., use of a scraper every 5 years for laser leveling and multi -slope systems), to use of a backhoe once a year for sediment cleanup for cascading tailwater systems, to use of a pump for 24 hours every 2 weeks for tailwater return/pumpback systems. The O&M activities expected for the water delivery system conservation measures include additional labor for visual inspections, maintenance, and patrolling of systems, as well as a small amount of equipment use periodically (e.g., use of a backhoe two to three times a year for channel cleanup for lateral interceptor and conveyance lining systems, and use of a utility truck for monthly pump and motor service for seepage interceptor systems). This air quality analysis assumes that these O&M activities are within the range of normal activities in the area. This air quality analysis also assumes that the O&M activities associated with on-farm irrigation management measures are within the range of normal activities in the area.

Windblown Dust From Exposed Shoreline Methodology

Hydrologic modeling of the Salton Sea was performed to determine the effect of reduced inflow volumes on salinity, surface area, and Sea level elevation (Reclamation 2001b). The Proposed Project consists of incremental increases in water conservation of about 25 KAFY per year until the total volume of water conserved for transfer reaches 300 KAFY. An additional 59 KAFY would be conserved for compliance with the IOP. This would reduce the volume of water entering the Sea, resulting in a decrease in the surface area and the exposure of areas formerly submerged. The Sea would decrease in elevation and surface area at a rate greater than that predicted for Baseline conditions.

Analysis of soils and sediments surrounding the Salton Sea indicates that acceleration of the predicted decrease in Sea level would also increase the potential for dust suspension. Spatial variations in sediment characteristics and soil erodibility, temporal variations in wind conditions, and variation in factors contributing to the formation of salt crusts prevent any reasonable quantitative estimate of emissions and associated impacts from the predicted increase in exposed shoreline. However, a qualitative assessment of the potential for dust suspension is possible.

Windblown Dust From Fallowing Methodology

Fallowing of agricultural lands is one of the conservation methods proposed under the Proposed Project and some of the alternatives and HCP (Salton Sea Portion) Approach 2. Baseline conditions include approximately 20,000 acres of fallowed lands. The potential maximum fallowed acres that might be required for all project components for the Proposed Project or alternatives, plus HCP Approach 2, might be as great as 84,800 acres, assuming fallowing is maximized for conservation and the HCP.

It is not possible to quantify emissions and associated impacts from potential increases in fallowing of agricultural lands, at a variety of locations over time, for water conservation. On one hand, emissions would decrease because the fallowed land would not be subject to plowing or the other agricultural activities that disturb soil. On the other hand, fallowed lands that are not properly retired or mitigated may be subject to wind erosion, creating fugitive dust impacts. A qualitative assessment is provided.

Subregions Excluded From Impact Analysis. No impacts to air quality resources would occur in the SDCWA service area geographic subregion because no construction of new facilities or changes in operation of existing facilities would occur in this subregion; therefore, this area is not discussed in the impact discussions.

3.7.4.2 Significance Criteria

The Proposed Project or alternatives would have a significant impact on air quality if total direct and indirect emissions from the Proposed Project or alternatives would:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Conflict with or obstruct implementation of an applicable air quality plan
- Expose sensitive receptors to substantial pollutant concentrations

- Create objectionable odors affecting a substantial number of people
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region of influence is nonattainment under an applicable federal or state ambient air quality standard

Significance Criteria During Construction and Operation

Impacts would be considered significant if any total direct and/or indirect emissions resulting from construction and implementation of the Proposed Project or alternatives exceed the federal general conformity *de minimis* thresholds. These thresholds apply only to pollutants designated as nonattainment or attainment-maintenance.

Compliance with the conformity rule is presumed if the *de minimis* thresholds are not exceeded. The conformity rule process is intended to demonstrate that the Proposed Project:

- Will not cause or contribute to new violations of federal air quality standards
- Will not increase the frequency or severity of existing violations of federal air quality standards
- Will not delay the timely attainment of federal air quality standards

If the *de minimis* thresholds would be exceeded, compliance with the general conformity rule must be demonstrated before the Proposed Project can continue. This is accomplished by means of a formal conformity determination process involving dispersion modeling, comparison to SIP requirements, and, possibly, emission offsetting or revisions to the SIP to accommodate emissions.

Significance thresholds for toxic air contaminants are also defined by some air districts. Emissions of toxic air contaminants would be significant if the emissions exceed the cancer risk, cancer burden, or health hazard indexes. MDAQMD and ICAPCD have not established significance criteria for toxic air contaminant emissions.

Colorado River Area –MDAQMD and ICAPCD Jurisdiction. Other than the general conformity *de minimis* thresholds, the MDAQMD and ICAPCD have not established significance criteria for projects in the Colorado River area.

The MDAQMD is designated as a serious federal PM_{10} nonattainment area. The general conformity *de minimis* threshold for serious PM_{10} nonattainment areas is 70 tons per year. Projects in the MDAQMD with emissions of PM_{10} in excess of 70 tons per year would be considered significant.

Imperial Valley – ICAPCD Jurisdiction. The study area is located in a federally designated nonattainment area for PM_{10} and ozone. Therefore, the general conformity rule is applicable in the study area for emissions of PM_{10} and for ROC (or VOC) and NO_x as precursors to ozone. Table 3.7-8 presents *de minimis* thresholds for the Imperial Valley contained in ICAPCD Rule 925, General Conformity. Exceedance of *de minimis* thresholds would require that a general conformity demonstration be performed prior to approval of a project by the air district.

The ICAPCD follows the requirements set forth by its planning division, which tend to follow the state's CEQA guidelines. For Imperial County, air quality impacts from proposed projects are evaluated on a case-by-case basis. There are two types of operational significance criteria in the Imperial Valley: criteria related to New Source Review (NSR) and criteria related to general conformity. The NSR criteria only apply to stationary sources. Both types are listed in Table 3.7-8.

TABLE 3.7-8
Significance Criteria for the IID Water Service Area

Pollutant	BACT Thresholds[a] (lbs/day) (ICAPCD Rule 207)	General Conformity[b] (tons/yr)
ROC	25	100 (VOC)
NO_x	25	100
CO	550	NA
PM_{10}	25	100
SO_x	NA	NA
Pb	3.3	NA

NA = not applicable because Imperial in County is in attainment of the NAAQS standard for CO.
ROC = reactive organic compound
a Source: ICAPCD Rule 207, New and Modified Stationary Source Review
b Source: ICAPCD Rule 925, General Conformity

Salton Sea Area –SCAQMD and ICAPCD Jurisdiction. The SCAQMD has established construction-related thresholds of significance for the portion of Riverside County that is in the SCAQMD. This portion includes part of the SSAB, including the Coachella Valley. Construction-related emissions in excess of any of the criteria listed in Table 3.7-9 are considered significant in this area. Significance criteria for construction activities have not been established in the Imperial County portion of the SSAB, other than the general conformity *de minimis* thresholds.

TABLE 3.7-9
Construction Emissions Thresholds of Significance for the Portion of the Salton Sea Air Basin within the South Coast AQMD (Riverside County)

Pollutant	Threshold	
	Daily (lb)	Quarterly (tons)
ROC	75	2.5
NO_x	100	2.5
CO	550	24.75
PM_{10}	150	6.75
SO_x	-	6.75

Projects in the Riverside County portion of the SSAB are subject to the requirements of the SCAQMD. Projects with peak operation-related emissions that exceed any of the criteria listed in Table 3.7-10 would be considered significant.

TABLE 3.7-10
Operational Significance Criteria for the Riverside County Portion of the Salton Sea Air Basin

Pollutant	SCAQMD NSR[a] (Rules 1303 and 1401)	CEQA[b] (lb/day)	General Conformity[c] (tons/yr)
ROC	NA	75	25
NO_x	40 tons/yr	100	25
CO	NA	550	N/A
PM_{10}	15 tons/yr	150	70
SO_x	NA	150	NA
Cancer Risk with TBACT without TBACT	 10^{-5} or 10 in 1 million 10^{-6} or 1 in 1 million	NA	NA
Cancer Burden	0.5	NA	NA
Acute HHI	1.0	NA	NA
Chronic HHI	1.0	NA	NA

HHI = Health Hazard Index
NA = not applicable
NSR = New Source Review (applicable to stationary sources only)
ROC = reactive organic compound
TBACT = toxics best available control technology
a Source: SCAQMD Rule 1303, Section (b)5(C)(I); Rule 1401, Section (d)
b Source: SCAQMD. CEQA Air Quality Handbook. November 1993.
c Source: SCAQMD Rule 1901; 40 CFR 51, General Conformity

There are three types of operational significance criteria in the Riverside County portion of the SSAB: criteria related to NSR, criteria related to general conformity, and SSAB-specific criteria related to CEQA. In addition, maximum allowable changes in pollutant concentrations attributed to projects in the SSAB also constitute significance criteria. These criteria are summarized in Table 3.7-11. Projects in the portion of the SSAB located in Imperial County must comply with the ICAPCD's requirements, as described in the previous subsection.

TABLE 3.7-11
Most Stringent Ambient Air Quality Standard and Allowable Change in Concentration[a]

Air Contaminant	Averaging Time	Most Stringent Air Quality Standard	Significant Change in Air Quality Concentration
NO_2	1-hour Annual	25 pphm (500 µg/m^3) 5.3 pphm (100 µg/m^3)	1 pphm (20 µg/m^3) 0.05 pphm (1 µg/m^3)
CO	1-hour 8-hour	20 ppm (23 mg/m^3) 9.0 ppm (10 mg/m^3)	1 ppm (1.1 mg/m^3) 0.45 ppm (0.50 mg/m^3)
PM_{10}	24-hour Annual GM	50 µg/m^3 30 µg/m^3	2.5 µg/m^3 1 µg/m^3
Sulfate	24-hour	25 µg/m^3	1 µg/m^3

[a] Source: SCAQMD Rule 1303

3.7.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Impact AQ-1: Fugitive dust from exposed riverbank and de-watered backwaters. Construction and operation of the on-farm and water delivery system conservation measures and treatment facilities would not occur in the LCR, so few air quality impacts would occur in this subregion. As a result of decreased water levels in the Colorado River between Parker Dam and Imperial Dam, there is some potential for increased fugitive dust emissions from exposed shoreline. However, the amount of land exposed by decreased water levels is relatively small, and some of the area will become re-vegetated. Backwaters would be replaced. The potential increase in windblown dust from exposed areas along the Colorado River would be minimal. (Less than significant impact.)

Biological Conservation Measures in USFWS' Biological Opinion

Air quality impacts from implementation of biological conservation measures would result from combustion emissions due to the use of fossil fuel-fired construction equipment and fugitive dust emissions due to ground-disturbing activities. The proposed conservation measures that would produce the most emissions would include the restoration of backwaters and creation of willow flycatcher habitat. No specific locations or designs have been formulated for these measures. Some of the activities needed to implement these measures could include dredging, grading, vegetation clearing, and channel deepening. It is expected that the impact of combustion emissions from these activities would not be large enough in a localized area to cause an exceedance of an ambient air quality standard, as most emission sources would be mobile and intermittent in nature. Fugitive dust emissions could be substantial from activities that disturb large amounts of soil. However, implementation of fugitive dust control measures outlined in the Draft IA EIS would effectively minimize PM_{10} emissions from proposed construction activities (Reclamation 2002).

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact AQ-2: Emissions from construction and operation of on-farm and delivery system conservation measures from water conservation program. Because the IID water service area subregion, and in particular, the IID water service area, is where most of the construction activities for on-farm and system conservation measures would occur, this subregion has the greatest potential for construction-related air quality impacts from the Proposed Project.

Potential annual equipment exhaust emissions from construction activities for on-farm conservation measures are summarized in Table 3.7-12. Each column in the table presents emissions estimated for construction of the indicated conservation measure at five hundred 80-acre farms, to conserve an estimated 20 KAFY of water. (The actual number of 80-acre farms would be approximately 470, so 500 is being used for a conservative estimate of emissions). This amount represents the maximum construction level anticipated in any given year over the life of the Proposed Project for construction of on-farm conservation measures for transfer. Emissions for the measures, therefore, should not be summed, but can be compared from measure to measure to determine a range of annual emissions that have the potential to occur with construction of on-farm conservation measures.

TABLE 3.7-12
Estimated Annual Equipment Exhaust Emissions for Construction of On-Farm Measures to Conserve 20 KAFY

		Annual Emissions from Construction Activities (ton/yr)			
Conservation Measures	**Applied (acres/yr)**	**CO**	**ROC**	**NO_x**	**PM_{10}**
Tailwater Return/Pumpback Systems	40,000	46.2	6.5	76.8	4.6
Cascading Tailwater	40,000	8.0	1.1	15.9	0.9
Level Basins	40,000	55.7	5.9	60.8	3.5
Shorten Furrows/Border Strip Improvements	40,000	55.7	5.9	60.8	3.5
Narrow Border Strips	40,000	11.8	1.1	3.9	0.3
Laser Leveling	40,000	22.4	2.2	23.8	1.6
Multi Slope	40,000	22.4	2.2	23.8	1.6
Drip Irrigation	40,000	101.6	9.7	64.3	4.4

Note: Emission factors from the SCAQMD CEQA *Air Quality Handbook* were used to estimate exhaust emissions associated with operation of the construction equipment. 20KAFY was selected because this amount represents the maximum construction level anticipated in any given year over the life of the project for construction of conservation measures.

The highest annual emissions associated with constructing conservation measures to yield 20 KAFY using on-farm measures are estimated based on the assumption that the farms would install drip irrigation. The lowest annual emissions are estimated based on the assumption that the farms would install cascading tailwater systems or narrow border strips. Neither of these options is likely, but they are presented to show the range of air emission rates that could be emitted as exhaust from construction equipment for on-farm measures on an annual basis.

The potential annual equipment exhaust emissions from construction activities for water delivery system conservation measures are summarized in Table 3.7-13. As indicated in the column labeled "Units or Miles Assumed," assumptions were made for the number of systems, reservoirs, or miles to be installed per year. The timeframe for installation has been used to adjust the total amount of water per year estimated to be available for conservation by the listed conservation measure. To evaluate other options—for example, if more than one lateral interceptor system or reservoir were proposed to be installed in a given year—the annual emissions would need to be multiplied by the number of systems or reservoirs proposed, and the amount of water conserved would increase proportionally (up to the total amount assumed to be available for conservation by that measure).

As indicated in Table 3.7-12, annual estimated emissions for on-farm conservation measures of: ROC from construction equipment exhaust range from 1.1 to 9.7 tons per year; nitrogen oxide (NO_x) emissions estimates range from 3.9 to 64.3 tons per year; PM_{10} emissions estimates range from 0.3 to 4.6 tons per year; and CO emissions estimates range from 8.0 to 101.6 tons per year.

As shown in Table 3.7-13, the lowest annual construction exhaust emissions associated with conservation of 20 KAFY using water delivery system conservation measures would be associated with the installation of 5 to 8 miles of seepage interceptors. The highest annual emissions would be associated with construction of three to four lateral interceptor systems per year. Assuming four lateral interceptor systems would be constructed per year, emissions would be approximately 6.4 tons per year of ROC, 77.6 tons per year of NO_x, 5.2 tons per year of PM_{10} and 64.4 tons per year of CO.

The applicable significance criteria in the Imperial Valley area are the general conformity *de minimis* thresholds (100 tons per year) for the nonattainment pollutants ozone (ROC and NO_x) and PM_{10}. Compared to these significance criteria, the estimated emissions would be less than significant.

TABLE 3.7-13
Estimated Annual Equipment Exhaust Emissions for Construction of Water Delivery System Measures to Conserve 20 KAFY

Conservation Measures	Units or Miles Assumed	Water Conserved AFY (estimate)	Annual Emissions from Construction (ton/yr)			
			CO	ROC	NO_x	PM_{10}
Lateral Interceptor Systems (Estimated Water Conservation 82,882 AFY)	1 system/yr for 15 years	5,525	16.1 (avg.)	1.6 (avg.)	19.4 (avg.)	1.3 (avg.)
Mid-Lateral Reservoirs (Estimated Water Conservation 5,255 AFY)	1 reservoir/yr for 5 years	1,051	1.9	0.2	2.2	0.1
Seepage Interceptors (Estimated Water Conservation 42,000 AFY)	5 miles/yr for 3 years	14,000	1.3	0.1	1.7	0.1
Conveyance Lining (Estimated Water Conservation 224 AFY)	1.73 miles/yr for 1 year	224	0.2	0.0	0.4	0.0
Total		**20,800**				

Note: Emission factors from the SCAQMD California Environmental Quality Act (CEQA) *Air Quality Handbook* were used to estimate exhaust emissions associated with operation of the construction equipment.

As discussed in Section 3.7.4.1, soil disturbance associated with conservation measures is assumed to be within the range of typical historic and existing activities. Any construction-related increases in emissions of fugitive dust and exhaust from employee commute vehicles would be temporary and localized, thus less than significant. (Less than significant impact.)

The IID water service area is the subregion where the operations associated with on-farm and water delivery system conservation measures would occur in the Proposed Project. This is the area with the greatest potential for operation-related air quality impacts, other than the Salton Sea subregion, where indirect air-quality impacts could result from operation of the Proposed Project (associated with lowered water levels in the Salton Sea). Operation of the on-farm irrigation management measures would occur over the lifetime of the Proposed Project, up to 75 years, depending on when the measures are implemented.

As discussed in Section 3.7.4.1, other than a substantial increase in fallowing, the construction and O&M activities are within the range of typical activities in the area, and the air quality impacts of construction and operation of the on-farm and water delivery system conservation measures would be negligible. (Less than significant impact.)

Mitigation Measure AQ-2: Although impacts are less than significant, implementation of BMPs during construction and site restoration and operation following construction would help to minimize PM_{10} emissions. BMPs could include, but are not limited to, the following:

- Equip diesel powered construction equipment with particulate matter emission control systems, where feasible.
- Use paved roads to access the construction sites when possible.
- Minimize the amount of disturbed area, and apply water or soil stabilization chemicals periodically to areas undergoing ground-disturbing activities. Limit vehicular access to disturbed areas, and minimize vehicle speeds.
- Reduce ground disturbing activities as wind speeds increase. Suspend grading and excavation activities during windy periods (i.e., surface winds in excess of 20 miles per hour).
- Limit vehicle speeds to 10 mph on unpaved roads.
- Cover trucks that haul soils or fine aggregate materials.
- Enclose, cover, or water excavated soil twice daily.
- Cover stockpiles of excavated soil at all times when the stockpile is not in use. Secure the covers.
- Replant vegetation in disturbed areas where water is available, following the completion of grading and/or construction activities.
- Designate personnel to monitor dust control measures to ensure effectiveness in minimizing fugitive dust emissions.

Impact AQ-3: Windblown dust from fallowed lands. Fallowing of agricultural lands is one of the potential water conservation methods for the Proposed Project. Baseline conditions include approximately 20,000 acres of fallowed lands per year. The potential maximum fallowed acres that might be required each year, for all project components for the Proposed Project plus HCP Approach 2, and the IOP could be as great as 84,800 acres, assuming fallowing is maximized for conservation and the HCP.

It is not possible to quantify emissions and associated impacts from potential increases in fallowing of agricultural lands, at a variety of locations over time, for water conservation. On one hand, emissions would decrease because the fallowed land would not be subject to plowing or the other agricultural activities that disturb soil. On the other hand, fallowed lands that are not properly retired or mitigated may be subject to wind erosion, resulting in fugitive dust impacts.

Depending on the amount of land that is fallowed, and the way the land is managed before and during fallowing, the potential exists for fugitive dust impacts. On occasion, existing concentrations of PM_{10} in the IID water service area violate national and state ambient air quality standards. To be conservative, this analysis concludes that the fugitive windblown dust emissions associated with additional exposed areas due to fallowing would be potentially significant. (Potentially significant impact.)

Mitigation Measure AQ-3: As lands are fallowed, at least one of the following BMPs to minimize PM_{10} emissions must be implemented. BMPs could include, but are not limited to, the following:

- Implement conservation cropping sequences and wind erosion protection measures as outlined by the US Department of Agriculture Natural Resources Conservation Service, such as:
  - Plan ahead to start with plenty of vegetation residue, and maintain as much residue on fallowed fields as possible. Residue is more effective for wind erosion protection if left standing.
  - If residues are not adequate, small grain can be seeded about the first of the year to take advantage of the winter rains and irrigated with a light irrigation if needed to get adequate growth.
  - Avoid any tillage if possible.
  - Avoid any traffic or tillage when fields are extremely dry to avoid pulverization.
- Apply soil stabilization chemicals to fallowed lands.
- Re-apply drain water to allow protective vegetation to be established.
- Reuse irrigation return flows to irrigate windbreaks across blocks of land including many fields to reduce wind fetch and reduce emissions from fallowed, farmed, and other lands within the block. Windbreak species, management, and layout would be optimized to achieve the largest feasible dust emissions reduction per unit water available for their irrigation. Windbreak corridors would provide ancillary aesthetic and habitat benefits.

With implementation of one or more of the above BMPs, impacts would be less than significant. (Less than significant impact with mitigation.)

Inadvertent Overrun and Payback Policy (IOP)

Impact AQ-4. Emissions from construction and operation of on-farm and delivery system conservation measures for compliance with the IOP. In the worst case scenario for air quality impacts, conservation of an average 59 KAFY for the IOP would be generated by constructing on-farm and system based conservation measures. This scenario is highly unlikely because IID is required to payback overruns within 1-3 years and it would be onerous to construct sufficient conservation measures as quickly as the payback would be required. A more likely scenario is that IID would fallow lands on a rotational basis to comply with the IOP. However, IID could potentially elect to construct conservation measures to comply with the IOP and in the worst case if they constructed conservation measures to generate 59 KAFY it could result in an annual emissions rate approximately 3 times as high as the emissions presented in Table 3.7-12 or 3.7-13, indicating the potential for significant air quality impacts. Comparison to the general conformity de minimis thresholds (100 tons per year) for the nonattainment pollutants ozone (ROC and NOx) and PM_{10} would indicate the potential for significant emission rates to occur, if construction of certain on-farm measures is undertaken to conserve more than about 25 to 30 KAFY in any given year. (Potentially significant impact.)

Mitigation Measure AQ-4: If construction of sufficient magnitude is proposed for any given year, assuming construction emissions are determined to be the direct or indirect result of a federal action, a general conformity determination for that federal action would be required. General conformity requirements in the IID water service area are outlined in Rule 925 of the ICAPCD and the USEPA General Conformity Rule. However, the only project component that could involve the construction of conservation measures that is considered to be a federal action is implementation of HCP (Salton Sea Portion) Approach 2: Use of conserved water for mitigation. The selection of conservation measures for transfer or for compliance with the IOP is not a federal action.

If general conformity requirements are triggered, the federal agency must conduct a full-scale conformity analysis, culminating in a conformity determination. Opportunity for review and comment by the public and other interested federal, state, and local agencies must be provided. The analysis must demonstrate that the project satisfies the criteria in the ICAPCD Rule and 40 CFR 93.158 and 93.159. If the action does not satisfy the criteria, the federal agency must take mitigation measures to arrive at a positive conformity determination. Methods for determining conformity include the following:

- The proposed emissions are specifically identified and accounted for in the applicable SIP
- The proposed emissions are <u>fully</u> offset through reductions elsewhere in the same non-attainment or maintenance area
- Air quality modeling demonstrates emissions would not cause or contribute to new violations of air quality standards, increase the frequency or severity of existing violations, or delay the timely attainment of the NAAQS
- Emissions would not exceed the emissions budgets available for this type of emission source in the applicable SIP
- State would sign a commitment to revise the SIP to include the proposed action

(Less than significant impact with mitigation.)

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-AQ-5: Emissions from construction of the managed marsh and native tree habitat. Construction would result in a temporary increase in PM_{10} (dust) emissions, temporary increases in soil erosion potential, and increase in traffic and transportation impacts resulting from construction activities. Most of these impacts would be temporary and could be reduced substantially with implementation of BMPs during construction and site restoration following construction. Further, these impacts would be offset by the long-term benefit to air quality by converting areas that would potentially be barren, or cultivated every year, into more stable habitats. (Less than significant impact.)

Mitigation Measure AQ-5: Implement BMPs as listed under Mitigation Measure AQ-2, above, during construction and site restoration following construction. (Less than significant.)

Operation of the elements of the HCP will not result in emissions in the IID water service area, and no impacts to air quality would occur.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Construction of 5,000 acres of ponds and the fish hatchery would require the use of standard construction equipment as described above in Impact AQ-2. Air quality impacts during construction would be less than significant with the implementation of recommended BMPs. This approach is addressed at a program level in this Draft EIR/EIS. If, as more details of this approach are developed, additional air quality impacts are identified, they will be evaluated in subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-AQ-6 Windblown dust from fallowing as well as emissions resulting from construction and operation of on-farm and water delivery system conservation measures for HCP2. Implementation of HCP Approach 2 could be accomplished via construction of on-farm or system based improvements or fallowing. It is most likely that this conserved water would be generated via fallowing. However, if conservation measures are constructed, the maximum that would be constructed in 1 year to provide mitigation for the Salton Sea as flows to the Sea are reduced would be about 12 KAFY. Construction of 12 KAFY would result in similar impacts in the IID water service area as described above under Impact AQ-2. Emissions would be about 60 percent of those shown in Tables 3.7-12 and 3.7-13.

If fallowing is implemented impacts would be similar to those described under Impact AQ-3. Conservation for HCP Approach 2 would be in addition to the up to 300 KAFY for transfer and the 59 KAFY for the IOP. If fallowing is selected for this HCP approach, a total of about 25,000 additional fallowed acres (for a total as great as 84,800 acres) would be required, as discussed under Impact AQ-3. (Potentially significant impact.)

Mitigation Measure HCP-AQ-6. This impact would be less that significant with implementation of Mitigation Measures AQ-2 and AQ-3. (Less than significant impact with mitigation.)

Impacts resulting from implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under those alternatives.

SALTON SEA

Water Conservation and Transfer

Construction of the on-farm and water delivery system conservation measures would not occur in the Salton Sea subregion. There would be no air quality impacts associated with construction of the Proposed Project in this subregion.

No direct air quality impacts would be associated with operation of the Proposed Project in the Salton Sea subregion. Operation of the on-farm conservation measures would not occur in this subregion.

Impact AQ-7: Indirect air quality impacts from potential for windblown dust from exposed shoreline. Implementation of the Proposed Project would result in the conservation of up to 300 KAFY for transfer and a reduction in the volume of water discharged to the Salton Sea. The amount of water conserved is expected to increase at a rate of approximately 25 KAFY as conservation measures are implemented incrementally, until the full amount of conservation is reached. The effect of the conservation measures and reduced inflow volumes on the Sea would not be noticeable in the short-term. The water level and the total surface area of the Salton Sea would, however, decrease in the long term.

Under the Proposed Project, the elevation of the Salton Sea would decrease from the Baseline level of -235 feet msl to -250 by the year 2077, a decrease of 15 feet. The total surface area of the Sea would decrease from the Baseline area of about 217,000 acres to about 167,000 acres. The decrease in Sea level would expose about 50,000 acres of currently submerged bottom sediments or playa. This is approximately 3.5 times the exposed area of about 16,000 acres predicted under the Baseline conditions.

The predicted decrease in Sea level and increase in exposed area would increase the potential for dust suspension. Spatial variations in sediment characteristics and soil erodibility, temporal variations in wind conditions, and variation in factors contributing to the formation of salt crusts prevent any reasonable quantitative estimate of emissions and associated impacts from the exposed shoreline. Therefore, a qualitative assessment of the potential for dust suspension is provided in this Draft EIR/EIS.

Several conditions at the Salton Sea currently exist or would be expected to exist in the future as a result of lowered Sea levels. Qualitatively, it is anticipated that the combination of moisture present in the unsaturated zone beneath the exposed playa, the probable formation of dried algal mats and stable efflorescent salt crusts consisting of chloride and sulfate salts, and the relatively low frequency of high wind events at the Salton Sea would inhibit the suspension of dust. It is likely, however, that these assumptions would not apply to all areas of exposed playa or shoreline at all times, so dust events could potentially occur.

Based on the factors influencing emissions at the Salton Sea as discussed above, the extent of any increases in dust emissions and associated increases in ambient concentrations of the nonattainment pollutant PM_{10} in the future, as shoreline conditions change, is unknown. On occasion, existing concentrations of PM_{10} in the Salton Sea area violate national and state ambient air quality standards. Wind erosion of natural desert soils and vehicle travel over unpaved roads are expected to continue to represent the predominant source of dust emissions around the Salton Sea.

To further consider the potential impact for emissions from the Salton Sea , a comparison was made to existing dry lake beds where dust impacts have been observed. Fortunately, conditions found to produce dust storms on dry salt lake beds, such as Owens Lake, were not found to be present at the Salton Sea. The following three primary factors would be expected to make the situation at the Salton Sea much less severe than at Owens Lake:

- **Soil chemistry**: As a result of the relatively high salinity of groundwater beneath the playa at the Salton Sea, formation of an efflorescent salt crust on the surface of the playa is likely to occur. The soil system at the Salton Sea is predominately sodium sulfate and sodium chloride. These salts do not change in volume significantly with fluctuations in temperature, so the crust at the Salton Sea should be fairly stable and resistant to erosion. This anticipated situation at the Salton Sea is different from similar current situations at Owens and Mono Lakes, where a significant portion of the salinity is in the form of carbonates. The volume of carbonate salts is much more sensitive to temperature fluctuations, and desiccation of these salts produces fines that are readily suspended from playa at these lakes. Therefore, the salt crust on the exposed playa at the Salton Sea should be more stable and less emissive than Owens Lake. Also, distribution of mobile sand on the dry lakebed at Owens Lake is part of what drives high emissions rates, and comparable conditions are not expected at the Salton Sea.
- **Meteorology**: The frequency of high wind events at the Salton Sea is less than at Owens Lake. Therefore, the dust storms at the Salton Sea would be less frequent than at Owens Lake. To substantiate this statement, threshold wind speeds that might be required to initiate erosion of playa soils have been estimated and compared to wind measurements in the area. Threshold velocity values for playas, which consist of soils high in clay and salt content, have been found to be larger than 100 cm/s when disturbed and 150 cm/s when undisturbed (Gillette 1980). Threshold velocities for skirts around playas, which are siltier and have slightly hard crusts, have been found to range from 20 to 60 cm/s when disturbed and 150 cm/s when undisturbed. Based on these threshold velocities, an average roughness height of 1.0 cm, and an anemometer height of 366 cm, wind speeds at the Salton Sea required to initiate erosion of disturbed playa soils would need to exceed 27 knots (kts). Wind speeds required to initiate erosion of undisturbed playa soils would need to exceed 40 kts. Hourly wind data collected from two CIMIS weather stations located north and west of the Salton Sea (Station Nos. 127 and 154, respectively) indicate that wind speed exceeded 22 kts approximately 0.1 to 0.2 percent of the time between 1995 and 1999. The predominant wind direction at the Salton Sea is also favorable; during high wind events at the Sea, it is from the west and northwest, which is perpendicular to the orientation of the playa. Dust suspension on the playa of the Salton Sea would be higher if the playa were oriented parallel to the predominant wind direction.
- **Recession Rate**: The anticipated decline in water levels at the Salton Sea is predicted to be significantly slower than what occurred at Owens Lake (only about 20 percent as fast). Natural processes may contribute more to controlling dust emissions at the Salton Sea than they have at Owens. These natural processes could include (a) the enabling of vegetation through development of soil conditions favorable to plant growth (including improvement in natural drainage), (b) development of native plant communities; (c) sequestration of sand into relatively stable dunes; and (d) formation of relatively stable crusts.

As discussed in Section 3.1, Hydrology and Water Quality, a reduction of the Salton Sea surface elevation, and resulting exposure of playa, is expected even in the absence of the Proposed Project, but it would be accelerated when the Proposed Project or its alternatives are implemented. It should be noted that the model projections included throughout the document for the Proposed Project reflect the worst-case scenario for the Proposed Project. The projections for the Salton Sea assume a maximum level of conservation of 300 KAFY accomplished via on-farm irrigation improvements and water delivery system improvements with no fallowing. This scenario also includes the additional 59 KAFY conservation required to comply with the IOP. As described in Chapter 2, the Proposed Project could be implemented with lesser amounts of conservation and using fallowing, both of which would result in lesser impacts to the Salton Sea.

To be conservative, this analysis concludes that windblown dust from exposed shoreline may result in potentially significant air quality impacts. (Potentially significant impact.)

Mitigation Measure AQ-7: To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID Water Service Area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives.

With implementation of this approach, this impact would be avoided; without it, it would remain a potentially significant unavoidable impact. Until an HCP Approach for the Salton Sea is selected, this impact will remain potentially significant and unavoidable. (Potentially significant unavoidable impact.)

One possible approach to reduce this from a potentially significant unavoidable impact to an impact that is less than significant with mitigation would be for the project proponent to negotiate a Salton Sea monitoring and mitigation plan with the SCAQMD and the ICAPCD.

Impact AQ-8: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea. Decreased water flow and quality in the Salton Sea could contribute to the premature death of flora or fauna and/or increase the summertime algae blooms, either or both of which would contribute to odorous emissions. However, as a result of low population levels around the Sea, it is not likely that "objectionable odors would affect a substantial number of people." This impact is expected to be less than significant.

3.7.4.4 Alternative 1: No Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Implementation of the No Project would result in no air quality impacts in the LCR subregion.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Implementation of the No Project would result in no air quality impacts in the IID water service area and AAC subregion.

SALTON SEA

Water Conservation and Transfer

With the No Project alternative, water levels and surface area in the Salton Sea would decline. Water levels are projected to decline from an existing level of -228 to -235 msl (a decline of 7 feet) and total surface area is projected to decline from 233,000 to 217,000 acres, exposing about 16,000 acres over the next 75 years. The exposure of this previously inundated area may result in windblown dust as described in Impact AQ-3.

3.7.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A2-AQ-1: Emissions from construction and operation of on-farm conservation measures from the water conservation program. As discussed above for the Proposed Project, annual estimated construction emissions for on-farm conservation measures for 130 KAFY would be 1.1 to 9.7 tons per year of ROC, 3.9 to 64.3 tons per year NO_x, 0.3 to 4.6 tons per year PM_{10}, and 8.0 to 101.6 tons per year CO. These levels are less than the *de minimis* thresholds [100 tons per year] for the nonattainment pollutants ozone [ROC and NO_x] and PM_{10} in the Imperial Valley area. Impacts from the estimated emissions would be less than significant.

As discussed in Section 3.7.4.1, soil disturbance associated with the construction of conservation measures is assumed to be within the realm of typical activities. Any construction-related increases in emissions of fugitive dust and exhaust from employee commute vehicles would be temporary and localized, thus, less than significant.

Overall construction emissions from Alternative 2 would be expected to be similar to the Proposed Project however they would likely occur over a shorter duration because only 130KAFY would be conserved for transfer compared to 300 KAFY for transfer for the Proposed Project.

As discussed in Section 3.7.4.1, construction and O&M activities are within the realm of typical activities in the area, and the air quality impacts of construction and operation of the on-farm conservation measures would be negligible. (Less than significant impact.)

Mitigation Measure A2-AQ-1: Although impacts are less than significant, implementation of BMPs, as described under Mitigation Measure AQ-2 above, during construction and site restoration and operation following construction would help to minimize PM_{10} emissions. (Less than significant impact.)

SALTON SEA

Water Conservation and Transfer

Construction of the on-farm and water delivery based conservation measures would not occur in the Salton Sea subregion. No air quality impacts would be associated with construction of the Alternative 2 in this subregion.

No direct air quality impacts would be associated with operation of Alternative 2 in the Salton Sea subregion. Operation of the on-farm conservation measures would not occur in this subregion.

Impact A2-AQ-2: Indirect air quality impacts from potential for windblown dust from exposed shoreline. As described above, the impacts and potential for impacts would increase because implementation of the proposed water conservation measures would reduce the volume of water discharged to the Salton Sea. Alternative 2 would result in a decline in elevation of the Sea from the Baseline condition of -235 to -242 msl (a decline of 7 feet) and a reduction in surface area from 217,000 acres to 195,000 acres, exposing about 22,000 acres of shoreline.

It is anticipated that the Salton Sea level would decrease over time and expose the shoreline even in the absence of implementation of the Proposed Project or its alternatives. Implementation of Alternative 2 would accelerate the shoreline exposure, and result in approximately 42 percent more exposed area compared to the Baseline. The predicted increase in exposed area would increase the potential for dust suspension. The extent of any potential increases in dust emissions and ambient PM_{10} concentrations in the future is unknown. The impacts from Alternative 2 in the Salton Sea area would be expected to be similar to, but less than for the Proposed Project, because the Sea would recede at a slower rate, and substantially less area would ultimately be exposed. To be conservative, this analysis concludes that windblown dust from exposed shoreline may still result in potentially significant impacts. (Potentially significant, unavoidable impact).

Mitigation Measure A2-AQ-2: To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID Water Service Area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2 Project Description.

With implementation of this approach, this impact would be avoided; without it, it would remain a potentially significant unavoidable impact. Until an HCP Approach for the Salton Sea is selected, this impact will remain potentially significant and unavoidable. (Potentially significant unavoidable impact.)

One possible approach to reduce this from a potentially significant unavoidable impact to an impact that is less than significant with mitigation would be for the project proponent to negotiate a Salton Sea monitoring and mitigation plan with the SCAQMD and the ICAPCD.

Impact A2-AQ-3: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea. Decreased water flow and quality in the Salton Sea could contribute to the premature death of flora or fauna and/or increase the summertime algae blooms, either or both of which would contribute to odorous emissions. However, due to low population levels around the Sea, it is not likely that "objectionable odors would affect a substantial number of people". This impact is expected to be less than significant (Less than significant impact.)

3.7.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-AQ-1: Emissions from construction and operation of on-farm and delivery system conservation measures from the water conservation program. As discussed above for the Proposed Project, annual estimated construction emissions for on-farm conservation measures or water delivery system conservation measures would be less than the applicable *de minimis* thresholds [100 tons per year] for the nonattainment pollutants ozone [ROC and NO_x] and PM_{10} in the IID water service area. Impacts from the estimated emissions would be less than significant.

As discussed in Section 3.7.4.1, soil disturbance associated with conservation measures is assumed to be within the realm of typical activities. Any construction-related increases in emissions of fugitive dust and exhaust from employee commute vehicles would be temporary and localized, and thus less than significant.

Overall construction and operation emissions from Alternative 3 would be expected to be similar to the Proposed Project; however, they would likely occur over a shorter duration because only 230 KAFY would be conserved for transfer compared to 300 KAFY for transfer for the Proposed Project. As discussed in Section 3.7.4.1, construction and O&M activities are within the range of typical activities in the area, and the air quality impacts of construction and operation of the on-farm and delivery system conservation measures would be negligible. (Less than significant impact.)

Mitigation Measure A3-AQ-1. Although impacts are less than significant, implementation of BMPs, as described under Mitigation Measure AQ-2, during construction and site restoration and operation following construction will help to minimize PM_{10} emissions. (Less than significant impact.)

Impact A3-AQ-2: Windblown dust from fallowed lands. Fallowing of agricultural lands is one of the potential water conservation methods for Alternative 3. Baseline conditions include approximately 20,000 acres of fallowed lands per year. The potential maximum fallowed acres that might be required each year, for all project components for Alternative 3 plus HCP Approach 2, might be as great as 67,300 acres, assuming fallowing is maximized for conservation and the HCP.

Impacts for Alternative 3 would be similar to, but less than those discussed for the Proposed Project, as less land will need to be fallowed. (Potentially significant impact.)

Mitigation Measure A3-AQ-2: Implement BMPs, as described in Mitigation Measure AQ-3. With implementation of one or more of the BMPs, impacts would be less than significant. (Less than significant impact with mitigation.)

SALTON SEA

Water Conservation and Transfer

Construction of the on-farm and water delivery system conservation measures would not occur in the Salton Sea subregion. No air quality impacts would be associated with construction of the Alternative 3 in this subregion.

No direct air quality impacts would be associated with operation of Alternative 3 in the Salton Sea subregion. Operation of the on-farm conservation measures would not occur in this subregion.

Impact A3-AQ-3: Indirect air quality impacts from the potential for windblown dust from exposed shoreline. As described above, the impacts and potential for impacts would increase because implementation of the proposed water conservation measures would reduce the volume of water discharged to the Salton Sea. Alternative 3 would result in a decline in elevation of the Sea from an existing condition of -235 to -247 msl (a decline of 12 feet) and a reduction in surface area from 217,000 acres to 178,000 acres, exposing about 39,000 acres of shoreline.

It is anticipated that the Salton Sea level would decrease over time and expose the shoreline even in the absence of implementation of the Proposed Project or its alternatives. Implementation of Alternative 3 would accelerate the shoreline exposure, and result in almost 3.5 times as much exposed area compared to the Baseline. The predicted increase in exposed area would increase the potential for dust suspension. The extent of any potential increases in dust emissions and ambient PM_{10} concentrations in the future is unknown. The impacts from Alternative 3 in the Salton Sea area would be expected to be similar to, but less than for the Proposed Project, because the Sea would be receding at a slower rate, and less area would be exposed. To be conservative, this analysis concludes that windblown dust from exposed shoreline may still result in potentially significant impacts. (Potentially significant impact.)

Mitigation Measure A3-AQ-3: To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID Water Service Area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives.

With implementation of this approach, this impact would be avoided; without it, it would remain a potentially significant unavoidable impact. Until an HCP Approach for the Salton Sea is selected, this impact will remain potentially significant and unavoidable. (Potentially significant unavoidable impact.)

One possible approach to reduce this from a potentially significant unavoidable impact to an impact that is less than significant with mitigation would be for the project proponent to negotiate a Salton Sea monitoring and mitigation plan with the SCAQMD and the ICAPCD.

Impact A3-AQ-4: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea. Decreased water flow and quality in the Salton Sea could contribute to the premature death of flora or fauna and/or increase the summertime algae blooms, either or both of which would contribute to odorous emissions. However, as a result of low population levels around the Sea, it is not likely that "objectionable odors would affect a substantial number of people." This impact is expected to be less than significant. (Less than significant impact.)

3.7.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Because conservation would be achieved exclusively through fallowing, no construction activities would be required, and no construction-related air emissions would occur. In addition, no air emissions from operation and maintenance of conservation facilities would occur because no facilities for conservation would be constructed.

Impact A4-AQ-1: Windblown dust from fallowed lands. Fallowing of agricultural lands is the water conservation method proposed for Alternative 4. Baseline conditions include approximately 20,000 acres of fallowed lands per year. The potential maximum fallowed acres that might be required each year, for all project components for Alternative 4 plus HCP Approach 2, might be as great as 84,800 acres.

Impacts for Alternative 4 would be similar to those discussed for the Proposed Project. (Potentially significant impact.)

Mitigation Measure A4-AQ-1: Implement BMPs, as described in Mitigation Measure AQ-3. With implementation of one or more of the BMPs, impacts would be less than significant. (Less than significant impact with mitigation.)

SALTON SEA

Water Conservation and Transfer

Conservation measures would not be implemented in the Salton Sea subregion. No air quality impacts would be associated with construction of Alternative 4 in this subregion.

No direct air quality impacts would be associated with operation of Alternative 4 in the Salton Sea subregion. Operation of the on-farm conservation measures would not occur in this subregion.

Impact A4-AQ-2: Indirect air quality impacts due to the potential for windblown dust from exposed shoreline. As described above, the impacts and potential for impacts would increase because implementation of the proposed water conservation measures would reduce the volume of water discharged to the Salton Sea. Alternative 4 would result in a decline in elevation of the Sea from a Baseline condition of -235 to -241 msl (a decline of 6 feet) and a reduction in surface area from 217,000 acres to 201,000 acres, exposing about 16,000 acres of shoreline. It is anticipated that the Salton Sea level would decrease over time and expose the shoreline even in the absence of implementation of the Proposed Project or its alternatives. Implementation of Alternative 4 would accelerate the shoreline exposure, and result in approximately 50 percent more exposed area compared to the Baseline. The predicted increase in exposed area would increase the potential for dust suspension. The extent of any potential increases in dust emissions and ambient PM_{10} concentrations in the future is unknown. The impacts from Alternative 4 in the Salton Sea area would be expected to be similar to, but less than for the Proposed Project, because the Sea would be receding at a slower rate, and substantially less area would be exposed. To be conservative, this analysis concludes that windblown dust from exposed shoreline may still result in potentially significant impacts. (Potentially significant impact.)

Mitigation Measure A4-AQ-2: To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID Water Service Area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2, Project Description.

With implementation of this approach, this impact would be avoided; without it, it would remain a potentially significant unavoidable impact. Until an HCP Approach for the Salton Sea is selected, this impact will remain potentially significant and unavoidable. (Potentially significant unavoidable impact.)

One possible approach to reduce this from a potentially significant unavoidable impact to an impact that is less than significant with mitigation would be for the project proponent to negotiate a Salton Sea monitoring and mitigation plan with the SCAQMD and the ICAPCD.

Impact A4-AQ-3: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea. Decreased water flow and quality in the Salton Sea could contribute to the premature death of flora or fauna and/or increase the summertime algae blooms, either or both of which would contribute to odorous emissions. However, due to low population levels around the Sea, it is not likely that "objectionable odors would affect a substantial number of people". This impact is expected to be less than significant (Less than significant impact.)

3.8 Cultural Resources

3.8.1 Introduction and Summary

This section addresses existing cultural resources in the LCR, IID water service area and AAC, and Salton Sea geographic subregions and potential impacts to cultural resources associated with the implementation of the Proposed Project. Section 3.8.2 describes the applicable regulations and standards that pertain to cultural resources in the Proposed Project's region of influence. Section 3.8.3 presents existing cultural resources characteristics. Cultural resources in the SDCWA service area geographic subregion would not be affected by this Project because no construction or land disturbance would occur; therefore, this subregion is not discussed.

Cultural resources are districts, sites, buildings, structures, objects, and landscapes significant in American history, prehistory, architecture, archaeology, engineering, and culture. These resources are protected by statutes and regulations at all levels of government and must be taken into consideration in this Draft EIR/EIS. For the purposes of this Draft EIR/EIS, cultural resources include existing and/or potential historic and prehistoric archaeological sites, historic buildings and structures, American Indian traditional cultural properties (TCPs), and paleontological sites. Cultural resources are divided into three groups: archaeological resources, ethnographic resources, and the historic built environment (architectural resources). These groups are further defined below.

Archaeological resources include precontact or prehistoric and post-contact or historic resources. Prehistoric resources are physical properties that result from human activities that predate European contact with native peoples in America. Prehistoric archaeological sites may include villages, campsites, lithic or artifact scatters, fishing sites, roasting pits/hearths, milling features, rock art (petroglyphs/pictographs, intaglios), rock features (circles, blinds, etc.), and burials. Historic archaeological sites consist of the physical remains (unoccupied ruins) of structures or built objects that result from the work of EuroAmericans. These physical remains must be more than 50 years old and postdate contact between Europeans and Native Americans. Historic archaeological sites may include townsites, homesteads, agricultural or ranching features, mining-related features, and refuse concentration.

3.8.1.1 Archaeological Resources

Archaeological resources include precontact or prehistoric and post-contact or historic resources. Prehistoric resources are physical properties that result from human activities that predate European contact with native peoples in America. Prehistoric archaeological sites may include villages, campsites, lithic or artifact scatters, fishing sites, roasting pits/hearths, milling features, rock art (petroglyphs/pictographs, intaglios), rock features (circles, blinds, etc.) and burials. Historic archaeological sites consist of the physical remains (unoccupied ruins) of structures or built objects that result from the work of EuroAmericans and are greater than 50 years old but postdate contact between Europeans and Native Americans. Historic archaeological sites may include townsites, homesteads, agricultural or ranching features, mining-related features, and refuse concentration.

3.8.1.2 Ethnographic Resources

Ethnographic resources include sites, areas, and materials important to American Indians for religious, spiritual, or traditional uses. These resources can encompass the sacred character of physical locations (mountain peaks, springs, and burial sites) or particular native plants, animals, or minerals that are gathered for use in traditional ritual activities. Also included are villages, burials, rock art, rock features, and traditional hunting, gathering, or fishing sites. Ethnographic resources are often referred to as "traditional cultural properties," a type of cultural resource that can be eligible for listing in the National Register of Historic Places (NRHP) if certain criteria are met (refer to National Register Bulletin 38 - *Guidelines for Evaluating and Documenting Traditional Cultural Properties* - Parker and King 1990).

Ethnographic resources that meet the definition set forth in Executive Order 13007 can be considered sacred sites under Federal law. Activities that might affect accessibility to, or availability of, materials used in traditional practices are subject to Executive Order 13007. In some cases, ethnographic resources may overlap prehistoric or historic archaeological resources or they may be embedded within each other.

3.8.1.3 Historic Built Environment

Architectural resources of the historic built environment can include houses, barns, stores, post offices, bridges, and community structures that are more than 50 years old. These resources are generally standing structures that are currently occupied or are being preserved from deterioration rehabilitated to accommodate occupation and use.

Table 3.8-1 presents a summary of the potential cultural resources impacts that could result from implementation of the Proposed Project and/or alternatives.

3.8.2 Regulatory Framework

3.8.2.1 Federal Standards and Regulations

Archaeological and architectural resources (buildings and structures) are protected through the National Historic Preservation Act (NHPA) of 1966 and its implementing regulation, Protection of Historic Properties (36 CFR Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979.

Section 106 of the NHPA (16 USC 470-470w6), as amended (PL 89-515), requires federal agencies to consider the effects of their actions on properties that are listed in or eligible for listing in the National Register of Historic Places (NRHP). The implementing regulations of the NHPA require federal agencies to provide the State Historic Preservation Officer (SHPO) with an opportunity to comment on any actions that may affect a historic property and to provide the Advisory Council on Historic Preservation (ACHP) with an opportunity to comment on any action that will adversely affect a historic property. Section 110 of the NHPA (16 USC 470h-2[a]) directs federal agencies to consider the effects of their actions on properties that are owned or controlled by federal agencies.

TABLE 3.8-1
Summary of Cultural Resource Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Continuation of Baseline conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
CR-1: Construction of conservation measures from water conservation program: Less than significant impact with mitigation.	Continuation of existing conditions.	**A2-CR-1: Construction of conservation measures from water conservation program:** Less than significant impact with mitigation.	**A3-CR-1: Construction of conservation measures from water conservation program:** Less than significant with mitigation.	No impact.
CR-2: Construction of conservation measures for IOP compliance: Less than significant impact with mitigation.	Continuation of existing conditions.	**Same as HCP-CR-2.**	**Same as HCP-CR-2.**	No impact.
HCP-CR-3: Creation of managed habitat: Less than significant impact with mitigation.	Continuation of existing conditions.	**Same as HCP-CR-3.**	**Same as HCP-CR-3.**	**Same as HCP-CR-3.**
HCP2-CR-4: Construction of conservation measures for HCP Approach 2: Less than significant impact with mitigation.	Continuation of existing conditions.	**Same as HCP2-CR-4.**	**Same as HCP2-CR-4.**	**Same as HCP2-CR-4.**
SALTON SEA				
CR-5: Reduced inflows to the Salton Sea: Less than significant impact with mitigation.	Construction of Baseline conditions.	**A2-CR-2: Reduced inflows to the Salton Sea:** Less than significant impact with mitigation.	**A3-CR-2: Reduced inflows to the Salton Sea:** Less than significant with mitigation.	**A4-CR-1: Reduced inflows to the Salton Sea:** Less than significant impact with mitigation.
SDCWA SERVICE AREA				
No impact.	Continuation of Baseline conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the NRHP. The American Indian Religious Freedom Act of 1978 allows access to sites of religious importance to Native Americans. The Native American Graves Protection and Repatriation Act of 1990 provides standards and procedures for disposition or repatriation, as appropriate, of cultural items, including human remains.

Several federal laws include paleontological resources within their scope. Federal agencies are required under NEPA to consider impacts to historical, cultural, and natural aspects of the environment. FLPMA specifies that public lands should be managed in a manner that protects the quality of scientific resources. The BLM considers all vertebrate and some scientifically important invertebrate species to be significant, nonrenewable resources (Cunkelman 1999). Fossil resources on BLM land are regulated by three statutes/regulations (FLPMA, Federal Caves Resources Protection Act of 1988, and Crimes and Criminal Procedures 18 USC 641). Permits are required to collect or disturb vertebrate fossils on BLM land. Reclamation must adhere to statutes (18 USC 641, PL 100-691) that prohibit collecting fossils or destroying cave resources. Secretarial Order 3104 grants Reclamation the authority to issue paleontological resource use permits for lands under its jurisdiction.

3.8.2.2 State Standards and Regulations

Archaeological and architectural resources (buildings and structures) are protected on the state level by CEQA. CEQA requires state agencies to consider the effects of their actions on historically significant resources, i.e., resources that meet the criteria for listing in the California Register of Historical Resources (CRHR) or a local register of historical resources. Criteria for inclusion in the CRHR are provided in Section 15064.5 of CEQA and are similar to the criteria for inclusion in the NRHP described above. CEQA also contains provisions (in the PRC) for the discovery of human remains that are of Native American origin.

CEQA requires state agencies to consider the effects of their projects on all aspects of the physical conditions that exist within the area affected by the Proposed Project, including paleontological resources. Appendix G of CEQA states that a project may be deemed to have a significant effect on the environment if it will disrupt or adversely affect a zpaleontological site, except as part of a scientific study. CEQA standards and regulations apply to two geographic subregions that are included in this analysis (IID water service area and Salton Sea).

3.8.2.3 Local Standards and Regulations

CEQA requires state agencies to consider the effects of their actions on historically significant resources, which include those listed in a local register of historical resources. This would apply to two geographic subregions: IID water service area and AAC, and Salton Sea.

3.8.3 Existing Setting

The following sections describe the existing cultural resources setting of the LCR, IID water service area, and Salton Sea geographic subregions.

3.8.3.1 Physical Cultural Resources Environment

The Colorado Desert is located in the Salton Trough, which is a massive graben formed by the interface of parts of the North American and Pacific plates (Figure 3.8-1). The trough formed by the ongoing movement of these faults and the general subduction of the basement formations has been filled by immense quantities of colluvial and alluvial sediments that in places are up to 20,000 feet deep (Morton 1977). Ancient river meandering reworked these sediments. Where the Colorado River empties into the Gulf of Mexico, finer sediments are released onto a vast and growing delta while coarser materials fall out along the bed and nearby floodplains of the River. The trough is being constantly filled with sediments as it deepens while portions of the Imperial Valley remain well below sea level.

Before dams controlled the flows of the Colorado River, deposited sediment in the lower channels of the delta encouraged local flooding that dropped even more sediments on the fan. Gradual silt accumulation raised the delta and lowered stream-channel margins above the average grade of the main River channel to the north, resulting in an impoundment. This happened frequently after large flood events when the receding waters of the Colorado were unable to find a route back through the newly reworked delta. Then, rapid filling of the trough by the Colorado resulted in the formation of a vast freshwater lake. The filling generally continued until the impounding delta was breached (often after many decades or centuries).

While they lasted, these lakestands became the center of flourishing plant and animal communities that attracted peoples from around the region (Schaefer 1998). Past lakes in the trough included the ancient Blake Sea, Lake LeConte, and Lake Cahuilla. The typical late Holocene lakestands are marked by beach formations about 40 feet above sea level. Ancient late Pleistocene or early Holocene high stands extended as much as 100 feet above sea level.

While summer storms can be violent, most rainfall in the Colorado Desert comes in mid-winter. Because of sparse vegetation, summer storm runoff is typically severe, particularly in the large portions of the central Salton Basin, which is characterized by hard lacustrine clays. Consequently, few permanent water sources are found although seasonal springs and wells associated with localized aquifers are present. In some places, freshwater and alkaline springs nourish wetlands in the middle of an otherwise arid desert; these areas hosted major prehistoric occupation. The most dominant lacustrine feature was Lake Cahuilla, a large, extensive freshwater lake that filled the northern part of the Salton Trough for several thousand years. Lake Cahuilla, too, attracted prehistoric occupation and use for long time periods.

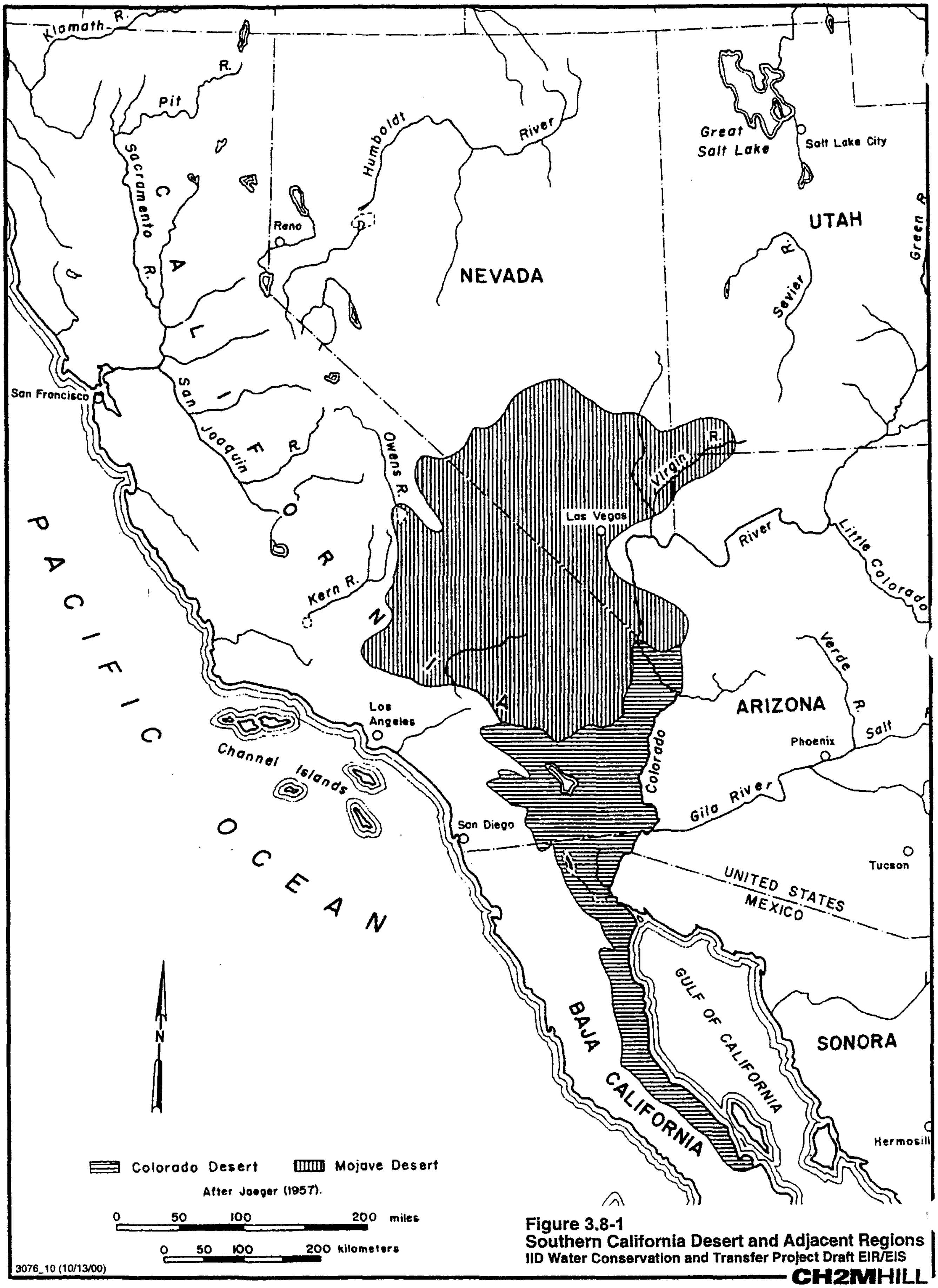

Figure 3.8-1
Southern California Desert and Adjacent Regions
IID Water Conservation and Transfer Project Draft EIR/EIS
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Most closed desert basin floors are characterized by an Alkali Sink plant community. In prehistoric times, in some parts of the Salton Basin and low-lying spots in the Proposed Project vicinity, deep-rooted mesquite was able to tap the shallow water table and grow abundantly. Most of the Salton Basin floor has been turned over to agriculture or has been inundated by the Salton Sea. Today, local plant communities are dominated by creosote-bursage scrub that occurs over most of the lower Colorado Desert alluvial terraces and floors. In non-cultivated areas, common plants include creosote bush (*Larrea tridentata*), brittlebush (*Encelia frutescans*), ocotillo (*Fouquiera splendens*), and bursage (*Ambrosia dumosa*).

Geology/Geomorphology. The ancient shoreline of Lake Cahuilla nearly surrounds the Salton Trough (Figure 3.8-2). On the surface, the Salton Trough province exhibits ancient lakebed sediments, alluvial channels, and dune sands. The central portion (Imperial and Coachella Valleys, Salton Sink) is covered by clay and silt deposits from the prehistoric lakestands. Shoreline deposits circumscribe the central lakebed deposits and consist mostly of unconsolidated sand and gravel, grading into silts and clays. During the Late Prehistoric period, Lake Cahuilla stretched from north of Indio to south of Mexicali. The Colorado fed it, and, when full, it spilled southward to the Colorado delta and the Gulf of California (Laylander 1995).

A cooler, more humid environment most likely existed when Lake Cahuilla was full. Radiocarbon dating suggests a late Holocene age of between 1600 and 400 years ago. Repeated fillings of the basin to capacity suggest at least three lacustral intervals of the lake; however, these lakes must have been transient and unreliable resources because little Archaic Period (Amargosan) archaeological material has been found in the Salton Trough (Gallegos 1980). Wilke (1978) proposed at least three lacustral intervals and Gallegos (1980) suggested at least four lake filling periods. Recently, Laylander (1995) established the existence of a substantial stand for the lake in the 17th Century AD.

Colorado incursions into the Salton Trough occurred in 1840, 1842, 1852, 1859, 1862, 1867, and 1891. During the 1862 summer flood, the mail stage between Yuma and San Diego was interrupted; for several weeks, a flat boat was used to cross the New River. During the summer of 1891, water filled the Sink and formed a lake several miles long (Gallegos 1980). The most recent flooding occurred between 1904 and 1907, when the Colorado entered the irrigation system leading to the Sink. In the winter of 1904-05, floodwaters from the Colorado and Gila Rivers combined, producing an abnormally high discharge, which flowed through an unprotected headgate and down the steeper grade of the canal. The canal and tributary channels began to cut and enlarge. By 1905, almost the entire Colorado discharge was flowing into the Salton Trough. The Colorado was finally returned to its channel in early 1907, but not before the Salton Sea was formed (Sykes 1914).

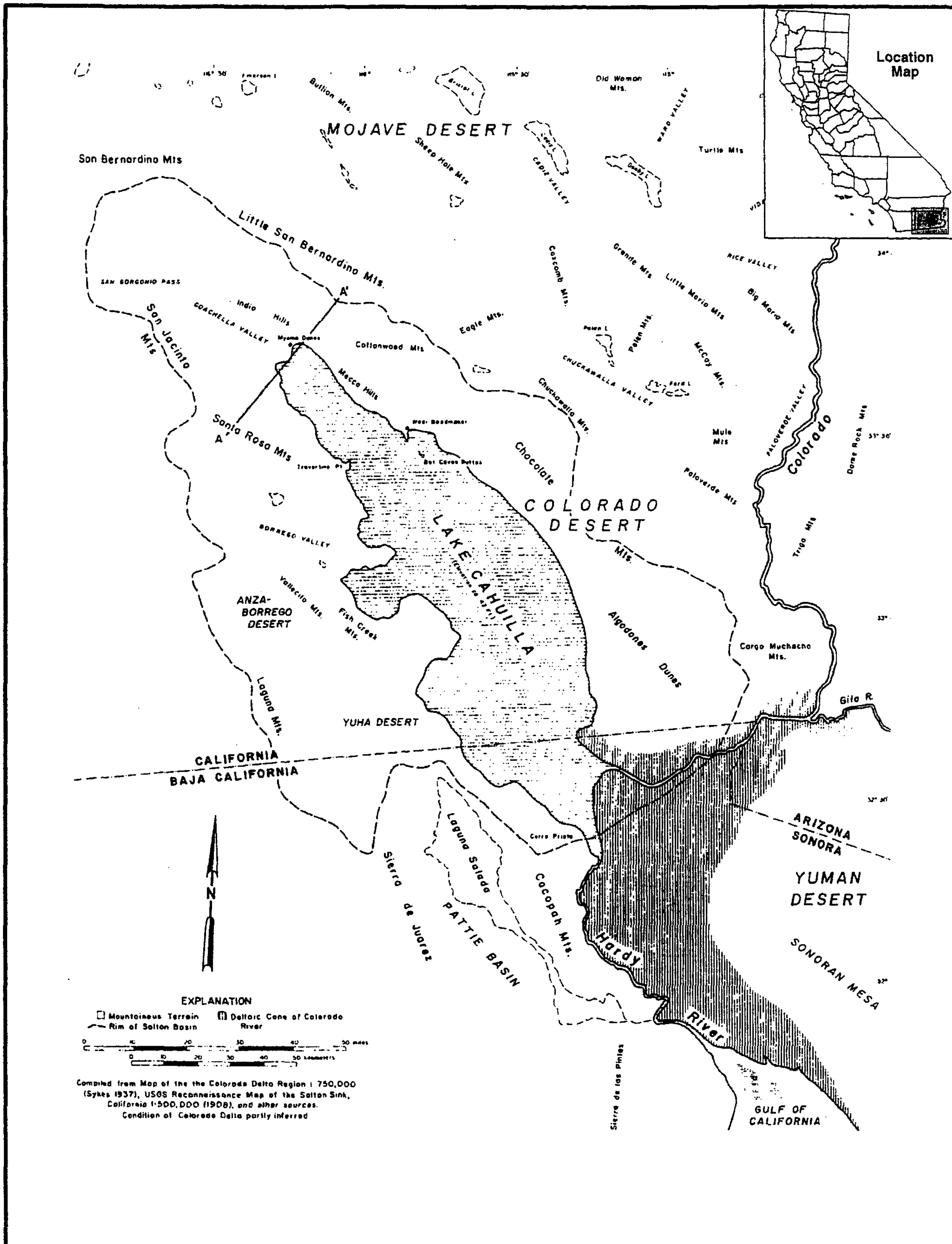

Figure 3.8-2
Location and Extent of Late Prehistoric Lake Cahuilla
IID Water Conservation and Transfer Project Draft EIR/EIS

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GeoArchaeology/Modern Geomorphology. Von Werlhof (1974) evaluated the archaeological potential of the Imperial Valley from the perspective of modern geomorphological changes that occurred in the early 20th century. His main finding is that early 20th Century settlers had seen artifacts (portable mortars and pestles, metates and manos, projectile points, knives, scrapers, and hearthstones) at an undetermined number of temporary campsites along the old wash prior to the 1906 flood. The flood destroyed such evidence as the wash became New River, and collectors obliterated what other evidence of Indian habitats that might have existed nearby. The lack of depth to aboriginal sites in the valley, coupled with extensive land developments in historic times, render dim the prospects of discovering archaeological sites in this large region. Nonetheless, a possibility exists, regardless of how remote, that some sites escaped molesting or destruction.

3.8.3.2 Cultural Resources Background and Context

Prehistoric Context. About 20,000 years ago, people lived along the coast, and left flint scrapers and choppers made of pebbles. About 10,000 years later, in the cool, pluvial, terminal Pleistocene and early Holocene epochs, other relatively unspecialized bands exploited particular niches for food. While coastal shell middens attest to intensive fishing and shell fish gathering, inland campsites provide evidence for Big Game hunting. Animals were dismembered with heavy stone choppers, and their hides were processed with flint scrapers. Their tools appear in campsites between the coast and former lakes and marshes in the present Mojave and Colorado deserts (Luomala 1978).

As the glaciers retreated and people adapted to ever drier, hotter weather, the topography itself gradually changed from marshes and streams to deserts. Early sites of the Desert Tradition show increasing reliance on wild plant foods, especially seeds to be parched or nuts and even bones to be ground into flour. Small, chipped-stone projectile points for darts are evidence, as are later arrow points, that meat mostly came from small game (Luomala 1978). By about AD 600, two great changes modified the collecting-hunting traditions: LCR peoples (probably inspired by indirect contact with Middle American horticulture) began to plant maize, beans, and gourds in floodplains, and make pottery.

Schaefer, et al. (1998), reviewed several overviews and resyntheses of Colorado Desert culture history (Rogers 1939, 1945, 1966; Weide and Barker 1974; Crabtree 1981; Gallegos 1980; and Schaefer 1994b) to develop a culture sequence. Six successive periods, each with distinctive cultural patterns, are defined for the Colorado Desert, extending back over 12,000 years: Early Man (Malpais), PaleoIndian (San Dieguito), Archaic (Pinto and Amargosa), Late Prehistoric (Patayan), Historic Yuman, and Historic Euro-American. Historic Yuman and Historic Euro-American periods are reviewed separately below ("Ethnographic Context" and "Historic Context").

Early Man (Malpais) Pattern (50,000 to 12,000 years BP). The Malpais pattern is a complex of archaeological material believed to date from 12,000 to 50,000 years BP (Begole 1973, 1976; Davis et al. 1980; Hayden 1976). Rogers (1939, 1966) used the term Malpais for ancient-looking cleared circles, heavily varnished chopping and scraping tools, and rock alignments he later classified as San Dieguito I. Dating remains from this period has been problematic (McGuire and Schiffer 1982). Redating the Yuha Man cast doubt on early settlement of the Colorado Desert. Originally dated to over 20,000 years BP based on radiocarbon dating of caliche, accelerator mass spectrometry dates on bone fragments now date "Yuha Man" to only 5,000 years BP (Taylor et al. 1985).

PaleoIndian Period (San Dieguito) (12,000 to 7,000 years BP). Most non-ceramic lithic assemblages, rock features, and cleared circles are assigned to the San Dieguito Complex, Phase III and most Colorado Desert sites are assumed to be San Dieguito. Rogers (1939, 1966) first defined this complex as consisting of three phases, with each phase characterized by the addition of new, more sophisticated tool types to the pre-existing tool kit. San Dieguito technology is based on primary and secondary percussion flaking of cores and flakes. San Dieguito I and II phase tools include bifacial and unifacially reduced chopping tools, concave-edged scrapers (spoke shaves), bilateral-notched pebbles and scraper planes. Appearing in the San Dieguito II are finely-made blades, smaller bifacial points, and a larger variety of scrapers and choppers. The San Dieguito III tool kit is appreciably more diverse, with fine pressure flaked tools such as blades, leaf-shaped projectile points, scraper planes, plano-convex scrapers, crescentrics (amulets), and elongated bifacial knives (Rogers 1939, 1958, 1966; Warren and True 1961; Warren 1967).

San Dieguito culture was a hunter-gatherer adaptation comprising small, mobile bands exploiting small and large game, and collecting seasonally available wild plants. Some believe the absence of groundstone reflects a lack of hard nuts and seeds in the diet, and is a cultural marker separating the San Dieguito culture from the later Desert Archaic culture (Rogers 1966; Warren 1967; Moratto 1984). Portable manos and metates are now being found in coastal sites radiocarbon dated in excess of 8000 BP and in association with late San Dieguito (III) adaptation.

Archaic Period (Pinto and Amargosa) (7,000 to 1,500 years BP). The Pinto and Amargosa Complexes were regional specializations within the existent hunting and gathering adaptations that characterized the Archaic Period. These complexes occur more frequently in the northern Great Basin, Mojave Desert, and the Sonoran Desert east of the Colorado. Few Pinto or Amargosa (Elko series) projectile points have been found on the desert pavements in the Colorado Desert. The desert environment was unstable at this time, especially during the Altithermal Period of 7,000 and 4,000 years BP, which forced the mobile hunter-gatherers into more hospitable regions (Crabtree 1981, Schaefer 1994a, Weide and Barker 1974). Indian Hill Rockshelter in Anza-Borrego Desert State Park contained 1.5 meters of deposits *below* a Late Prehistoric component (McDonald 1992). Eleven rock-lined cache pits and numerous hearths indicate a residential base or temporary camp in which food storage was integral to the hunting and gathering subsistence and settlement strategy. Numerous Elko-Eared dart points, flaked and milling stone tools, and three burials were recovered. Similar finds were made at a small rockshelter in Tahquitz Canyon (Bean, et al. 1995). More recently a late Archaic Period campsite was identified in 8-meter-deep dune deposits adjacent to the north Lake Cahuilla shoreline (Love 1996). Radiocarbon dates and associated avian and fish remains confirm a Late Archaic Period Lake Cahuilla occupation. Additional Archaic sites certainly lie buried under alluvial fans and wash deposits, sand dunes, and Lake Cahuilla sediments.

Late Prehistoric Period (Patayan) (1,500 to 100 years BP). The Patayan is divided into four phases, including a pre-ceramic transitional phase from 1,500 to 1,200 years BP. Major innovations include introduction of paddle-and-anvil pottery making around 1,200 years BP and the introduction of floodplain agriculture (Rogers 1945, Schroeder 1979). These advancements were introduced from Mexico or through the Hohokam of the Gila River (Schroeder 1975, 1979, Rogers 1945, McGuire and Schiffer 1982). The flooding of Lake Cahuilla corresponds to Patayan II, 950 to 300 years BP. Previous studies suggest the final Lake Cahuilla recession occurred around A.D. 1500, but recent research reveals a fifth infilling between A.D. 1600 - 1700 (Schaefer 1994 [1994a]; Laylander 1995).

Major excavations along the east side of Lake Cahuilla (Gallegos 1980, 1986; von Werlhof and McNitt 1980, von Werlhof et al. 1979) revealed desert peoples (A.D. 1000 - 1700) shifting their focus from the Colorado floodplains to a more mobile, diversified resource procurement pattern with increased travel between the Colorado and Lake Cahuilla (Pendleton 1984). Major temporary camps and smaller resource collection sites were established around marshy embayments and open stretches of the shoreline to fish, hunt waterfowl and rabbits, and to exploit mesquite and other resources in the sand dunes. Long-range travel to special resource collection zones, trading expeditions, and possibly some warfare, are reflected by the numerous trails throughout the Colorado Desert. These trails are often found associated with pot drops and trailside shrines.

Many pictographs, petroglyphs, geoglyphs, and bedrock grinding surfaces in the Colorado Desert are associated with the Patayan, although direct dating and cultural affiliation of such features is difficult to determine. In the Patayan, and possibly in the Archaic, specific volcanic and sandstone rock outcrops along the Colorado and Gila Rivers were exploited for the manufacture of stone pestles and portable milling slabs (Schneider 1993, 1994) but all groups used ironwood mortars and pestles. When Lake Cahuilla dried up, Patayan III emerged with returned reliance on the Colorado floodplain and some floodplain agriculture along the New and Alamo Rivers in a mixed horticulture/hunter-gatherer economy.

Ethnographic Context. Ethnohistorically documented tribes living in the three geographic subregions include the Quechan (LCR and around the AAC), the Kamia (IID water service area and part of the Salton Sea geographic subregion) and the Cahuilla (Salton Sea geographic subregion and southern Coachella Valley) (Figure 3.8-3). The Cocopah, located south of Yuma, were first contacted by Europeans. Their 19th Century village, which was ethnohistorically recorded, was located east of Calexico-Mexicali. The Quechan have been described by Kroeber (1920) and Forde (1931); the Kamia (or eastern Kumeyaay) by Gifford (1931), Knack (1981) and Spier (1923); and the Cahuilla by Barrows (1900), Bean (1972), Bean and Saubel (1972), Curtis (1926), Drucker (1937), Heizer (1974), Hooper (1920), Kroeber (1908), and Strong (1929).

Quechan. The Quechan inhabited the LCR and part of the AAC vicinity. Their traditional economy was a mix of floodplain horticulture, fishing, and hunting-gathering, as detailed by Castetter and Bell (1951). The Quechan are a Yuman-speaking group with linguistic and cultural ties to the Cochimi, Cocopah, Halyikwamai, Kohuana, Kumeyaay, Kiliwa, Walapai, Havasupai, Yavapai, Halchidhoma, Maricopa, and Mohave (Forde 1931, Kroeber 1920). Friendly with the Kumeyaay, Yavapai, Papago and Mohave, they were traditional enemies of the Cocopah and Maricopa, but got along poorly with the Cahuilla. Between 1780 and 1850, the Quechan experienced lengthy hostilities with the Halchidhoma, resulting in the ultimate displacement of the Halchidhoma from the Colorado to the middle Gila River.

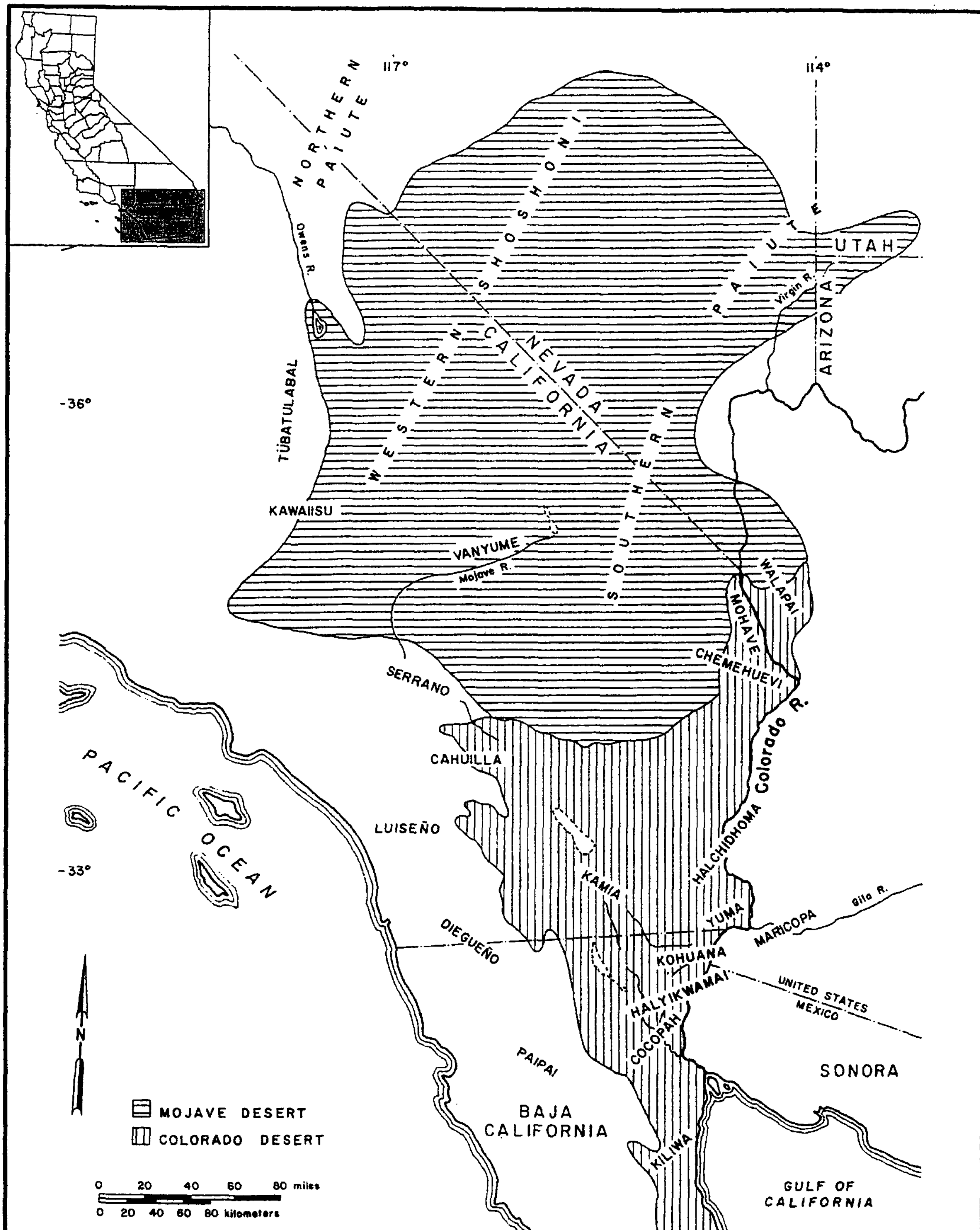

Figure 3.8-3
Historic Tribes of California Desert and Adjacent Regions
IID Water Conservation and Transfer Project Draft EIR/EIS

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The Quechan lived in dispersed settlements along the Colorado and lower Gila and today, the 33,000-acre Fort Yuma Indian Reservation remains the center of cultural and political life for the 3,000-plus members of the Quechan Nation (Bee 1981, 1983, 1989). Pilot Knob, located near the beginning of the AAC, is the Quechan sacred site, *Avikwalal*. Pilot Knob was the first stop in a four-day ceremonial journey up the Colorado to the creation site at *Avikwame*, near Needles. This symbolic journey, with four major stops, was undertaken in a special *keruk* or memorial ceremony held in remembrance of the first creation given by the culture-giver, *Kumastamxo*, for his father the creator, *Kikumat*. This ceremony was held every four or five years to commemorate the people who had died since the last keruk (Raven and Raven 1986; Ezzo and Altschul 1993; Altschul and Ezzo 1994).

Kumeyaay/Kamia. South of the Salton Sea was home to the Kamia (a subdivision of the Kumeyaay), a sedentary agricultural people related culturally to the River Yumans. Their territory extended southward to the Colorado delta below the International Line in Baja California. Their territory's eastern boundary was east of the sand dunes near the eastern shore of the Salton Sea (Figure 3.8-4). It included the New and Alamo Rivers, and innumerable temporary sloughs and shallow lakes (Van Camp 1979). The Indians who occupied the Imperial Valley area at Spanish Contact were the Tipai and Ipai (Kroeber 1925; Luomala 1978; Spier 1923) who use the term Kumeyaay for their tribal name. Until the 1960s, ethnographers used the term Diegueno for these peoples. Since contact, the Kumeyaay gradually acculturated; they no longer practice many of their traditions. Many bands and once-autonomous tribelets were combined by the government to form a larger group that was placed on reservations throughout San Diego County.

By the late 19th and early 20th centuries, Kamia society had disintegrated from disease, assimilation, and warfare. Kumeyaay descriptions from early European contact to the present are preserved in the writings of explorers, soldiers, settlers, ethnographers, and Indians. From these works, a rather complete picture of protohistoric native lifeways has been recreated by Barrows (1900), Gifford (1918, 1931 and 1934), Hooper (1920), Strong (1929), Heizer and Whipple (1957), Kroeber (1925), and Phillips (1975).

Kumeyaay were seasonal hunters and gatherers (and occasional agriculturists) who used all major ecological zones at various times of the year, including the coast and its maritime resources, the mountain oaks and piñon, and the desert foothill agave and mesquite. The Salton Sea and the Laguna Salada area were desert oases during some portions of the year. They were used to grow beans, corn, and squash whenever the floodwaters of the Colorado River backed up into the area through various overflow channels, such as the New and Alamo Rivers. While the Kumeyaay have been depicted as hunter/gatherers in ethnographic documents, some groups practiced agriculture in the Imperial Valley (Gifford 1931). Shipek (1989) suggested that horticultural practices among the Kumeyaay were widespread and intensive, involving transplantation and cultivation of several native plant species.

Most groups had a mountain home base that provided acorns, greens, fruits, and abundant game. Each group operated out of its home base for most of the year. Seasonal campsites were scattered throughout their territory and used as needed, but their central villages were larger and permanently situated (see Schaefer 1998 for Kumeyaay settlement patterns and Luomala 1978 and Spier 1923 for traditional Kumeyaay mountain dwellings).

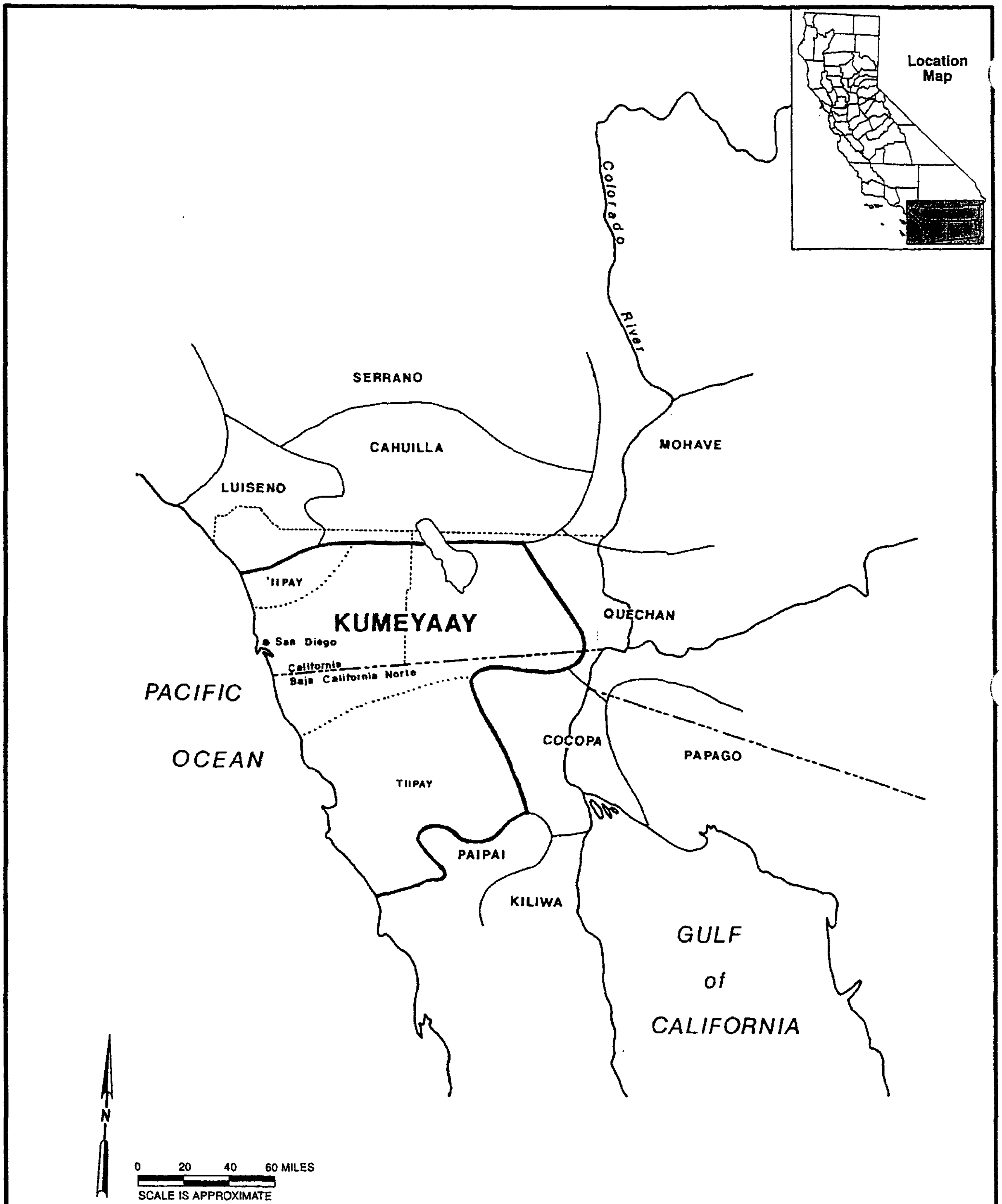

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Figure 3.8-4
Location of the Kumeyaay and Their Neighbors
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Lands along New River belonged to individuals and/or families who cleared and leveled them, built dams and levees, and maintained canals. Any Kumeyaay from any band (coastal, foothill, or mountain), could acquire New River floodplain land by clearing additional land, helping to build dams, and extending the levee and canal system to the newly cleared land (Shipek 1982). The easternmost *Tipais* lived along sloughs such as New River, and in the adjoining desert (Luomala 1978). A Kumeyaay tribelet referred to as the *Iya'tcarp*, lived on the west side of the New River (Spier 1923).

Desert Cahuilla. The northern part of the Salton Sea was home to the Desert Cahuilla (Strong 1929; James 1969) who practiced some agriculture (Bean and Saubel 1972). Shipek (1982) puts their southern border at San Felipe Creek while Strong (1929) puts the border between the Cahuilla and Kumeyaay around the Riverside/Imperial County line.

The Cahuilla are a Takic-speaking group that occupied northwestern Imperial and Riverside Counties. Desert Cahuilla society was set up with a dozen or more land-holding clans, each with territory that ranged from desert or valley floor to mountain areas within which several biotic zones could be exploited. Each clan included several lineages, each with an independent community area it owned within a larger clan area. Each lineage had ownership rights to various hunting and gathering areas. Cahuilla clans varied in size but some numbered up to several thousand people. Clans were arranged so each lineage/community had access to water and food resources. Within each community, houses and structures were placed at some distance from each other; often a community would be spread over a mile or two, with each nuclear and extended family having houses and associated structures for storage of food, and shaded work places to manufacture tools and process food (Schaefer 1998). Hilly, rocky areas, cave sites, or walled cave sites were used for temporary camping, food storage, hunting blinds, and as fasting places for shamans.

The Torres-Martinez were contacted as early as 1797, but their more western relatives were contacted by the Spanish some years earlier. Runaway mission neophytes probably sought refuge among the desert tribes. By 1823, the Cahuilla were familiar with Hispanic lifeways and comfortable operating with them. At that time, Mexicans were running livestock through the San Gorgonio Pass as far as Palm Springs. The 1823 Romero expedition reported that the Cahuilla at Toro were growing corn and melons and were already familiar with the use of horses and cattle (Schaefer 1998). In 1851, the Cahuilla and Luiseno leaders signed a treaty that was never ratified by Congress. In the 1860s, epidemic disease virtually wiped out the Cahuilla and survivors of decimated lineages and clans joined villages to maintain their ceremonial, cultural, and economic institutions (Schaefer 1998).

Cahuilla Indians from Torres-Martinez and Cabazon villages helped build the Southern Pacific Railroad in 1877, even as their (and Quechan) traditional lands were taken away by the U.S. government and given to the railroad, with only a small portion provided to them as reservations. By 1891, the Cahuilla and other Indians were firmly settled on local reservations; the Torres-Martinez Reservation was established by an Executive Order in 1876. In 1903 another 640 acres of state lands were added to the reservation. The present area under trust is about 14,000 acres. In 1991, 192 people were living on the reservation, and 57 were living adjacent to the reservation (Schaefer 1998). The Cabazon Reservation was established near Indio by an Executive Order in 1876. In 1895, the area was increased by an Act passed in 1891. Around 1923, 60 to 70 acres of the reservation were under irrigated cultivation. By 1991, the reservation totaled 1,382 acres. At that time, the BIA had listed the Cabazon population as 17 within the reservation, and 8 adjacent (Schaefer 1998).

Historic Context. When settlers filled up Kumeyaay gathering areas, and conducted aggressive and violent acts against them, the starving and demoralized Kumeyaay broke up and dispersed. Some moved to the Colorado River Basin to live among the Quechan, while others moved into Baja California. Others accommodated themselves to Caucasian patterns at a very impoverished level. They often hired out as migratory workers on ranches and as domestic workers in the towns. When most the Kumeyaay were impounded on reservations in 1870, much of their culture was obliterated, except in the memories of the older generation (Van Camp 1979). Luomala (1978) presented a detailed account of Kumeyaay struggles in the late 19th and early 20th centuries; a few salient points are noted below.

The Kumeyaay remained within their protohistoric boundaries during successive Spanish, Mexican, and Anglo-American control. Of all mission tribes in the Californias, the *Tipais* and *Ipais* most stubbornly and violently resisted Franciscan and Dominican control. In 1834, Mexico secularized the missions. To make them Mexican farmers and colonists, Indians were to get half the mission lands, but only to use, and were to work on community projects. Those receiving lots soon lost them as secular administrators, who (ignoring their responsibility to the Indians) functioned like feudal lords. *Ipais* and *Tipais* became serfs, trespassers on ancestral lands, rebels, or mountain fugitives (Luomala 1978). Throughout the 20th Century, the Kumeyaay continued to struggle for justice and to preserve and protect their First Nation sovereignty and the resources necessary for their economic independence (Viejas Band of Kumeyaay [no date]).

At the time of Spanish contact, the Desert Cahuilla lived in the San Gorgonio Pass, the Coachella Valley eastward to the middle of the present Salton Sea, and the San Jacinto and Santa Rosa mountains. Spanish contact with desert Cahuilla groups in the Coachella Valley first occurred in December 1823, when Captain Romero found Indians living near Thermal, growing corn, pumpkins, melons, and watermelons (Bean and Saubel 1972). In 1853, Lt. Williamson crossed the Colorado Desert, south of Agua Caliente (Palm Springs), and observed the remains of an Indian brush-house and the stubble of a barley field. South of Indian Wells, Indians anxious to trade corn, melons, squash, and barley met Williamson's surveyors. Near Thermal, Williamson reported the Indians had good stores of grain and melons. Although melons, wheat, and barley are European introductions, they were well integrated into the Indian agricultural complex prior to contact (Bean and Saubel 1972).

Historic Context of Indian Agriculture. The Kumeyaay and Cahuilla were the first to struggle with water supply and conservation issues; their story helps frame expectations of the types and distributions of cultural resource sites that might be present beneath the waters of the Salton Sea or within the irrigated farmlands of the Imperial Valley. According to Lawton and Bean (1968) and Bean and Saubel (1972), Indian crop-growing in the arid desert became possible only after the introduction of ditch irrigation by the Spanish, because the Colorado River tribes to the east of the Cahuilla relied mostly on floodwater farming. But on the Colorado Desert, no native streams or readily procurable surface water existed. Native desert agriculture might have been helped by occasional rains, but it could not have been dependent on rainfall. (However, several geological features helped to compensate for the lack of water.) While no streams flowed year round, the valley floor has an underlying aquifer that collects and stores runoff from the surrounding mountains. This artesian basin extends from near Indian Wells to the Salton Sea. At certain places, faults in impermeable strata occur that, during the early historic period, allowed water to flow upward in some places, keeping it near the surface. In historic times, at least five natural and artificial water-utilization techniques were employed to grow crops (Bean and Saubel 1972):

- Dry farming ("temporales") agriculture, which was dependent on rainfall in excess of 8 inches annually
- Conventional irrigation by ditches from wells, springs, streams, and small impoundments
- Diversion of artesian flow so that it flooded and soaked gardens prior to planting
- Runoff farming, or the exploitation of small rainfall catchment basins with soil-moisture storage capacity
- Pot irrigation

As Bean and Saubel (1972) described Williamson (1856) reported that the Cahuilla deepened and enlarged springs. Near Thermal, Williamson (1856) found a pool 20 feet or more in diameter at a Cahuilla *rancheria,* which had been "created by an artificial embankment three or four feet high." Both the Cahuilla and their Kamia neighbors perfected a highly sophisticated water supply technique - the water well. A Cahuilla well reported by Romero (Bean and Mason 1962) in 1823 had a depth of about 15 feet. These wells were great pits dug into the desert sands. Terraced steps make it possible for a woman with an olla (jar) to descend to the bottom and dip up water. (An even earlier account of water wells comes from the Anza Expedition.)

As reported by Glendenning (1951), in the later 19th Century, before settlers lowered the water table by drilling hundreds of wells in the Coachella Valley, many seepy areas existed in the artesian section. Early historic period reports indicate marshy areas in parts of the valley were created by breakthrough in artesian flow. As reported by Strong (1929), agricultural plots were cultivated in four Cahuilla villages around 1850, and natural seepage was recalled as the water source for crops at one of these villages. Lawton and Bean (Bean and Saubel 1972) conclude:

Another technique, runoff farming, required a relatively large natural watershed area, which concentrates its rainfall into a small catchment basin, usually amounting to about an acre or less (Bean and Saubel 1972). To accomplish pot irrigation, young girls were sent to fill earthen jars with water, which were then brought back and used to sprinkle on vegetable crops. The development of well-digging among the desert Cahuilla is suggestive of pot irrigation.

Lawton and Bean's (Bean and Saubel 1972) Lake Cahuilla hypothesis suggests the way in which the present Salton Sea basin was used by prehistoric Indians. In precontact times, after the formation of Lake Cahuilla, certain Yuman groups moved in and settled around the lakeshore. The fresh-water Sea existed from about 900 to 1500 A.D. When the Colorado shifted course to the Gulf of California, the Sea began to dry up, probably at a rate of 5 feet per year. The lake would have produced a water table that would have supplied surface soil moisture by capillary action in irregular areas along the changing shore. This arable land would have been relatively free of salinity. Several Cahuilla myths make mention of the lake and the tribal dislocations that occurred among the Cahuilla as a result of its formation. The

Cahuilla probably emulated the Yumans in planting around the shores of the lake, only to discover later, as the lake subsided, the existence of occasional seepage areas, natural catchment basins, and other favorable micro-niches. These discoveries made it possible to plant crops season after season without conventional irrigation.

As discussed later, reduction in the surface elevation of the Salton Sea through reduced inflows generated by project conservation measures might expose former Cahuilla Indian farmlands and associated archaeological sites. James (1969) provides an example of the kinds of resources that might be exposed if the Salton Sea were to shrink:

> The most southerly of the Desert Cahuilla villages was located at Fish Springs near the northern end of the Salton Sea. This village was called *Tuva* and it belonged to the clan of one of the best-known Cahuilla Indians, Fig Tree John. We believe he did not live at Tuva but near springs a few miles to the northwest. These springs later came to be known as Fig Tree John Springs and were so designated on the Geological Survey Map of the period. When this spot was flooded by the Salton Sea, Fig Tree John and his people moved to Agua Dulce Springs where they re-established their village. Unfortunately Agua Dulce Springs soon became known as Fig Tree John Springs, too, and this duplication of names has resulted in serious confusion in the identification of village sites in this particular area.

Historic Context of Euroamerican Agriculture. Certainly, by the time settlers entered the area, Lake Cahuilla had disappeared and Indian agricultural practices probably occurred as described above. From the settlers' perspective, the Proposed Project area was a desert and only in need of large-scale irrigation to make it flourish. The story of the conversion of the area into a productive agricultural region is detailed by Frisby (1993). Spreading farms attracted the opening of service centers, some of which arose into the modern urban communities that today dot the Imperial Valley. But in the 19th Century, Imperial Valley held little attraction for settlers, except for two main stagecoach routes through the valley along the Southern Emigrant Trail and the Alternate Eastern Route to San Diego.

In 1849, while crossing the Colorado Desert enroute to San Francisco and the gold fields, Dr. O.M. Wozencroft was probably the first to conceive of diverting Colorado River water to irrigate desert lands. Although Wozencroft died in 1887, several others shared his dream and by 1895, several water appropriations were filed to divert Colorado River water to irrigate lands in "that portion of San Diego County known as New River Country."

In the later half of the 19th Century, attempts were made to irrigate and develop the Imperial Valley, but these efforts lacked adequate financing and suffered from water and governmental restrictions. Charles R. Rockwood and George Chaffey, both experienced water engineers, organized the California Development Company in 1896 to entice settlers; the developers called the newly irrigated area the Imperial Valley.

In early 1900, surveys were conducted to find a suitable canal route from the Colorado River to the Imperial Valley, and the Imperial Land Company (ILC) was formed as a subsidiary of the California Development Company (CDC). ILC was to promote agricultural development of the Imperial Valley and attract settlers, who would claim government land under the Desert Land Act. The CDC successfully brought irrigation water to Imperial Valley in 1901 by opening up the Alamo Canal to serve about 1,500 acres. This canal project spawned both town formation and conversion of desert land into irrigated farmland. About 40 miles of the Alamo Canal ran through Mexico before crossing into the US, east of Calexico. Within 3 years, silting up of the headworks and upper reaches of the canal led to the excavation of a temporary bypass channel, about 4 miles downstream in Mexico.

In 1901, the Imperial Valley was platted and from 1901 to 1905 the Imperial Valley rapidly developed as more land was cleared and more irrigation drainage ditches were constructed to deliver the water coming through the Alamo Canal. For a few years, this water distribution system worked well, but in the fall of 1904, unseasonable floodwaters on the Colorado and Gila Rivers broke into the bypass and down the Alamo Canal. For almost 2 years the entire flow of the Colorado River poured into the Salton Sink forming the Salton Sea.

Meanwhile, to promote increased commercial export of agricultural products, a branch rail line was built from Niland in 1907 to serve the growing settlements to the south. The branch line connected to the transcontinental line of the Southern Pacific Railroad (SPRR), located along the north end of Imperial Valley and northeast of the Algodones Sand Dunes to Yuma. More importantly, by 1907, SPRR bought out the CDC and successfully returned the Colorado River to its original channel. Also in 1907, Imperial County was broken off from San Diego County and boasted a population of around 15,000.

As an outgrowth of the flood, Imperial Valley residents were forced to make major improvements to the irrigation system. But during the next several years, physical, financial, and international complications, and legal problems plagued the project. In 1911, the settlers formed a local agency that resulted in the formation of IID. IID is a public corporation organized under the California Irrigation District Act. By 1916, with financial and legal problems settled, IID purchased the rights and property of the CDC and SPRR, and settlement of Imperial Valley expanded along with the grown of agriculture.

Although the original plan called for the AAC to be lined, both the AAC and Coachella Canal were built as unlined canals in the 1940s to bring Colorado River water into the Imperial and Coachella Valleys. Construction of the AAC started in 1934 and was completed in 1940. Water deliveries to the East Highline Canal began in late 1940. In early 1942, all water diverted to the Imperial Valley was delivered via the AAC. By 1948, the Coachella Canal was completed and began diverting water from the AAC to the Coachella Valley. Leakage from the unlined canals prompted Reclamation to reconstruct the first 49 miles of the Coachella Canal with a new, concrete-lined canal. Today, Imperial County has a complex system of irrigation and drainage canals that serve communities with water for agricultural and domestic uses.

3.8.3.3 Identification Methods for Collection of Existing Setting Information

For the LCR geographic subregion, cultural resources existing setting information was summarized from the Draft IA EIS (Reclamation 2002) and Draft QSA PEIR (CVWD, et al 2002). For the IID water service area and AAC geographic subregion, cultural resources information was obtained from CHRIS. Although the AAC is included in this geographic subregion, all Projected Project-related impacts to the canal would be limited to fluctuations in water flow within the canal itself; no new ground-disturbing construction would be anticipated.

Archaeological Resources and the Recorded Historic Built Environment. For archaeological resources and elements of the historic built environment that are present within the Salton Sea geographic subregion, record searches were conducted at the appropriate CHRIS branch offices. Information on surveys and sites in Riverside County were obtained from the CHRIS Eastern Information Center at U.C. Riverside. Information on surveys and sites in Imperial County was gathered from the CHRIS Southeast Information Center at the Imperial Valley College Desert Museum in Ocotillo. Many historic sites in the built environment were not recorded.

Ethnographic Resources. Ethnographic resources were identified through the joint efforts of Reclamation and Tetra Tech. Reclamation sent letters to 29 tribal organizations in California and Arizona with traditional and historic ties to the area. The intent of the correspondence was to initiate consultation on ethnographic resources important to the tribes that might be affected by the Salton Sea Restoration Project. The methods employed by Tetra Tech for the Salton Sea Restoration Project were summarized by Smith, et al. (1999b) in a report titled, "Salton Sea Restoration Project: Contacts with Native American Groups."

CH2M HILL sent letters to tribes within, or adjacent to, the Salton Sea and the IID water service area to solicit information about cultural resources of concern to those tribes. See Section 3.9, Indian Trust Assets, for additional information on tribes in these subregions. Additional ethnographic resource information is presented in the Draft QSA PEIR (CVWD, et. al. 2002).

For the Proposed Project's LCR effects, Reclamation is implementing a similar methodology for contacting Indian tribes with traditional and historic ties to the LCR geographic subregion. Reclamation is engaged in frequent government-to-government consultations with the tribes along the LCR that could potentially be affected by changes in the operation of the LCR as a result of the Proposed Project. Reclamation is responsible for offering each tribe an opportunity to directly express its concerns. Since Reclamation is the co-lead agency with IID for this Draft EIR/EIS, Reclamation has provided the results of its tribal consultations to IID for incorporation into this Draft EIR/EIS in Section 3.9, Indian Trust Assets.

3.8.3.4 Known Cultural Resources

Archaeological Resources. According to information provided by Karen Collins and Jay von Werlhof (Imperial Valley College) to Jurg Heuberger, who prepared the Conservation and Open Space Element for Imperial County, about 7,500 prehistoric archaeological sites, consisting of settlements, trails, rock art, geoglyphs, fish traps, and resource procurement and manufacturing locations, have been recorded in Imperial County (Heuberger [no date]).

The current distribution and availability of such resources are a consequence of several environmental and historic factors, including the periodic flooding of ancient Lake Cahuilla and the existence of the New and Alamo Rivers, all of which encouraged prehistoric settlement and resource use of their shorelines and riverbanks. Conversely, the Algodones Sand Dunes are a feature that discourages the likelihood of finding prehistoric sites. Further, intensive use of Imperial Valley for irrigation agriculture since the beginning of the 20th Century have harmed most resources that might have existed on land that is now farmland or under the Salton Sea.

Jay von Werlhof's archaeological sensitivity map (Heuberger [no date]) portrays areas of vastly different probability for finding archaeological sites. Few highly sensitive resources exist within major populated and developed portions of Imperial County (i.e., the areas that have been intensively farmed). Important exceptions include the New and Alamo Rivers, which were extensively used by the Kamia as late as the mid-1800s. Highly sensitive areas include the east and west shorelines of former Lake Cahuilla; lower Borrego Valley east to Highway 86; the area around Ocotillo; part of the Pilot Knob Mesa east of Glamis; and the easternmost part of the county, including the Palo Verde Mountains and the area between Ogilby Road and the Colorado River. The only non-agricultural areas not expected to contain resources are in the immediate east and west sides of the Salton Sea and the Algodones Sand Dunes. Areas of moderate to low sensitivity include most of the (mostly unsurveyed) Chocolate Mountains; parts of East Mesa, West Mesa, the Fish Creek Mountains; and the Superstition Mountains. The paucity of water and harsh terrain discouraged major prehistoric use of these regions.

Known/recorded archaeological resources within the IID water service area include 979 prehistoric sites, 111 historic sites, and several other elements of the historic built environment. Known or recorded archaeological resources within the Salton Sea geographic subregion include 83 prehistoric sites, 13 historic sites, and one other element of the historic built environment. Known/recorded archaeological resources within the LCR geographic subregion include seven prehistoric sites, up to 35 historic sites, and three elements of the historic built environment. The distribution of these resources is shown in Table 3.8-2.

TABLE 3.8-2
Cultural Resources within the Proposed Project Geographic Focus Areas

Site Types	LCR	IID Water Service Area	Salton Sea	Total (No. %)
Prehistoric	7 (see below)	979	83	1069
	CA-RIV-783, CA-RIV-1109/CA-RIV-419, CA-IMP-7092, 4-IMP-5871H, AZ-050-1643, AZ-050-347, X:3:13 (ASM)			86%
Historic	6 (see below)	111	13	159
	29 GLO resources			13%
	CA-SBR-9853H, AZ R:6:11 (ASM)/BLM 02-050-037, AZ R:14:16 (ASM), AZ R:14:17 (ASM), 4-IMP-5898H, 4-IMP-5871H			
Historic Built Environment	3	7	1	11
	Parker Dam, Old Parker Road, Imperial Dam,	Historic Bonita School; historic AAC; historic cemetery; historic airstrip; historic Southern Pacific railroad tracks; historic railroad grade; and historic Laguna Dam	Historic railroad grade	1%

Schaefer's (1994b) review of archaeological research in the Colorado Desert addresses the difficulty inherent in site detection in the Imperial Valley vicinity. Schaefer 1994a observed that many sites relating to the reoccupation of the Salton Trough (after the desiccation of Lake Cahuilla) along the New and Alamo rivers were destroyed in the great flood of 1905-1906, or by later agricultural activities. He further commented that no substantial Late Prehistoric sites have been investigated on the LCR floodplain because many have been obscured by alluvium or recent agricultural developments.

When sites are discovered on or near the banks of New River, they usually consist of scatters of broken pottery. As Van Camp (1979) observed, an essential element to the success of the hunting and gathering lifeway is the ability find foods, process them, and store them so that something is available at all times. The major processes (pounding, milling, grinding, leaching, and drying) could convert almost any plant into a product, which would be used as a food, medicine, or tools. Food in most of aboriginal California was stored in basket containers.

While pottery was not essential to Kumeyaay life, it did confer considerable advantages. Pottery vessels are waterproof, rat-proof, and insect-proof, if well sealed. Pottery makes possible direct cooking over a fire and eliminates the time-consuming process of stone-boiling, in which stones hot from the fire are dropped into a sealed basket of food until the food is hot. Water could be stored in larger containers for longer periods of time. Pottery may have enabled the Kumeyaay to be more sedentary because of increased storage capacity, leading to larger populations and the establishment of more long-term residences in favorable spots. It is also possible that use of more reliable storage containers and a greater dependence on stored plant foods might have facilitated the introduction of horticulture (Van Camp 1979). The important point is that pottery is probably the most obvious indicator (in addition to isolated lithic debitage) of prehistoric occupation in the Proposed Project area, because fired ceramics survive well and perishable basketry does not.

In contrast to the Imperial Valley bottom land, archaeological sites along the ancient shorelines of the Salton Trough are often recognized by a number of distinctive features, such as house rings with associated artifacts, sandstone slab hearths, cremations , artifacts sometimes covered with travertine, abundant obsidian and quartzite lithic debris, shell (abalone, *Olivella*, cardium, limpet, and mussel), fishbone, bird bones, and mammal bones.

Many sites along the ancient shorelines consist of elaborately constructed stone fish-traps located below the maximum shoreline at 12 meters (m) (40 feet) above sea level. Examination of fish-trap sites has recently shed greater light on the importance of fishing by peoples ancestral to the historic Cahuilla and Kamia, and to reconstructing the nature and timing of Lake Cahuilla infillings and recessions (Schaefer 1998).

Resources of the Historic Built Environment. According to von Werlhoff, about 800 historic sites (including trash dumps) have been recorded in Imperial County (Heuberger [no date]). Important historic resources date back to 1540, when Hernando de Alarcon discovered Alta California near the intersection of Interstate 8 and Highway 186 on the Colorado River (California Historical Landmark [CHL] No. 568). In 1775, Juan Bautista de Anza first passed through the area. The Anza Trail, itself, is a significant cultural resource, as is the later Sonoran/Southern Emigrant Trail that served as a major route to and from coastal California, from 1825 to 1865. Several historical markers are present along the Anza Trail, including the monument of Los Puertecitos (CHL No. 635) near Highway 78 and Kane Springs Road. Two significant resources from the Spanish period (1769-1821) are the La Purisima Conception Mission site (CHL No. 35), located at Mission St. Thomas on Indian Hill, and the San Pedro y San Pablo de Bicuner Mission site (CHL No. 921), located near Laguna Dam. The former was built in 1780 at the request of the local Indians; the latter was built in January 1781 as a strategic settlement for those crossing the Colorado River. Both were attacked and destroyed on July 17, 1781, by the Quechans.

One of the few known Mexican-period (1821-1848) sites is Fort Romualdo Pacheco (CHL No. 944). Located about 7 miles west of Imperial, near the New River, it was the only Mexican fort in Alta California, and was built to help maintain the Sonoran Trail. It was constructed in 1825 and attacked by the Kamia on April 26, 1826, resulting in the deaths of three soldiers and its abandonment. Low, adobe mounds remained in 1968, but were leveled for agricultural purposes shortly thereafter. Imperial Valley College excavated this site in 1978. Few early American-period (1848–early 1900s) sites remain (except for the Southern Pacific Railroad) because little settlement or other use occurred until irrigation water became available in 1901.

Most sites have been disturbed by agricultural activities and town construction. One site has received a historical monument designation for being the location where the first irrigation water entered the county–a few feet from the U.S. Mexican border on Barbara Worth Road, between Calexico and the Alamo River.

Another significant site is the Plank Road near I-8 along the Algodones Sand Dunes, which was used from 1914 to 1927 (CHL No. 845). Sites of local importance are documented in Imperial Valley Historical Markers (Little 1982). Plat maps from the early 1900s indicate numerous structures throughout Imperial Valley. While many of these structures are no longer standing, the potential exists for subsurface features, such as house foundations, privies, and trash deposits.

The BCPA began one of the most monumental public reclamation projects ever undertaken in the western US. The Act authorized construction of Boulder Dam (Hoover Dam), Imperial Dam, the AAC, and the Coachella Branch of the AAC (Schaefer and O'Neill 1998b). Boulder Dam was dedicated in 1935. Some 300 miles downstream, Imperial Dam was constructed between 1935 and 1938. This was the diversion point for the AAC, where three enormous desilting basins cleansed the muddy Colorado River waters. The AAC was excavated between 1934 and 1940 to carry water 82 miles to the Imperial Valley; the last element to be completed was the 123.5-mile Coachella Branch, which was begun in 1934 but not opened until 1949 because of a construction hiatus during World War II. The original Coachella Canal supplied water to the Coachella Valley until 1982, when portions of it were replaced by a concrete-lined canal designed to greatly reduce seepage.

The AAC is a historic property (CA-IMP-7130-H) and has been assigned the National Register Status Code 3D (appearing to be eligible for listing in the National Register of Historic Places, as a contributing property of a district) (Reclamation 1994). The Old Coachella Canal is also a historic property (CA-IMP-7658) that has been evaluated by Schaefer and O'Neill (1998b) as eligible for listing in the NRHP, under Criteria A.

Ethnographic Resources.

Lower Colorado River. Information on ethnographic resources in the LCR geographic subregion is incorporated into this Draft EIR/EIS by reference of the Draft IA EIS (Reclamation 2002) and Draft QSA PEIR (CVWD et al 2002).

The Native American Heritage Commission in Sacramento was contacted to secure information on any sacred lands that might be present in LCR geographic subregion, and to secure a list of Most Likely Descendants (MLDs) who should be contacted for information about ethnographic resources. The Native American Heritage Commission reported that no sacred lands are present in the LCR Proposed Project area (Pilas-Treadway 2000).

IID Water Service Area. For the IID water service area and AAC geographic subregion, limited ethnographic Baseline information was collected from CHRIS (see below). Although the AAC is included in this geographic subregion, all Proposed Project-related effects would be limited to fluctuations in water flow within the AAC itself; no new ground-disturbing construction would be anticipated. Additional Baseline information on ethnographic resources might be obtained from Reclamation if Reclamation releases the cultural resources technical report that supported the March 1994 AAC Lining Project FEIS/FEIR (CA State Clearinghouse No. SCH 90010472). The Baseline information collected for the AAC includes the canal itself, and a 0.5-mile-wide buffer around the canal. In addition, the Native American Heritage Commission in Sacramento was contacted to secure information on any Sacred Lands that might be present in Imperial County Proposed Project area, and to secure a list of MLDs who should be contacted for information about ethnographic resources. The Native American Heritage Commission reported that no sacred lands are present in the IID water service area and AAC geographic subregion (Pilas-Treadway 2000).

The AAC, from Pilot Knob to Drop 4, traverses through land that contains the remains of cultural activity from prehistoric times until recent historic periods. The Pilot Knob area, which is adjacent to the AAC near Yuma, is one of the most significant and sensitive cultural resource areas in the Colorado Desert. Pilot Knob, which contains abundant and diverse archaeological remains, was the focus of traditional ceremonies and symbolism for the Quechan, Cocopah, Kamia, and possibly other Indian groups. Pilot Knob and parts of the gravel terraces on its south side are sacred in the religious practices of the Quechan Indian Tribe, on whose behalf the BLM has restricted public access. Pilot Knob has been established as an Area of Critical Environmental Concern along the AAC to protect archaeological and Native American cultural resources (Reclamation 1994).

Salton Sea. For the Salton Sea geographic subregion, limited ethnographic existing setting information was collected from CHRIS (Ocotillo and UC Riverside). In addition, the Native American Heritage Commission in Sacramento was contacted to secure information on any sacred lands that might be present in the Salton Sea geographic subregion, and to secure a list of MLDs who should be contacted for information about ethnographic resources. The Native American Heritage Commission reported that no sacred lands are present in the Salton Sea geographic subregion (Pilas-Treadway 2000).

For the Salton Sea Restoration Project (see Chapter 1, Section 1.5), 29 tribal organizations in California and Arizona were contacted by Reclamation by letter, phone calls, and follow-up visits, in certain cases. Twenty-two groups stated that they had no direct concerns about the Proposed Project, while one group–the Torres Martinez Desert Cahuilla–stated specific concerns, and four other groups said that they might have concerns. Several groups stated that they would like to participate in monitoring sensitive areas. The Kumeyaay Cultural Repatriation Committee (KCRC) stated that they should be contacted immediately if human remains or burial goods are found during any construction activities. The Torres Martinez expressed concerns about cultural and ethnographic resources in and around the Salton Sea, and about archaeological sites located on the US Navy Test Base that may be affected by restoration efforts.

3.8.4 Impacts and Mitigation Measures

3.8.4.1 Significance Criteria

Section 15064.5 (CEQA Guidelines, revised October 26, 1998) indicates a project may have a significant environmental effect if it causes "substantial adverse change" in the significance of an "historical resource" or a "unique archaeological resource" as defined or referenced in CEQA Guidelines section 15064.5[b, c] (1998). Such changes include "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines 1998 section 15064.5 [b]).

An impact on cultural resources is considered significant, therefore, if it adversely affects a resource that is listed in or eligible for listing in the CRHR or is otherwise considered a unique or important archaeological resource under CEQA. In general, the Proposed Project and/or alternatives would have a significant impact if they:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5;
- Cause a substantial adverse change in the significance of an archeological resource pursuant to CEQA Guidelines section 15064.5;
- Directly or indirectly destroy a unique paleontologic resource or site or unique geologic feature; or
- Disturb any human remains, including those interred outside of formal cemeteries.

Note that federal criteria used to determine the adverse effects of federal actions are not specifically listed. Refer to the Draft IA EIS (Reclamation 2002) for information on the methodology used to determine such adverse effects in the LCR geographic subregion.

3.8.4.2 Methodology

The methodology used to support this cultural resources analysis is based on existing cultural resource data on file with the CHRIS offices in Riverside and Ocotillo, California, information collected from IID archives, the Draft QSA PEIR (CVWD, et. al. 2002), Draft IA EIS (Reclamation 2002), and other resources listed throughout this section. For the purpose of this impact assessment, the following agencies were contacted:

- Native American Heritage Commission, Sacramento - Sacred Lands Inventory.
- California Historical Resources Information Center, located at the Imperial Valley College Desert Museum (Ocotillo) and the University of California, Riverside.

- IID cultural resource archives.
- Reclamation, Phoenix Area Office.

In addition, the impact analysis assumes that significant cultural resources are those listed in, or are eligible for listing in, national, state, and local historic registers and/or landmark inventories, consistent with definitions of eligibility in federal, state, and local laws and regulations (see Section 3.8.4.1, Significance Criteria).

As described in the IA EIS (Reclamation 2002), the effects of the Proposed Project as a result of the federal action of changing the point of diversion of Colorado River water from its current point of diversion at Imperial Dam, upstream to Parker Dam, will best be considered within the broader framework provided by the Section 110 consultation effort it has committed to conducting under the Interim Surplus Guidelines ROD (see Section 1.6.3 in Chapter 1), which covers all activities involved in its on-going operation of the LCR.

Subregions Excluded From Impact Analysis. The SDCWA geographic subregion is not discussed in this section because no construction or land disturbance would occur.

3.8.4.3 Proposed Project

LOWER COLORADO RIVER

Approval of a change in the point of delivery of conserved Colorado River water annually, from Imperial Dam upstream to Parker Dam, would reduce the volume of water flowing between the two dams. A decrease in flow volume could lead to a concomitant lowering of stream surface elevation. However, because River flows and associated surface elevations would fluctuate within the predicted ranges for a variety of reasons, it is unlikely that there would be any changes to depositional or erosion processes along the River and its tributaries. In addition, no changes to the surface area of backwaters or riparian habitats are expected to occur. Because no surface disturbance would occur as a result of the approval in the change in the point of diversion, there would be no adverse effect to Parker Dam or Imperial Dam. Reclamation finds that there would be no adverse effect to cultural resources in the LCR geographic subregion as a result of the approval of the change in the point of diversion (Reclamation 2002). (No impact.)

Reclamation will request concurrence from the Arizona and California SHPOs on its finding of no adverse effect to historic properties resulting from execution of the IA, and will consider their views with respect to development of such measures. If it is determined mitigation measures are necessary to protect historic properties, they will be identified in the final EIS for this action (Reclamation 2002).

The federal action involving implementation of the biological conservation measures in USFWS's Biological Opinion will also be subject to review under the NHPA. Additional NEPA compliance, including full assessment of potential effects to historic properties, would be conducted, as appropriate, when Reclamation begins developing site-specific plans for implementation of the conservation measures (Reclamation 2002).

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact CR-1. Construction of conservation measures from water conservation program. Potential impacts to cultural resources could occur because several conservation measures involve ground disturbance. It is difficult to quantify the relative impact of the conservation measures on archaeological sites that might be present. The first consideration is that in existing farmland, archaeological sites that consisted only of surface or near surface cultural deposits have already suffered disturbance from plowing and furrowing. Deeper archaeological sites, if present, might have survived ongoing plowing and furrowing associated with active farming and their cultural deposits might still be intact. As a result, those conservation measures that require ground disturbance to greater depth would have the greatest potential for impacts to archaeological resources.

Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

(Note that if fallowing is used as the exclusive conservation measure under the Proposed Project, no impacts would occur and no mitigation measures would be required.)

Mitigation Measure CR-1. Construction of conservation measures can occur anywhere within the IID water service area; therefore, pre-Project surveys have not been conducted. The following mitigation measures have been designed to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

- Archaeological and historical surface surveys to identify any cultural resources that may be affected. Areas that may contain buried archaeological resources also will be identified.

Archaeological Resources

- Modify Project design, when feasible, to avoid impacts to cultural resources, unless a qualified archaeologist conducts a field inspection and determines that the resource has no potential for significance because it is re-deposited, an isolated occurrence, modern, or otherwise lacks data potential.
- Develop and implement a pre-Project Phase II Testing and Evaluation Plan for all unavoidable potentially significant archaeological sites that will be directly impacted to evaluate the significance of the resource in terms of applicable criteria.
- Develop and implement a pre-Project Phase III Data Recovery Plan for all significant archaeological sites that will be directly impacted if the sites cannot be avoided through redesign.
- If impacts to significant resources cannot be reduced to less than significant levels through data recovery or other by other mitigation measures, then the Project will be redesigned to avoid the impact.

- Develop a Cultural Resources Construction Monitoring Plan prior to construction if ground disturbance will occur within any areas of archaeological sensitivity, such as recorded sites and areas that may contain buried archaeological sites.
- In the event of an unanticipated cultural resource discovery during construction, all ground disturbances within 200 feet of the discovery will be halted or re-directed to other areas until the discovery has been documented by a qualified archaeologist and its potential significance evaluated in terms of applicable criteria. Resources considered significant will be avoided or subject to a data recovery program as described above.
- Coordinate with SHPO and local Native American groups, if required, in compliance with applicable state laws.

Architectural Resources

- If avoidance of a potentially significant architectural resource is not feasible, then the resource will be documented on DPR forms and resource significance will be evaluated according to applicable criteria. If significant, then the architectural resource either will be relocated or integrated into construction design. Structural reuse will be consistent with the Secretary's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (see CEQA Guidelines 1998 Section 15064.5 [b][3] and Section 9.
- If a significant resource is not avoidable or incorporated into construction design, then recordation will be conducted through large-format black-and-white archival photographs, building descriptions, and archival research to establish their regional context. The recordation report will be submitted to a local or regional historic society.

Paleontologic Resources

- A literature review and paleontological field survey (as needed) will be conducted as part of site-specific CEQA review to identify potential impacts to rock units that may contain significant fossil remains.
- Modify construction design, when feasible, to avoid impacts to all significant paleontologic resources.
- Construction monitoring by a qualified paleontologist may be recommended for locations within paleontologically sensitive sediments. If so, a Paleontological Monitoring Plan shall be prepared prior to ground disturbance in sensitive areas.
- In the event of an unanticipated discovery during construction, all ground disturbance within 200 feet of the discovery will be halted or re-directed to other areas until the discovery has been recovered by a qualified paleontologist.
- All paleontologic resources recovered will be appropriately described, processed, and curated in a scientific institution such as a museum or university.

Inadvertent Overrun and Payback Policy (IOP)

Impact CR-2. Construction of conservation measures for IOP compliance. Potential impacts to cultural resources could occur for the same reasons discussed above under Impact CR-1.

Impacts on cultural resources would be potentially significant. (Potentially significant impact.)

(Note that if fallowing is used as the exclusive conservation measure under the Proposed Project, no impacts would occur and no mitigation measures would be required.)

Mitigation Measure CR-2. Construction of conservation measures can occur anywhere within the IID water service area; therefore, pre-Project surveys have not been conducted. The mitigation measures discussed under Mitigation Measure CR-1 have been designed to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

Impacts resulting from the compliance of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-CR-3. Creation of Managed Marsh Habitat. Potential impacts to cultural resources could occur during ground disturbance and construction activities. For the same reasons as discussed above under Impact CR-1, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

Mitigation Measure CR-3. The exact location of the managed marsh habitat in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply to this impact to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

HCP (Salton Sea Portion) Approach 1 (HCP1): Hatchery and Habitat Replacement

Potential impacts to cultural resources could occur during ground disturbance and construction activities. For the same reasons as discussed above under Impact CR-1, impacts on cultural resources would be potentially significant.

(Note that if HCP Approach 2 is implemented, this impact would not occur and mitigation measures would not be necessary.)

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-CR-4. Construction of conservation measures for HCP Approach 2. Potential impacts to cultural resources could occur during ground disturbance and construction activities unless fallowing is the only conservation measure employed to conserve additional water for mitigation under this HCP approach. The amount of conservation would be scaled based on the amount of water needed to be conserved. For the same reasons as discussed above under Impact CR-1, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

Mitigation Measure HCP2-CR-4. The exact location of the conservation measures in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply under this HCP approach to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

Impacts resulting from implementation of HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Impact CR-5. Reduced Inflows to the Salton Sea. Reduced inflows to the Salton Sea from the Proposed Project's water conservation program (see Section 3.1, Hydrology and Water Quality) would lower the Sea's level. Lower Sea level would, in turn, expose submerged land. Newly exposed land potentially contains archaeological sites that could potentially be vandalized if they were not protected. Newly exposed land could also potentially be cultivated or developed, thus harming any archaeological sites, if they were not protected.

Prior to the accidental creation of the Salton Sea in the early years of the 20th Century, prehistoric and historic archaeological sites were present in what is now the Salton Sea. Creation of the Salton Sea flooded any prehistoric and historic sites that were present. Once the Salton Sea level reached stability in the early decades of the 20th Century, the shorelines were used for recreational purposes. Archaeological sites accessible to recreationists might have suffered from unauthorized artifact collection. In the later decades of the 20th Century, the Salton Sea received wastewater inflows from the Imperial Valley. The shoreline elevation rose and flooded these early- to mid-20th Century shorelines.

Through the years, the rich sediment load of inflowing wastewaters have deposited silt on the lake bottom, probably covering the inundated archaeological sites with one or more inches of deposited sediment. With reduced inflows anticipated by early 21st Century water conservation, Salton Sea levels will fall and previous early-mid 20th Century shorelines will be exposed (but with a layer of deposited silt). Any archaeological sites that might be present would be only gradually exposed over a 20-year time period (as reduced inflows gradually result in lowered Sea levels). Such sites would be obscured by the deposited sediment, and would likely be recolonization of freshly exposed surfaces to invading plant life. (Potentially significant impact.)

(Note that if HCP Approach 2 is implemented, impacts to cultural resources at the Salton Sea would be avoided and mitigation measures would not be necessary.)

Mitigation Measure CR-5. Gradual exposure of submerged lands would potentially expose archaeological sites, if they are present. The same mitigation measures listed under Mitigation Measure CR-1 would apply to this impact to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. In addition, a series of archaeological surveys at regular intervals (once every 3 years) will be conducted to check freshly exposed lands for the presence/absence of archaeological sites. (Less than significant impact with mitigation.)

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Potential impacts to cultural resources could occur during ground disturbance and construction activities. For the same reasons as discussed above under Impact CR-1, impacts on cultural resources would be potentially significant. The exact location of the hatchery and ponds in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply under this HCP approach to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately.

(Note that if HCP Approach 2 is implemented, this impact would not occur and mitigation measures would not be necessary.)

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

The use of conserved water as mitigation would avoid Impact CR-1 and not create any new impacts.

3.8.4.4 Alternative 1: No Project

LOWER COLORADO RIVER

Under the No Project alternative, Baseline conditions would continue and the River's elevation would continue to fluctuate. No disturbance to cultural resources would occur.

IID WATER SERVICE AREA AND AAC

Under the No Project alternative, the Baseline condition would continue. Current agricultural practices would continue, and cultural resources would continue to receive only the protection and/or consideration afforded by environmental assessments triggered by other projects that may require CEQA and/or NEPA compliance. In addition, the HCP would not be implemented.

SALTON SEA

Under the No Project alternative, Baseline conditions would continue and the Salton Sea's elevation would continue to decline. The same cultural resources impacts described under the Proposed Project would occur (except at a later date) as the Sea level declines if buried cultural resources are present in the Sea bed. In addition, the HCP would not be implemented.

3.8.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

For the same reasons as listed under the Proposed Project, no adverse effects would occur in the LCR geographic subregion with implementation of this alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A2-CR-1. Construction of conservation measures for water conservation program. Similar potential impacts to cultural resources could occur under this alternative as under the Proposed Project because several conservation measures involve ground disturbance. If impacts do occur, however, they would be fewer than under the Proposed Project because fewer conservation measures would need to be constructed.

Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

Mitigation Measure A2-CR-1. The exact location of the conservation measures in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

SALTON SEA

Water Conservation and Transfer

Impact A2-CR-2. Reduced inflows to the Salton Sea. Similar potential impacts to cultural resources along the Salton Sea bed could occur under this alternative as under the Proposed Project. If impacts do occur, however, they would be fewer than under the Proposed Project because less Sea bed acreage would be exposed.

Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

(Note that if HCP Approach 2 is implemented, impacts to cultural resources at the Salton Sea would be avoided and mitigation measures would not be necessary.)

Mitigation Measure A2-CR-2. The same mitigation measures listed under Mitigation Measure CR-6 would apply to this impact to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

3.8.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

For the same reasons as listed under the Proposed Project, no adverse effects would occur in the LCR geographic subregion with implementation of this alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-CR-1. Construction of conservation measures for water conservation program. Similar potential impacts to cultural resources could occur under this alternative as under the Proposed Project because several conservation measures involve ground disturbance. If impacts do occur, however, they would be fewer than under the Proposed Project because fewer conservation measures would need to be constructed.

Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

Mitigation Measure A3-CR-1. The exact location of the conservation measures in the IID water service area has not been determined; therefore, pre-Project surveys have not been conducted. The same mitigation measures listed under Mitigation Measure CR-1 would apply to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

SALTON SEA

Water Conservation and Transfer

Impact A3-CR-2. Reduced Inflows to the Salton Sea. Similar potential impacts to cultural resources along the Salton Sea bed could occur under this alternative as under the Proposed Project. If impacts do occur, however, they would be fewer than under the Proposed Project because less Sea bed acreage would be exposed.

Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

(Note that if HCP Approach 2 is implemented, impacts to cultural resources at the Salton Sea would be avoided and mitigation measures would not be necessary.)

Mitigation Measure A3-CR-2. The same mitigation measures listed under Mitigation Measure CR-6 would apply to this impact to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

3.8.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

For the same reasons as listed under the Proposed Project, no impacts would occur in the LCR geographic subregion with implementation of this alternative.

IID WATER SERVICE AREA AND AAC

No impacts would occur under this alternative because fallowing does not involve ground disturbance.

SALTON SEA

Water Conservation and Transfer

Impact A4-CR-1. Reduced inflows to the Salton Sea. The same potential impacts to cultural resources along the Salton Sea bed would occur under this alternative as under the Proposed Project.

Depending on the nature of the cultural resource, the impact, and the ability to modify construction activities to avoid or minimize the impact, impacts on cultural resources would be potentially significant. (Potentially significant impact.)

(Note that if HCP Approach 2 is implemented, impacts to cultural resources at the Salton Sea would be avoided and mitigation measures would not be necessary.)

Mitigation Measure A4-CR-1. The same mitigation measures listed under Mitigation Measure CR-6 would apply to this impact to provide assurances in the event that if cultural resources are encountered during Project construction or operation, they will be handled appropriately. (Less than significant impact with mitigation.)

3.9 Indian Trust Assets

3.9.1 Introduction and Summary

This section addresses existing Indian Trust Assets (ITAs) in the LCR and Salton Sea geographic subregions and potential impacts to ITAs associated with the implementation of federal components of the Proposed Project: (1) Reclamation's approval of the change in the point of diversion of up to 300 KAFY of Colorado River water conserved by IID (this action has the potential to affect ITAs along the LCR); and (2) USFWS' approval of an Incidental Take Permit, under Section 10 of the ESA (this action has the potential to affect ITAs in the IID water service area and AAC and Salton Sea geographic subregions).

ITA impacts in the IID water service area and AAC geographic subregion are not evaluated in this section because this subregion does not contain any reservation lands or ITAs. ITA impacts in the SDCWA service area geographic subregion are also not evaluated in this section because no construction or operation of new facilities will occur in this subregion. The indirect effects of the Proposed Project within the MWD and CVWD service areas are related to local actions and decisions made by non-federal entities. For this reason, an evaluation of potential ITA effects was not conducted for the indirect Project effects that could occur within the these subregions. During scoping for the Proposed Project, representatives of the Agua Caliente Band of Cahuilla Indians questioned the effect of the Proposed Project on groundwater pumping by CVWD. Although the CVWD service area is outside the scope of this ITA analysis, it is noted that the Proposed Project could benefit the groundwater aquifer in the CVWD service area if conserved water is transferred to CVWD pursuant to the QSA.

Section 3.9.2 describes the applicable regulations and standards that pertain to ITAs. Section 3.9.3 presents the ITA characteristics. Table 3.9-1 below presents a summary of the potential ITA impacts that could result from implementation of the Proposed Project and/or alternatives.

ITAs are legal assets associated with rights or property held in trust by the US for the benefit of federally recognized Indian Tribes or individuals. The US, as trustee, is responsible for protecting and maintaining rights reserved by, or granted to, Indian Tribes or individuals by treaties, statutes, and executive orders. All federal bureaus and agencies share a duty to act responsibly to protect and maintain ITAs. Reclamation's policy is to protect ITAs from adverse impacts resulting from its programs and activities whenever possible. Reclamation, in cooperation with Tribe(s) potentially impacted by a given Project, must inventory and evaluate assets, and then mitigate, or compensate, for adverse impacts to the asset. While most ITAs are located on a reservation, they can also be located off-reservation. Examples of ITAs include lands, minerals, water rights, and hunting and fishing rights. ITAs include property in which a Tribe has legal interest.

For example, tribal entitlements to Colorado River water rights established in each of the Basin States pursuant to water rights settlements are considered trust assets, although the reservations of these Tribes may or may not be located along the River. A Tribe may also have other off-reservation interests and concerns that must be taken into account.

TABLE 3.9-1
Summary of Indian Trust Assets Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
SALTON SEA				
Impact ITA-1: Potential adverse and/or beneficial on ITAs from reduced inflow to Salton Sea.	Continuation of Baseline conditions.	**Impact A2-ITA-1: Potential adverse and/or beneficial on ITAs from reduced inflow to Salton Sea.**	**Impact A3-ITA-1: Potential adverse and/or beneficial on ITAs from reduced inflow to Salton Sea.**	**Impact A4-ITA-1: Potential adverse and/or beneficial on ITAs from reduced inflow to Salton Sea.**
SDCWA Service Area				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

Reclamation has entered into government-to-government consultations with potentially affected Tribes to identify and address concerns for ITAs. These include Tribes along the LCR and other Tribes within the Project region of influence in California and Arizona. Based on meetings and discussions among the Tribes, US Bureau of Indian Affairs (BIA), and Reclamation staff, the this section describes ITAs that have the potential to be impacted by the federal actions associated with the Proposed Project (Reclamation 2002).

3.9.2 Regulatory Framework

3.9.2.1 Federal Standards and Regulations

As stated above in Section 3.9.1, Reclamation's policy is to protect ITAs from adverse impacts of its programs and activities whenever possible.

3.9.3 Existing Setting

The following section provides a description Tribes within the LCR and Salton Sea geographic subregions that are associated with the Project.

3.9.3.1 Lower Colorado River

FORT MOHAVE INDIAN TRIBE

The Fort Mohave Indian Reservation is located in the Lower Basin of the Colorado River where Nevada, Arizona, and California meet. The Tribe possesses PPRs from the mainstem of the Colorado River in all three of the states that contain reservation land, pursuant to the Decree in Arizona v. California and supplemental Decrees (1979 and 1984). Since the original Decree was entered in 1964, 1,102 acres of land have been added to the reservation, along with rights to 6.464 AF of water per acre of land as specified in the 1979 Decree. The amounts, including added lands, priority dates, and state where the water rights are listed in the Draft IA EIS in Section 3.10 (Reclamation 2002).

The Fort Mohave Indian Tribe has exercised its water rights in California in excess of the amounts currently decreed. In its June 19, 2000 Opinion, the US Supreme Court accepted the Special Master's uncontested recommendation and approved the Proposed settlement of the dispute respecting the Fort Mohave Indian Reservation . Under the settlement, the Tribe is awarded the lesser of an additional 3,022 AF of water or enough water to supply the needs of 468 acres.

CHEMEHUEVI TRIBE

The Chemehuevi Indian Reservation is located in Southern California on the plateau above the shoreline of Lake Havasu. The Tribe possesses PPRs from the mainstem of the Colorado River pursuant to the Decree in Arizona v. California and supplemental Decrees (1979 and 1984). The amounts, priority dates, and state where the rights are perfected are listed in the Draft IA EIS in Section 3.10 (Reclamation 2002).

COLORADO RIVER INDIAN TRIBES (CRIT)

The Colorado River Indian Reservation is located in southwestern Arizona and Southern California south of Parker, Arizona. The Tribes possess PPRs from the mainstem of the Colorado River pursuant to the Decree in Arizona v. California and supplemental Decrees (1979 and 1984). The amounts, priority dates, and state where the rights are perfected are in the Draft IA EIS in Section 3.10 (Reclamation 2002).

QUECHAN INDIAN TRIBE

The Fort Yuma Indian Reservation (Quechan Tribe) is located in southwestern Arizona and Southern California near Yuma, Arizona. The Tribe possesses PPRs from the mainstem of the Colorado River pursuant to the Decree in Arizona v. California and supplemental Decrees (1979 and 1984). The amounts, priority dates, and state where the rights are perfected are in the Draft IA EIS in Section 3.10 (Reclamation 2002).

A Supreme Court decision issued on June 19, 2000 allows the Tribe to proceed with litigation to claim rights to an additional 9,000 acres of irrigatable lands. Proving this claim would increase the water rights for the reservation.

COCOPAH INDIAN TRIBE

The Cocopah Indian Reservation is located in southwestern Arizona near Yuma, Arizona. The Tribe possesses PPRs from the mainstem of the Colorado River pursuant to the Decree in Arizona v. California and supplemental Decrees (1979 and 1984). The amounts, priority dates, and state where the rights are perfected are in the Draft IA EIS in Section 3.10 (Reclamation 2002).

The rights listed in the Draft IA EIS include only that water diverted directly from the Colorado River at Imperial Dam. In addition to these rights, the Tribe has numerous well permits that divert groundwater that may be connected to the Colorado River within the boundaries of the US (studies are ongoing). The 1974 PPR for the Cocopah Indian Reservation is unique because of its more recent priority date. The 1979 supplemental Decree in Arizona v. California specifies that in the event of a determination of insufficient mainstream water to satisfy PPRs pursuant to Article II (B) (3) of the 1964 Decree, the PPRs set forth in paragraphs (1) through (5) of Article II (D) of the Decree must be satisfied first.

The 1984 supplemental Decree in Arizona v. California recognized the PPR for the Cocopah Indian Reservation dated June 24, 1974, and amended paragraph (5) of Article II (D) of the Decree to reflect this 1974 right. The Tribe is involved in litigation to claim rights to a total of 2,400 acres of irrigatable lands. Proving this claim would further increase the water rights for the reservation.

3.9.3.2 Salton Sea

TORRES MARTINEZ DESERT CAHUILLA INDIANS

The Torres Martinez Reservation is located on about 24,000 acres along the northern shore of the Salton Sea. About 11,800 acres of the reservation are currently inundated by the Sea. The Torres Martinez Indians have sought damages and compensation for lands claimed to be inundated or damaged by the Salton Sea. In 1996, a Settlement Agreement was reached to provide compensation to the Tribe and provide a permanent flowage easement to IID and CVWD over the Indian Trust lands. The issue was resolved when legislation required to implement the settlement was passed in 2001 as Title VI of Public Law 106-568 (Torres Martinez Desert Cahuilla Settlement Claims Act).

The Tribe's existing water rights are held in trust by the US. In 1908, the US Supreme Court (Winters v. US, 207 US 564) ruled that when Congress created Indian reservations, water rights needed to develop and support these reservations were reserved. The Winters Doctrine has been extended by rulings of the US Supreme Court to include groundwater rights as well as surface water rights. Additional federal - and state-reserved water rights are provided through Executive Orders, Supreme Court decisions, and statutes and regulations, all of which may apply to the Torres Martinez Reservation (Reclamation and SSA 2000).

No specific hunting or fishing rights other than those granted to all citizens with proper permits from CDFG have been identified in the subregion. CDFG regulates hunting and fishing in and around the Salton Sea, except within the Torres-Martinez Indian Reservation, where the Tribe is the primary regulatory and management authority. Significant gold deposits have been located on the Torres Martinez Reservation and are considered an ITA. The Torres Martinez Indians have indicated that they consider cultural resources located within the Torres Martinez Reservation to be ITAs as well (Reclamation and SSA 2000).

Reclamation's ITA Policy and NEPA Implementing Procedures (1994) indicate that cultural resources on tribal lands are frequently considered ITAs. Regardless, Torres-Martinez owns such resources on lands owned by the Tribe. Currently, approximately 70 archaeological resources are known to exist on the Torres Martinez Reservation (Reclamation and SSA 2000). Cultural resources located off-reservation are unlikely to be considered trust assets of the Torres Martinez Band.

3.9.4 Impacts and Mitigation Measures

3.9.4.1 Methodology

The federal actions proposed by USFWS and Reclamation associated with the Proposed Project and alternatives were reviewed to determine whether their implementation would result in adverse effects on ITAs.

Subregions Excluded From Impact Analysis. The IID water service area and AAC geographic subregion is not discussed in this section because it does not contain Indian reservation lands or ITAs. In addition, as described in Section 3.9.1 above, the SDCWA, MWD, and CVWD service area geographic subregions were also excluded from the analysis.

3.9.4.2 Proposed Project

LOWER COLORADO RIVER

<u>Water Conservation and Transfer</u>

There would be no significant adverse impact to ITAs from approval of the water transfers and change in point of diversion from the Colorado River. Hunting and fishing rights, tribal lands, cultural resources, and tribal water rights would not be affected.

The change in the water diversion point could result in LCR flows between Parker Dam and Imperial Dam. The riparian and marsh resources along the River are important to many Native American tribes. CRIT has an ongoing riparian restoration program along the River and has expressed concern that the potential reduction in Colorado River water surface elevation could affect its ability to divert water for the restoration program. The fluctuation in water surface elevations that would result from changes in the points of diversion would be within the historic variations experienced on the River. For this reason, CRIT's ability to divert water from the River should not vary from what has occurred in the past. It is anticipated that the biological conservation measures identified to reduce the impact to sensitive species and riparian /aquatic habitats, some of which could be implemented on tribal lands if agreed to by the Tribe, would also mitigate any impact to biological resources within tribal lands.

The results of the analysis by Reclamation (2002) indicate that salinity levels at Imperial Dam would increase as compared to the Baseline. This change in salinity would have the potential to affect tribal lands located along the Colorado River between Parker Dam and Imperial Dam. However, this increase falls within the normal range of fluctuations that occur along the reach. Further, mitigation in the form of additional salinity control Projects would ensure that water quality targets established by the Salinity Control Forum would not be exceeded.

Biological Conservation Measures in USFWS' Biological Opinion

Construction of biological conservation measures has the potential for short-term, localized impacts associated with construction of habitat restoration sites. Although these effects could occur on tribal lands, they would not be substantial and would be short-term in duration. In addition, implementation of the biological conservation measures could covert some lands from agricultural use to backwaters or cottonwood-willow habitat. These habitat areas could be constructed on tribal lands. However, because the lands would only be provided by willing landowners, this conversion would not be an adverse effect on tribal land uses (Reclamation 2002).

SALTON SEA

Water Conservation and Transfer

Impact ITA-1: Potential adverse and/or beneficial impacts on ITAs from reduced inflow to Salton Sea. Under the Proposed Project, the Salton Sea is expected to decline to about elevation -250 feet msl over the 75-year duration of the Proposed Project compared to the Baseline elevation of -235 feet msl. This would result in the exposure of land containing natural and cultural resources that are considered by the Torres Martinez to be ITAs. This could have both adverse and beneficial impacts. Beneficial impacts could result from allowing scientific investigations of exposed resources, including archaeological data collection and natural resource exploitation. Exposure also could result in damage from vandalism and erosion, however (this impact is discussed in Section 3.8, Cultural Resources).

The Torres Martinez also have expressed concerns that exposed land might be spoiled by salts, DDT, or other contaminants in the soils. If this is true, Torres Martinez may seek provisions to reclaim exposed lands so that the lands may be used for purposes that suit the needs of the Torres Martinez Reservation; use of the lands, however, would be subject to the provisions of the Torres Martinez Desert Cahuilla Settlement Claims Act (see Section 3.9.3.2). The soils have not been tested for contamination. If this land were found to be suitable for agriculture or other purposes, exposure of the land would be a beneficial impact to the Torres Martinez. The Torres Martinez also have indicated that possible benefits could result if lower water levels prevented the use of existing boat launching facilities that are not tribally owned. If public boat ramp access is lost and access moved onto tribal lands, the Torres Martinez Indians would be able to charge boaters to launch their boats from tribal lands obtain revenues from public use of tribally-owned recreation facilities (Reclamation and SSA 2000).

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

This HCP approach would provide for construction of 5,000 acres of ponds and one or more fish hatcheries on the Salton Sea. Final locations for the ponds have not been determined, but all would be located on the south end of the Sea, and none would impact the lands of the Torres Martinez Indian Reservation. Fish hatchery locations have also not been determined, but would not be located on the Torres Martinez Indian Reservation without the approval and cooperation of the Tribe. Supplemental environmental review will occur once final locations and design of this HCP alternative are complete, and prior to construction. However, based on the above information, there would be no impacts to ITAs under this approach.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

This HCP approach would totally compensate for reduced inflow to the Sea, so that the impacts described in Impact ITA-1 would not occur. Since the inflow to the Sea would be maintained at Baseline levels, the impact from the reduced water surface elevation would be identical to the No Project condition, and there would be no impact to ITAs from the Proposed Project.

HCP impacts would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

3.9.4.3 Alternative 1: No Project

LOWER COLORADO RIVER

Under the No Project alternative, Baseline conditions would continue and no impacts to ITAs would occur.

SALTON SEA

Under the No Project alternative, the elevation of the Salton Sea is expected to decline to about elevation -235 feet msl over the 75-year study period, which is the same as the Baseline elevation of -235 feet msl. Potential impacts to ITAs would the same as described for the Proposed Project, although the drop in elevation over the life of the project would be more gradual, and would not be as great. For example, the decline to elevation -233 feet msl is expected to take 9 years under the Proposed Project, versus 28 years under No Project conditions.

3.9.4.4 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

For the same reasons as listed under the Proposed Project, no impacts to ITAs would occur in the LCR geographic subregion with implementation of this alternative.

SALTON SEA

Water Conservation and Transfer

Impact A2-ITA-1: Potential adverse and/or beneficial impacts on ITAs from reduced inflow to Salton Sea. Under Alternative 2, the elevation of the Salton Sea is expected to decline to about elevation -242 feet msl over the 75-year study period compared to the Baseline elevation of -235 feet msl. Potential impacts to ITAs would the same as described for the Proposed Project, although the drop in elevation over the life of the project would not be as great. The initial rate of decline, however, would be identical. For example, the decline to elevation -233 feet msl is expected to take 9 years under the Proposed Project and 9 years under Alternative 2.

3.9.4.5 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

For the same reasons as listed under the Proposed Project, no impacts to ITAs would occur in the LCR geographic subregion with implementation of this alternative.

SALTON SEA

Water Conservation and Transfer

Impact A3-ITA-1: Potential adverse and/or beneficial impacts on ITAs from reduced inflow to Salton Sea. Under Alternative 3, the elevation of the Salton Sea is expected to decline to about elevation -247 feet msl over the 75-year study period compared to the Baseline elevation of -235 feet msl. Potential impacts to ITAs would the same as described for the Proposed Project, although the drop in elevation over the life of the project would not be as great. The initial rate of decline, however, would be identical. For example, the decline to elevation -233 feet msl is expected to take 9 years under the Proposed Project and 9 years under Alternative 3.

3.9.4.6 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

For the same reasons as listed under the Proposed Project, no impacts to ITAs would occur in the LCR geographic subregion with implementation of this alternative.

SALTON SEA

Water Conservation and Transfer

Impact A4-ITA-1: Potential adverse and/or beneficial impacts on ITAs from reduced inflow to Salton Sea. Under Alternative 4, the elevation of the Salton Sea is expected to decline to about elevation -241 feet msl over the 75-year study period compared to the Baseline elevation of -235 feet msl. Potential impacts to ITAs would be the same as described for the Proposed Project, although rate of decline and drop in elevation over the life of the project would not be as great. For example, the decline to elevation -233 feet msl is expected to take 10 years under the Proposed Project, versus 14 years under Alternative 4.

3.10 Noise

3.10.1 Introduction and Summary

This section addresses the local regulations and standards for limiting noise levels for a variety of noise-generating activities within the LCR, IID water service area and AAC, and Salton Sea geographic subregions. In general, noise-generating activities include traffic and air travel, and industrial and agricultural. Noise-generating activities associated with the Proposed Project and alternatives include construction and pump operation.

This section includes an explanation of the measurement and characterization of noise, and a summary of existing noise sources and noise levels within the geographic subregions. This section also presents the impacts to noise as a result of implementing the Proposed Project and Alternatives. Temporary and short-term impacts during construction and impacts from operation are anticipated to occur, including impacts from vehicles and equipment required to construct, operate, and maintain new facilities. After mitigation, impacts would be less than significant.

TABLE 3.10-1
Summary of Noise Impacts

Proposed Project: 300 KAFY All Conservation Measures	**Alternative 1: No Project**	**Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only**	**Alternative 3: 230 KAFY All Conservation Measures**	**Alternative 4: 300 KAFY Fallowing Only**
LOWER COLORADO RIVER				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
N-1: Noise impacts to sensitive receptors from construction of conservation measures: Less than significant impact with mitigation.	Continuation of existing conditions, including general agricultural noise.	**A2-N-1: Noise impacts to sensitive receptors from construction of conservation measures:** Less than significant impact with mitigation.	**A3-N-1: Noise impacts to sensitive receptors from construction of conservation measures:** Less than significant impact with mitigation.	No impact.
N-2: Exposure to long-term operation noise: Less than significant impact with mitigation.	Continuation of existing conditions, including general agricultural noise.	**A2-N-2: Exposure to long-term operation noise:** Less than significant impact with mitigation.	**A3-N-2: Exposure to long-term operation noise:** Less than significant impact with mitigation.	No impact.

TABLE 3.10-1
Summary of Noise Impacts

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
N-3: Noise impacts from lateral interceptor pumps: Less than significant impact with mitigation.	Continuation of existing conditions, including general agricultural noise.	No impact.	**A3-N-3: Noise impacts from lateral interceptor pumps:** Less than significant impact with mitigation.	No impact.
N-4: Noise from compliance with the IOP: Less than significant impact with mitigation.	Continuation of existing conditions, including general agricultural noise.	**Same as N-4.**	**Same as N-4.**	**Same as N-4.**
HCP-N-5: Noise impacts to sensitive receptors from construction of new marsh habitat or drain channels. Less than significant impact.	Continuation of existing conditions, including general agricultural noise.	**Same as HCP-N-5.**	**Same as HCP-N-5.**	**Same as HCP-N-5.**
HCP2-N-6: Noise impacts to sensitive receptors from construction of conservation measures. Less than significant impact with mitigation.	Continuation of existing conditions, including general agricultural noise.	**Same as HCP2-N-6.**	**Same as HCP2-N-6.**	**Same as HCP2-N-6.**
SALTON SEA				
No impact.	No impact.	No impact.	No impact.	No impact.
SDCWA SERVICE AREA				
No impact.	No impact.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.10.2 Regulatory Framework

3.10.2.1 Federal Regulations and Standards

Federal legislation pertaining to noise includes:

- Noise Pollution and Abatement Act of 1970
- Trust Communities Act of 1978
- Noise Control Act of 1972
- Occupational Safety and Health Act of 1970

However, for the purposes of environmental impact evaluations of local projects, local noise ordinances and policies are generally used as guidance for setting noise-related significance standards.

3.10.2.2 Local Regulations and Standards

NOISE TERMINOLOGY

Several weighting scales are used to measure noise levels. The basic unit of measurement that indicates the relative amplitude of sound is the decibel (dB). The zero on the dB scale is based on the lowest sound level that a healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dB represents a ten-fold increase in acoustic energy, while an increase of 20 dB is 100 times more intense, an increase of 30 dB is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.

There are several methods of characterizing sound. The most common is the A-weighted dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy equivalent sound/noise descriptor is called equivalent noise level (L_{eq}). The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration. Table 3.10-2 shows typical A-weighted noise levels measured in the environment and in industry (Beranek 1988).

TABLE 3.10-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels[1]	Noise Environments	Subjective Impression
	140		
Civil defense siren (100 ft)	130		
Jet takeoff (200 ft)	120		Pain threshold
	110	Rock music concert	
Pile driver (50 ft)	100		Very loud
Ambulance siren (100 ft)			
	90	Boiler room	
Freight cars (50 ft)		Printing press plant	
Pneumatic drill (50 ft)	80	In kitchen with garbage disposal running	

TABLE 3.10-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels[1]	Noise Environments	Subjective Impression
Freeway (100 ft)	70		Moderately loud
Vacuum cleaner (10 ft)	60	Data processing center	
Department store			
Light traffic (100 ft)	50	Private business office	
Large transformer (200 ft)	40		Quiet
Soft whisper (5 ft)	30	Quiet bedroom	
	20	Recording studio	
	10		
	0		Threshold of hearing

[a] A-Weighted Sound Level, dB: The A-weighted filter de-emphasizes very low and very high frequency components of sound similar to the response of the human ear. All sound levels in this Draft EIR/EIS are A-weighted.
Source: Baraneck 1988

Because sensitivity to noise increases during the evening and at night—since excessive noise interferes with the ability to sleep—24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level (CNEL) is a measure of the cumulative noise exposure in a community with approximately 5 dB penalty added to evening (7:00 pm to 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm to 7:00 am) noise levels. The day/night average sound level (L_{dn}) is essentially the same as CNEL, without applying any penalty to noise events occurring in the evening time period.

IMPERIAL COUNTY NOISE STANDARDS

The primary regulatory documents that establish noise standards in the county are the Imperial County General Plan Noise Element and the Imperial County Noise Abatement and Control Ordinance. Relevant standards from both documents are discussed below by type of standard (e.g. for construction noise or operation noise) and are referenced as to which document they are from.

Sensitive Receptors. As defined in the Imperial County General Plan Noise Element, sensitive noise receptors are, in general, areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use or enjoyment of the environment. Sensitive receptors include, but are not limited to, residences, schools, hospitals, parks and office buildings. Sensitive receptors may also be non-human species. Many riparian bird species are sensitive to excessive noise.

Construction Noise. The Imperial County General Plan limits sound levels from construction activities during specific hours of the day and night through a set of construction noise standards, presented below in Table 3.10-3 (County of Imperial 1997c). The standards apply to the noise measured at the nearest sensitive receptor.

TABLE 3.10-3
Construction Noise Standards, County of Imperial, CA

Duration of Construction	Noise Source	Sound Level (dB L_{eq})[1]	Period of Averaging (hours)	Restricted Hours of Operation
Short-term (days or weeks)	Single piece of construction equipment	75	8	7 am to 7 pm Monday-Friday 9 am to 5 pm Saturday No commercial construction operation is permitted on Sundays and holidays.
Short-term (days or weeks)	Combination of pieces of construction equipment	75	8	7 am to 7 pm Monday-Friday 9 am to 5 pm Saturday No commercial construction operation is permitted on Sundays and holidays.
Extended-term[2]	Single piece of construction equipment	75	1	7 am to 7 pm Monday-Friday 9 am to 5 pm Saturday No commercial construction operation is permitted on Sundays and holidays.
Extended-term[2]	Combination of pieces of construction equipment	75	1	7 am to 7 pm Monday-Friday 9 am to 5 pm Saturday No commercial construction operation is permitted on Sundays and holidays.

[1] As measured at the nearest sensitive receptor.

[2] The standards assume a construction period, relative to an individual sensitive receptor, of days or weeks. The standard can be made more restrictive in cases of extended-length construction times.

L_{eq} = unit for measuring environmental sounds; dB = decibel
Source: County of Imperial 1997c

Operation Noise. The Imperial County General Plan Noise Element includes Property Line Noise Limits, listed in Table 3.10-4, that apply to noise generation from one property to an adjacent property (County of Imperial 1997c). The standards imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. An analysis is required for any project that has the potential to generate noise in excess of the Property Line Noise Limits. The Imperial County Noise Abatement and Control Ordinance also includes property line noise limits that are consistent with those listed below.

TABLE 3.10-4
Operation Noise Standards, County of Imperial, CA

Land Use Zone	Time	Applicable Limit 1-hour Average Sound Level (dB)
Residential Zones	7 am to 10 pm	50
	10 pm to 7 am	45
Multi-residential Zones	7 am to 10 pm	55
	10 pm to 7 am	50
Commercial Zone	7 am to 10 pm	60
	10 pm to 7 am	55

TABLE 3.10-4
Operation Noise Standards, County of Imperial, CA

Land Use Zone	Time	Applicable Limit 1-hour Average Sound Level (dB)
Light Industrial/Industrial Park Zones	Anytime	70
General Industrial Zones (inc. agriculture operations)	Anytime	75

Source: County of Imperial General Plan Noise Element 1997c.
Note: When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB L_{eq}.

A Noise Impact Zone is an area that is likely to be exposed to significant noise. The County of Imperial defines a Noise Impact Zone as an area that may be exposed to noise greater than 60 dB CNEL or 75 dB L_{eq} (averaged over one hour). The purpose of the Noise Impact Zone is to define areas and properties where an acoustical analysis of a Proposed Project is required to demonstrate project compliance with land use compatibility requirements and other applicable environmental noise standards. Any property within one-quarter mile (1,320 feet) of existing farmland that is in an agricultural zone is included in the definition of a Noise Impact Zone. The noise/land use compatibility guidelines for the Agriculture Land Use category in the Imperial County General Plan are as shown in Table 3.10-5.

TABLE 3.10-5
Noise/Land Use Compatibility Guidelines for Agriculture Land Use, County of Imperial, CA

Compatibility Category	CNEL (dB)	Compatibility Guidelines
Normally Acceptable	Less than 70	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements
Conditionally Acceptable	70 - 75	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
Normally Unacceptable	75-80	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable	Over 80	New construction or development clearly should not be undertaken.

Source: County of Imperial General Plan Noise Element 1997c.
CNEL: Community Noise Equivalent Level

An acoustical analysis is required for any project which would be located, all or in part, in a Noise Impact Zone. According to the Imperial County General Plan Noise Element, if the future noise levels from the project are within the "normally acceptable" noise level guideline, but result in an increase of 5 dB CNEL or greater, the project would have a potentially significant noise impact and mitigation measures must be considered. If the future noise level after the project is completed is greater than the "normally acceptable" noise level, a noise increase of 3 dB CNEL or greater should be considered a potentially significant noise impact and mitigation measures must be considered.

Right to Farm Ordinance. In recognition of the role of agriculture in the county, Imperial County has adopted a Right to Farm ordinance (Division 2, Title 6 of the Codified Ordinances of the County of Imperial). This ordinance requires a disclosure to land owners near agricultural land operations, or areas zoned for agricultural purposes. The disclosure advises persons that discomfort and inconvenience from machinery resulting from conforming and accepted agricultural operations are a normal and necessary aspect of living in the agricultural areas of the county (County of Imperial 1993).

RIVERSIDE COUNTY NOISE STANDARDS

Sensitive Receptors. Sensitive receptors are recognized in the Riverside County Comprehensive General Plan and include certain agricultural operations involving livestock, recreational lands, and wildlife habitat. The Riverside County Comprehensive General Plan (Riverside County 1984) addresses abatement of noise sources for these sensitive uses by guiding the location and future development of the county based on existing and predicted noise levels. These policies include guidance related to the preferable location of noise sensitive land uses in areas of low level community noise and the use of proper siting and physical barriers of an intensive noise source near sensitive land uses.

Construction Noise. Construction noise standards for Riverside County are found in Title 15.04.020 of the Riverside County Code. The Riverside County Code does not provide construction noise limits; however, it does restrict construction activities within one-quarter mile of an occupied residence(s) to the hours of 6 am to 6 pm during the months of June through September. During the months of October through May, such construction activities are restricted to the hours of 7 a.m. to 6 p.m. Exceptions to these standards are developed with the consent of a County building official. (Riverside County 2001)

Operation Noise. According to the Riverside County Department of Industrial Hygiene (Riverside County Department of Industrial Hygiene 2000), stationary source noise, "as projected to any portion of any surrounding property containing an occupied residential structure," must not exceed the following worst-case noise levels:

- 45 dBA 10-minute L_{eq} between 10 pm and 7 am (nighttime standard); and
- 65 dBA 10-minute L_{eq} between 7 am and 10 pm (daytime standard).

3.10.3 Existing Setting

3.10.3.1 Lower Colorado River

The primary sources of noise along the LCR include transportation sources, including aircraft, rail lines, and motor vehicles; industrial sources, including rail switching yards, utilities, and manufacturing facilities; agricultural operations; and recreational activities (County of Imperial 1997c). I-10, SR 95, SR 78, Highway 62, the Burlington Northern and Sante Fe (BNSF) Railroad rail line, the SPRR rail line, Parker Dam, and Imperial Dam are the primary sources of noise along the LCR.

Other noise sources are associated with developed recreation sites managed by BLM. Noise from recreational sources includes active and passive recreational noise sources from tent and RV camping, swimming, and boating (power boating and fishing). Existing recreational resources along the LCR are discussed further in Section 3.6.

SENSITIVE RECEPTORS

Because land use in the LCR geographic subregion is primarily recreational, there are few areas that include sensitive receptors other than scattered, isolated residences.

3.10.3.2 IID Water Service Area and AAC

Primary sources of noise in the IID water service area include aircraft, geothermal hydroelectric facilities, agricultural equipment, rail traffic, and vehicle traffic (County of Imperial 1997c). Rural areas within the IID water service area do not fall within the 60 dB or higher noise limit contours for airports in Imperial County. The Imperial County General Plan does not provide noise data for existing geothermal power plants. Existing geothermal power plants are located in the southeast Salton Sea, Heber, and East Mesa areas.

AGRICULTURAL OPERATIONS NOISE

The predominant land use in Imperial County is agriculture. Noise sources associated with agricultural operations include the field machinery, especially diesel engine driven heavy trucks, used for the delivery of supplies and the distribution of products; and aircraft, used for the spraying of crops (County of Imperial 1997c). Typical electric pump noise emissions from agricultural operations range from 69 – 77 dBA at 50 feet.

RAILROAD NOISE

SPRR is the primary source of rail traffic noise in the IID water service area. In 1990, noise attributable to SPRR traffic, just north of the Riverside County border, was documented by Imperial County (County of Imperial 1997c). The results of this assessment are presented in Table 3.10-6. Subsequent to the compilation of the latter data, operations data for 1992 were reviewed for the main SPRR line and were determined to be similar to those for 1988 (i.e., an average of about 40 trains per day) (County of Imperial 1997c). According to the Imperial County General Plan, the data summarized in Table 3.10-6 are representative of existing conditions. Railroad noise from spur tracks presents much less noise than noise from main rail lines. The SPRR branch to Imperial and Calexico averages four trains per day; the branch to Holtville averages four trains per week (County of Imperial 1997c). Figure 3.14-1 in Section 3.14, Transportation, presents the location of the railroads discussed in this section.

TABLE 3.10-6
Existing Railroad Noise Levels

Distance (ft)	100	200	300	400	500	700	1,000	2,000	5,000
CNEL (dBA)	74	70	67	64	62	60	57	51	44

Notes: ft = feet; CNEL = Community Noise Equivalent Level; dBA – decibel A-weighted
Source: County of Imperial 1997c

ROADWAY NOISE

I-8, SR 86/78, SR 98, SR 111, and SR 115 are the primary sources of vehicular noise in the IID water service area. Figure 3.13-2 in Section 3.13, Transportation, shows the routes of these roadways. Data regarding the interstate and state highways in Imperial County, vehicle volumes, percent of each vehicle type, and calculated distances to the 60, 65, and 70 dB CNEL contours are presented in Table 3.10-7.

TABLE 3.10-7
Imperial County Interstate and State Highway Traffic and Noise Data (Existing Conditions)

Road Segment	Traffic Volume (thousands)	Speed (mph)	Vehicle Mix (percent)			Distance in feet to CNEL Contour		
			Auto	Medium	Heavy	70 dB	65 dB	60 dB
I-8								
w/o[1] Ocotillo	10.7	65	84	4.8	11.2	180	565	1605
e/o Ocotillo	8.6	65	84	4.8	11.2	145	455	1355
w/o El Centro	10.9	65	87	4.0	9.0	170	524	1455
e/o El Centro	22.9	65	89	3.4	7.6	325	1005	2205
e/o 111	8.4	65	83	5.0	12.0	145	455	1355
w/o 115	6.5	65	81	4.8	14.2	125	380	1155
e/o 115	7.2	65	77	4.6	18.4	160	495	1405
e/o 98	8.7	65	80	4.4	15.6	170	530	1505
w/o 186	10.7	65	80	4.4	15.6	215	655	1705
e/o 186	14.0	65	80	4.4	15.6	275	855	2005
SR 78								
w/o 86	0.6	55	66	6.1	27.9	*	*	135
e/o 111S	3.5	55	70	2.1	27.9	80	240	775
e/o 115S	1.5	55	73	7.0	20.0	*	85	275
SR 86								
w/o 111	4.3	55	93	4.8	2.2	*	105	315
s/o 8	9.2	55	94	4.1	1.9	70	205	630
s/o 78E	13.5	55	90	4.8	5.2	130	385	1180
nw/o Brawley	5.3	55	78	6.8	15.2	85	245	780
s/o 78W	4.6	55	52	5.1	42.9	150	465	1380
n/o 78W	4.1	55	52	5.0	43.0	135	410	1225
SR 98								
e/o Ocotillo	1.8	55	89	4.6	6.4	*	55	175
w/o Drew	2.1	55	89	2.6	8.4	*	70	220
w/o 111	12.0	55	93	2.8	4.2	95	300	950
w/o 8	0.9	55	77	2.3	20.7	*	50	160
SR 111								
s/o 86W	25.0	55	92	4.4	3.6	205	635	1655
s/o 8	22.0	55	93	3.7	3.3	170	535	1505
n/o 8	9.5	55	87	5.9	7.1	100	310	980

TABLE 3.10-7
Imperial County Interstate and State Highway Traffic and Noise Data (Existing Conditions)

Road Segment	Traffic Volume (thousands)	Speed (mph)	Vehicle Mix (percent)			Distance in feet to CNEL Contour		
			Auto	Medium	Heavy	70 dB	65 dB	60 dB
s/o 78	6.9	55	84	7.2	8.8	80	240	775
n/o 78	7.1	55	82	7.5	10.5	90	285	900
s/o 115	7.1	55	79	7.5	13.5	100	210	980
n/o 115	5.6	55	82	7.5	10.5	70	225	700
s/o Riv. Cty.	3.5	55	71	12.2	16.8	60	190	600
SR 115								
n/o 8	2.1	55	63	9.3	27.7	49	155	485
s/o 78	2.7	55	68	7.9	24.1	55	175	560
n/o 78	1.3	55	18	19.7	62.3	60	185	590
SR 186	2.0	55	90	8.8	1.2	*	50	150

Notes:
1 w/o: west of; e/o: east of; s/o: south of; n/o: north of; nw/o: northwest of
* indicates contours lies within the right-of-way
All calculations assume flat, hard terrain with no obstructions; actual conditions
Source: County of Imperial General Plan Noise Element 1997c

SENSITIVE RECEPTORS

Sensitive receptors in the IID water service area and AAC geographic subregion include residences, schools, hospitals, parks, and office buildings that could occur in the incorporated and unincorporated communities of the IID water service area, as well as rural residences throughout the IID water service area. Riparian birds species sensitive to excessive noise occur in the geographic subregion as described in Section 3.2, Biological Resources.

3.10.4 Impacts and Mitigation Measures

3.10.4.1 Methodology

Evaluation of potential noise impacts from the Proposed Project included reviewing relevant federal, state, and county noise standards; characterizing the existing noise environment; and projecting noise emissions from the construction and operation activities that could occur in the Proposed Project area. The analysis conducted in the Draft EIR/EIS is a qualitative assessment of noise impacts that could result from implementation of the Proposed Project and Alternatives. The potential for noise impacts is associated with construction and operation of the water conservation measures and the increase in pumping at diversion on the LCR. Because of the potential for conservation measures to be constructed at various locations throughout the Proposed Project area, qualitative assumptions have been made regarding the types of noise sources, their sound levels, and the duration of their operation.

Construction Noise

Construction of the water conservation components of the Proposed Project and Project Alternatives and of the habitat creation under the HCP would be typical of current on-farm building construction/improvements in terms of equipment and traffic noise. Table 3.10-8 includes the standard noise emissions for construction equipment that would be temporarily operating at various sites throughout rural Imperial Valley during the construction of on-farm facilities, creation/restoration of HCP habitat areas, and improvement of existing facilities, as required.

Operation Noise

Operation of the conservation components of the Proposed Project would include the use of various electric pumps similar to pumps currently in use on-farm. Assumptions regarding the type and size of pumps that would be used are listed in Table 3.10-9.

Subregions Excluded from Impact Analysis. No new facilities will be constructed within the SDCWA service area and the Salton Sea subregions, and no changes in operations would occur that would result in noise impacts in these subregions. Therefore, these subregions are not discussed in the impact analysis.

3.10.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant impact from noise if they:

- Expose persons to or generate noise levels in excess of standards established in an adopted general plan or noise ordinance that pertains to the Project region of influence, or applicable standards of other agencies.
- Expose persons to or generate excessive groundbourne vibration or groundbourne noise levels.
- Result in a substantial, permanent increase in ambient noise levels in the project vicinity above levels existing without the Project.
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Project.

TABLE 3.10-8
Description of Equipment Associated with IID Water Conservation Alternatives

				Noise Level at Receiver (dBA)		
Source	**Size (bhp)**	**Type**	**Fuel**	**50 ft**	**500 ft**	**2000 ft**
Backhoe	100	Off-Road	Diesel	85	65	53
Chain Trencher, Riding	40	Off-Road	Diesel	77	57	45
Compactor	80	Off-Road	Diesel	80	60	48
Concrete Mix Truck	200	On-Road	Diesel	85	65	53
Dozer, D-6	165	Off-Road	Diesel	83	63	51

TABLE 3.10-8
Description of Equipment Associated with IID Water Conservation Alternatives

Source	Size (bhp)	Type	Fuel	Noise Level at Receiver (dBA)		
				50 ft	500 ft	2000 ft
End Loader	170	Off-Road	Diesel	84	64	52
Excavator	250	Off-Road	Diesel	85	65	53
Loader	180	Off-Road	Diesel	83	63	51
Scraper	175	Off-Road	Diesel	84	64	52
Slipform Paver	300	Off-Road	Diesel	89	69	57
Utility Truck, 1 ton*	200	On-Road	Gasoline	77	62	53

* Moving at 40 mph, engine operating at full throttle.
Sources: EPA 1971; Empire State Electric Energy Research Corporation 1977.

TABLE 3.10-9
Typical Noise Emissions for Electric Pumps

Conservation Measure	Type of Pump	Sound Level at 50 ft (dBA)	Duration of Operation
Tailwater Return System	Nondiesel, truckmounted	77	Intermittent
Drip Irrigation	25-50 hp*	69-72	Intermittent- running approximately 40% of the time
Lateral Interceptor System	Max 500 hp*	78	Intermittent- running approximately 50% of the time
Mid-Lateral Reservoirs	25 hp*	Up to 69	If necessary, running approximately 30% of the time
Seepage Interceptors	25-50 hp*	69-72	Continuous

* Pump size is an estimate. Actual size of pump would depend on exact system built for the different conservation measures.
Source: Miller 1982.

3.10.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Because the Proposed Project would not include construction of new or improvement of existing facilities in the LCR subregion, no construction noise impacts would occur.

Biological Conservation Measures in USFWS' Biological Opinion

Implementation of the biological conservation measures may result in minor, temporary noise impacts during habitat construction activities.

Noise impacts from construction of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact N-1: Noise impacts to sensitive receptors from construction of conservation measures. Implementation of the Proposed Project could result in the construction of new on-farm facilities and improvement or expansion of the existing water delivery system in the irrigated portion of rural Imperial Valley. Construction activities that might be required for the conservation of 300 KAFY could expose sensitive receptors, including riparian bird species, to temporary construction noise. As can be seen from Table 2-3, which describes the construction process associated with each of the on-farm and water delivery system improvements, and Table 3-10.8, which lists the corresponding noise of each piece of construction equipment, the potential exists for sound levels to exceed 75 dB L_{eq} over an 8-hour period. Specific construction equipment that would be used for each conservation measure, and the potential resulting noise levels, are listed below in Table 3.10-10.

Because 75 dBA L_{eq} over an 8-hour period exceeds County of Imperial construction noise standards, direct construction noise impacts to sensitive receptors, including riparian bird species, from the Proposed Project in the Imperial Valley could be considered potentially significant and would require appropriate mitigation measures to reduce the impact to a less than significant level.

TABLE 3.10-10
Expected Conservation Measure Construction Noise Impacts in the IID Water Service Area

Conservation Measure	Construction Equipment Required	Sound Level at 50 ft (dBA)[1]
On-farm Irrigation System Improvements		
Tailwater Return System	Scraper, D-6 dozer, backhoes, excavators, 1-ton utility truck, loader, compactor	77 – 85
Cascading Tailwater	Compactor, backhoe, excavator	80 – 85
Level Basins	1-ton utility truck, 2 D-6 dozers, scraper	77 – 84
Shortening Furrows/ Border Strip Improvements	1-ton utility truck, 2 D-6 dozers, scraper	77 – 84
Narrowing Border Strips	1-ton utility truck, backhoe	77 – 85
Laser Leveling	1-ton utility truck, D-6 dozer, scraper	77 – 84
Multislope	1-ton utility truck, D-6 dozer, scraper	77 – 84
Drip irrigation	Scraper, D-6 dozer, backhoe, excavator, 1-ton utility truck, concrete mix truck, riding chain trencher	77 – 85

TABLE 3.10-10
Expected Conservation Measure Construction Noise Impacts in the IID Water Service Area

Conservation Measure	Construction Equipment Required	Sound Level at 50 ft (dBA)[1]
Water Delivery System Conservation Measures		
Lateral Interceptor System	Scraper, D-6 dozer, backhoe, 1-ton utility truck, concrete mix truck, slipform paver, compactor, end loader	77 – 89
Mid-Lateral Reservoir	D-6 dozers, backhoes, 1-ton utility trucks, scrapers, excavator	77 – 85
Regulating Reservoir	D-6 dozers, backhoes, 1-ton utility trucks, scrapers, excavator	77 – 85
Seepage Interceptors	D-6 dozer, backhoes, 1-ton utility truck, scraper, excavators	77 – 85
Conveyance Lining	Compactor, excavator, D-6 dozer, concrete mix trucks, backhoes, 1-ton utility truck	77 – 85

[1] Per individual piece of equipment

Cutback, an on-farm irrigation management technique, does not require any construction and, therefore, does not have noise impacts. Similarly, if fallowing is selected as a conservation measure, no noise impacts would occur. (Potentially significant impact.)

Mitigation Measure N-1. The following measures would be implemented to reduce noise resulting from construction activities.

- Use hydraulically or electrically powered impact tools (e.g., jack hammers) when possible. If the use of pneumatically powered tools is unavoidable, use an exhaust muffler on the compressed air exhaust.
- Install manufacturer's standard noise control devices, such as mufflers, on engineer-powered equipment.
- Locate stationary construction equipment as far from noise-sensitive receptors as possible.
- Limit construction activities to non-mating, non-nesting seasons (also see Biological Resources).
- Notify nearby property users whenever extremely noisy work might occur.
- Utilize stockpiles as effective noise barriers when feasible.
- Keep idling of construction equipment to a minimum when not in use. No piece of equipment should idle in place for more than 30 minutes.
- Install temporary or portable acoustic barriers around stationary construction noise sources.

Implementation of these mitigation measures would reduce potentially significant noise impacts from construction of water conservation measures in the IID water service area to less-than-significant. (Less than significant impact with mitigation.)

Impact N-2: Exposure to long-term operation noise. Operation of measures to conserve 300 KAFY is proposed to occur solely within the irrigated portion of rural Imperial Valley.

As shown in Table 3.10-9 above, several on-farm and delivery system conservation measures, including tailwater return systems, drip irrigation, lateral interceptor systems, mid-lateral reservoirs, and seepage interceptors require the operation of pumps that produce noise at various levels, some over 70 dBA at 50 feet. These pumps could potentially exceed the Normally Acceptable noise/land use compatibility guideline of 70 dBA (see Table 3.10-5). (Potentially significant impact.)

Mitigation Measure N-2: If possible, conservation system pumps would be located at sufficient distances from sensitive receptors to ensure that noise levels at the receptor do not exceed the 70 dBA guideline. If there is no flexibility in placement of equipment, permanent or temporary barriers/semi-enclosures would be placed over the pumps to ensure adherence to the guideline. Implementation of this measure would reduce potentially significant noise impacts from conservation system pump operation in the IID water service area to a less than significant level. (Less than significant impact with mitigation.)

Impact N-3: Noise impacts from lateral interceptor pumps. Lateral interceptor system pumps, which could operate up to approximately 50 percent of the time at 78 dBA, would exceed the County operation noise standard of 75 dB (averaged sound level over one hour) for agriculture operations. (Potentially significant impact.)

Mitigation Measure N-3: If possible, lateral interceptor system pumps would be located at sufficient distances from sensitive receptors to ensure that noise levels at the nearest receptor do not exceed the Normally Acceptable noise/land use compatibility guideline of 70 dBA (see Table 3.10-5). If there is no flexibility in placement of the pumps, permanent or temporary barriers/semi-enclosures will be placed over the pumps to ensure adherence to the standard. Implementation of this measure would reduce potentially significant noise impacts from lateral interceptor system pump operation in the IID water service area to a less than significant impact.

Maintenance of the pumps for the various conservation systems would require occasional vehicular traffic; however, the change in the noise level from infrequent maintenance vehicles would likely be indistinguishable from existing farm equipment and maintenance truck traffic, and any impacts would be negligible. (Less than significant impact with mitigation.)

Inadvertent Overrun and Payback Policy (IOP)

Impact N-4: Noise impacts from compliance with the IOP. Conservation of 59 KAFY for the IOP can be accomplished via fallowing (about 9,800 acres) or other conservation measures. Noise impacts could occur during construction of additional on-farm irrigation system improvements or water delivery system improvements as described in Impact N-1 through N-3. This conservation would be in addition to the up to 300 KAFY for the Proposed Project and is part of the Proposed Project. If fallowing is selected for IOP compliance about 9,800 additional acres would be required and no noise impacts would occur. (Potentially significant impact.)

Mitigation Measure N-3: See Mitigation Measures N-1 through N-3. (Less than significant impact with mitigation.)

Impacts resulting from the compliance of IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-N-5: Noise impacts to sensitive receptors from construction of new marsh habitat or drain channels. Construction of new marsh habitat and drain channels would require the use of standard construction equipment such as backhoes, excavators, and utility trucks. Each of these pieces of equipment emits noise at a minimum of 77 dBA, which exceeds the County of Imperial construction noise standards. Therefore, the noise impact to sensitive receptors, including riparian bird species, from construction associated with creation of marsh habitat or drain channels is potentially significant. (Potentially significant impact.)

Mitigation Measure HCP-N-5. Implementation of the measures described above in Mitigation Measure N-1, especially limiting construction activities to non-mating, non-nesting seasons, would reduce potentially significant noise impacts to less-than-significant levels.

Operation of HCP elements will not result in equipment-related noise. The increased habitat may result in an increased number of birds nesting or feeding in the IID water service area, which could result in increased noise from birds; however, these noise impacts are expected to be minor. Operation of the elements of the HCP will not result in any significant noise impacts in the IID water service area. (Less than significant impact with mitigation.)

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Construction of 5,000 acres of ponds and the fish hatchery would require the use of standard construction equipment as described above in Impact N-5. Noise impacts during construction would likely be potentially significant during construction, however, with the implementation of mitigation measures they would be less than significant. This approach is addressed at a program level in this EIR/EIS. If, as more details of this approach are developed, additional noise impacts are identified, they will be evaluated in subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-N-6: Noise impacts to sensitive receptors from construction of conservation measures. Noise impacts could occur during construction of additional on-farm irrigation system improvements or water delivery system improvements as described in Impacts N-1 through N-3. This conservation would be in addition to the up to 300 KAFY for transfer and the 59KAFY for the IOP. If fallowing is selected for this approach, about 25,000 additional acres would be required and no noise impacts would occur. (Potentially significant impact.)

Mitigation Measure HCP2-N-6. If the conservation measures selected for this approach require construction, implementation of the measures described above in Mitigation Measure N-1 would be required. If fallowing is selected to implement this Approach, no mitigation is required. (Less than significant impact with mitigation.)

Noise impacts resulting from implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under those alternatives.

3.10.4.4 Alternative 1: No Project

LOWER COLORADO RIVER

With the No Project alternative, IID would not engage in a program to conserve water for the purpose of transferring it outside the service area other than continued implementation of the 1988 IID/MWD Water Conservation and Transfer Agreement. None of the conservation measures included in the Proposed Project would be constructed or operated, and no water would be diverted from Parker Dam for transfer. The No Project alternative would not result in any construction or noise impacts in the LCR geographic subregion.

IID WATER SERVICE AREA AND AAC

With the No Project alternative, IID would not engage in a program to conserve water for the purpose of transferring it outside the service area other than continued implementation of the 1988 IID/MWD Water Conservation and Transfer Agreement. System improvements and modernization programs would continue as needed; however, none of the conservation measures included in the Proposed Project would be constructed or operated, and none of the noise impacts described above for the IID water service area would occur.

3.10.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

<u>**Water Conservation and Transfer**</u>

Impact A2-N-1: Noise impacts to sensitive receptors from construction of conservation measures. Construction of on-farm irrigation system improvements in the IID water service area under Alternative 2 could result in potentially significant noise impacts to sensitive receptors, similar to those described above for the Proposed Project. The level of impact would be relatively less than for the Proposed Project, because fewer conservation measures would be implemented to achieve the lower level of conservation. (Potentially significant impact.)

Mitigation Measure A2-N-1. The mitigation measures listed above for the Proposed Project to reduce construction noise would need to be implemented to reduce impacts to less than significant. (Less than significant impact with mitigation.)

Impact A2-N-2: Exposure to long-term operation noise. Operation of on-farm irrigation system improvements in the IID water service area under Alternative 2 could result in potentially significant noise impacts to sensitive receptors from exposure to long-term operation noise. Pump operation noise levels could potentially exceed the normally acceptable noise/land use compatibility guideline of 70 dBA; however, the level of impact would be relatively less than for the Proposed Project due to the reduced transfer quantity. Because no distribution system improvements would be included in Alternative 2, no lateral interceptor pump systems would be installed. Potentially significant noise impacts that occur with the use of the lateral interceptor pumps in the Proposed Project would not occur with Alternative 2. (Potentially significant impact.)

Mitigation Measure A2-N-2: As described above for the Proposed Project, pumps would be located a sufficient from sensitive receptors or covered with permanent or temporary barriers/semi-enclosures to ensure that noise standards are met and impacts are reduced to less-than-significant. (Less than significant impact with mitigation.)

3.10.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-N-1: Noise impacts to sensitive receptors from construction of conservation measures. Construction of on-farm irrigation system improvements in the IID water service area under Alternative 3 could result in potentially significant noise impacts to sensitive receptors, similar to those described above for the Proposed Project. The level of impact would be relatively less than for the Proposed Project, because fewer conservation measures would be implemented to achieve the lower level of conservation. (Potentially significant impact.)

Mitigation Measure A3-N-1. The mitigation measures listed above for the Proposed Project to reduce construction noise would need to be implemented to reduce impacts to less than significant. (Less than significant impact with mitigation.)

Impact A3-N-2: Exposure to long-term operation noise. Operation of on-farm irrigation system improvements in the IID water service area under Alternative 3 could result in potentially significant noise impacts from exposure to long-term operation noise. Pump operation noise levels could potentially exceed the Normally Acceptable noise/land use compatibility guideline of 70 dBA; however, the level of impact would be relatively less than for the Proposed Project due to the reduced transfer quantity. (Potentially significant impact.)

Mitigation Measure A3-N-2: As described above for the Proposed Project, pumps would be located a sufficient from sensitive receptors or covered with permanent or temporary barriers/semi-enclosures to ensure that noise standards are met and impacts are reduced to less-than-significant. (Less than significant impact with mitigation.)

Impact A3-N-3: Noise impacts from lateral interceptor pumps. Lateral interceptor system pumps, which would operate approximately 50 percent of the time at 78 dBA, would exceed the County operation noise standard of 75 dB (averaged sound level over one hour) for agriculture operations. (Potentially significant impact.)

Mitigation Measure A3-N-3: As described above for the Proposed Project, pumps would be located a sufficient from sensitive receptors or covered with permanent or temporary barriers/semi-enclosures to ensure that noise standards are met and impacts are reduced to less-than-significant. (Less than significant impact with mitigation.)

3.10.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Fallowing does not require the construction of any facilities for implementation, and no construction noise impacts would occur with Alternative 4, and no mitigation would be required.

Because fallowing would result in a decrease in the number of pieces of farm machinery required during planting and harvesting, Alternative 4 would result in beneficial impacts to operational noise levels in the IID water service area. (Beneficial impact.)

3.11 Aesthetics

3.11 Aesthetics

3.11.1 Introduction and Summary

This section presents the environmental setting and impacts related to aesthetic resources in the four geographic subregions. The aesthetic characteristics of an area are determined by the manner in which the resources contained in that area are perceived. Baseline aesthetic conditions are primarily described in terms of existing visual resources.

Aesthetics discussions related to the Salton Sea also include a description of the olfactory character (odors) of that specific geographic subregion, which are briefly described below.

Visual resources along the LCR include volcanic mountain ranges and hills; distinctive sand dunes; broad areas of the Joshua tree, alkali scrub, and cholla communities; and elevated river terraces (California Department of Water Resources [DWR] 1994). Views of the LCR occur at various locations along I-95.

The IID water service area is characterized visually by substantial agricultural production and associated heavy machinery. Beyond the IID water service area, deserts, sand dunes, mountains, and the Salton Sea characterize the visual resources.

Visual resources in the area of the Salton Sea geographic subregion include various landforms, vegetation, man-made structures, and the Sea itself. The Salton Sea covers approximately 211,000 acres (330 square miles) and is immediately surrounded by a sparsely vegetated desert landscape, which gives way to rocky, sandy hills (SSA and Reclamation 2000). The presence of odors at the Salton Sea currently affects both visitor numbers and resident populations in the area. Factors contributing to odors at the Salton Sea include water quality, high nutrient levels, and biological factors, such as fish and bird die-offs.

Highly varied scenic resources characterize the SDCWA service area. These include deserts, snow-capped peaks, rugged mountains, coastal foothills, pine forests, citrus and avocado orchards, and the Pacific Ocean, as well as historical and contemporary urban structures.

Table 3.11-1 presents a summary of potential impacts on the aesthetic resources in the subregions.

3.11.2 Regulatory Framework

3.11.2.1 State and Local Regulations and Standards

State Scenic Highway Program *(Streets and Highways Code, Section 260 et seq.).* The purpose of this program is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways.

TABLE 3.11-1
Summary of Aesthetics Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
SALTON SEA				
A-1: Impacts on aesthetics would occur from a drop in the level of the Salton Sea. Less than significant impact with mitigation.	Drop in the level of the Salton Sea.	**A2-A-1: Impacts on aesthetics from a drop in the level of the Salton Sea.** Less than significant impact with mitigation.	**A3-A-1: Impacts on aesthetics from a drop in the level of the Salton Sea.** Less than significant impact with mitigation.	**A4-A-1: Impacts on aesthetics from a drop in the level of the Salton Sea.** Less than significant impact.
A-2: Impacts on aesthetics from odors. Less than significant impact.	Continuation of existing odors.	**A2-A-2: Impacts on aesthetics from odors.** Less than significant impact.	**A3-A-2: Impacts on aesthetics from odors.** Less than significant impact.	**A4-A-2: Impacts on aesthetics from odors.** Less than significant impact.
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

The County of Imperial General Plan, Conservation and Open Space Element 1997. The element contains the following standard for visual resources along scenic highways:

Appendix B: Standards for Scenic Highway Corridor Protection

> "The value of the state's Official Scenic Highways is recognized. The primary concern of this program is to reasonably control corridor appearance through land use regulations in the viewshed, so that the full scenic value of the area can be appreciated."

3.11.3 Environmental Setting

3.11.3.1 Lower Colorado River

The LCR geographic subregion encompasses the southeastern corner of California, from Parker Dam south to Imperial Dam. Visual resources along the LCR include volcanic mountain ranges and hills, distinctive sand dunes, broad areas of the Joshua tree, alkali scrub, and cholla communities, and elevated river terraces (DWR 1994). Views of the LCR occur at various locations along I-95. Picacho State Recreation Area also provides views of and access to the LCR.

3.11.3.2 IID Water Service Area and AAC

The IID water service area is characterized visually by substantial agricultural production. Approximately 20 percent of the nearly 3 million acres of Imperial County land is irrigated for this purpose (County of Imperial 1997b). Beyond the IID water service area, deserts, sand dunes, mountains, and the Salton Sea characterize the visual resources.

Regional deserts include the Yuha Desert, located in the southeastern portion of Imperial County. The Yuha Desert contains unique geologic features, including sand chimneys and painted gorge formations. These features contribute to the scenic quality of the region and provide a stark contrast to the region's foothills and mountains. Additional scenic deserts in the region include the East Mesa area, bordered on the east by the Algodones Sand Dunes; the Lower Borrego Valley, east of the Anza-Borrego Desert State Park in the vicinity of SR 78; the West Mesa area, east of the Fish Creek Mountains and west of Superstition Mountain; and Pilot Knob Mesa, south of I-8 near Sidewinder Road (County of Imperial 1997b). Figure 3.11-1 illustrates the locations of these scenic deserts. The Algodones Sand Dunes are located between East Mesa and Pilot Knob Mesa, covering an area of approximately 160 square miles. The shifting sands of the dunes extend in a northwest to southeast direction, stretching 40 miles wide, and are currently bisected by SR 78 between the towns of Brawley and Glamis, and by I-8 between El Centro and Yuma, Arizona. An important part of the early development of Imperial County, the dunes represent a unique visual resource within the county (County of Imperial 1997b).

Various mountains and foothills within the region also add to the visual scenery in the Imperial Valley. The eastern foothills of the Peninsular Range, including the Jacumba, Coyote, Fish Creek, and Santa Rosa Mountains, are located to the west of the IID water service area. To the northeast, the Chocolate Mountains stretch in a northwest to southeast direction between Riverside County and the Colorado River. SR 78 traverses these rugged, undeveloped mountains between Glamis and the Palo Verde area. With an elevation of 2,700 feet, the Chocolate Mountains can be viewed from locations throughout the valley. Additional landmarks visible within the Imperial Valley include Superstition Mountain, with an elevation of 759 feet, and Mt. Signal, located west of the city of Calexico and north of the International Boundary with Mexico, on the eastern edge of the Yuha Desert (County of Imperial 1997b).

Several public highways within the IID water service area have been selected as eligible for state scenic highway designation. Views afforded by sections of I-8, SR 78, and SR 111 include rock and boulder scenery and plant life variations, the Chocolate Mountains, and the Salton Sea (County of Imperial 1997b).

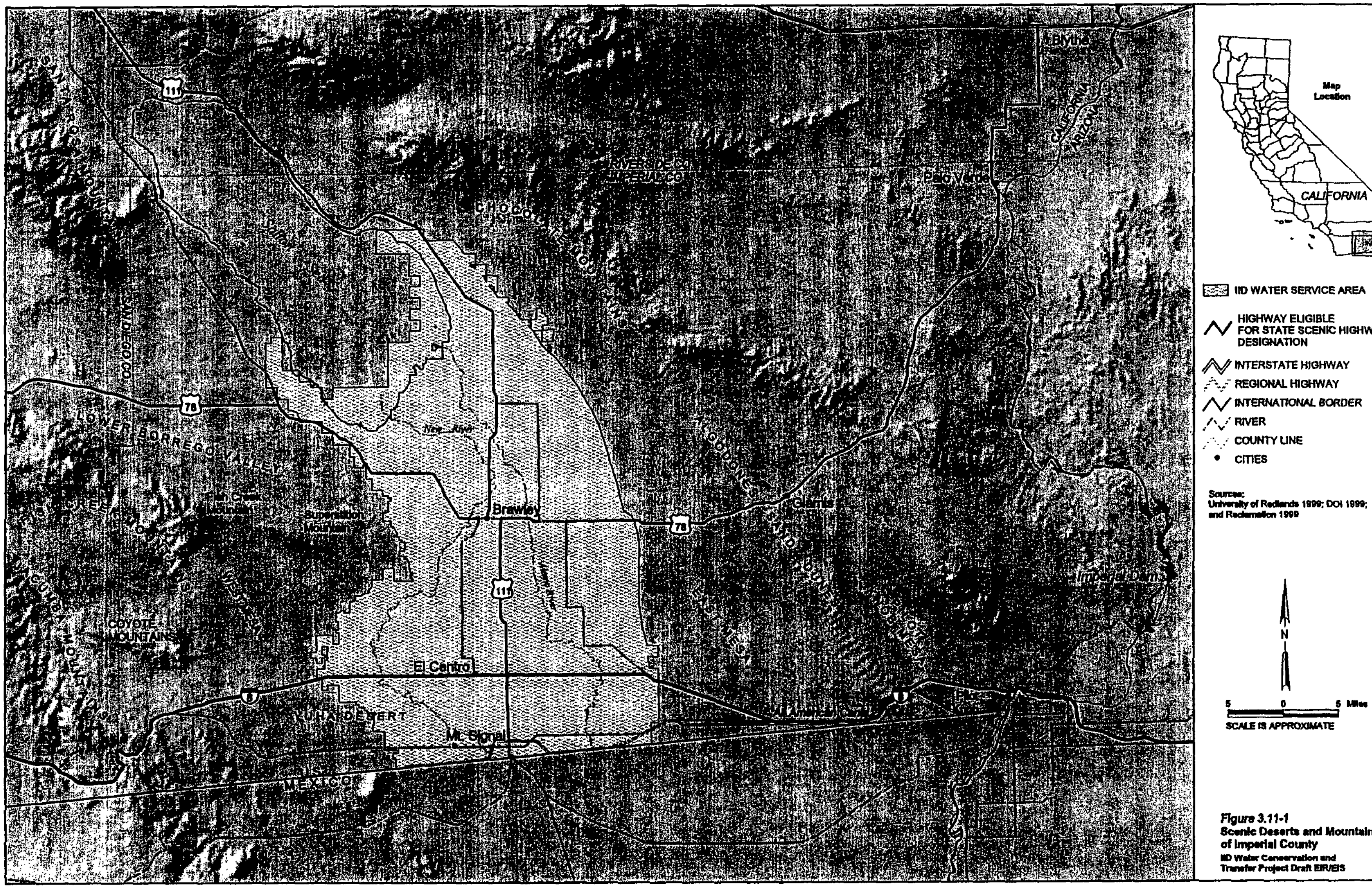

Figure 3.11-1
Scenic Deserts and Mountains of Imperial County
IID Water Conservation and Transfer Project Draft EIR/EIS

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3.11.3.3 Salton Sea

VISUAL RESOURCES

Visual resources in the area of the Salton Sea geographic subregion include various landforms, vegetation, man-made structures, and the Sea itself. The Salton Sea covers approximately 211,000 acres (330 square miles) and is immediately surrounded by a sparsely vegetated desert landscape, which gives way to rocky, sandy hills (SSA and Reclamation 2000). Primary views of the Salton Sea and surrounding landscape occur along SR 111 and SR 86, from nearby residential and commercial areas, including the communities of North Shore, Bombay Beach, Niland, Salton City, Salton Sea Beach, and Desert Shores, and from public parks and recreation areas, including the Salton Sea State Recreation Area developed along 20 miles of the northeastern shoreline by DPR, and the Sonny Bono Salton Sea NWR at the southern end of the Sea. Recreation in the vicinity of the Salton Sea is discussed in Section 3.6, Recreation.

The Salton Sea viewshed, the general area from which the Sea is visible, contains several distinct sub-areas or visual units that are described briefly below. Figure 3.11-2 shows the generalized viewshed within a 5-mile radius of the Sea's shoreline. Four visual units are also delineated on this figure. Viewpoint locations are shown in Figure 3.11-3, and photographs depicting representative views are included as Figures 3.11-4a-h.

Eight key viewpoints (KVPs) have also been identified for purposes of documenting currently existing visual conditions at the Salton Sea. Table 3.11-2 summarizes the existing visual characteristics at the KVPs in terms of landscape features, current viewing distance to the Sea's shoreline, and primary potentially affected viewer groups. Figures 3.11-4a-h include photographs taken from each of the KVPs.

North Shore. The area bordering the Salton Sea's north shore is a gently sloping alluvial plain dominated by intensive, high-value agriculture. The area is characterized by small plots of land containing crops of differing color, height, texture, and spacing, such as date palms and vineyards. The Orocopia Mountains are northeast of the Sea (SSA and Reclamation 2000). The three highways approaching from the north—SR 86, SR 195, and SR 111—provide the primary public views of the Sea in this area. In places where the Sea is visible from the roadway, the viewing distance varies between 1 and 2 miles (photos 2 and 4, Figure 3.11-4a). Other roads approaching from Mecca, north of the Sea, do not provide access to the shoreline (photo 1, Figure 3.11-4a). However, in the agricultural area in the northwest corner of the Sea, some local roads connecting to SR 86 provide shoreline access (photo 3, Figure 3.11—4a). No recreation facilities are at this location.

West Shore. The west shore area includes SR 86 and the shoreline from south of Salton City to north of Desert Shores. The area includes most of the residential development around the Sea. Topography of this portion of the shore is a gradually sloping alluvial fan between the Sea and the boundary to Anza-Borrego State Park. Undeveloped residential lots appear on many maps, but are identified on the ground only by the roads and utilities servicing them. Views of the Chocolate Mountains across the Sea and the Santa Rosa Mountains to the west provide a dramatic landscape backdrop (SSA and Reclamation 2000). The communities of Salton City, Salton Sea Beach, and Desert Shores provide foreground views of the Salton Sea from marinas and other private recreational facilities along the western shore of the Sea (photos 6-10, Figure 3.11-4b-c). Commercial and residential development surrounding the

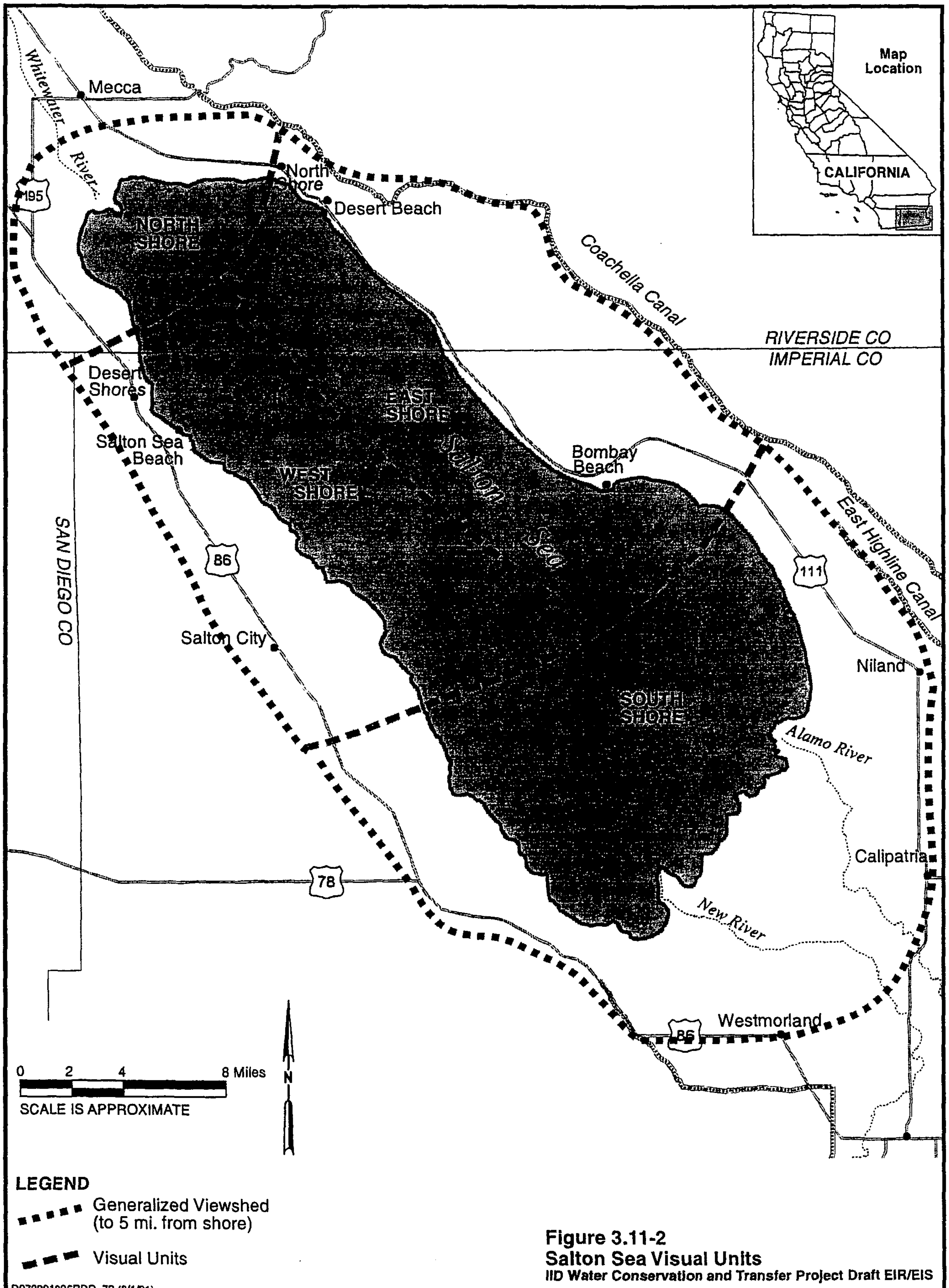

Figure 3.11-2
Salton Sea Visual Units
IID Water Conservation and Transfer Project Draft EIR/EIS

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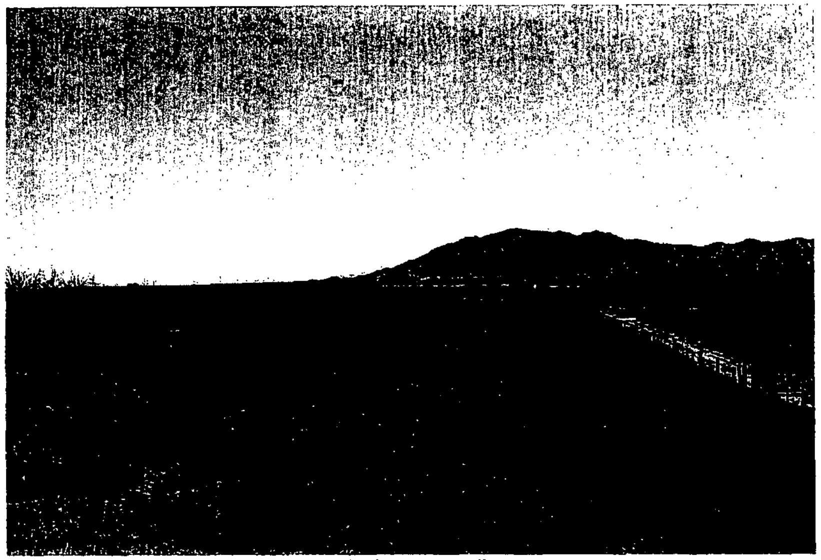
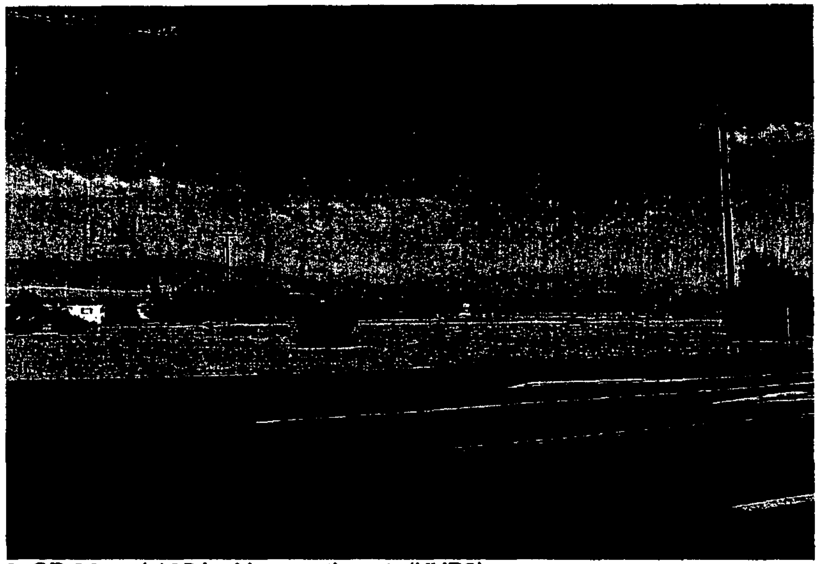
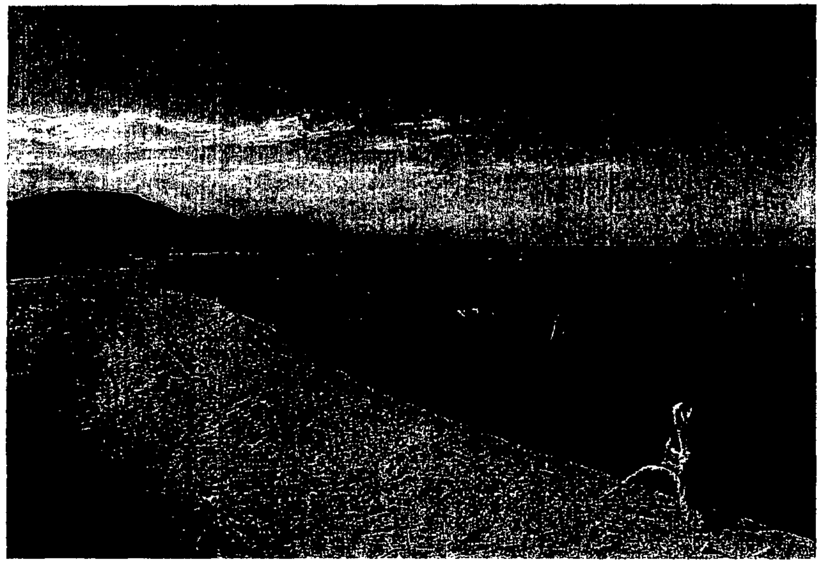


1. Lincoln Street looking south (private road).



2. SR 86 and 195 looking southeast. (KVP2)



3. Johnson and 81st Street at shore looking north.

4. SR 86 looking east. (KVP2)

Figure 3.11-4a
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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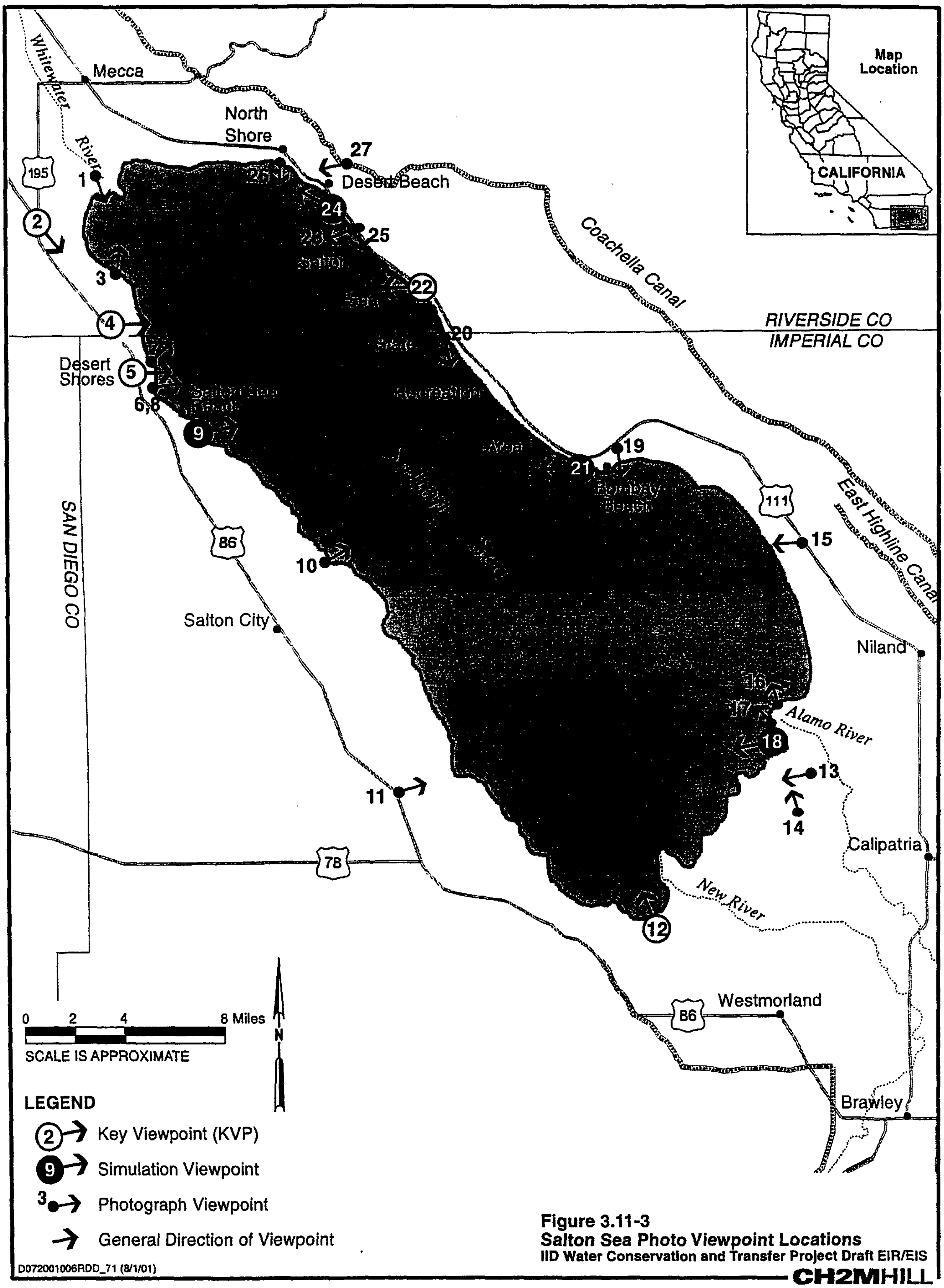
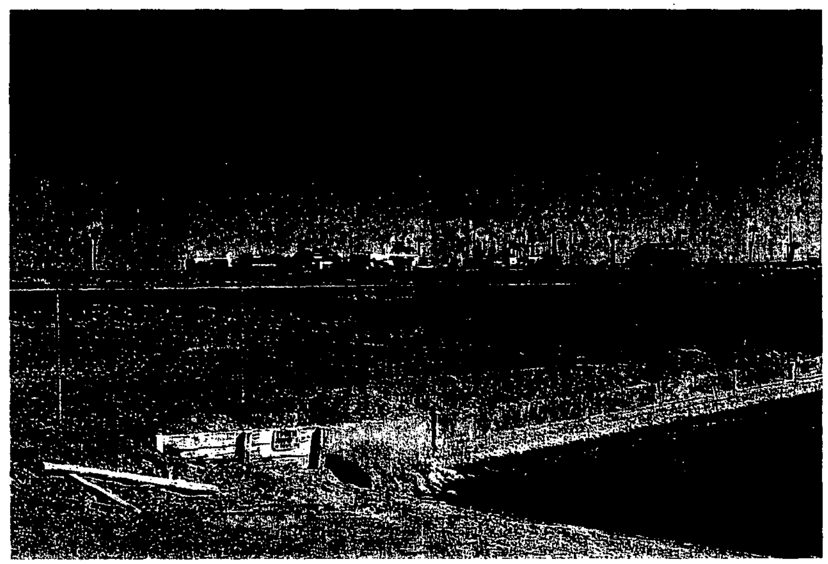


Figure 3.11-3
Salton Sea Photo Viewpoint Locations
IID Water Conservation and Transfer Project Draft EIR/EIS

5. SR 86 at Desert Shores looking east. (KVP)

6. Desert Shores.

7. Rancho Marina at Desert Shores.



8. Rancho Marino boat launch.

Figure 3.11-4b
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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9. Salton Sea Beach looking southeast.** (KVP4)

10. Johnson's Landing looking east.

11. SR 86 at Salton Sea test base.

** Simulation Viewpoint

Figure 3.11-4c
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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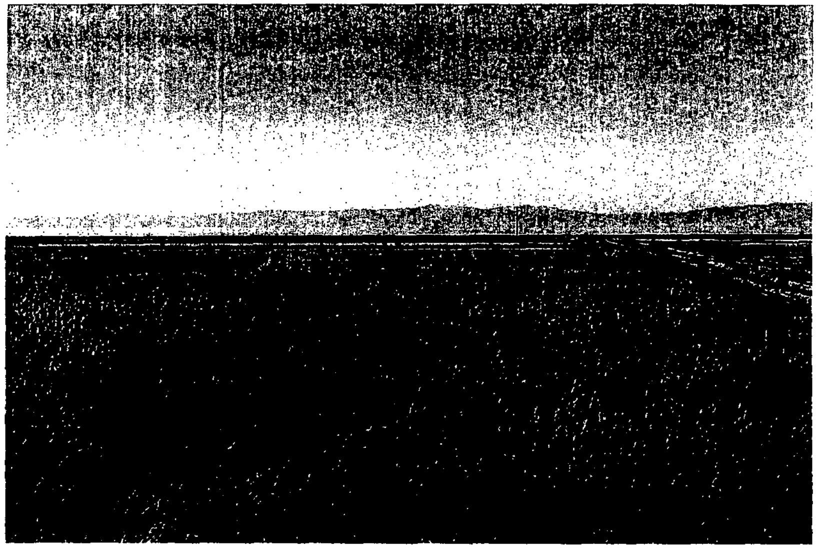

12. SSNWR observation tower (public access). (KVP)

13. Sinclair Road looking west.

14. Agricultural area looking north toward Red Hill.

15. SR 111 near Wister looking northwest.

Figure 3.11-4d
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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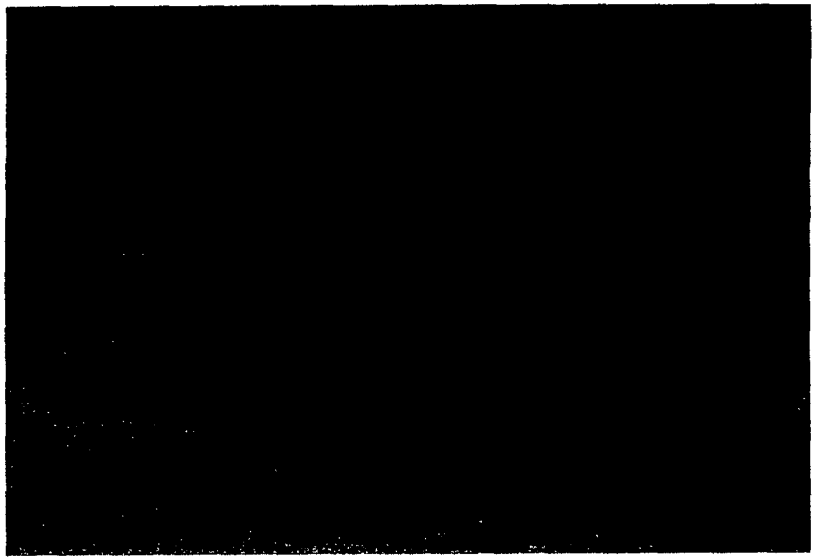
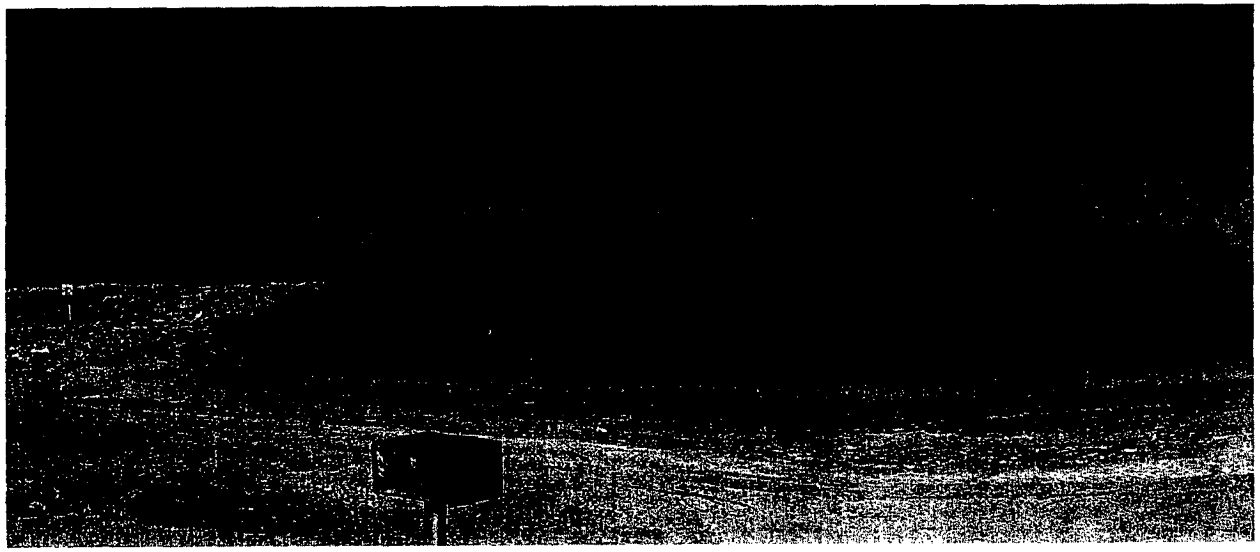


16. Near Red Hill looking north.

17. Red Hill Marina County Park.

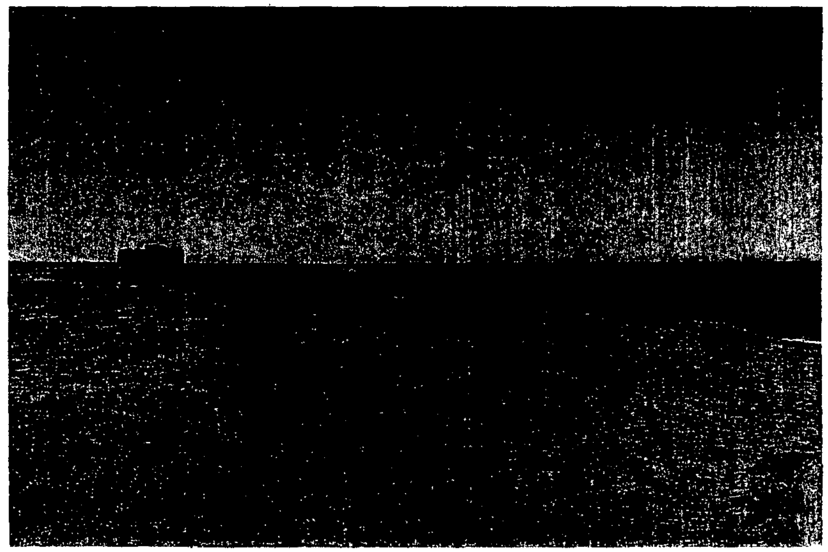


18. Red Hill County Park looking northwest.** (KVP 6)

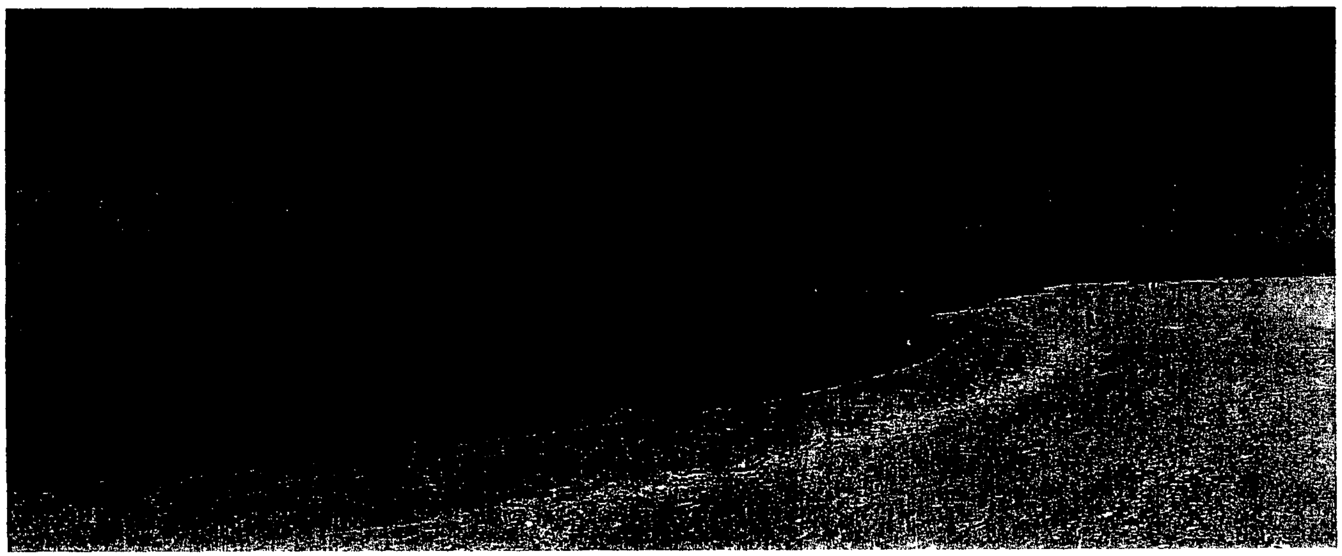
** Simulation Viewpoint

Figure 3.11-4e
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

19. Bombay Beach looking south towards Salton Sea.



20. Salt Creek Campground looking south.



21. Bombay Beach (SSSRA).** (KVP 7)

** Simulation Viewpoint

Figure 3.11-4f
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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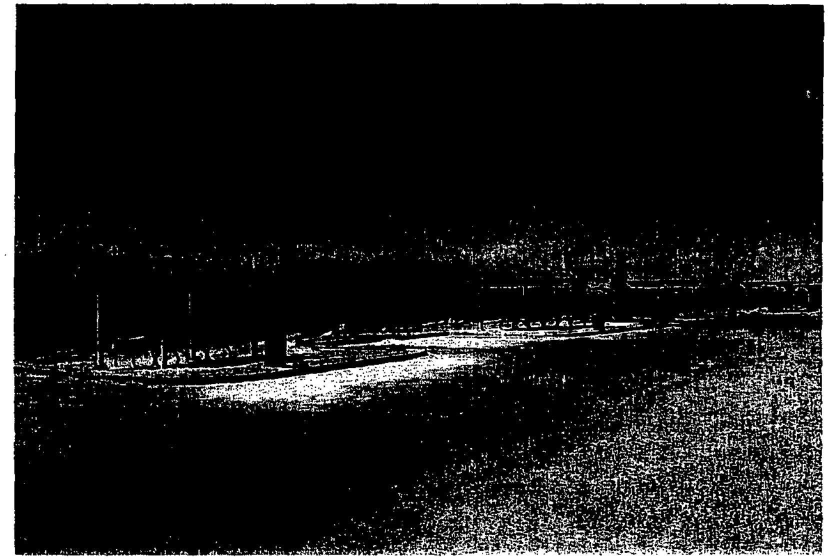
22. SR 111 near Corvina Beach. (KVP 8)



23. SSSRA Headquarters picnic area looking west.

24. Sneaker Beach near SSSRA Headquarters looking west.** (KVP 9)

** Simulation Viewpoint

Figure 3.11-4g
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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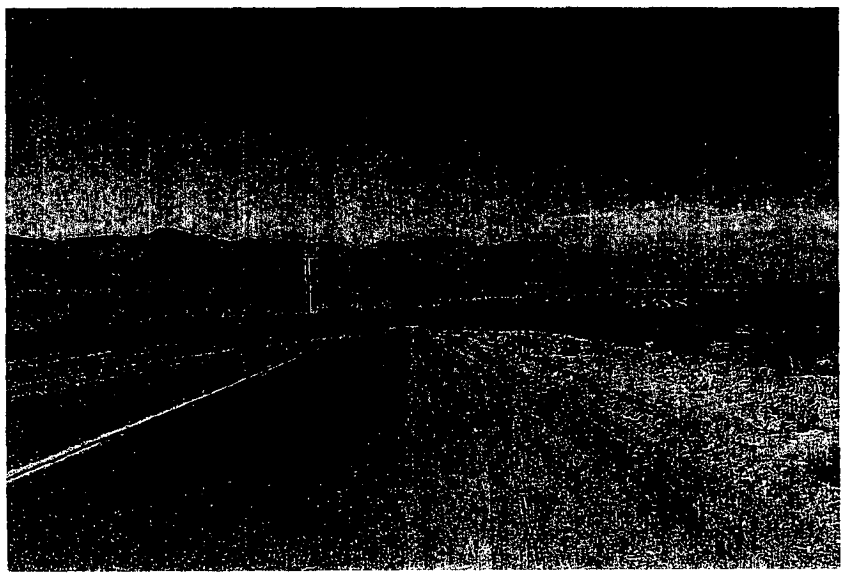
25. SSSRA boat launch/harbor looking southwest.

26. North Shore Beach looking south at old marina.



27. Parkhills Drive looking north.

Figure 3.11-4h
Visual Character Photos
IID Water Conservation and Transfer Project Draft EIR/EIS

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TABLE 3.11-2
Salton Sea Viewshed Characteristics

Visual Unit	KVP (Photo #) Location*	Landscape Features/ Visual Character	Primary Viewer Group	Distance From Viewer to Shoreline***
North Shore	KVP 1 (photo 2) SR 86 & 195	Foreground views include barren desert landscape with limited horizontal expanse of water seen against distant mountain backdrop.	Roadway motorist	9,400 ft. (1¾ mi.)
North Shore	KVP 2 (photo 4) SR 86	Foreground views encompass agricultural crops and palm orchard. Horizontal expanse of water seen against mountains in backdrop.	Roadway motorist	8,200 ft. (1½ mi.)
West Shore	KVP 3 (photo 5) SR 86	Foreground views include barren desert with scattered vegetation and commercial/residential buildings. Partially screened distant views encompass water and shoreline.	Roadway motorist	3,700 ft. (¾ mi.)
West Shore	KVP 4 (photo 9) Salton Sea Beach**	Shoreline and water dominate foreground views and distant vistas.	Recreationalist	50 ft.
South Shore	KVP 5 (photo 12) Salton Sea Nat'l Wildlife Refuge	Foreground views encompass marsh and grassland. Limited horizontal expanse of water seen against mountain backdrop.	Recreationalist	4,400 ft. (~1 mi.)
South Shore	KVP 6 (photo 18) Red Hill County Park**	Shoreline dominates foreground views with open expanse of water seen against distant mountain backdrop.	Recreationalist	150 ft.
East Shore	KVP 7 (photo 21) Bombay Beach**	Shoreline and water dominate foreground views. Mountains provide backdrop to expansive open water vistas.	Recreationalist	20 ft.
East Shore	KVP 8 (photo 22) SR 111	Desert landscape seen in foreground views. Mountains provide backdrop to open water vistas.	Roadway motorist	800 ft.
East Shore	KVP 9 (photo 24) Sneaker Beach**	Foreground water and shoreline views are partially framed by shoreline vegetation with distant mountain backdrop.	Recreationalist	10 ft.

Notes:
* Refer to Figure 3.11-3
** Simulation view
*** Distances are approximate

Sea is most concentrated in these communities (photo 5, Figure 3.11-4b). Agricultural fields dominate both sides of SR 86 north of Desert Shores. Desert landscape dominates the portion of SR 86 from Desert Shores south to the Salton Sea Test Base (photo 11, Figure 3.11-4c) (SSA and Reclamation 2000).

South Shore. The area south of the Salton Sea is a northward-sloping, wide-open valley supporting large fields of intensive commercial agriculture. The two rivers that terminate in the Sea, the Alamo River and the New River, are deeply incised in the alluvial slope. Large tracts of irrigated farmland are bordered by irrigation and drainage ditches (photo 14, Figure 3.11-4d). The tracts form a patchwork of fields planted with crops of similar size and spacing, but with differing color and texture. Geothermal plants (photo 13, Figure 3.11-4d) near the mouths of the Alamo and New Rivers are dominant features of the landscape because of their height and because their steam plumes provide a stark contrast to the blue skies characteristic of the region (SSA and Reclamation 2000). Along the southwest corner of the Sea, SR 86 provides distant views to the Sea from a distance of 1.5 to 4 miles away, views of Imperial Valley agricultural fields to the southwest, and the Vallecito and Santa Rosa Mountains to the northwest (photo 15, Figure 3.11-4d). Views to the Sea are also available near the abandoned Salton Sea Test Base, west of the Sonny Bono NWR between SR 86 and the Salton Sea (photo 11, Figure 3.11-4c).

The Sonny Bono NWR is in the southeast corner of the Salton Sea. The refuge, a sanctuary for wintering waterfowl and other water birds, provides 35,484 acres of salt marsh and open water, in addition to 2,000 acres of pasture and freshwater marsh (L.L. Bean 2000). Public access to the shoreline is not available, but a public wildlife observation tower provides a view of the Sea at a distance of approximately 0.50 mile (photo 12, Figure 3.11-4d).

The main public access to the shoreline in the Sea's south shore is Red Hill Marina County Park, located near the mouth of the Alamo River. The red, rocky outcropping is home to a campground, boat launch, and trailer park (photos 16-18, Figure 3.11-4e). Panoramic views from this area include a broad expanse of water and distant mountains. Large changes in the shoreline are visible here as a result of the shallow bottom slope of the Sea (photo 16, Figure 4.11-e).

East Shore. The east shore area includes approximately 20 miles of Sea shoreline and stretches from north shore at the north end to Bombay Beach at the south end along SR 111. The terrain consists of the lower alluvial plains of the Mecca Hills and the Orocopia and Chocolate Mountains, with typically moderate gradients of 1 to 5 percent. California low desert scrub vegetation is the predominant cover for this zone, with introduced palms and exotics at some of the public use areas (SSA and Reclamation 2000).

SR 111, along the northeast shore of the Salton Sea, is included in the "Master Plan of State Highways Eligible for Official Scenic Highway Designation," from the Bombay Beach in Imperial County to Mecca in Riverside County. Because of the proximity of SR 111 to the Sea, low-growing desert scrub vegetation, and gradual slopes, this area affords wide-open views of the Sea and provides the best viewing opportunities to the Sea from public lands (photo 22, Figure 3.11-4g).

The Salton Sea SRA is located along SR 111 between the Sea and the Chocolate Mountains. Spread out over almost 20 miles of shoreline are five campgrounds and a facility headquarters, which includes a visitor center and day-use area (photos 20-21, and 23-25, Figures 3.11-4f, g, and h). Other resort facilities in this area are in various stages of disrepair. The North Shore Yacht Club and Marina are unused (photo 26, Figure 3.11-4h). The Coachella Canal also lies parallel to SR 111 through this area (SSA and Reclamation 2000).

Sea Level Variations. The elevation of the Salton Sea has varied historically since its creation in 1905. On average, the elevation went from a high of –195 ft msl in 1907 to a low of over -250 ft msl in the mid-1920s. Since the mid-1920s, the water level has gradually increased to its current elevation of –228 ft msl (Reclamation 2002b). Over this 75-year period, on average, the level has increased by approximately 0.4 foot per year. In addition to the historic variation, the water level of the Sea also varies by up to 1.5 feet on an annual cycle, according to seasonal runoff and evaporation rates. As a result of these water level changes, the surface area of the Sea and shoreline locations have historically varied both in long- and short-term periods. (Section 3.1, Hydrology and Water Quality, includes a more detailed discussion of water resources.) Evidence of these shoreline variations is particularly evident at shoreline locations such as Red Hill and near the Salton Sea SRA headquarters, where recreation facilities have been inundated by rising waters (photos 16-18 and 25-26, Figures 3.11-4e and 3.11-4h).

ODORS

The presence of odors at the Salton Sea currently affects both visitor numbers and resident populations in the area. Factors contributing to odors at the Salton Sea include water quality, high nutrient levels, and biological factors such as fish and bird die-offs.

Water quality at the Salton Sea is affected by a high concentration of sulfates and other compounds present in the saline Sea, as well as inputs of agricultural drainage. The water originates at the Colorado River, where it is diverted for irrigation through canals to both the Coachella and Imperial Valleys. Nutrient-rich runoff entering the Salton Sea produces eutrophic conditions that result in phytoplankton blooms. These microscopic plants float close to the Sea's surface, and offensive odors are created when large numbers of plants die and decompose. Odors resulting from algal bloom die-offs are most prevalent during the summer months, when inputs of freshwater to the Salton Sea are low and temperatures are high (SSA and Reclamation, 2000).

Fish and bird die-offs at the Sea also contribute to the odor problem. The increases in water level and salinity over the past two decades have been accompanied by several large die-offs, producing unpleasant odors as fish and birds decompose along the shoreline (SSA and Reclamation 2000). These episodes are discussed in more detail in Section 3.2, Biological Resources.

Odors produced by decaying algal blooms, and fish and bird die-offs occur predominantly in the southern and eastern portions of the Salton Sea, although all areas of the Sea are subject to these occurrences. The most prevalent odors exist during the summer months when temperatures are high and winds from the southeast are predominant. High winds in the Salton Sea area are most frequent during the months of April and May (SSA and Reclamation 2000).

3.11.4 Impacts and Mitigation Measures

3.11.4.1 Methodology

Potential effects of the Proposed Project and alternatives were evaluated qualitatively for the LCR, the IID water service area, and the SDCWA service area because little to no change in the visual landscape or scenic resources is anticipated in these areas as a result of the Proposed Project or its alternatives. The Salton Sea, however, would have different water levels and surface areas under the Proposed Project and alternatives. Therefore, the visual impacts on the Salton Sea were evaluated graphically using visual simulation techniques to present future views of the Sea at different water levels. The future views of the Sea under the Proposed Project and the various conservation alternatives were compared against the view under the Baseline, which for practical purposes appears the same as the No Project alternative. The future views of the Salton Sea will not look like the existing views shown in this section, because the elevation and surface area of the Sea will continue to decline regardless of the Proposed Project or any of its alternatives including the No Project alternative.

For the Salton Sea, the potential for olfactory impacts from the Proposed Project or its alternatives was evaluated because of the existing odors that characterize the Sea. The potential for increased odors associated with the Proposed Project and/or alternatives is also addressed in Section 3.1, Hydrology and Water Quality, and Section 3.2, Biological Resources.

Visual Simulations. Visual effects at the Salton Sea have been evaluated using an approach that includes computer-generated visual simulations of water levels associated with reduced inflows to the Sea resulting from water conservation. Visual simulations show the conceptual appearance of the anticipated lowered Salton Sea elevations as seen from four representative public viewing locations that are within approximately 150 feet of the present shoreline (see Table 3.11-2).

Visual simulations and analyses were prepared for the Proposed Project and each of the project alternatives. These simulations have been based on modeling of reduced inflows in Reclamation's Salton Sea Model. The analysis of the potential visual effects at the Salton Sea associated with implementation of the Proposed Project and alternatives is based on field observations conducted in September 2000 and review of the following information including, background reports and documents; project maps and technical data; computer-generated visual simulations from representative viewpoints; ground and aerial photography, including historic photos and topographic maps of the Project region of influence.

The computer-generated simulations are the result of an objective analytical and computer modeling process, and are accurate within the constraints of the available site and project data. The simulations are based on existing terrain data from USGS and bathymetric modeling data (Reclamation 2002).

Subregions Excluded from Impact Analysis. No impacts to aesthetics resources would occur in the SDCWA service area or LCR subregions because no construction of new facilities would occur. Additionally, no changes in operation of existing facilities that would result in impacts to aesthetics would occur; therefore, the SDCWA service area and LCR geographic subregions are not included in the impact discussions for each alternative.

3.11.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant effect on aesthetics if they:

- Have a substantial adverse effect on a scenic vista within the Project region of influence

- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway
- Substantially degrade the existing visual character or quality of the site and its surroundings
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the project region of influence

The Proposed Project and/or alternatives would have a significant effect on odors if they would create additional objectionable odors affecting a substantial number of people, compared to the odor potential under the Baseline.

3.11.4.3 Proposed Project

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Construction of on-farm irrigation system and/or water delivery system conservation measures under the Proposed Project would occur solely within the IID water service area and the aesthetic character of desert areas, sand dunes, and mountains located outside the IID water service area would not be impacted. Equipment required for construction of conservation measures is currently commonly used for ongoing projects in the irrigated portions of the IID water service area and therefore is consistent with the existing visual character. If conservation were to be achieved through fallowing, up to 50,000 additional acres throughout the IID water service area would go into a fallowed state. Currently, about 18,000 acres are fallowed each year (IID 2000a). Although the additional fallowed acreage could be three times the current amount, it would be distributed through the subregion and would not become an obvious visual feature of the landscape. Currently, many farms go fallow for part of the year, so the landscape is constantly changing from cropped to fallow acres.

The implementation of the Proposed Project does not require the installation of any lighting; therefore, no impacts related to increased light and glare would occur. No aesthetic impacts are anticipated in this subregion.

Inadvertent Overrun and Payback Policy (IOP)

No impacts to aesthetics are associated with compliance with the IOP in this subregion.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Implementation of the HCP will result in the restoration of native tree and marsh habitat, which will add variability and natural forms to the landscape of Imperial County, thus improving the quality of the viewshed. Construction efforts required for the HCP will require use of equipment which is generally in character with the agricultural activities historically and currently ongoing in the IID water service area. Therefore, no impacts on aesthetics would be associated with the HCP in the IID water service area subregion.

HCP (Salton Sea Portion) Approach 1 (HCP1): Hatchery and Habitat Replacement

Implementation of this approach would develop 5,000 acres of ponds and a hatchery in this subregion. These facilities will add variability and natural forms to the landscape of Imperial County, thus improving the quality of the viewshed. Construction efforts required for this approach will use equipment that is generally in character with the agricultural activities historically and currently ongoing in the IID water service area. Therefore, there would likely be no impact on aesthetics associated with the implementation of this HCP approach in the IID water service area subregion. However, additional details of this approach are still under development and may require subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

This approach could result in either additional conservation or additional fallowing to generate conserved water for mitigation. The additional fallowing could be as much as 25,000 in addition to the amount fallowed for the Proposed Project. Although the total amount of fallowed acreage could be 84,800, it would be distributed through the subregion and would not become an obvious visual feature of the landscape. Currently, many farms go fallow for part of the year, so the landscape is constantly changing from cropped to fallow acres.

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Impact A-1: Impacts on aesthetics would occur from a decrease in the elevation of the Salton Sea. Implementation of 300 KAFY of water conservation under the Proposed Project would result in lowering the elevation of the Salton Sea, thus reducing the overall water surface area and exposing areas of shoreline that are currently inundated. Figure 3.6-5 presented in Section 3.6, Recreation, illustrates the location and amount of newly exposed area that would occur due to the receding shoreline. The Proposed Project would primarily affect views of the Salton Sea landscape as seen from public shoreline recreation areas and more distant public roadways. The specific visual effects and their severity would vary according to the affected viewer's location and activity. In general, it is anticipated that views most affected by the Project would be at public recreation locations situated near the existing shoreline. A limited number of residences and commercial establishments also occur in these areas. The visual simulations presented as Figures 3.11-5a through 3.11-5l show the appearance of the lower Salton Sea elevations in year 2077 as seen from four public viewing locations:

- Salton Sea Beach
- Red Hill Marina County Park
- Bombay Beach
- Sneaker Beach

Six images are presented for each of these selected views. The first is the Baseline condition showing the Sea as it appears at an elevation of –235 msl. The subsequent views show the predicted elevation in the year 2077 for the Proposed Project and each of the Project

Alternatives, including the No Project Alternative 1. (Project alternatives are discussed below.) It is essential to remember that the Proposed Project and the various conservation alternatives must be compared against Baseline conditions to determine impacts and their severity, not against the existing conditions in the year 2002.

Locations of the simulation photographs are shown in Figure 3.11-3. The four panoramic visual simulation photographs each encompass a 65-degree view angle (equivalent to a 28-mm wide-angle camera lens).

Table 3.11-3 summarizes the anticipated visual impacts that would generally occur within the Salton Sea viewshed as a result of the Proposed Project. Project impacts are identified and evaluated qualitatively with respect to views from each of the four visual units. The visual simulations illustrating these anticipated effects (Figures 3.11-5a through 5l) are also referenced in the table.

As indicated in Table 3.11-3, foreground views seen from public roadways would not be affected, but a very minor decrease in the amount of water visible in the distance would occur. Overall, this would not result in a substantial change in the landscape character currently seen by motorists.

However, implementation of the Proposed Project would impact the views available to recreationalists. The Proposed Project would generally have a minor effect on views of the Sea as seen from the North Shore Area. This is due in part to the limited amount of public access and recreational use in this area. As seen from the other three visual units, however, the Proposed Project would affect views of the Sea particularly at locations situated in proximity to the existing shoreline. The visual simulations shown on Figures 3.11-5a through 3.11-5l indicate that views from existing public shoreline areas at Salton Sea Beach, Red Hill Marina County Park, Bombay Beach, and Sneaker Beach would encompass noticeably greater amounts of foreground mudflat or shoreline while decreased amounts of open water vista would be available. The exposed area would look like the existing beach and would eventually revegetate; however, views of the water, considered a scenic vista, would be possible only from a greater distance from the developed public viewing facilities at these locations.

Comparison of the extent to which the shoreline recedes under the Baseline and the Proposed Project indicates a significant difference, especially at Salton Sea Beach and Red Hill County Park. Changes in elevation and thus vistas, though gradual, would be accelerated with the Proposed Project. The ultimate elevation would be significantly lower and thus have a greater visual impact. These visual impacts are considered to be significant. (Significant impact.)

TABLE 3.11-3
Summary – Anticipated Effects at Key Viewpoints

Visual Unit	Key Viewpoint (Photo #) Location*	Primary Viewer Group	Distance from viewer to Shoreline*** Under Baseline	Project Alternative****	Distance Shoreline Would Recede (feet)***	Anticipated Visual Change
Baseline Conditions				***Project Operation Impacts at Year 2077***		
North Shore	KVP 1 (photo 2) SR 86 & 195	Roadway motorist	10,850 ft (2+ miles)	Proposed Project	10,050	Foreground view would not be affected; minor decrease in amount of visible water seen in distance. No substantial change in landscape character as seen from roadway.
				Alt. 1	0	
				Alt. 2	3,150	
				Alt. 3	6,750	
				Alt. 4	2,200	
North Shore	KVP 2 (photo 4) SR 86	Roadway motorist	8,800 ft. (1 2/3 mi.)	Proposed Project	2,400	Similar to KVP 1.
				Alt. 1	0	
				Alt. 2	1,100	
				Alt. 3	2,050	
				Alt. 4	850	
West Shore	KVP 3 (photo 5) SR 86	Roadway motorist	4,300 ft. (0.8 mi.)	Proposed Project	1,850	Similar to KVP 1.
				Alt. 1	0	
				Alt. 2	700	
				Alt. 3	1,200	
				Alt. 4	600	

TABLE 3.11-3
Summary – Anticipated Effects at Key Viewpoints

Baseline Conditions				[illegible] *Project Operation Impacts at Year 2077*		
West Shore	KVP 4 (photo 9) Salton Sea Beach**	Recreationalist	450 ft.	Proposed Project	2,300	The Proposed Project and Alternative 3 would result in a noticeable effect on the view of the Sea compared to the Baseline.
				Alt. 1	0	
				Alt. 2	900	Shoreline/mudflat area would become even more prominent in foreground with water seen in the distance and at the horizon.
				Alt. 3	1,700	
				Alt. 4	700	Alternative 2 would result in a less noticeable change. Alternative 4 would be indistinguishable visually from the Baseline.
South Shore	KVP 5 (photo 12) Salton Sea Nat'l Wildlife Refuge	Recreationalist	6,000 ft. (1.15 mi.)	Proposed Project	18,900	Similar to KVP 1.
				Alt. 1	0	
				Alt. 2	6,500	
				Alt. 3	16,400	
				Alt. 4	4,400	
South Shore	KVP 6 (photo 18) Red Hill County Park**	Recreationalist	2,150 ft.	Proposed Project	11,700	The Proposed Project and all alternatives would result in views that are similar to that of the Baseline. However, the water will appear much further away for the Proposed Project and Alternative 3.
				Alt. 1	0	
				Alt. 2	4,200	
				Alt. 3	9,500	
				Alt. 4	3,300	

TABLE 3.11-3
Summary – Anticipated Effects at Key Viewpoints

Baseline Conditions				Project Operation Impacts at Year 2077		
East Shore	KVP 7 (photo 21) Bombay Beach**	Recreationalist	570 ft.	Proposed Project	1,450	Similar to KVP 4.
				Alt. 1	0	
				Alt. 2	600	
				Alt. 3	1,150	
				Alt. 4	500	
East Shore	KVP 8 (photo 22) SR 111	Roadway motorist	1,100 ft.	Proposed Project	900	Similar to KVP 1.
				Alt. 1	0	
				Alt. 2	400	
				Alt. 3	700	
				Alt. 4	300	
East Shore	KVP 9 (photo 24) Sneaker Beach**	Recreationalist	260 ft.	Proposed Project	1,150	The Proposed Project and Alternative 3 would result in noticeable changes in views; the water would appear noticeably further away. Alternatives 2 and 4 would result in views essentially indistinguishable from those under the Baseline.
				Alt. 1	0	
				Alt. 2	450	
				Alt. 3	950	
				Alt. 4	300	

* Refer to Figure 3.11-3
** Simulation view (Figures 3.11-5a – 3.11-5h
*** Distances are approximate
**** Alternative 1, No Project, is essentially the same as the Baseline.

Mitigation Measure A-1: The following mitigation measures should be implemented to reduce the effects of the Proposed Project on views of the Salton Sea as seen from public recreation areas located along the east, west, and south shoreline. These measures should implemented on an ongoing basis as the Sea recedes until it reaches its lowest and stable elevation at which point they should be permanent. The measures to be undertaken in the Salton Sea area include:

- Relocate recreation facilities and extend access to the new shoreline to provide quality public viewing opportunities of the Salton Sea and its shoreline. These facilities may be temporary until the Sea reaches its minimum and stable elevation.
- Develop interpretive facilities and material to be made available to the public at recreation areas and along public roadways. Interpretive displays may include historic photographs of the Salton Sea landscape and information about water conservation measures including their effects on Salton Sea water levels.

After mitigation, the visual impacts due to reduction of the level of the Salton Sea and the associated shoreline exposure would be less than significant. (Less than significant impact with mitigation.)

Impact A-2: Impacts on aesthetics from odors. The reduction of water flow into the Salton Sea could increase odors near the Salton Sea. This would occur if the Proposed Project were to decrease adversely affect water quality in the Salton Sea to the point that it: 1) contributed to the death of flora or fauna, or 2) increased the existing summertime algae bloom, which produces large amounts of sulfuric odors. Under the Baseline, the salinity of the Salton Sea will increase in future years to the point that it will kill most aquatic invertebrates and fish. As a result, odor emissions from animal die-offs would occur in future years, with or without the implementation of the Proposed Project. Nutrient levels within the Salton Sea will also continue to increase under the Baseline, which will perpetuate or enhance algae blooms and their associated odor emissions. While the Proposed Project could somewhat accelerate the future rate of animal die-offs or algae blooms, because there will be ongoing objectionable odor episodes at the Salton Sea under the Baseline, this effect from the project would be insignificant. (Less than significant impact.)

HCP (Salton Sea Portion) Approach 1 (HCP1): Hatchery and Habitat Replacement

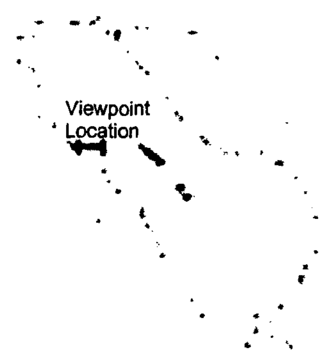
Although this HCP approach would mitigate for impacts to the Salton Sea, the 5,000 acres of ponds and the hatchery would be constructed within the IID water service area subregion and there would no aesthetic effects in the Salton Sea subregion.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Although this HCP approach would mitigate for impacts to the Salton Sea, the additional conservation of water, either through on-farm irrigation improvements, water delivery system improvements or fallowing, would occur in the IID water service area subregion. However, if this approach is selected, the impacts to aesthetics described under the Proposed Project (and alternatives), Impact A-1 and A-2, would be avoided.

Baseline - Salton Sea Beach (water level at - 235 ft msl)

Proposed Project (300KAFY) - Visual Simulation at Salton Sea Beach (water level at -250 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5a
Visual Simulations
IID Water Conservation and Transfer Project
Draft EIR/EIS

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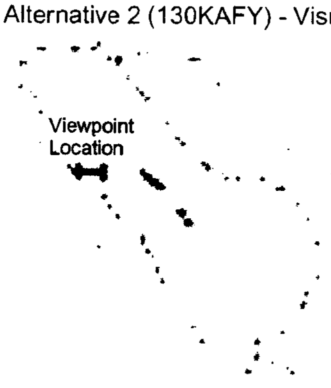
Alternative 1 (No Project) - Visual Simulation at Salton Sea Beach (water level at -235 ft msl)

Alternative 2 (130KAFY) - Visual Simulation at Salton Sea Beach (water level at -242 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5b
Visual Simulations
IID Water Conservation and Transfer Project
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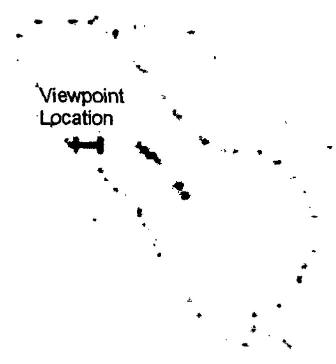
Alternative 3 (230KAFY) - Visual Simulation at Salton Sea Beach (water level at -247 ft msl)

Alternative 4 (300KAFY - Fallowing as Exclusive Conservation) - Visual Simulation at Salton Sea Beach (water level at -241 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5c
Visual Simulations
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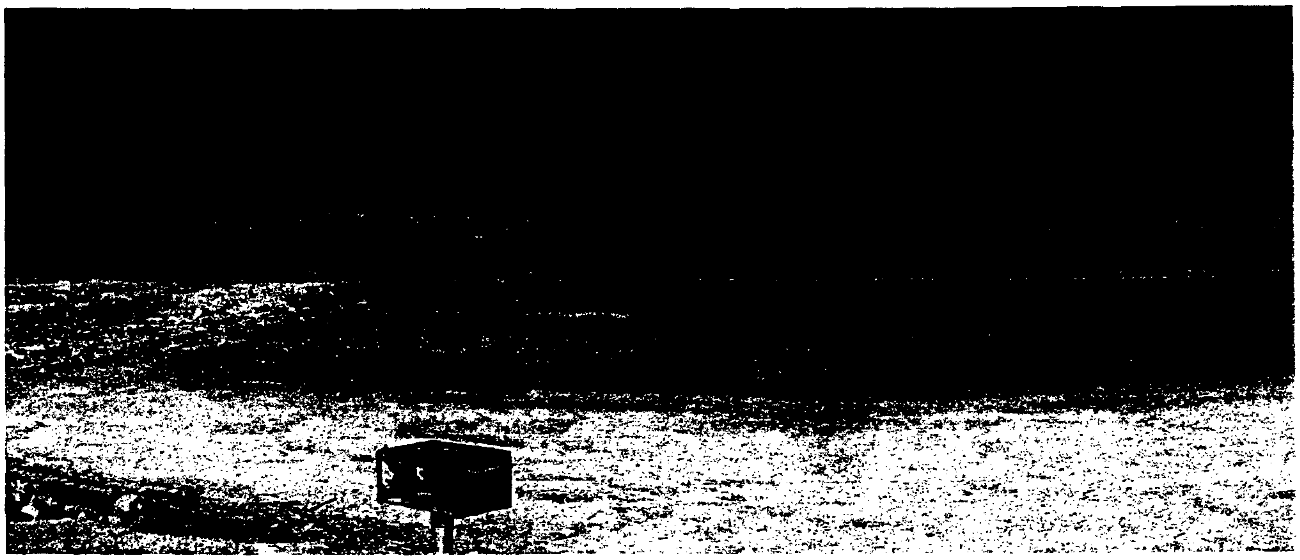
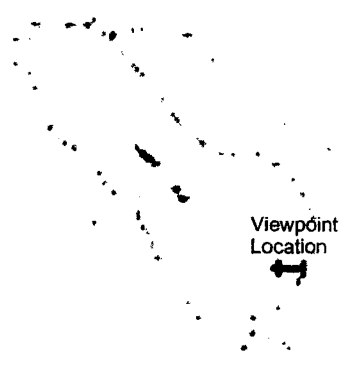
Baseline - Red Hill Marina County Park (water level at - 235 ft msl)



Proposed Project (300KAFY) - Visual Simulation at Red Hill Marina County Park (water level at -250 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5d
Visual Simulations
IID Water Conservation and Transfer Project Draft EIR/EIS

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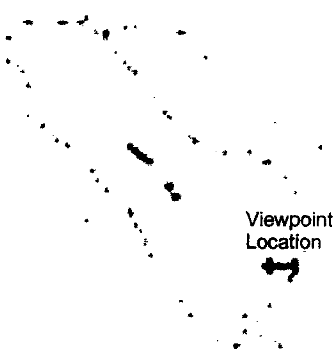
Alternative 1 (No Project) - Visual Simulation at Red Hill Marina County Park (water level at -235 ft msl)

Alternative 2 (130KAFY) - Visual Simulation at Red Hill Marina County Park (water level at -242 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5e
Visual Simulations
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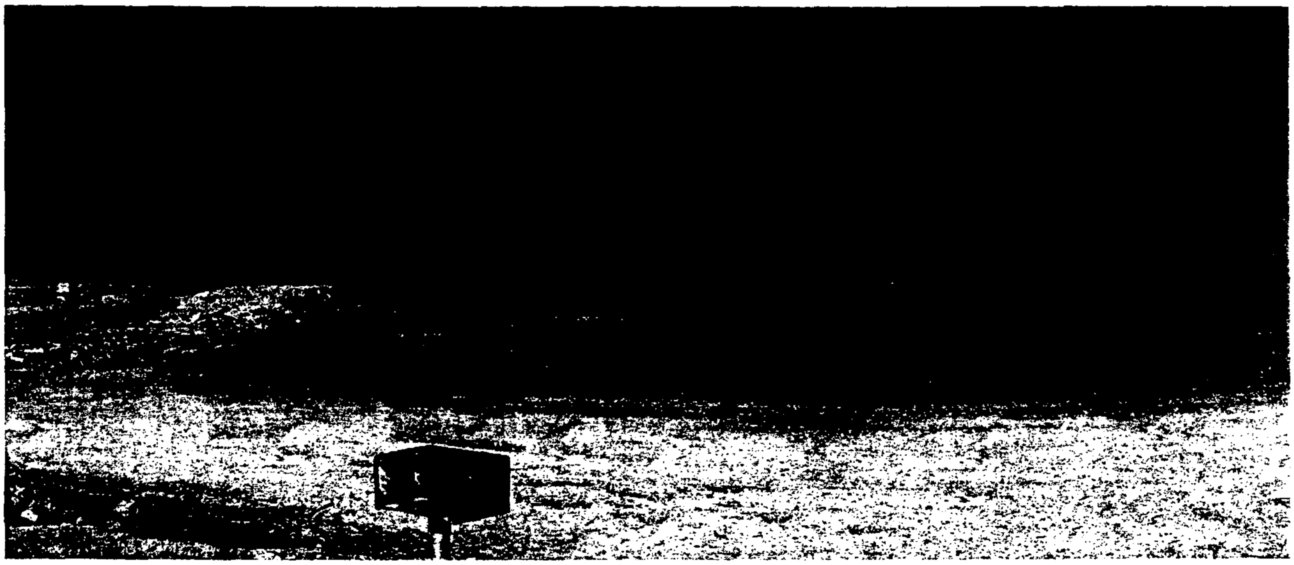
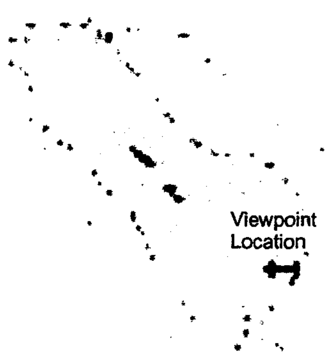


Alternative 3 (230KAFY) - Visual Simulation at Red Hill Marina County Park (water level at -247 ft msl)

Alternative 4 (300KAFY - Fallowing as Exclusive Conservation) - Visual Simulation at Red Hill Marina County Park (water level at -241 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5f
Visual Simulations
IID Water Conservation and Transfer Project Draft EIR/EIS

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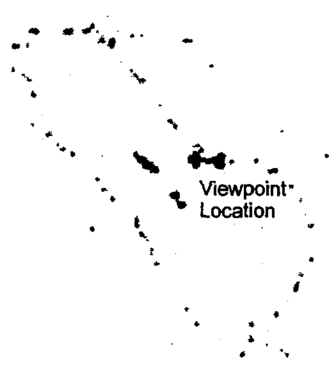
Baseline - Bombay Beach (water level at -235 ft msl)

Proposed Project (300KAFY) - Visual Simulation at Bombay Beach (water level at -250 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5g
Visual Simulations
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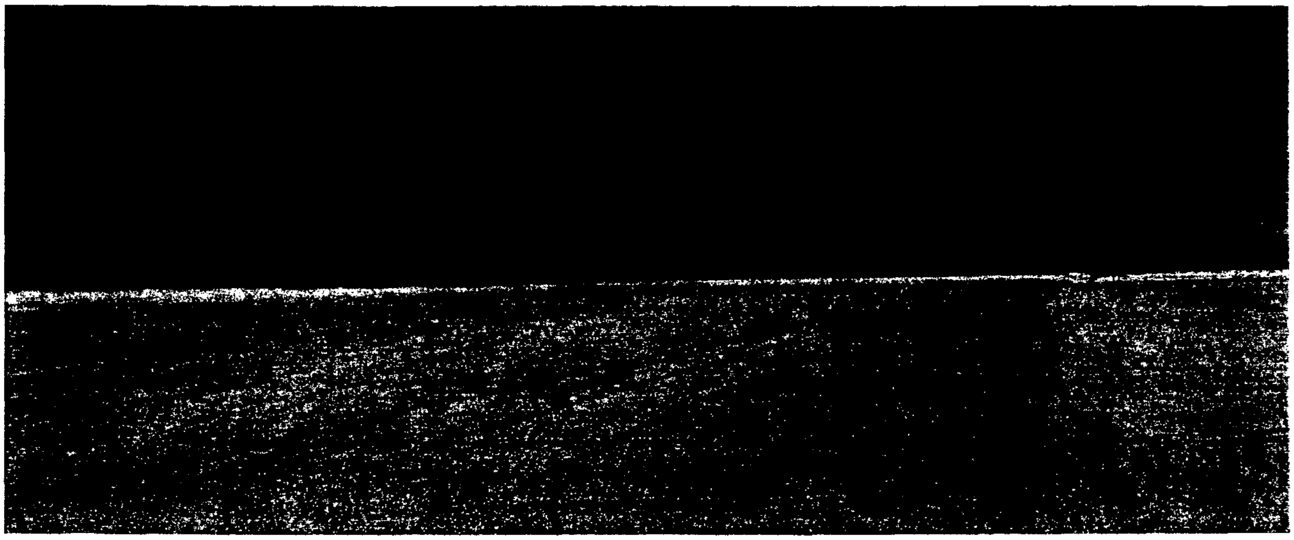
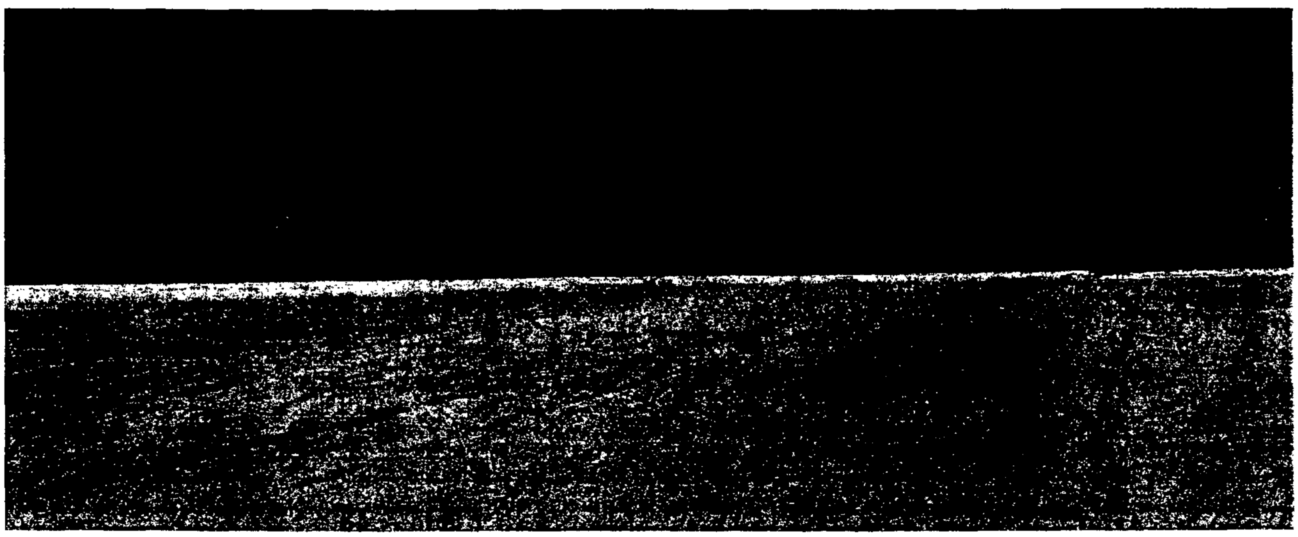
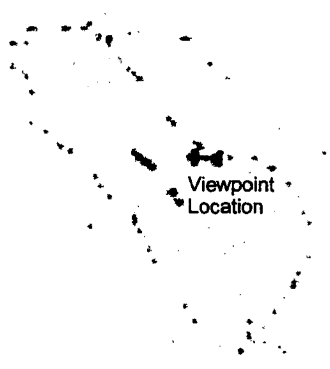


Alternative 1 (No Project) - Visual Simulation at Bombay Beach (water level at -235 ft msl)



Alternative 2 (130KAFY) - Visual Simulation at Bombay Beach (water level at -242 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5h
Visual Simulations
IID Water Conservation and Transfer Project Draft EIR/EIS

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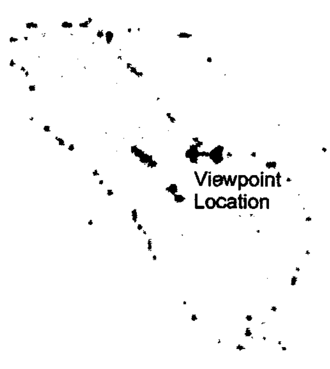
Alternative 3 (230KAFY) - Visual Simulation at Bombay Beach (water level at -247 ft msl)

Alternative 4 (300KAFY - Fallowing as Exclusive Conservation) - Visual Simulation at Bombay Beach (water level at - 241 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5i
Visual Simulations
IID Water Conservation and Transfer Project Draft EIR/EIS

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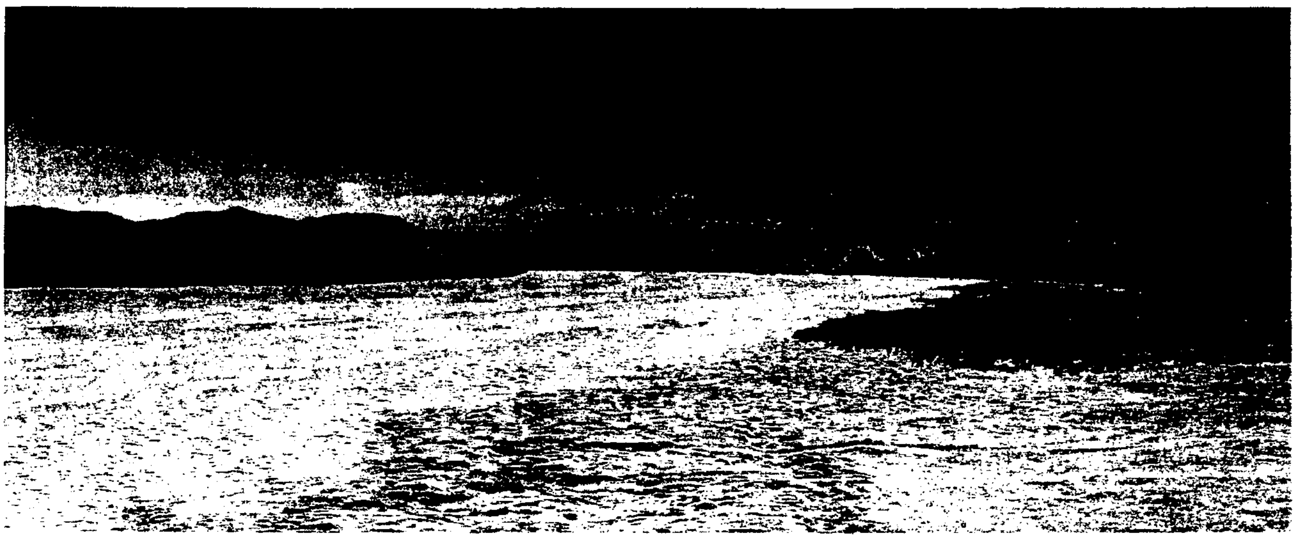
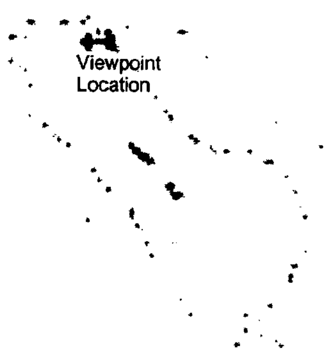
Baseline - Sneaker Beach (water level at -235 ft msl)



Proposed Project (300KAFY) - Conceptual Visual Simulation at Sneaker Beach (water level at -250 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5j
Visual Simulations
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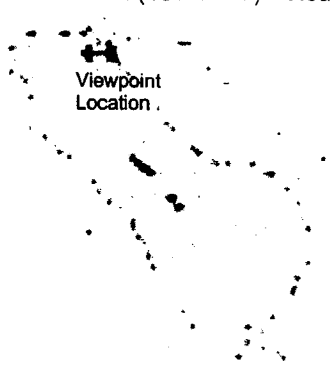
Alternative 1 (No Project) - Visual Simulation at Sneaker Beach (water level at -235 ft msl)

Alternative 2 (130KAFY) - Visual Simulation at Sneaker Beach (water level at -242 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5k
Visual Simulations
IID Water Conservation and Transfer Project Draft EIR/EIS

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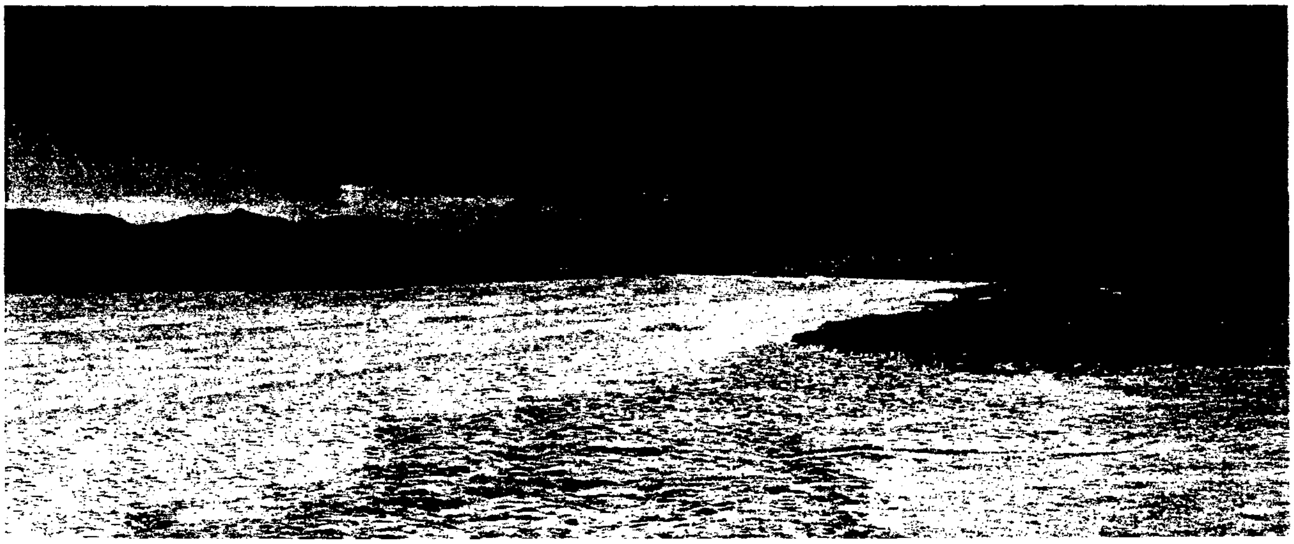
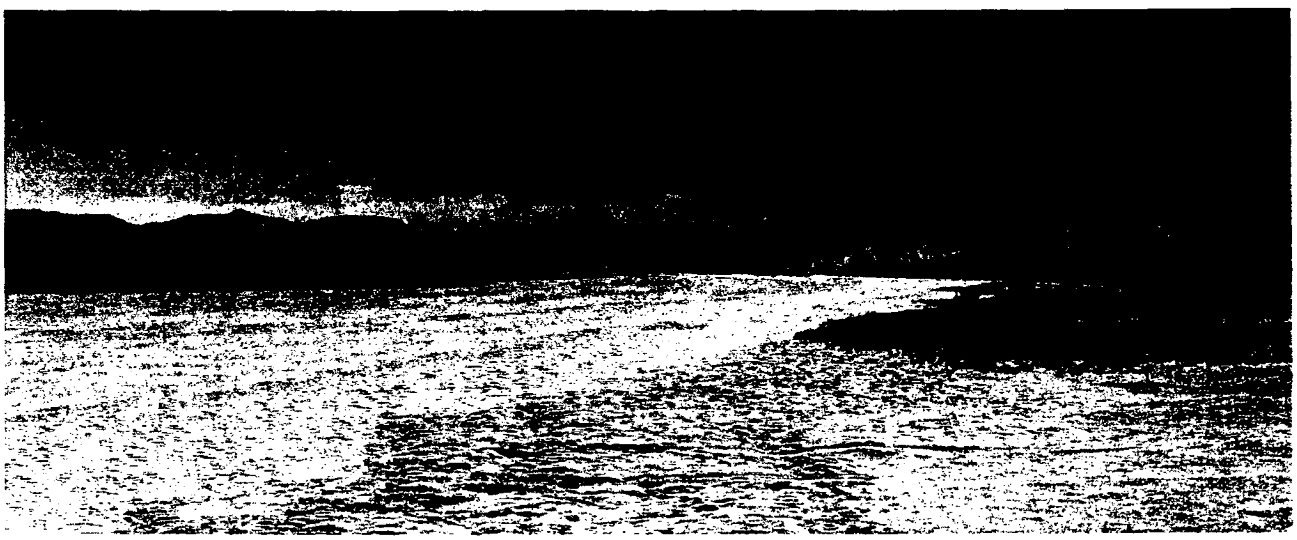
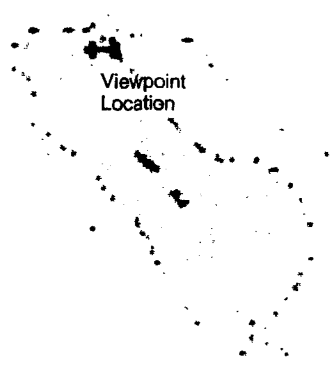


Alternative 3 (230KAFY) - Visual Simulation at Sneaker Beach (water level at -247 ft msl)



Alternative 4 (300KAFY - Fallowing as Exclusive Conservation) - Visual Simulation at Sneaker Beach (water level at -241 ft msl)



The conceptual visual simulations show the Salton Sea in the year 2077. Data sources: University of Redlands,1999; DOI, 1999; Reclamation, 1999.

Figure 3.11-5l
Visual Simulations
IID Water Conservation and Transfer Project
Draft EIR/EIS

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3.11.4.4 Alternative 1: No Project

Implementation of the No Project alternative would largely maintain existing conditions with regard to recreation in the LCR, IID water service area, and SDCWA service area. However, under No Project/Baseline conditions, the Salton Sea would drop from its current elevation of –228 msl and area of 364 square miles to approximately –235 ft msl (decline of 7 feet) and 339 square miles after 75 years (Reclamation 2002b). The No Project alternative would result in the same elevation and surface area as the Baseline. A more detailed description of elevation change at the Salton Sea over time is presented in Section 3.1, Hydrology and Water Quality.

Views under the No Project alternative would be the same as those with the Baseline. In addition, the No Project alternative has the same potential for increasing offensive odors as the Baseline.

3.11.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Under Alternative 2, construction of on-farm irrigation system improvements for water conservation in the IID water service area and the AAC would be consistent with the existing visual character of the agricultural landscape. The implementation of Alternative 2 would not require the installation of any lighting; therefore, no impacts related to increased light and glare would occur. Therefore, no aesthetic impacts are anticipated in this subregion.

SALTON SEA

Impact A2-A-1: Impacts on aesthetics from a drop in the level of the Salton Sea. As with the Proposed Project as described under Impact A2, implementation of Alternative 2 would result in lowering the elevation of the Salton Sea, thus reducing the overall water surface area and thereby exposing some areas of barren shoreline that are currently inundated. As described in Section 3.1, Hydrology and Water Resources, the surface elevation of the Salton Sea would not change as much as a result of implementation of Alternative 2 as it would as a result of implementing the Proposed Project. Implementation of Alternative 2 would result in a surface elevation of the Salton Sea to –242 ft msl after 75 years, exposing 34 square miles more than the Baseline. Though the visual impacts of Alternative 2 are considerably less than those of the Proposed Project, they are still significant. (Significant impact)

Mitigation Measure A2-A-1: The same mitigation measures as identified for the Proposed Project should be implemented to reduce the effects of Alternative 2 on views of the Salton Sea as seen from public recreation areas located along the east, west, and south shoreline.

After mitigation, the visual impacts due to reduction of the level of the Salton Sea and the associated shoreline exposure under Alternative 2 would be less than significant. (Less than significant impact with mitigation.)

Impact A2-A-2: Impacts on aesthetics from odors. As described in Impact A3, the reduction of water flow into the Salton Sea could increase odor emissions in proximity to the Salton Sea. This would occur if Alternative 2 were to decrease water quality in the Salton Sea to the point that it 1) contributed to the death of flora or fauna, or 2) increased the existing summertime algae bloom, which produces large amounts of sulfuric odors. Under the Baseline, the salinity of the Salton Sea will increase in future years to the point that it will kill most aquatic invertebrates and fish. As a result, odor emissions from animal die-offs will occur in future years. Nutrient levels within the Salton Sea will also continue to increase under the Baseline, which will perpetuate or enhance algae blooms and their associated odor emissions. While Alternative 2 could somewhat accelerate the future rate of animal die-offs or algae blooms, because there will be ongoing objectionable odor episodes at the Salton Sea under the Baseline, this effect would be insignificant. (Less than significant impact.)

3.11.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

IID WATER SERVICE AREA AND AAC

As described above for the Proposed Project, construction of on-farm and/or system-wide conservation facilities and/or fallowing for water conservation in the IID water service area and the AAC would be consistent with the existing visual character of the agricultural landscape. Additionally, as with the Proposed Project, the implementation of Alternative 3 would not require the installation of any lighting, therefore no impacts related to increased light and glare would occur. Therefore, no aesthetic impacts are anticipated in this subregion.

SALTON SEA

Impact A3-A-1: Impacts on aesthetics from a drop in the level of the Salton Sea. Implementation of Alternative 3 would result in lowering the elevation of the Salton Sea, thus reducing the overall water surface area and thereby exposing some areas of barren shoreline that are currently inundated. As described in Section 3.1, Hydrology and Water Resources, the surface elevation of the Salton Sea would not change as much as a result of implementation of Alternative 3 as it would as a result of implementing the Proposed Project. Implementation of Alternative 3 would result in a reduction of the surface elevation of the Salton Sea to –247 ft msl after 75 years, exposing an area of 61 square miles more than the Baseline. Though the visual impacts of Alternative 3 are less than those of the Proposed Project, they are still significant. (Significant impact.)

Mitigation Measure A3-A-1: The same mitigation measures as for the Proposed Project should be implemented to reduce the effects of Alternative 3 on views of the Salton Sea as seen from public recreation areas located along the east, west, and south shoreline.

After mitigation, the visual impacts due to reduction of the level of the Salton Sea and the associated shoreline exposure would be less than significant. (Less than significant impact with mitigation.)

Impact A3-A-2: Impacts on aesthetics from odors. As described in Impact A3, impacts on aesthetics from odors will be less than significant. (Less than significant impact.)

3.11.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA

Under Alternative 4, no construction would be required in the IID water service area. The addition of approximately 50,000 acres of fallowed lands to achieve 300 KAFY conservation is not anticipated to create a dramatic visual change in the character of the IID water service area subregion. Currently, approximately 18,000 acres per year are fallowed. Although the additional fallowed acreage under Alternative 4 would be three times the current amount, it would be distributed throughout the subregion and thus would not become an obvious feature in the landscape. Additionally, many farms currently go fallow for part of the year, therefore the landscape is currently constantly changing from areas which are cropped to fallow. No impacts to aesthetics are anticipated in the Imperial Valley. (No impact.)

SALTON SEA

Water Conservation and Transfer

Impact A4-A-1: Impacts on aesthetics from a drop in the level of the Salton Sea. Implementation of Alternative 4 would result in lowering the elevation of the Salton Sea, thus reducing the overall water surface area and thereby exposing some areas of barren shoreline that are currently inundated. Implementation of Alternative 4 would result in a reduction of the surface elevation of the Salton Sea to –241 ft msl after 75 years (compared to –235 ft msl for the Baseline), exposing an area of 25 square miles more than the Baseline. The impacts of Alternative 4 are not significant compared to the Baseline. (Less than significant impacts.)

Impact A4-A-2: Impacts to aesthetics from odors. Alternative 4 would conserve 300 KAFY of water per year; however, the volume of water ultimately draining to the Salton Sea would remain at levels similar to the Baseline. Therefore, subsequent impacts would continue at a level similar to those expected under the Baseline, and the impact would therefore be less than significant. (Less than significant impact.)

19478

Contents of 3.11

List of Tables

List of Figures

3.12 Public Services and Utilities

3.12.1 Introduction and Summary

This section describes the environmental setting with regard to public services and utilities that could be affected by the Proposed Project. Public services and utilities include the systems, facilities, and services that are provided by cities, counties, and public and private agencies to maintain the public health and general welfare. These systems, facilities, and services include:

- Fire and police protection
- Public education services and facilities
- Potable water supply, treatment, and distribution
- Wastewater collection, treatment, and disposal
- Power generation and distribution

This section presents the impacts to public services and utilities as a result of implementing the Proposed Project and/or alternatives, as well as associated mitigation measures, if necessary. Significant impacts are not anticipated. Potential less than significant impacts to public services and utilities would be anticipated to occur primarily in the LCR and IID water service area and AAC geographic subregions based on implementation of the Proposed Project, including the HCP. No impacts to public services and utilities are anticipated in the Salton Sea and SDCWA service area subregions. Table 3.12-1 lists the impacts to public services and utilities that could occur as a result of construction and operation of the Proposed Project and its alternatives.

TABLE 3.12-1
Summary of Public Services Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
PSU-1: Diversion of up to 300 KAFY at Parker Dam could impact power generation capacities at the dam. Less than significant impact.	Continuation of existing conditions.	**A2-PSU-1: Diversion of up to 130 KAFY at Parker Dam could impact power generation capacities at the dam.** Less than significant impact.	**A3-PSU-1: Diversion of up to 230 KAFY at Parker Dam could impact power generation capacities at the dam.** Less than significant impact.	**A4-PSU-1: Diversion of up to 300 KAFY of water at Parker Dam could impact power generation capacities at the dam.** Less than significant impact.

TABLE 3.12-1
Summary of Public Services Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
PSU-2: Diversion of up to 300 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam. Less than significant impact.	Continuation of existing conditions.	**A2-PSU-2: Diversion of up to 130 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam.** Less than significant impact.	**A3-PSU-2: Diversion of up to 230 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam.** Less than significant impact.	**A4-PSU-2: Diversion of up to 300 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam.** Less than significant impact.
IID WATER SERVICE AREA AND AAC				
PSU-3: Operation of components of the Proposed Project could result in an increased demand for utilities. Less than significant impact.	Continuation of existing conditions.	**A2-PSU-3: Construction of components of the Proposed Project could result in an increased demand for utilities.** Less than significant impact.		**A4-PSU-3: Fallowing would reduce the need for power.** Minimal beneficial impact.
PSU-4: Construction of components of the Proposed Project could result in an increased demand for utilities. Less than significant impact.	Continuation of existing conditions.		**A3-PSU-3: Construction of components of the Proposed Project could result in an increased demand for utilities.** Less than significant impact.	
PSU-5: Diversion of up to 300 KAFY of water at Parker Dam would reduce flow through the AAC by up to 300 KAFY and would subsequently result in a decrease in power generation along the AAC. Less than significant impact.	Continuation of existing conditions.	**A2-PSU-4: Diversion of up to 130 KAFY of water at Parker Dam would reduce flow through the AAC by up to 130 KAFY and would subsequently result in a decrease in power generation along the AAC.** Less than significant impact.	**A3-PSU-4: Diversion of up to 230 KAFY of water at Parker Dam would reduce flow through the AAC by up to 230 KAFY and would subsequently result in a decrease in power generation along the AAC.** Less than significant impact.	**A4-PSU-4: Diversion of up to 300 KAFY of water at Parker Dam would reduce flow through the AAC by up to 300 KAFY and would subsequently result in a decrease in power generation along the AAC.** Less than significant impact.

TABLE 3.12-1
Summary of Public Services Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
HCP-PSU-6: Construction of the HCP components could result in an increased demand for utilities. Less than significant impact.	Continuation of existing conditions.	**Same as HCP-PSU-6.**	**Same as HCP-PSU-6.**	**Same as HCP-PSU-6.**
HCP-PSU-7: Implementation of HCP components could result in an increase in demand for water during the HCP's operational phase. Less than significant impact.	Continuation of existing conditions.	**Same as HCP-PSU-7.**	**Same as HCP-PSU-7.**	**Same as HCP-PSU-7.**
HCP2-PSU-8: Construction of HCP components could result in an increased demand for utilities. Less than significant impact.	Continuation of existing conditions.	**Same as HCP2-PSU-8.**	**Same as HCP2-PSU-8.**	**Same as HCP2-PSU-8.**
SALTON SEA				
No impact.	Continuation of Baseline conditions.	No impact.	No impact.	No impact.
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.12.2 Regulatory Framework

3.12.2.1 Local Regulations and Standards

Public services and utilities are provided and maintained by various public and private agencies and districts. For example, the Imperial County Fire Department and Office of Emergency Services provide fire protection in unincorporated areas of Imperial County whereas IID, a community-owned utility, provides electric power and water.

Regulations that affect the provision and maintenance of public services and utilities are generally based on local policies and other regulations. The sources of regulations are varied and include the following:

- Policies contained in general plans (e.g., Land Use Element, Housing Element) or building codes of local jurisdictions
- Ordinances or resolutions that establish growth-management or growth-control standards

3.12.3 Environmental Setting

3.12.3.1 Lower Colorado River

POTABLE WATER SUPPLY, TREATMENT, AND DISTRIBUTION

Parker Dam. In recent years, MWD has been using an average of 1.2 MAFY of water from the Colorado River for potable water (SDCWA 1997). The water is diverted at Parker Dam and imported by MWD through the 242-mile CRA to the MWD service area in southern California for treatment and distribution (SDCWA 2000B). The average yearly flow over Parker Dam from 1985 to 1999 was approximately 8,657,153 AF [Reclamation 1999].

Imperial Dam. Water is diverted at Imperial Dam to both the AAC, which transports water to the IID water service area, and the Gila Canal, which serves the Yuma, Arizona area. The maximum diversion capacities of the AAC and the Gila Canal are 15,155 cfs and 2,200 cfs, respectively (IID 1998G). The average flow at Imperial Dam (1985 to 1999) was approximately 7,588,753 AFY.

WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

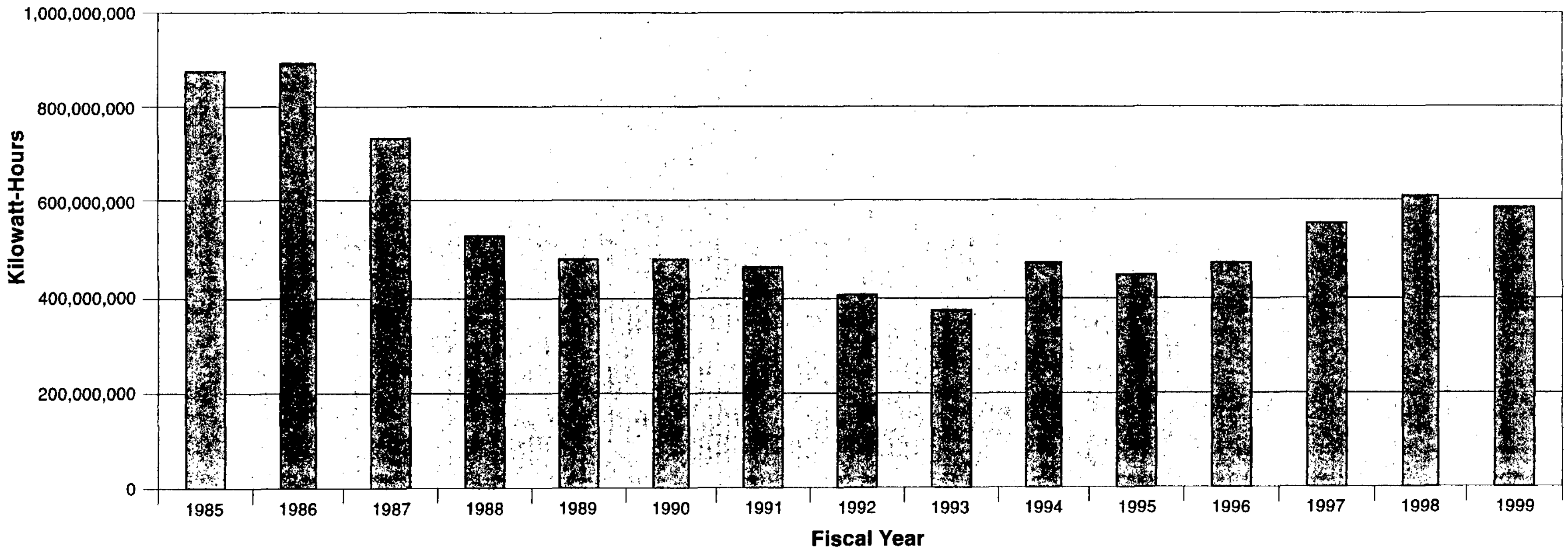
Sewer lines are typically owned and maintained by local jurisdictions, public works departments, and/or sanitation departments. Rural households not within the service area of a local sewage treatment facility typically dispose of raw sewage using individual septic tank and leach field systems.

POWER GENERATION AND DISTRIBUTION

Within the LCR subregion, hydroelectric power is generated on the LCR at Parker Dam and at Headgate Rock Dam (Headgate). Power generation at Hoover and Davis Dams is described and evaluated in the Draft IA EIS (Reclamation 2002).

Parker Dam. Parker Power Plant is a Reclamation-administered and remotely operated hydroelectric facility located approximately 155 miles downstream of Hoover Dam on the California-Arizona state line, 12 miles northeast of Parker, Arizona. The power plant has four generators and a 108 MW maximum operating capacity. The average gross generation of power at Parker Power Plant from 1985 to 1999 was 556,965,416 kilowatt-hours (kWh) (Reclamation 2000D). Figure 3.12-1 illustrates the annual rate of power generation at Parker Dam from 1985 through 1999.

Electric power generated at Parker Power Plant is shared between Reclamation and MWD. Because of MWD's role in the construction of Parker Dam and power plant, MWD has a perpetual contract right to 50 percent of the electric power generated at Parker Dam.



Source: Reclamation 2000.

Figure 3.12-1
Gross Power Generation at Parker Dam, Fiscal Years 1985-1999 (kWH)
IID Water Conservation and Transfer Project Draft EIR/EIS

Colorado River water is diverted into the CRA via the Whitsett Pumping Plant located along the western shore of Lake Havasu. MWD uses all of its contractual federal power to pump water from Lake Havasu through the Colorado River Aqueduct to its service area in southern California. MWD pays Reclamation 50 percent of operation, maintenance, and extraordinary maintenance costs for Parker Dam, plus 15 percent of operation and maintenance costs for Parker power plant administrative and general purposes (Reclamation 2002).

The highest priority use of Reclamation power produced at Parker Dam is given to Project Use Power (PUP) customers. PUP customers include federal projects, whether operated by the federal government or an operator under agreement with the federal government. The Western Area Power Administration (Western) is the federal agency authorized to market Reclamation's 50 percent share of power generation at Parker power generation facility that is surplus to the amount reserved for the PUP customers.

The second priority use group for Reclamation power holds firm electric service contracts; holders of these contractual and are called preference customers. Preference customers are entities (other than those operating federal projects) that use the power for non-profit purposes, such as municipalities, cooperatives, and irrigation districts. Some preference customers further distribute power received via firm electric service contracts to other entities. Both PUP and preference customers buy power "at cost" – that is, at rates that reflect the actual costs associated with the generation, transmission, and delivery of that power. This includes the cost for administering the contracts and operating, maintaining, and replacing the power plants and transmission facilities.

Under the existing firm electric service contracts, the amounts of power per month and per season are guaranteed. This means that, if the power is not available, Western would purchase the additional power required to fulfill the contracts. During the rate-setting process, Western estimates the cost for the previous year to purchase power that is under contract but anticipated not to be available when required. This is called the "purchase power cost." The purchase power cost is then figured into the rate base for firm electric service customers. If the actual purchase power cost for any given year is more or less than what was estimated, an adjustment is made in the following year's rate-setting process so that the cost of power to firm electric service contract customers continues to reflect an "at cost" rate.

Power generated by Parker Dam over and above what has been guaranteed to PUP and preference customers who hold firm electric service contracts is referred to as surplus energy. A portion of the surplus energy, referred to as excess energy, is offered to customers for purchase at an "at cost" rate or for "banking" of energy up to the limit of the contractor's contracted rate of delivery. Any remaining surplus energy may be sold at market rates to interested parties or may be "banked" for future use (Reclamation 2002).

Headgate Rock Dam. Headgate is owned and operated by BIA for the purpose of satisfying the power needs of Colorado River Indian Tribes (CRIT) and other Indian tribes. Headgate power plant, a run-of-the-river hydroplant (meaning power generation is dependent upon the flow of the river), has 3 generators and a 19.5-MW maximum operating capacity. During CY 1996 and CY 1997, the average net energy generated annually from Headgate powerplant was 87,165 MWh. CY 1996 and CY 1997 were the only years for which complete data were available for Headgate. Any surplus energy not sold to CRIT is currently being sold to the Fort Mojave Indian Tribe. There are no power contracts with nonIndian users for any portion of the power generated at Headgate. Headgate is unable to store water in excess of the amount that can flow through the generator turbines or through CRIT's diversion facilities. Any water that is not diverted by CRIT or passed through the turbines is spilled downstream (Reclamation 2002).

FIRE AND POLICE PROTECTION

Fire Protection. The Riverside County Fire Department, USDA, USFS, and California Department of Forestry and Fire provide fire protection for the wildlands on the west side of the LCR. The USDA, USFS, and various firefighting units in Yuma and La Paz Counties in Arizona provide fire protection on the east side of the LCR.

Police Protection. The California Highway Patrol and the Riverside County and Imperial County sheriffs' departments provide law enforcement on the west side of the LCR. Various city and county law enforcement agencies, including the Yuma County and La Paz County sheriffs' departments, provide law enforcement on the east side of the LCR.

PUBLIC EDUCATION SERVICES AND FACILITIES

The County of Imperial Department of Education and the Riverside County Department of Education serve the west side of the LCR. The Yuma County School Superintendent's Office and the La Paz County School Superintendent's Office serve the east side of the LCR.

3.12.3.2 IID Water Service Area and AAC

Public utilities and services are provided to the residents in the IID water service area by a variety of organizations. Water treatment, sewage treatment, and police and fire services are provided by each of the seven incorporated cities in the IID water service area (Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland). Other services are provided to residents by school districts, special districts, and private utility companies.

POTABLE WATER SUPPLY, TREATMENT, AND DISTRIBUTION

IID diverts and delivers approximately 3.1 MAFY of Colorado River water to nine cities and nearly 500,000 acres of agricultural land in the IID water service area. Each of these cities and unincorporated communities has its own facilities for treating and distributing water within its jurisdiction (IID 1998f).

As part of its operating system, IID maintains an extensive irrigation system and 10 reservoirs with total storage capacity of more than 3 KAFY (IID 1998e, 1998g). Water is conveyed from Imperial Dam on the LCR through the AAC to the IID water service area. Three primary main canals - East Highline, Central Main, and Westside Main - receive water from the AAC and convey water to lateral canals. Of the water that IID transports, 98 percent is used for agriculture. The remaining 2 percent of the water is delivered to nine cities that treat the water to safe drinking water standards and then sell it to their residents (IID 1998e) and to industrial users. The total volume of water delivered by IID from 1993 through 1997 is shown in Table 3.12-2.

TABLE 3.12-2
Historic Water Volumes (in AF) Delivered by IID

Category	1993	1994	1995	1996	1997
Agricultural	2,414,113 (98%)	2,674,282 (98%)	2,678,768 (98%)	2,821,987 (98%)	2,803,640 (98%)
Industrial	14,897 (1%)	17,152 (1%)	17,708 (1%)	18,130 (1%)	17,458 (1%)
Municipal	30,513 (1%)	31,439 (1%)	34,052 (1%)	34,267 (1%)	31,374 (1%)
Total	**2,459,523**	**2,722,873**	**2,730,528**	**2,874,384**	**2,852,472**

Source: SSA and Reclamation 2000

WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

The cities and incorporated communities of Heber, Niland, and Seeley each provide sewage treatment services. CRB RWQCB issues permits under the NPDES program for sewage treatment plants, which generally provide primary and secondary sewage treatment. Rural residences on existing lots and minor subdivisions with minimum lot sizes of 20,000 square feet (approximately 0.5 acre) per dwelling (lot size required for approval by the Imperial County Health Department) use septic tanks and leach line systems.

POWER GENERATION AND DISTRIBUTION

IID supplies electricity to more than 90,000 customers in Imperial County and parts of Riverside and San Diego Counties, including the Coachella Valley and Salton Sea areas. IID operates eight hydroelectric generation plants, one generating station, and eight gas turbines. For many years, the average consumption by residential customers has been the highest in the southwest, and about 30 percent higher than the national average. The all-time peak demand for energy reached 545.4 MW in June 1990 (IID 1998d). IID generates 352 MW of power; approximately 49 MW of it is hydroelectric (IID 1994).

As the need for electrical energy has increased, IID has expanded the resources available to it. IID is a one-third participant, with Southern California Edison (SCE) and Arizona Public Service Company, in a 75-MW steam plant. IID also purchased an interest in the Palo Verde-San Diego 500-kilovolt (kV) transmission facility, which allows IID access to less expensive imported energy. IID has an energy supply contract with El Paso Electric Company for 100 MW, to increase to 150 MW from 1992 to 2002 (IID 1998c). Table 3.12-3 provides information regarding the amount of energy delivered by IID from 1993 through 1998.

TABLE 3.12-3
Historic Electric Power Volumes in Megawatt-hours (MWh) Delivered by IID

Category	1993	1994	1995	1996	1997	1998
Residential	830,757	884,516	867,229	942,020	952,866	983,589
Commercial/Industrial	1,160,942	1,231,184	1,276,291	1,272,742	1,297,306	1,140,059
Other	144,261	154,823	157,593	167,684	162,161	230,210
Total	**2,135,960**	**2,270,523**	**2,301,113**	**2,382,446**	**2,412,333**	**2,353,858**

Source: SSA and Reclamation 2000; Sandoval 2000

Hydroelectric Power. IID operates power plants at Drops 1, 2, 3, 4, 5, and at the East Highline Canal turnout along the AAC (see Figure 3.12-2). The hydroelectric power plants generate power from the water flowing through them. Power generation fluctuates with canal water delivery. To maximize power production, the canal generally is operated with the highest water level possible (Reclamation and IID 1994). The average hydroelectric power generated by IID from 1985 to 1999 was approximately 226,592 kWh (approximately 227 MW) (IID 1998d).

Fossil Fuels. There are no known available fossil fuel reserves in the IID water service area. IID imports these fuels for use in power generation (IID 1994).

Geothermal Resources. Imperial County is a leader in the development of geothermal resources and has one of the largest geothermal resources in the world (IID 1994). Currently, Imperial County has 15 geothermal plants, seven of which are in the Salton Sea KGRA. The Salton Sea known geothermal resource area (KGRA) generally encompasses the southeastern part of the Salton Sea and land to the east, approximately to the communities of Niland and Calipatria. Additionally, geothermal exploration is being conducted in the nine KGRAs in Imperial County (SSA and Reclamation 2000). Most of the geothermal power generated in Imperial County is exported out of the county (IID 1994).

FIRE AND POLICE PROTECTION

Fire Protection. The Imperial County Fire Department provides firefighting capabilities in cooperation with the fire services in incorporated cities and volunteer units in unincorporated communities. The Imperial County Fire Department's main facility is located at the county airport in Imperial (IID 1994).

Police Protection. The Imperial County Sheriff's Department is responsible for law enforcement in the county. Substations are located in Salton City, Brawley, and Winterhaven; resident deputies serve the unincorporated areas of Niland, Bombay Beach, Ocotillo, and Palo Verde. The main patrol division patrols all other areas. Except for Calipatria, the other six unincorporated cities in the IID water service area maintain their own police departments (IID 1994).

PUBLIC EDUCATION SERVICES AND FACILITIES

Sixteen independent public school districts in Imperial County provide programs for elementary and secondary school children. Imperial County has three types of school districts - elementary, high school, and unified - that serve more than 32,000 students. The unified districts serve both elementary and high school grades (Imperial County Office of Education 1996-2000).

3.12.4 Impacts and Mitigation Measures

3.12.4.1 Significance Criteria

Implementation of the Proposed Project or alternatives would have a significant impact on Public Services and Utilities if the Proposed Project or alternatives:

- Result in substantial, adverse physical impacts associated with the provision of new or physically altered governmental facilities (the construction or operation of which could

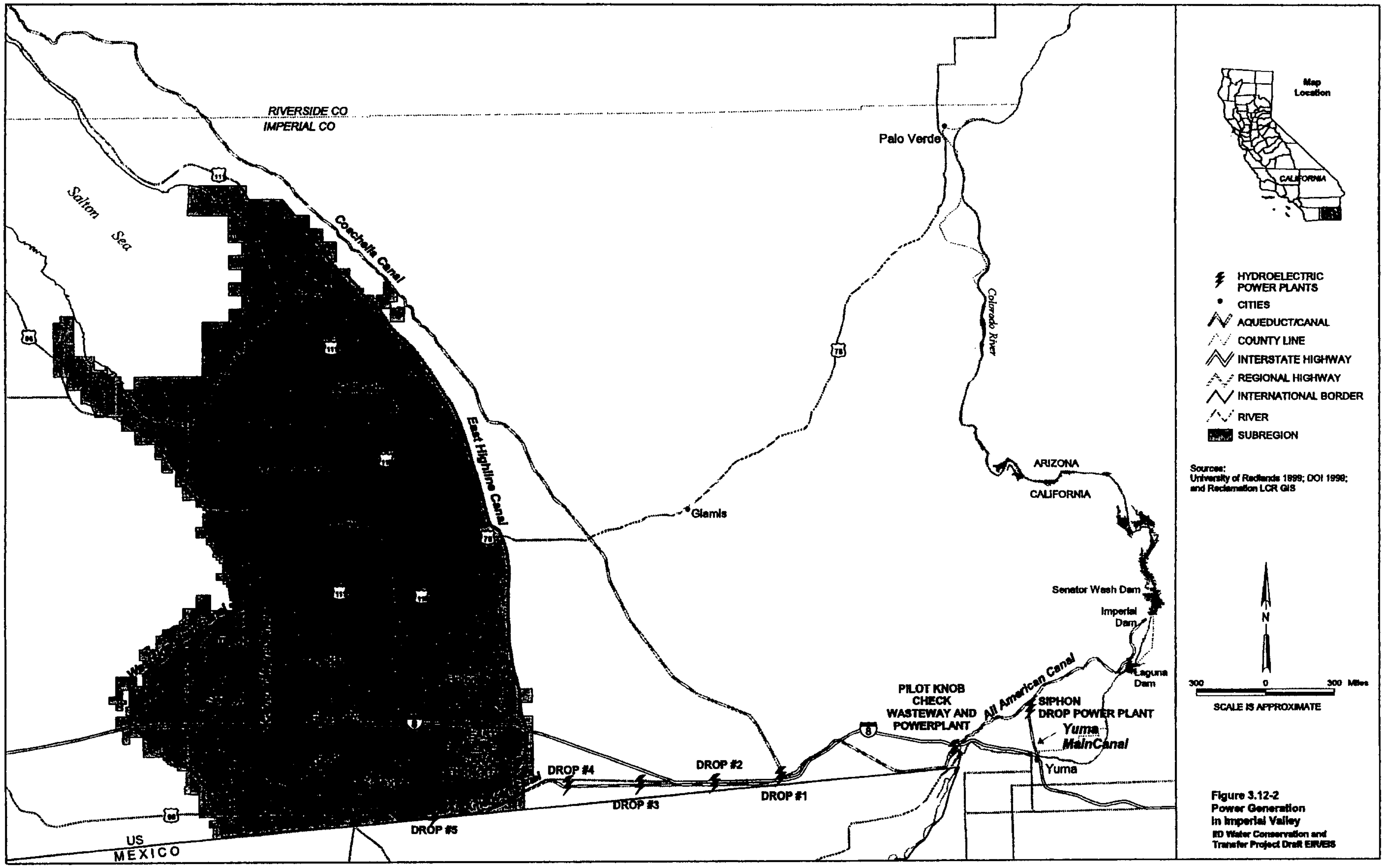


Figure 3.12-2
Power Generation in Imperial Valley
IID Water Conservation and Transfer Project Draft EIR/EIS

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cause significant environmental impacts) to maintain acceptable service ratios, response times, or other performance objectives for any public service, including

- Fire Protection
- Police Protection
- Schools
- Parks

- Required or resulted in the construction of new stormwater drainage facilities or expansion of existing facilities, which could cause significant environmental effects.
- Required or resulted in the construction of new electricity generation facilities or expansion of existing facilities, which could cause significant environmental effects.
- Had insufficient water supplies available to serve the Projected Project from existing entitlements and resources, or required new or expanded entitlements.
- Substantially reduced a hydroelectric facility's ability to produce power (by reducing the amount of flow through the respective dam's power plant).

3.12.4.2 Methodology

The impact analysis is based on projected increases in the demand for public services and utilities from the construction and operation of new facilities or from the improvement of existing facilities. Utility demands were determined based on the estimated needs of construction and operation activities (see Section 3.3.4.1, Transportation, Methodology). The potential effects of the Proposed Project and alternatives on public services and utilities were analyzed against existing conditions to determine changes to services dependent on power generation and distribution.

Public services and utilities related to potable water supply, treatment, and distribution; and wastewater collection, treatment, and disposal will not be impacted by the Proposed Project and alternatives because the water conservation and transfer would not result in the need for additional facilities, changes to distribution system components, or treatment of water delivered within any of the subregions. In addition, the Proposed Project and alternatives do not involve wastewater collection, treatment, or disposal or solid waste collection, disposal, or recycling. Therefore, these services and utilities will not be discussed in the impact analysis.

Projected increases in demand for public services, such as fire protection, police services, and schools, generally result from population increases. Section 5.2, Growth-Inducing Impacts, notes that the Proposed Project is intended to provide reliability for existing service needs only within the SDCWA service area. The Proposed Project itself would not induce population growth in any of the four geographic regions. Because population increases are not anticipated as a result of implementing the Proposed Project (see Section 5.2), fire protection, police services, parks and schools will not be affected by the Proposed Project and alternatives and are therefore not discussed in the impact analysis.

Subregions Excluded from Impact Analysis. No impacts to public services and utilities are expected in the Salton Sea geographic subregion. In addition, no impacts would occur in the SDCWA service area as a result of implementation of the Proposed Project. Delivery of water transferred via the CRA to existing facilities and distribution systems would not change the existing facilities and distribution system. As discussed in Section 5.2, no growth-inducing impacts will occur as a result of delivery of a portion of the conserved water to the SDCWA service area. Also, no construction of new facilities or changes in operation of existing facilities would occur that would result in impacts on public services and utilities.

3.12.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Impact PSU-1: Diversion of up to 300 KAFY at Parker Dam could impact power generation capacities at the dam. Under the Law of the River and under IA EIS project-specific legislation, power production has the lowest priority in Colorado River operations (Reclamation 2002). Reducing the flow over Parker Dam could result in impacts to power generation capacities at Parker Dam. Gross power generation at Parker Dam fluctuated by nearly 250 percent between 1985 and 1999, from a minimum of 374,402,616 kilowatt-hours (kWh) (in 1993) to a maximum of 891,950,000 kWh (in 1986) (Reclamation 2000). Average gross power generated at Parker Dam from 1985 to 1999 was approximately 556,965,416 kWh/yr (Reclamation 2000), and average flow volume over Parker Dam from 1985 to 1999 was 8,657,153 AFY (CRBC 2000b); therefore, average gross power generation during the period was approximately 64 kWh/AF.

Reducing the flow over Parker Dam by 300 KAFY could reduce average annual gross power generation by 19,200,000 kWh, which represents approximately 3.5 percent of the average annual gross power generated at Parker Dam. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation (3.5 percent vs. almost 250 percent), the impact to power generation from changing the diversion point for up to 300 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Impact PSU-2: Diversion of up to 300 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam. Under the Law of the River and under IA EIS project-specific legislation, power production has the lowest priority in terms of Colorado River operations (Reclamation 2002). Reducing the flow over Parker Dam could result in impacts to power generation capacities at Headgate Dam. The IA EIS describes the average percentage of lost energy due to the IA (changing the point of delivery of approximately 388 KAF) as 5.37 percent. Diversion of up to 300 KAF would result in proportionately less lost energy and therefore less impact on power generation losses. Significance criteria set for impacts to power generation indicate that impacts must be substantial. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation, the impact to power generation from changing the diversion point for up to 300 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Additional details regarding the impacts to hydroelectric power are addressed in the Draft IA EIS and are incorporated by reference (Reclamation 2002).

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

No change in the population in the IID water service area would be anticipated from construction or operation of the water conservation measures (see Section 5.2, Growth-inducing Impacts). Mostly local workers would participate in construction of any components of the Proposed Project (e.g., water delivery system improvements). Import of workers from other areas would be short term to meet peak demand for construction assistance. Once components were constructed, local farmers' or IID staff would operate most water conservation measures. Because mostly local workers would be used to construct and operate any water conservation measures, and because the import of workers would be temporary, the population would not increase; thus, the demand for public services and utilities would not increase. Therefore, no impact would occur on public services and utilities from the presence of the workforce.

None of the components of the Proposed Project would require additional water or wastewater services during operation; therefore, these services would not be impacted.

Impact PSU-3: Operation of components of the Proposed Project could result in an increased demand for utilities. On-farm irrigation management would not create a demand for electricity. The demand for electricity for the on-farm irrigation system improvements and water delivery system improvements would mainly result from operating sprinklers, pumps, and gates, and would be expected to be minimal. Therefore, there would be less than significant impacts to power generation and distribution would occur. (Less than significant impact.)

Impact PSU-4: Construction of components of the Proposed Project could result in an increased demand for utilities. The demand for short-term, construction-related water service is expected to be minimal because water would be used mainly for dust control. Wastewater services for the construction effort would be provided by portable facilities, and wastewater would be disposed of in accordance with all applicable rules and regulations. Electrical services for the construction effort would be provided by portable generators or by self-powered construction equipment; therefore, demand on existing electricity sources would be minimal. Excavation of reservoirs would create material that would be made available to construction projects requiring clean fill. In addition, topsoil would be reused for agricultural purposes. A minimal amount of other construction debris generated by the Proposed Project would be hauled offsite to a designated landfill. Implementing these practices during construction would mean that construction-related impacts to public utilities would be less than significant. (Less than significant impact.)

Impact PSU-5: Diversion of up to 300 KAFY of water at Parker Dam would reduce flow through the AAC by up to 300 KAFY and would subsequently result in a decrease in power generation along the AAC. The Proposed Project would divert up to 300 KAFY of water at Parker Dam and transfer it via the CRA to the SDCWA service area. Implementation of the transfer would reduce flow through the AAC by up to 300 KAFY and would result in a decreasing power generation at Drop No. 1, Drop No. 2, Drop No. 3, Drop No. 4, Drop No. 5, and East Highline Canal in the AAC. Reducing the flow along the AAC by 300 KAFY could reduce average annual power generation by 24,000 kWh, which represents approximately 10.5 percent of the average annual power generated in the AAC. The variation from average-annual power generation to minimum power generation within the past 15 years is greater than 97 percent of the average generation. Implementation of the Proposed Project would not cause average power production to be less than the minimum amount of recent power generation (i.e., during the past 15 years). Furthermore, most of the power that IID generates is derived from fossil fuels, and only the generation of hydropower is affected by flows in the AAC.

Because the reduction in power generation attributable to the diversion of water from the AAC represents less than 10 percent of the overall power generated by IID, the impact on power generation from the reduced flow in the AAC would be less than significant. (Less than significant impact.)

Inadvertent Overrun and Payback Policy (IOP)

Compliance with the IOP would not result in any impacts to public services or utilities in the IID water service area and AAC subregion.

Impacts resulting from compliance with the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Impact HCP-PSU-6: Construction of HCP components could result in an increased demand for utilities. The demand for short-term, construction-related water service is expected to be minimal as water would be used mainly for dust control. Wastewater services for the construction effort would be provided by portable facilities, and wastewater would be disposed of in accordance with all applicable rules and regulations. Electrical services for the construction effort would be provided by portable generators or by self-powered construction equipment; therefore, demand on existing electricity sources would be minimal. Excavation of planting areas or channels would create material that would be made available to construction projects requiring clean fill. In addition, topsoil would be reused for agricultural purposes. A minimal amount of other construction debris generated by implementation of the HCP would be hauled offsite to a designated landfill. Implementing these practices during construction would mean that construction-related impacts to public utilities would be less than significant. (Less than significant impact.)

Impact HCP-PSU-7: Implementation of HCP components could result in an increased demand for water during the HCP's operational phase. There would be demand for water to irrigate the newly created marsh and tree habitats. However, most of the lands to be used for the HCP are currently in active production, using approximately 6AF of water per acre. This water would become available for implementation of the HCP. (Less than significant impact).

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

The impacts on public services and utilities during construction of this approach would be similar to those described under Impact PSU-6 and would be less than significant. However, the water requirements and water sources for this HCP approach have not been determined; therefore, the potential impacts to water supply during operation cannot be identified. Once further details of this approach are developed, if impacts to public water supply are identified, they will be evaluated in subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-PSU-8 Construction and Operation of components of the Proposed Project could result in an increased demand for utilities. Impacts resulting from the implementation of HCP Approach 2 would depend on the type of conservation method employed. If on-farm irrigation system improvements or water delivery system improvements are used, then the potential impacts would be the same but of a lesser magnitude then those described above in Impacts PSU-3 and PSU-4. If fallowing is selected as the conservation method, no impacts to public services and utilities would occur. (Less than significant impact.)

Impacts resulting from the implementation of the HCP in the IID subregion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

3.12.4.4 Alternative 1: No Project

The demand for public services and utilities would remain the same as under current conditions if the Proposed Project were not implemented.

3.12.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

Impact A2-PSU-1: Diversion of up to 130 KAFY at Parker Dam could impact power generation capacities at the dam. Reducing the flow over Parker Dam by 130 KAFY could reduce average annual gross power generation by 8,320,000 kWh, which represents approximately 1.5 percent of the average annual gross power generated at Parker Dam. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation (1.5 percent vs. almost 250 percent), the impact to power generation from changing the diversion point for up to 130 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Impact A2-PSU-2: Diversion of up to 130 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam. Under the Law of the River and under IA EIS project-specific legislation, power production has the lowest priority in Colorado River operations (Reclamation 2002). Reducing the flow over Parker Dam could result in impacts to power generation capacities at Headgate Dam. The IA EIS describes the average percentage of lost energy due to the IA (changing the point of delivery of approximately 388 KAF) as 5.37 percent. Diversion of up to 130 KAF would result in proportionally less lost energy and therefore less impact to power generation losses. Significance criteria set for impacts to power generation indicate that impacts must be substantial. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation, the impact to power generation from changing the diversion point for up to 300 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Additional details regarding the impacts to hydroelectric power are addressed in the Draft IA EIS and are incorporated in this Draft EIR/EIS by reference (Reclamation 2002).

IID WATER SERVICE AREA AND AAC

Impact A2-PSU-3: Construction of components of the Proposed Project could result in an increased demand for utilities. The demand for short-term, construction-related utilities would be of the same type but of lesser magnitude than those discussed for the Proposed Project under PSU-3 above. Implementing the practices listed above during construction would mean that construction-related impacts to public utilities would be less than significant. (Less than significant impact.)

Impact A2-PSU-4: Diversion of up to 130 KAFY of water at Parker Dam would reduce flow through the AAC by up to 130 KAFY and would subsequently result in a decrease in power generation along the AAC. As discussed under PSU-4, diversion of the amount of conserved water at Parker Dam would reduce the volume of water flowing through the AAC by the same amount and would, therefore, result in a proportional reduction in power generation. If 130 KAFY were diverted, the reduction in hydroelectric power generated along the AAC would be approximately 4.6 percent (compared to the annual average of approximately 227 MW). Because most of the power generated by IID is derived from fossil fuels, this reduction in hydroelectric power generation would be considered a less than significant impact. (Less than significant impact.)

3.12.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

Water Conservation and Transfer

Impact A3-PSU-1: Diversion of up to 230 KAFY at Parker Dam could impact power generation capacities at the dam. Reducing the flow over Parker Dam by 230 KAFY could reduce average annual gross power generation by 8,320,000 kWh, which represents approximately 2.6 percent of the average annual gross power generated at Parker Dam. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation (2.6 percent vs. almost 250 percent), the impact to power generation from changing the diversion point for up to 230 KAFY would fall within the operation range, and would, therefore, be less than significant. (Less than significant impact.)

Impact A3-PSU-2: Diversion of up to 230 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam. Under the Law of the River and under IA EIS project-specific legislation, power production has the lowest priority in Colorado River operations (Reclamation 2002). Reducing the flow over Parker Dam could result in impacts to power generation capacities at Headgate Dam. The IA EIS describes the average percentage of lost energy due to the IA (changing the point of delivery of approximately 388 KAF) as 5.37 percent. Diversion of up to 230 KAF, would result in less lost energy and therefore less impact to power generation losses. Significance criteria set for impacts to power generation indicate that impacts must be substantial. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation, the impact to power generation from changing the diversion point for up to 300 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Additional details regarding the impacts to hydroelectric power are addressed in the IA EIS (Reclamation 2002) and are incorporated by reference.

IID WATER SERVICE AREA AND AAC

Impact A3-PSU-3: Construction of components of the Proposed Project could result in an increased demand for utilities. The demand for short-term, construction-related utilities would be of the same type but of lesser magnitude as discussed for the Proposed Project under PSU-3 above. Implementing the practices listed above during construction would mean that construction-related impacts to public utilities would be less than significant. (Less than significant impact.)

Impact A3-PSU-4: Diversion of up to 230 KAFY of water at Parker Dam would reduce flow through the AAC by up to 230 KAFY and would subsequently result in a decrease in power generation along the AAC. As discussed under PSU-4, diversion of the amount of conserved water at Parker Dam would reduce the volume of water flowing through the AAC by the same amount, and would, therefore, result in a proportional reduction in power generation. If 230 KAFY were diverted, the reduction in hydroelectric power generated along the AAC would be approximately 8.0 percent (compared to the annual average of approximately 227 MW). Because most of the power generated by IID is derived from fossil fuels, this reduction in hydroelectric power generation would be considered a less than significant impact. (Less than significant impact.)

3.12.4.7 Alternative 4 (A4): Water Conservation and Transfer of up to 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

The demand for public services and utilities would not be impacted by implementation of fallowing for water conservation. Letting land lie fallow would not affect the need for fire or police protection, school, or parks. However, it would reduce the demand for water, so conserved water could be transferred to the SDCWA service area. The demand for wastewater treatment and/or solid waste disposal facilities would not change. The only potential impact would occur in the IID subregion.

LOWER COLORADO RIVER

<u>**Water Conservation and Transfer**</u>

Impact A4-PSU-1: Diversion of up to 300 KAFY of water at Parker Dam could impact power generation capacities at the dam. Under the Law of the River and under IA EIS project-specific legislation, power production has the lowest priority in Colorado River operations (Reclamation 2002). Reducing the flow over Parker Dam could result in impacts to power generation capacities at Parker Dam. Gross power generation at Parker Dam fluctuated by almost 250 percent between 1985 and 1999, from a minimum of 374,402,616 kilowatt-hours (kWh) (in 1993) to a maximum of 891,950,000 kWh (in 1986) (Reclamation 2000). Average gross power generated at Parker Dam from 1985 to 1999 was approximately 556,965,416 kWh/yr (Reclamation 2000), and average flow volume over Parker Dam from 1985 to 1999 was 8,657,153 AFY (CRB CA 2000); therefore, average gross power generation during the period was is approximately 64 kWh/AF.

Reducing the flow over Parker Dam by 300 KAFY could reduce average annual gross power generation by 19,200,000 kWh, which represents approximately 3.5 percent of the average annual gross power generated at Parker Dam. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation (3.5 percent vs. almost 250 percent), the impact to power generation from changing the diversion point for up to 300 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Impact A4-PSU-2: Diversion of up to 300 KAFY at Parker Dam could impact power generation capacities at the Headgate Rock Dam. Under the Law of the River and under IA EIS project-specific legislation, power production has the lowest priority in Colorado River operations (Reclamation 2002). Reducing the flow over Parker Dam could result in impacts to power generation capacities at Headgate Dam. The IA EIS describes the average percentage of lost energy due to the IA (changing the point of delivery of approximately 388 KAF) as 5.37 percent. Diversion of up to 300 KAF would result in proportionately less lost energy and therefore less impact to power generation losses. Significance criteria set for impacts to power generation indicate that impacts must be substantial. Because the diversion of water as a result of the Proposed Project would be much smaller than the fluctuation in the gross generation, the impact to power generation from changing the diversion point for up to 300 KAFY would fall within the operation range and would, therefore, be less than significant. (Less than significant impact.)

Additional details regarding the impacts to hydroelectric power are addressed in the IA EIS and are incorporated by reference (Reclamation 2002).

IID WATER SERVICE AREA AND AAC

Impact A4-PSU-3: Fallowing would reduce the need for power. The demand for power would be slightly reduced as the need for pumping water and powered farm equipment would be reduced. This would constitute a minimal beneficial impact. (Minimal beneficial impact.)

Impact A4-PSU-4: Diversion of up to 300 KAFY of water at Parker Dam would reduce flow through the AAC by up to 300 KAFY and would subsequently result in a decrease in power generation along the AAC. See impact PSU-5. (Less than significant impact.)

3.13 Transportation

3.13.1 Introduction and Summary

This section presents the impacts to transportation and traffic as a result of implementing the Proposed Project and alternatives. All construction and operation/maintenance activities associated with water conservation under the Proposed Project and alternatives would be consistent with existing agricultural activities in the IID water service area and would not affect roadway levels of service (LOS). The various components of the Proposed Project in the LCR and SDCWA service area subregions would not require construction or the use of considerable numbers of vehicles or amounts of equipment that could impact transportation and traffic in these areas. Table 3.13-1 summarizes the impacts of the Proposed Project and alternatives on transportation and traffic.

3.13.2 Regulatory Framework

The US Department of Transportation (DOT) (DOT Order 5610.1C) and Federal Highway Administration (FHWA) (23 CFR 771 and FHWA Technical Advisory T6640.8A) provide guidance and procedures for federal highway projects. State transportation departments, such as Caltrans, provide state standards and regulations for transportation and traffic.

Regional transportation plans prepared by SCAG, SANDAG, and circulation elements of general plans prepared by the California counties of San Diego, Riverside, and Imperial, address local standards for transportation and traffic, including congestion management thresholds for intersections.

3.13.3 Existing Setting

3.13.3.1 Lower Colorado River

The major transportation route along the LCR between Parker and Imperial Dams is SR 95, which is parallel to the California side of the Colorado River, from the Vidal Junction south to Blythe. Additional east-west transportation routes, such as I-10 and SR 78, provide access to the Colorado River from locations as far west as the Pacific Ocean. SR 78 travels east from Carlsbad at the coast and through the IID water service area before bending northeast and traveling parallel to the Colorado River from the Cibola NWR to Palo Verde. SR 78 ends at its interchange with I-10. SR 62, another east-west transportation route, travels from as far west as the Palm Springs area after branching to the northeast from I-10. SR 62 crosses the Colorado River at the City of Earp. The BNSF Railroad operates a rail line that crosses the Colorado River at the City of Earp. Figure 3.13-1 illustrates the primary transportation network along the LCR.

3.13.3.2 IID Water Service Area and AAC

Caltrans, regional agencies such as SCAG, Imperial County, and the federal government plan, construct, and maintain regional highway transportation systems serving the IID water service area. Transportation planning for roadways other than regional highways is provided in the circulation elements of the Imperial County General Plan (County of Imperial 1997c).

TABLE 3.13-1
Summary of Transportation Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impacts.	Continuation of existing conditions.	No impacts.	No impacts.	No impact.
IID WATER SERVICE AREA AND AAC				
T-1: Traffic from construction of on-farm irrigation and water delivery system improvements: Less than significant impact.	Continuation of existing conditions.	**A2-T-1: Traffic from construction of on-farm and water delivery system improvements:** Less than significant impact.	**A3-T-1: Traffic from construction of on-farm irrigation and water delivery system improvements:** Less than significant impact.	No impact.
T-2: Traffic from operation of on-farm irrigation and water delivery system improvements: Less than significant impact.	Continuation of existing conditions.	**A2-T-2: Traffic from operation on-farm irrigation system improvements:** Less than significant impact.	**A3-T-2: Traffic from operation on-farm irrigation and water delivery system improvements:** Less than significant impact.	No impact.
HCP-T-3: Traffic from construction of habitat and channels connecting the drains with the Salton Sea: Less than significant impact.	Continuation of existing conditions.	**Same as HCP-T-3.**	**Same as HCP-T-3.**	**Same as HCP-T-3.**
SALTON SEA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

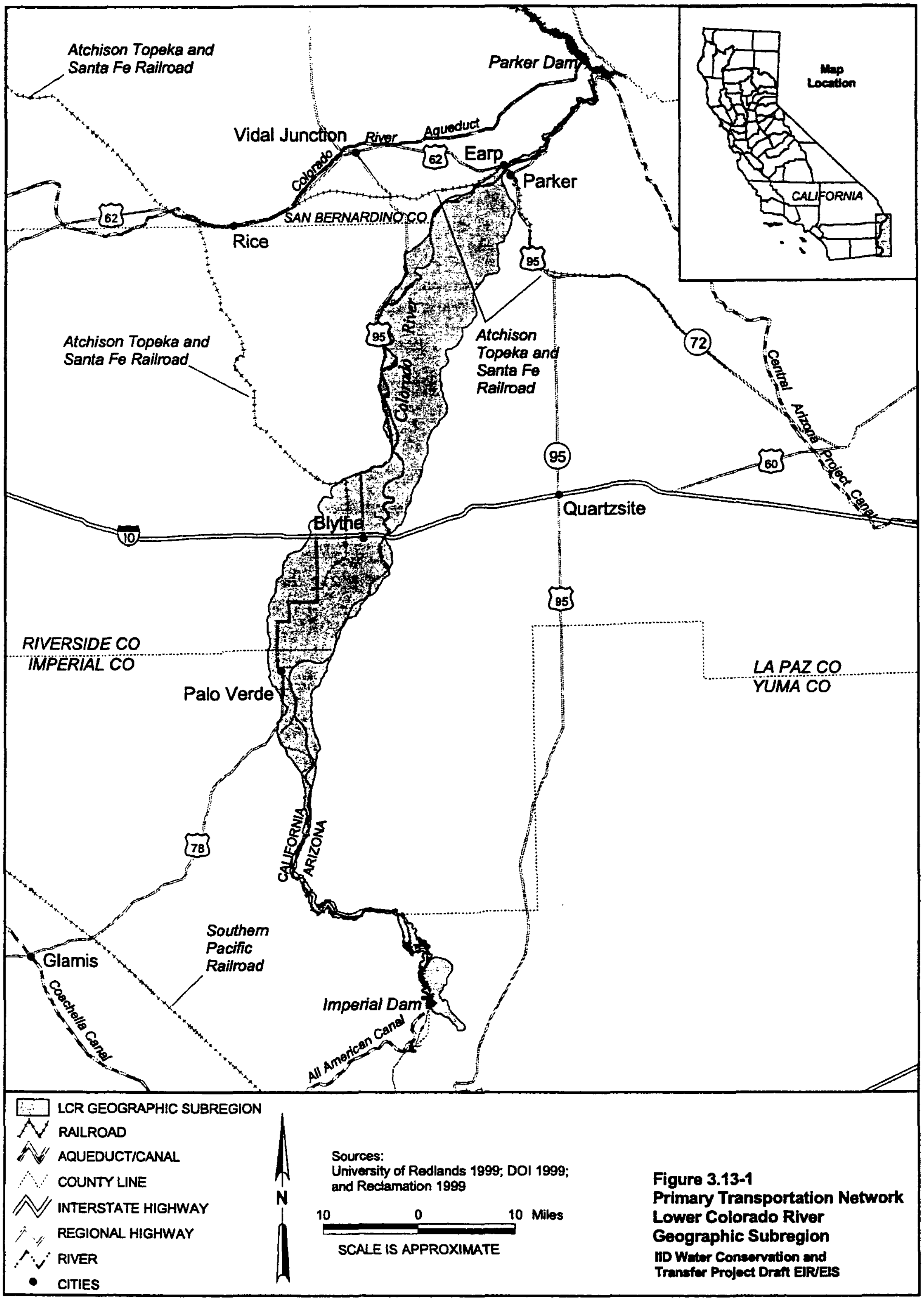

Figure 3.13-1
Primary Transportation Network
Lower Colorado River
Geographic Subregion
IID Water Conservation and Transfer Project Draft EIR/EIS

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Roadway operating conditions are determined by Caltrans, SCAG, and Riverside and Imperial Counties and are generally expressed in terms of LOS. LOS is a qualitative measure describing operational conditions for traffic flow. These conditions account for speed, travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. A description of operating conditions that determine LOS is provided in Table 3.13-2.

TABLE 3.13-2
Road Transportation Level of Service (LOS) Definitions

LOS	Description
A	Free flow, with user unaffected by the presence of other users on the roadway.
B	Stable flow, but presence of other users in traffic stream becomes noticeable.
C	Stable flow, but operation of users becomes affected by others in the traffic stream.
D	High-density but stable flow, speed and freedom of movement are severely restricted, poor level of comfort and convenience.
E	High-density with traffic demand usually at capacity, resulting in very long traffic delays.
F	Forced or breakdown flow with traffic demand exceeding capacity, unstable stop-and-go traffic.

The transportation network within the IID water service area consists of interstates, highways, state routes, and rural county highways that provide access through sparsely populated desert. In addition, the SPRR operates a main line connecting the west coast rail system with operations in southern and midwestern states (BLM and County of Imperial 1995). Figure 3.13-2 illustrates the primary transportation network in the IID water service area. I-8 provides the primary east-west transportation route from Yuma, Arizona on the Colorado River through the Imperial Valley to San Diego (Reclamation and IID 1994). SR 78, a second east-west transportation route, commences at Blythe in Riverside County and runs through the populated portions of the IID water service area and San Diego, terminating at I-5 in San Diego. Most of SR 78 is a two-lane highway.

Primary north-south routes include SR 86, SR 111, and SR 115. These state routes are primarily two-lane roads that provide access between I-8 and SR 78 in the Brawley, El Centro, and Holtville portions of the IID water service area (BLM and County of Imperial 1995). SR 111 begins at the Mexican border in Calexico and extends north to Brawley, Calipatria, and Niland. SR 115 connects Calipatria and Holtville (north-south). SR 98 extends in an east-west direction parallel to the International Boundary (Reclamation and IID 1994). I-8 traffic volumes are well under capacity.

The current LOS for most of SR 111 ranges from A to C (County of Imperial 1997). However, slow-moving farm equipment, recreational vehicles (RVs), and a lack of passing lanes contribute to traffic congestion on SR 111 near its intersection with I-8. Caltrans is planning to upgrade SR 111 to a four-lane expressway from Ross Road (north of I-8) to SR 78 to relieve congestion in this area. This transportation improvement project is scheduled for completion in 2002 (SSA and Reclamation 2000).

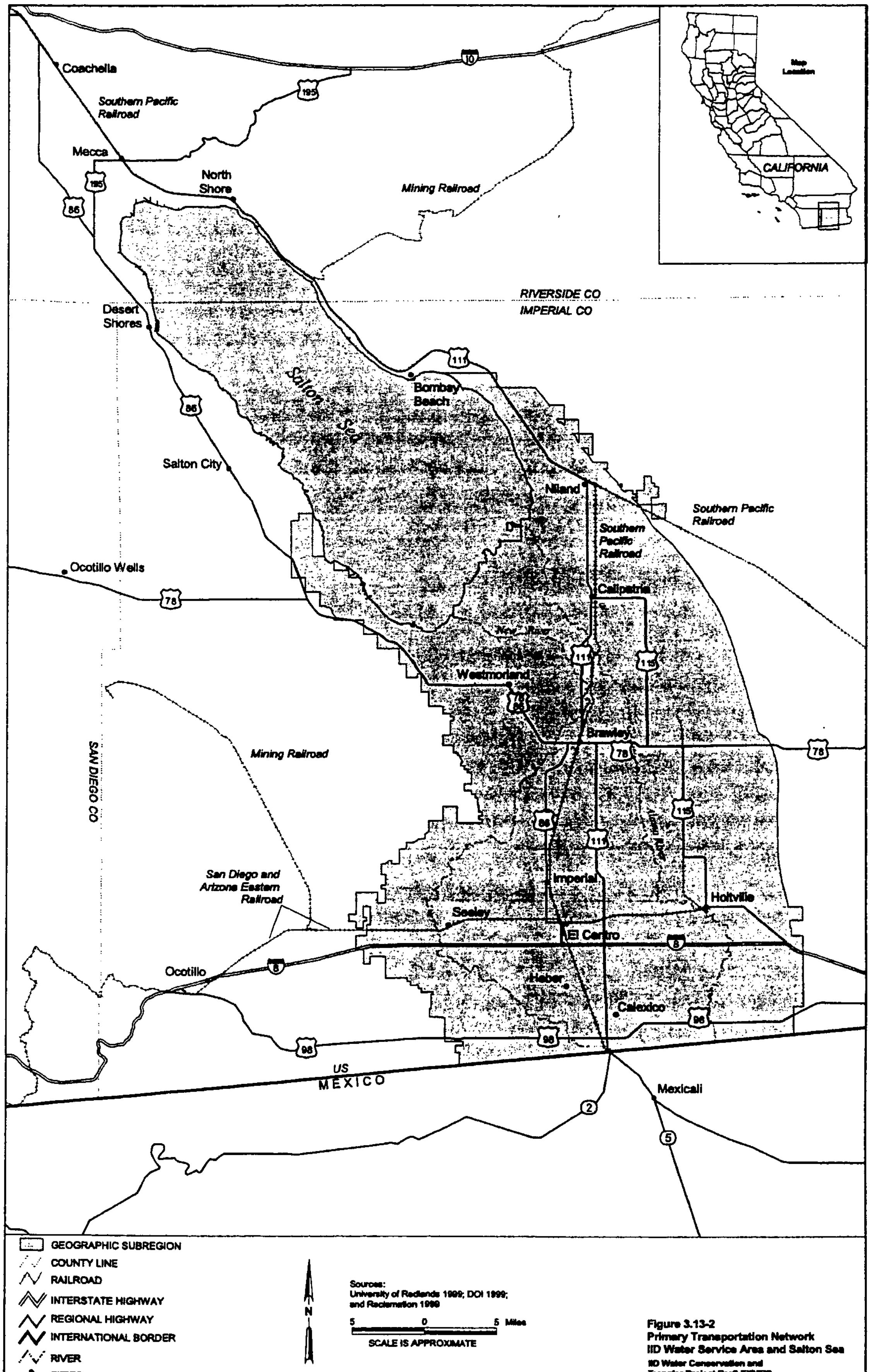

Figure 3.13-2
Primary Transportation Network
IID Water Service Area and Salton Sea
IID Water Conservation and Transfer Project Draft EIR/EIS

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The existing LOS on SR 78 is B (County of Imperial 1997d). Caltrans is planning a four-lane expressway bypass to relieve congestion along SR 78 near Brawley. The bypass would extend from 1.5 miles south of the eastern junction of SR 78 and SR 111 to SR 86 north of Brawley (County of Imperial 1997d). The current LOS along SR 86 ranges from A to C, depending on the segment location.

The SPRR main line enters the IID water service area from Yuma, Arizona. The line extends northwest toward Indio before turning west toward Los Angeles. Branch lines and spurs off the main line serve other IID water service area communities. One branch line, the Holten Interurban Railroad, provides service from Holtville to El Centro (Reclamation and IID 1994). In addition to the SPRR main line, a regional airport located in Imperial serves the area.

Unpaved service roads along irrigation canals within the IID water service area are used for maintenance, recreational travel, and surveillance by the border patrol. Additional jeep trails and dirt roads are occasionally used for OHV recreation activities (Reclamation and IID 1994). In general, IID water service area roads and farm access roads are used daily by vehicles associated with normal farming activities.

3.13.4 Impacts and Mitigation Measures

3.13.4.1 Methodology

The analysis of impacts to traffic and transportation focuses on the vehicle and equipment traffic required during the construction and operation of water conservation measures for transfer, IOP compliance and implementation of HCP measures. The region of influence for the transportation and traffic analysis includes major highways and roads in San Diego, Riverside, and Imperial Counties of California, with emphasis on the LCR, Imperial Valley, Salton Sea, and SDCWA service area. However, because construction and operation of conservation measures could only occur in the IID water service area, evaluation of potential impacts is focused on that area.

The transportation/traffic analysis is qualitative because the anticipated construction activities would be consistent with existing conditions and activities in the Imperial Valley. Construction would be expected to occur in increments until sufficient conservation measures have been constructed to conserve 300 KAFY. In general, measures would be constructed each year to conserve an additional 20 to 25 KAFY. It is assumed that, during the life of the project, any combination of conservation measures could be constructed in increments of 20 to 25 KAFY until the maximum level of conservation, 300 KAFY is reached. Additional conservation measures may be constructed to conserve water for the IOP and HCP Approach 2. If fallowing is selected for all or a portion of the conservation, no or less construction would be required. The transfer project would continue until year 2077. To evaluate the maximum potential impact to transportation, the assumption was made that the most construction-intensive conservation measure using the greatest number of vehicles would be used to generate 109 KAFY (25 KAFY for transfer plus 25 KAFY for HCP Approach 2+ 59 KAFY for IOP compliance). Drip irrigation, which requires 89 days of construction time and 13 pieces of equipment per 80-acre farm (average size), would be the most construction-intensive of the conservation measures included in the Proposed Project.

The assumption that 109 KAFY of conservation measures would be constructed is conservative.

Using drip irrigation, each 80-acre farm would yield a conservation of 53.25 AFY (assumes 0.71 AF/acre and 75 of 80 acres are irrigated). Therefore, about 2,046 80-acre farms would be required to generate 109 KAFY of conserved water. Table 3.13-3 shows the calculation used to determine that the predicted number of vehicles in a 10-square-mile area of the IID water service area during construction of conservation measures would be 16.

TABLE 3.13-3
Predicted Maximum Daily Traffic Trips During Construction of Conservation Measures[1]

Project Component	Number of Pieces of Equipment Required	Construction Days Required for each system	Number of Construction Periods/year	Number of Drip Systems to be constructed per year	Number of Facilities constructed at once	Pieces of Equipment in IID per day	Trips per day in 10 square miles
25 KAFY Conservation for Transfer	13	89	4	470	120	1,560	16
25 KAFY for implementation of HCP Approach 2	13	89	4	470	120	1,560	16
59 KAFY for compliance with the IOP	13	89	4	1,107	277	3,601	36
Totals	13	89	4	2,047	517	6,721	68

[1] All calculations assume that drip irrigation would be used. Drip irrigation is the conservation measure that would require the greatest amount of equipment for the longest construction period, and, therefore, represents the worst-case scenario for generating traffic during construction of conservation measures.

The following additional assumptions were applied to the equipment/traffic calculations shown in Table 3.13-3:

- Construction work required for each conservation measure would be evenly distributed throughout the year because of limitations on equipment and operator resources.
- A 350-day year would be assumed, accounting for holiday time off.
- It is unlikely that all equipment would be removed from the construction sites daily, so half of the required equipment (6.5 pieces) is assumed to be stored in a staging area near the construction site.
- Half of the required construction equipment (6.5 pieces) would travel to and from the construction site—once each day two trips per day per piece of equipment.

Subregions Excluded from Impact Analysis. No construction or operation activities resulting in traffic impacts would occur in the SDCWA or Salton Sea subregion; therefore, those subregions are not included in the impact discussions below.

3.13.4.2 Significance Criteria

The Proposed Project and/or alternatives would have a significant impact if they:

- Cause a substantial increase in traffic in relation to the existing load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or the amount of congestion at intersections).
- Cause an exceedance, either individually or cumulatively, of a LOS standard established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks.
- Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Result in inadequate parking capacity.
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

3.13.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

No construction or operation would occur with changing the point of diversion on the LCR from Imperial to Parker Dam. Therefore, no construction or operation-related transportation impacts would occur.

Biological Conservation Measures in USFWS' Biological Opinion

Construction of the biological conservation measures would likely require some equipment trips. However, the number of trips required is anticipated to be small and less than significant. As additional details on the biological conservation measures are developed and potential traffic impacts are identified, they will be addressed in subsequent environmental documentation, as necessary. Operation of the biological conservation measures would not result in any transportation impacts.

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact T-1: Traffic from construction of irrigation and water delivery system improvements. If conservation measures requiring construction were selected, limited construction traffic would be generated as a result of constructing on-farm or delivery system improvements for transfer, the IOP and HCP Approach 1. The impact on traffic as a result of the presence of construction equipment on public roads would be similar to existing agricultural practices in the Imperial Valley (over an area of approximately 1,000 square miles). Improvements would be implemented gradually, and construction would be conducted over a period of time; thus, the improvements would not result in intensive construction activities and associated traffic. Construction of these improvements would be temporary.

Equipment traffic required would primarily use county roads, farm access roads, and existing service roads. The anticipated construction-related traffic would be expected to be minimal: 68 trips per day for 10 square miles under the worst-case scenario as described in the Methodology section and shown in Table 3.13-1. The small increase in construction-related traffic on arterials and highways, which provide access to and from the farms, would not be expected to impact transportation or circulation because roadways are currently used for transport resulting from ongoing agricultural activities, and use of these roadways during construction would not differ greatly from existing conditions resulting from agricultural practices.

Roadways that provide direct regional access to the IID water service area would not be affected because the roadway capacities would be substantial enough to accommodate these increases without a change in LOS. Impacts to transportation and traffic would be expected to be less than significant during construction because the construction-related traffic would be short-term and temporary. This traffic would not differ substantially in its impact from current agricultural vehicle traffic, and the density of the equipment distributed throughout the IID water service area would be low. Implementation of fallowing would not require construction. (Less than significant impact.)

Impact T-2: Traffic from operation of irrigation and water delivery system improvements. Maintenance requirements for conservation facilities would be expected to be minimal. Maintenance would be conducted regularly by participating farmers and in conjunction with normal farm activities, including the removal of sediment from TRS, reservoirs, and cascading tailwater head ditches (frequency would depend on soil and crop type). Leveling and smoothing of fields is usually conducted every 1 to 2 years, and laser leveling is typically performed every 5 years.

Maintenance of water delivery system improvements would occur according to existing IID maintenance schedules. Scheduled maintenance would include activities such as vegetation and sediment removal from laterals and irrigation channels and from above subsurface seepage collection lines, replacement or repair of concrete panels, and service to sump pumps and motors. Additional, unscheduled maintenance would be conducted on an as-needed basis, for example, repairs to canal and reservoir embankment slippage, settlement, or erosion damage; pump/motor repair; and/or repairs required as a result of vandalism (replacement of power meters, float control assemblies, etc.).

Although maintenance of conservation facilities would occur over the long term (up to 75 years), maintenance activities would be conducted during short periods of time using on-site equipment and would not require use of roadways that provide direct regional access to the IID water service area. Implementation of fallowing would likely reduce regional traffic. Therefore, impacts would be less than significant. (Less than significant impact.)

Inadvertent Overrun and Payback Policy (IOP)

Traffic impacts associated with conservation required for compliance with the IOP are included in Impact T-1.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3 and 4, therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Traffic to conduct surveys would consist of regular passenger cars, four-wheel drives, and pickup trucks. Surveys would involve an estimated fewer than 10 staff and would, therefore, not generate any noticeable increase in traffic. This would result in virtually no impact.

Impact HCP-T-3: Traffic from construction of habitat and channels connecting the drains with the Salton Sea. Similar to Impact T-1, limited construction traffic would be generated from constructing marsh and/or native tree habitat, and from connecting the channels for Salton Sea drains to mitigate for impacts on pupfish (see Section 3.2, Biological Resources). The impact on traffic as a result of the presence of construction equipment on public roads would be similar to that of existing agricultural practices in the Imperial Valley (over an area of approximately 1,000 square miles). Implementation of the HCP would be gradual, and construction would be conducted over a period of time, so these activities would not result in intensive construction activities and associated traffic.

As discussed under Impact T-1, required equipment traffic would primarily use county roads, farm access roads, and existing service roads, causing a small increase in construction-related traffic on arterials and highways. HCP-related construction would be short-term and temporary. Impacts to transportation and traffic would be expected to be less than significant during construction because the construction-related traffic would be short-term and temporary. This traffic would not differ substantially in its impact from current agricultural vehicle traffic, and the density of the equipment distributed throughout the IID water service area would be low. (Less than significant impact.)

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

The anticipated equipment requirements for this Approach have not been developed. However, it is expected that they would be similar to the equipment requirements the IID water service area portion of the HCP and would result in a significant impact. As additional details of this approach are developed and if potential traffic impacts are identified, they will be evaluated in subsequent environmental analysis.

<u>HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation</u>

The traffic impacts associated with implementation of this approach are included in Impact T-1.

Impacts resulting from implementation of the HCP would be the same for Alternatives 2, 3 and 4; therefore, they are not discussed under each alternative.

3.13.4.4 Alternative 1: No Project

Implementation of the No Project alternative would maintain existing conditions with regard to transportation in the LCR, IID water service area, and the Salton Sea subregions.

3.13.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA

IID WATER SERVICE AREA AND AAC

<u>Water Conservation and Transfer</u>

Impact A2-T-1: Traffic from construction of on-farm irrigation and water delivery system improvements. Impacts to transportation resulting from implementation of Alternative 2 would be the same as described above under Impact T-1 for the Proposed Project. However, the impacts would have a shorter duration because a total of only 130 KAFY would be conserved at a rate of 20 KAFY per year. (Less than significant impact.)

Impact A2-T-2: Traffic from operation of on-farm irrigation system improvements. Impacts to transportation resulting from implementation of Alternative 2 would be the same as described above under Impact T-2 for the Proposed Project. However, the impacts would have a shorter duration, because a total of only 130 KAFY would be conserved. (Less than significant impact.)

3.13.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

IID WATER SERVICE AREA AND AAC

Impact A3-T-1: Traffic from construction of on-farm irrigation and water delivery system improvements. Impacts to transportation resulting from implementation of Alternative 3 would be the same as described above under Impact T-1 for the Proposed Project. However, the impacts would be smaller scale because a total of only 230 KAFY would be conserved. Fallowing would not require any construction, so implementation of fallowing would have no impact on traffic. (Less than significant impact.)

Impact A3-T-2: Traffic from operation of on-farm irrigation and water delivery system improvements. Impacts on transportation resulting from implementation of Alternative 3 would be the same as described above under Impact T-2 for the Proposed Project. However, the impacts would be smaller because a total of only 230 KAFY would be conserved. O&M of fallowing would result in minimal traffic impacts because fallowing would cause even less traffic than normal agricultural activity (see Section 3.13.4.7, Alternative 4, below). Therefore, impacts to transportation and traffic are anticipated to be less than significant during operation of Alternative 3. (Less than significant impact.)

3.13.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Under Alternative 4, fallowing would be employed in the IID water service area to conserve water and for mitigation. O&M activities associated with fallowing, such as revegetating land to prevent the exposure of topsoil to the atmosphere, would be considered a continuation of existing practices within the IID water service area and would not contribute to an increase in operation/maintenance equipment traffic. Alternative 4 would not require construction; therefore, no impacts to transportation or traffic is anticipated.

3.14 Socioeconomics

3.14.1 Introduction and Summary

This section describes the environmental setting and potential impacts from the Proposed Project and alternatives to socioeconomics in three geographic subregions: LCR, IID water service area and AAC, and Salton Sea. There are no socioeconomic impacts from the Proposed Project or its alternatives in the SDCWA service area geographic subregion. With the Proposed Project and the alternatives, SDCWA would receive the same amount of water from IID that it purchased previously from MWD. The objective for SDCWA is to increase the reliability of water supply for its service area. No new infrastructure would be needed for the water transfer because the transfer would be through existing infrastructure in an exchange with MWD. No new storage or distribution systems would be needed in SDCWA's service area. Water supply is not being increased (Reclamation 2002). Therefore, the SDCWA service area geographic subregion is not analyzed in this section. See Chapter 5 of this Draft EIR/EIS for a discussion of growth inducement.

Socioeconomic data are generally collected and reported at the county level. Therefore, this section presents information according to individual counties within each of the three geographic subregions. When the boundaries of some counties overlap among geographic subregions, the location of the county-related text is referenced.

Data for this section were obtained from the Arizona Department of Economic Security (AZDES), California Department of Finance (CDOF), the California Employment Development Department (CEDD), the California State Board of Equalization (CSBOE), the US Department of Commerce (DOC) Bureau of Economic Analysis (USBEA), and the DOC Bureau of Census (BOC).

Table 3.14-1 summarizes the socioeconomic impacts of the Proposed Project and the four alternatives. The results are driven by two overriding factors: infusing money into the Imperial County economy in the form of revenues from the water transfer, which would have a beneficial impact, and reducing agricultural production through fallowing land, which would have an adverse effect on the economy. For alternatives where transfer revenues are used for conservation improvements and agricultural production is not reduced, the net economic impacts are beneficial. For alternatives that include fallowing, some of the adverse effects of fallowing are offset by beneficial effects of the local expenditure of transfer revenues, but the beneficial effects are not large enough to totally outweigh the adverse effects of fallowing. The magnitude of the beneficial effects would be influenced by the amount of money IID is paid for transferred water as well as how the transfer revenue is applied by IID. The impact analysis evaluates multiple implementations of the Proposed Project and alternatives to capture the range of beneficial and adverse effects that could result depending on how water would be conserved and the price IID would receive.

TABLE 3.14-1
Summary of Socioeconomic Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
S-1: Net addition of 710 jobs and increase in business output of $55.0 million with conservation by on-farm system improvements and/or water delivery system improvements only.	Continuation of existing conditions, including the historic variation in agricultural employment levels.	**A2-S-1: Net addition of 430 jobs and increase in business output of $32.9 million with conservation by on-farm system improvements and/or water delivery system improvements only.**	**A3-S-1: Net addition of 660 jobs and increase in business output of $51.2 million with conservation by on-farm system improvements and/or water delivery system improvements only.**	No impact.
S-2: Net loss of 1,400 jobs and reduction in business output of $97.5 million with conservation by fallowing only.	Continuation of existing conditions, including the historic variation in agricultural employment levels.	No impact.	**A3-S-2: Net loss of 1,090 jobs and reduction in business output of $75.8 million with conservation by fallowing only.**	**A4-S-1: Net loss of 1,400 jobs and reduction in business output of $97.5 million with conservation by fallowing only.**
S-3: Loss of 290 jobs and reduction in business output of $20 million from conserving IOP water by fallowing only.	Continuation of existing conditions, including the historic variation in agricultural employment levels.	**Same as S-3.**	**Same as S-3.**	**Same as S-3.**
HCP2-S-4: Loss of up to 750 jobs and reduction in business output of $52 million from fallowing under HCP Approach 2.	Continuation of existing conditions, including the historic variation in agricultural employment levels.	**Same as HCP2-S-4.**	**Same as HCP2-S-4.**	**Same as HCP2-S-4.**
SALTON SEA				
S-5: Adverse change in regional economic conditions would be accelerated by up to 11 years.	Eventual loss of the majority of the recreation-related economic activity as a result of the deterioration of the biological resources that support current	**A2-S-2: Adverse change in regional economic conditions would be accelerated by up to 11 years.**	**A3-S-3: Adverse change in regional economic conditions would be accelerated by up to 11 years.**	**A4-S-2: Adverse change in regional economic conditions would be accelerated by up to 11 years.**

TABLE 3.14-1
Summary of Socioeconomic Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
	recreation activities. Decreased economic activity would put downward pressure on property values.			
HCP2-S-6: Total offset of the adverse economic impacts of accelerating the loss of recreation activities described as Impact S-5.	Eventual loss of the majority of the recreation-related economic activity as a result of the deterioration of the biological resources that support current recreation activities. Decreased economic activity would put downward pressure on property values.	**Same as HCP2-S-6.**	**Same as HCP2-S-6.**	**Same as HCP2-S-6.**
SDCWA SERVICE AREA				
No impact.	Continuation of existing conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.14.2 Environmental Setting

3.14.2.1 Lower Colorado River

For Imperial County data, see Section 3.14.2.2, IID water service area and AAC; for Riverside County data, see Section 3.14.2.3, Salton Sea.

YUMA COUNTY

Population. The Arizona Department of Economic Security estimated the 2000 population of Yuma County at 160,026 (AZDES 2001a). This represents about 3.1 percent of the total population of Arizona. Yuma is the largest city in the county, with an estimated population of 77,515. The second largest city is San Luis, with an estimated population of 15,322 (AZDES 2001a).

Employment. Although agriculture continues to form an important component of the county's economic base, the non-farm sector grew by 2.5 percent annually from 1995 to 2000. The construction sector was the second-fastest-growing sector in the same period with an average of annual growth of 11.5 percent (AZDES 2001b).

LA PAZ COUNTY

Population. AZ DES estimated the 2000 population of La Paz County at 19,715 (AZDES 2001a). This represents about 0.4 percent of the total population of Arizona. Quartsite town is the largest city, with an estimated population of 3,354 (AZDES 2001a).

Employment. Along with agriculture, trade and government account for approximately 75 percent of all jobs in La Paz County. The county's seasonally adjusted unemployment rate was only 7.2 percent for the year 2000 (AZDES 2001b).

3.14.2.2 IID Water Service Area and AAC

IMPERIAL COUNTY

Population. CDOF reported the year 2000 population of Imperial County at 142,361 (CDOF 2001a). The county has seven incorporated cities; the three largest are El Centro, Calexico, and Brawley, with 2000 populations of 37,650, 25,250, and 21,550, respectively. Approximately 77 percent of the county's inhabitants lived in incorporated areas in 2000. Table 3.14-2 shows county and city populations for Imperial County based on 1990 and 2000 census data.

TABLE 3.14-2
Imperial County/City Population Estimates

County/City	1990	1990 Percentage of Total	2000	2000 Percentage of Total
Brawley	18,923	17%	21,550	15%
Calexico	18,633	17%	25,250	18%
Calipatria	2,690	3%	7,475	5%
El Centro	31,405	29%	37,650	26%
Holtville	4,820	4%	5,525	4%
Imperial	4,113	4%	7,200	5%
Westmorland	1,380	1%	1,720	1%
Unincorporated	27,360	25%	32,773	23%
TOTALS	**109,303**	**100.00%**	**142,361**	**100.00%**

Source: CDOF 2001a

Employment. The civilian labor force in Imperial County in 2000 was 58,500. The primary employment sectors in the county are services, agriculture, and government. Table 3.14-3 shows the 2000 county employment data for the major employment sectors.

TABLE 3.14-3
Summary of 2000 Imperial County Employment Data

Sector	Number Employed	Percentage of Total
TOTAL[1]	**49,800**	**100 %**
Farm Production	5,200	10%
Farm Services	6,100	12%
Construction and Mining	2,100	4%
Manufacturing	1,900	4%
Transportation and Public Utilities	1,900	4%
Trade	10,400	21%
Finance, Insurance, and Real Estate	1,100	2%
Services	5,700	11%
Federal Government	1,800	4%
State and Local Government	13,700	28%

Source: CDOF 2001a
[1] The numbers in this table include both civilian and military employment.

Table 3.14-4 shows the historic variation in employment during the past 10 years. Over this period, total county employment has ranged from a low of 44,100 in 1992 to a high of 51,000 in 1999. Considering just farm employment (production and services), employment levels ranged from a low of 11,300 in 2000 to a high of 14,500 in 1995, a historic variation of 3,200 agricultural jobs (CDOF 2001).

TABLE 3.14-4
Historic Imperial County Employment by Major Industries, 1991 to 2000[1]

Major Industry	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Farm Production	5,600	4,600	4,500	5,000	5,000	4,500	4,800	5,100	6,100	5,200
Farm Services	8,200	7,400	8,200	8,800	9,500	9,300	9,100	9,200	8,200	6,100
Construction & Mining	2,500	2,200	2,000	1,800	1,700	1,600	1,500	1,400	1,400	2,100
Manufacturing	1,700	1,700	1,700	1,900	1,800	1,700	1,800	1,700	1,800	1,900
Transportation & Public Utilities	1,000	1,400	1,600	1,600	1,900	2,100	2,100	2,000	1,900	1,900
Trade	9,000	9,400	9,800	9,800	9,200	9,000	9,200	9,400	9,800	10,400
Finance, Insurance & Real Estate	900	1,000	1,100	1,200	1,200	1,100	1,100	1,100	1,200	1,100
Services	6,500	5,700	5,600	5,500	5,100	5,200	5,400	5,500	5,800	5,700
Federal Government	1,100	1,200	1,200	1,200	1,200	1,400	1,500	1,600	1,700	1,800
State & Local Government	8,100	9,600	10,500	11,600	12,000	12,100	12,500	12,800	13,100	13,700
Total, All Industries	44,600	44,100	46,200	48,400	48,500	47,900	48,800	49,700	51,000	49,800

Source: CDOF 2001a
[1] The numbers in this table include both civilian and military employment.

The average unemployment rate in the civilian labor force in Imperial County for 2000 was 26.3 percent, the highest of all California counties and more than five times the state average of 4.9 percent (CEDD 2001b). Historically, Imperial County has had one of the highest unemployment rates in the state, approaching 30 percent during the 1990s.

Recreation-based activities associated with the Salton Sea are mainly concentrated in Imperial County (see Section 3.6, Recreation). Recreational activities stimulate the purchase of goods and services, which affects other sectors of the county's economy and often provides direct employment. Recreation does not correspond to a single employment sector in the data used for this analysis (see Table 3.14-4 for the employment categories for county data reported). Less than 2 percent of the employed persons in the Salton Sea geographic subregion, however, are employed in businesses that cater to the recreation-based industry.

Agriculture and government provide more than 50 percent of Imperial County's jobs. Agriculture employs approximately 11,300 people, and government sectors (federal, state, and local) employ approximately 15,500 people. The trade sectors employ 21 percent of the labor force, accounting for 10,400 jobs.

Finance. Taxable retail sales in Imperial County for 1999 were $871.2 million (CDOF 2001d). This represented about 0.3 percent of total state sales. The current sales tax rate in the county is 7.5 percent.

Property taxes levied in Imperial County totaled $63 million in 1990-2000. Of this total, approximately 7 percent of revenues went to city governments, 17 percent to the county, 63 percent to school districts, and 13 percent to other districts (CSBOE 2001). Table 3.14-5 shows the allocations of property taxes.

TABLE 3.14-5
Allocation of Imperial County Property Tax Levies 1997-2000 ($ Thousands)

Recipient	Amount	Percentage of Total
City	4,669	7%
County	10,493	17 %
School	39,906	63 %
Other District	7,955	13 %
TOTAL	**63,023**	**100.00 %**

Source: CSBOE 2001

Value of Business Output. Estimates of the total business output of Imperial County are derived from the IMPLAN PRO data set that was used to model the impact of the Proposed Project and alternatives (see Section 3.14.3.1, Methodology, for the description of the IMPLAN PRO model). The base data provided by IMPLAN PRO were modified for some agricultural production sectors to be consistent with the 12-year historic average conditions of Imperial County. The modifications were based on data from Imperial County Agricultural Commissioner's reports; more information on the modifications can be found in Appendix G. Table 3.14-6 shows the estimates of value of industry output that are used as the Baseline for the impact analysis modeling. A report published in 1989 and based on survey data from 1987 estimates that Salton Sea recreation activities contribute about $80 million to the value of business output of the Imperial and Riverside County economies (CIC Research 1989).

TABLE 3.14-6
Value of Industry Output for Imperial County

Economic Industry Sector	Value of Industry Output ($ Millions)
Agriculture	1,428.46
Mining	20.471
Construction	213.172
Manufacturing	407.538
Transportation, Communication, Public Utilities	356.458
Trade	535.451
Finance, Insurance, and Real Estate	417.339
Services	589.199
Government	835.826
Other	0.582
Totals	4,804.49

Source: Minnesota Implan Group (MIG), with modifications
Source: CDOF 2001e; USBOC 2001

3.14.2.3 Salton Sea

The Salton Sea lies partly in Imperial County and partly in Riverside County. For Imperial County data, see Section 3.14.2.2, IID Water Service Area and AAC.

RIVERSIDE COUNTY

Population. CDOF reported the year 2000 population of Riverside County at 1,545,387. The population is concentrated in the western portion of the county, with closer economic ties to the metropolitan Los Angeles area than to the Salton Sea geographic subregion. The county has 24 incorporated cities. The largest three are Riverside, with a population of 225,166; Moreno Valley, with 142,381; and Corona, with 124,966. In the general vicinity of the Salton Sea, the larger population centers include Coachella (22,724), Indio (49,116), and Palm Desert (41,155). When combined, these population centers account for approximately 10 percent of the total county population (CDOF 2001a).

Employment. The civilian labor force in Riverside County in 2000 was 731,400. The average unemployment rate was 5.5 percent, slightly above the state rate of 4.9 percent (CEDD 2001a). The primary employment sectors are services, trade, and government, which account for almost 70 percent of all jobs in the county. Table 3.14-7 shows 2000 employment data by sector.

The services sector employed 127,000 people (approximately 27 percent), whereas the government sector (federal, state, and local) employed 83,600 people (approximately 18 percent). The trade sector employed 111,200 people or approximately 24 percent of the 2000 labor force.

TABLE 3.14-7
Summary of 2000 Riverside County Employment Data

Sector	Number Employed	Percentage of Total
TOTAL[1]	**468,000**	**100**
Farm Production	9,700	2
Farm Services	8,000	2
Construction	46,200	10
Mining	400	0
Manufacturing	53,800	11
Transportation and Public Utilities	13,800	3
Trade	111,200	24
Finance, Insurance, and Real Estate	14,400	3
Services	127,000	27
Federal Government	6,800	2
State and Local Government	76,800	16

Source: CEDD 2001a
1 The numbers in this table include civilian and military employment.

3.14.3 Impacts and Mitigation Measures

3.14.3.1 Methodology

Neither CEQA nor NEPA requires assessment of project effects that are purely economic or social unless there are related physical effects (State CEQA Guidelines, §§ 15064(e), (f)16, 15131, 15358; 40 CFR § 1508.14). However, if a project would have significant physical effects on the environment, economic and/or social impacts could result, and a socioeconomic assessment may be appropriate. Based on concerns raised during the scoping process about potential socioeconomic effects of the Proposed Project, particularly in Imperial County, a detailed socioeconomic assessment is included in this Draft EIR/EIS.

The methodology used to support the socioeconomic analysis of the Proposed Project and alternatives is based on a regional economic model using the software and data package IMPLAN PRO. IMPLAN PRO is an input-output (I-O) model that estimates the total impacts to a regional economy of changes to local business conditions, expenditures, or employment levels. Although the Proposed Project will be implemented over a period of up to 75 years, the entire socioeconomic impact analysis is conducted in 2001 dollars because use of present value is standard for socioeconomic analysis.

Economic changes are estimated and used as inputs to the IMPLAN PRO model, which predicts the total effects on the regional economy. The effect of the Proposed Project and alternatives on the regional economy are evaluated using: (1) changes in employment; and (2) the value of business output as the primary indicators. More detailed results of the impact analysis, including a breakdown of the total effect into the I-O components of direct, indirect, and induced effects, are reported for each economic sector in Appendix G.

To identify and assess the range of potential impacts, a set of illustrative scenarios was constructed for this socioeconomic analysis using three major factors in the Proposed Project and alternatives that would drive socioeconomic effects in Imperial County:

- Construction and operation of on-farm irrigation system and water delivery system improvements using water transfer revenues received by IID from water recipients (these measures would generally result in beneficial effects on the Imperial County economy);
- Use of fallowing to conserve water (fallowing would generally result in adverse effects on the Imperial County economy); and
- Payment agreements for conserved water; that is, whether SDCWA receives and pays for all of the conserved water under the IID/SDCWA Transfer Agreement, or whether, under the QSA, water is received and paid for by CVWD and/or MWD. A different pricing schedule than the one outlined in the IID/SDCWA Transfer Agreement applies if CVWD and MWD are receiving transferred water under the QSA. While the IID/SDCWA Transfer Agreement specifies a fixed pricing schedule for the duration of the Proposed Project, the QSA specifies base prices levels and applies a producer price index to escalate the base prices for the duration of the Proposed Project. Specifically, if CVWD purchases the first 50 KAFY of water from IID, IID is paid a base price of $50 per AF. If CVWD purchases the second 50 KAFY of water from IID, IID is paid a base price of $125 per AF. If CVWD does not purchase water from IID under the QSA, MWD could purchase the water at a base price of $125 per AF.

These economic changes would affect the Imperial County economy and are discussed in the subsections on the IID water service area and AAC geographic subregion below. Impacts attributed to changes in the elevation or salinity of the Salton Sea are discussed in the Salton Sea geographic subregion, even though some of these economic impacts might be incurred in Imperial County as well as in Riverside County.

The illustrative scenarios are shown in Table 3.14-8. They are designed to represent a range of economic impacts from the Proposed Project and the various alternatives. For example, for the Proposed Project, the worse-case economic impact would be that all conservation is achieved by fallowing, which would have the maximum adverse impact on agricultural production in Imperial County. Generally, infusing money into the Imperial County economy in the form of water transfer revenues would result in a beneficial effect. The magnitude of the beneficial effect would be influenced by the amount of revenue IID receives for the transferred water and how IID applies the transfer revenue in its water service area. Therefore, the worst-case economic impact in Imperial County would result if the first 50 KAFY of water conserved under the QSA were transferred to CVWD rather than to MWD. (The IID/SDCWA Transfer Agreement and the QSA are both summarized in Appendix A.)

The best case for the Proposed Project is that all conservation would be accomplished through on-farm irrigation system and water delivery system improvements and that SDCWA would receive all 300 KAFY.[1] Alternative 1, No Project, would include no conservation or transfer and thus no economic effects as compared to the Baseline.

Under Alternative 2, the QSA would not be in effect, and SDCWA would receive the entire 130 KAFY of conserved water. Fallowing would not be allowed, and the best economic case is that all conservation would be achieved through on-farm system improvements.

Under Alternative 3, the best case would be to conserve 130 KAFY of water using on-farm system improvements and transfer that conserved water to SDCWA. In addition, MWD would receive 100 KAFY at the base price of $125 per AF. The worse case for Alternative 3 would be to rely on fallowing for the entire 230 KAFY; SDCWA would receive 130 KAFY, CVWD would receive the first 50 KAFY at the base price of $50 per AF, and either CVWD and/or MWD would receive the second 50 KAFY at the base price of $125 per AF.

Alternative 4 involves conservation only by fallowing, so the best and worst cases are generated by whether the QSA would be in effect or not. Alternative 4 has the same impact as the fallowing scenarios of the Proposed Project.

For each scenario in Table 3.14-8, the annual changes in local expenditures and agricultural production relative to the Baseline were estimated for each year of the Proposed Project's 75-year duration. These 75-year annual impact levels are averaged into seven program year-blocks that were analyzed using IMPLAN PRO.

The first six of the seven program year-blocks each represent an average of 5 years worth of annual changes in expenditures and/or agricultural output. These six program year-blocks cover program years 1 to 30, during which the schedule to achieve the maximum conservation quantity for each of the scenarios would occur. These first six program year-blocks also represent the period over which conservation measures would be implemented and would represent combinations of construction and operation impacts. The seventh program year-block represents the average impact of years 31 to 75. This single, large program year-block is used because annual impact levels would vary less during this period of the Proposed Project because maximum conservation levels would have been reached for the scenarios and because all construction of on-farm and water delivery system improvements would have been completed. Therefore, this seventh program year-block would represent an operations impact for the Proposed Project and all alternatives.

[1] This is the first scenario under the Proposed Project: "IID/SDCWA Transfer Agreement Implementation Only." See Chapter 2, Description of the Proposed Project and Alternatives, for additional details on the two scenarios that could occur under the Proposed Project.

TABLE 3.14-8
Scenarios for Economic Analysis

		Conservation Program			Destination		
	Quantity Conserved (KAFY)	On-Farm Irrigation System Improvements	Water Delivery System Improvements	Fallowing	SDCWA	CVWD (1)	CVWD / MWD (2)
Proposed Project A – Beneficial effect without QSA	300	230	70		300		
Proposed Project B – Beneficial effect with QSA	300	230	70		200		100
Proposed Project C - Adverse effect without QSA	300			300	300		
Proposed Project D - Adverse effect with QSA	300			300	200	50	50
Alternative 1- No Project	0	0	0	0			
Alternative 2	130	130			130		
Alternative 3A- Beneficial effect	230	230			130		100
Alternative 3B - Adverse effect	230			230	130	50	50
Alternative 4A- Adverse effect without QSA	300			300	300		
Alternative 4B - Adverse effect with QSA	300			300	200	50	50

(1) IID is paid a price of $50 (in 1999$ escalated at 2.5%) for the first 50 KAFY to CVWD.
(2) IID is paid a price of $125 (in 1999$ escalated at 2.5%) for the second 50 KAFY to CVWD and/or MWD.

Changes in business activity that would be caused by the scenarios for the Proposed Project and alternatives are attributed to one of the following three economic change categories, which are individually modeled to estimate their impact on the regional economy:

- **Non-Agricultural Sectors** – Changes in local expenditures for goods, materials, and services associated with the construction, operation, maintenance, and replacement of on-farm and water delivery system improvements.
- **Transfer Revenue Expenditures** - Changes in the local expenditure of disposable income by farmers participating in the water conservation program.

- **Agricultural Production Sectors** - Reductions in agricultural output resulting from the fallowing of agricultural lands.

Non-Agricultural Sectors. Implementation of on-farm irrigation system and water delivery system improvements would result in annual direct expenditures within the economy for the goods and services required to construct, operate, and maintain the on-farm improvements and water delivery system improvements. The estimated level of these annual direct expenditures would vary over time and among Proposed Project and alternatives scenarios.

Because the conservation program is voluntary, it is not possible to predict the exact conservation measures participating farmers would employ, nor is it possible to predict when on-farm irrigation system improvements would be implemented. For the purpose of this analysis, it is assumed that on-farm irrigation system improvements would be in the form of permanent TRS (see Chapter 2 for a description of TRS). This assumption is made because this particular on-farm irrigation system has a proven track record in the IID water service area and could be applied to all combinations of cropping patterns, soil types, and field slopes that are found in the subregion.

To identify the number of TRS that would be required to conserve a given quantity of water, it is assumed that if a TRS was installed and operated on a standard 80-acre field, the system would conserve 53 AFY. This estimate assumes a standard 80-acre field will have 75 irrigated acres, and that the use of the TRS irrigation method will conserve 0.71 AF per irrigated acre. The estimate of per-acre conservation used for this analysis is derived from data used in IID's hydrologic model of the IID water service area (see Appendix E). The analysis assumes that once a farmer installs a TRS on a field, it would remain in operation for the duration of the Proposed Project (75 years).

The use of other on-farm irrigation system improvements would have somewhat different impacts than those described for a TRS. The hydrologic model that IID has developed indicates that, at most, on-farm irrigation system improvements could conserve a maximum of 230 KAFY.

IID has indicated that if water delivery system improvements were implemented to conserve water for the transfer, IID would construct and operate seepage recovery systems and lateral interceptor systems. Additionally, IID has indicated that it would construct the seepage recovery systems before installing lateral interceptor systems. The hydrologic model indicates that these types of two water delivery system improvements could conserve a maximum of 100 KAFY: 15 KAFY from seepage recovery systems and 85 KAFY using a combination of lateral interceptor systems.

The annual change in business activity has been estimated based on the timing of installations of lateral interceptor systems, seepage recovery systems, or TRS. These annual industry output changes are aggregated into the seven program year-blocks and used as inputs into IMPLAN PRO. A detailed discussion of the industries used to model impacts, and the initial economic change levels for each year and for the seven program year-blocks, can be found in Appendix G.

Transfer Revenue Expenditures. To conserve water for transfer, IID would compensate farmers for participating in the water conservation program by undertaking voluntary on-farm irrigation system improvements or fallowing lands. A portion of the compensation paid to farmers, in excess of what it costs them to conserve water, would be spent in Imperial County as disposable income. This increase in disposable income expenditures would have a beneficial effect on the local economy.

Disposable income will vary depending on the level of compensation paid to participating farmers for conserving water and the costs they incur to conserve water. For this analysis it is assumed that farmers will conserve water either by fallowing land or by installing TRS irrigation systems.

The actual distribution of transfer revenues has not been identified by IID and might vary over the term of the Proposed Project. Some dollar value must be estimated to evaluate the potential impact; therefore, for this analysis it is assumed that all transfer revenues not spent by IID on water delivery system improvements, program administration, or environmental or mitigation measures pursuant to the Final EIR/EIS or HCP will be passed on to participating farmers. The prices IID is paid for transferred water depend on which water agencies receive the water and will vary over time. Using a formula that allows IID to cover all program costs, farmer compensation level per acre-foot was calculated for each scenario. The farmer compensation price and estimates of farmer conservation were used to calculate the total annual transfer revenue paid to farmers. This amount may vary depending on the type of conservation a farmer uses and is therefore reduced to account for the cost farmers incur in conserving water to produce a before tax level of net transfer income.

Because disposable income is income that is actually spent in the economy, the before-tax level of transfer income must be reduced by estimated tax payments and savings. An additional adjustment is made to account for some of the transfer income leaving the Imperial county economy through out-of-county expenditures. This after-tax and after-savings level of transfer income is further reduced to account for out-of-county expenditures greater than the amount included in the IMPLAN PRO relationships. It is assumed there would be greater out-of-county expenditures because of out-of-county land ownership and because of county residents spending transfer revenues out of the county at a rate greater than assumed in the IMPLAN PRO relationships. Appendix G discusses in detail the prices IID would receive and the formula used to calculate the assumed farmer compensation levels used in this analysis.

This transfer revenue expenditures category would be sensitive to the level of compensation IID pays to farmers to conserve water. The analysis currently assumes that enough money is retained by IID to cover up to $30 million for environmental mitigation, which is consistent with the amount anticipated in the IID/SDCWA Transfer Agreement but might not be the actual cost of environmental mitigation. If additional funds are retained from transfer revenues to pay for environmental mitigation in excess of this amount, the beneficial effects of transfer revenue expenditures would be smaller than reported here.

Agricultural Production Sectors. For the purposes of this analysis, it is assumed that when farmers participate in the water conservation program by installing TRS, they would continue to grow the same crops that have historically been grown, using the same cropping patterns. This assumption is reasonable because of the long-term nature of the water conservation program and the difficulty of predicting future changes in cropping patterns for crops that are, to a large extent, influenced by world markets.

If farmers were to install on-farm irrigation system improvements, the construction, operation, and maintenance of the improvements would affect their production costs. However, the regional impact of those changes would be captured in the non-agricultural sectors expenditures section as changes in the costs associated with the operation and maintenance of the system improvements. Therefore, it is assumed that for regional economic impact modeling, changes in agricultural production would only occur in scenarios that include fallowing.

In scenarios in which fallowing is included as a conservation measure, reductions in agricultural output would have a adverse effects on the economy. Estimates of these impacts have assumed that reductions in agricultural output would be consistent with the percentage of non-permanent crops that have historically been grown in the IID water service area. The reason for using non-permanent crops is that farmers are unlikely to fallow areas with permanent crops, such as orchards, because of the large investment in such crops. The historical crop pattern was used because the actual future participants in a voluntary fallowing program cannot be identified in advance with certainty, and IID believes it is reasonable to assume that the program will involve a range of crops through the IID water service area. If the actual mix of fallowed lands includes a higher percentage of less valuable crops, the impacts could be less than what are reported, and if a higher percentage of more valuable crops were fallowed, the impacts could be greater.

All crops that are grown in the IID water service area are categorized according to one of the agricultural production sectors used in IMPLAN PRO. Using these assumptions and historic IID data from 1987 to 1999, the percentage of total non-permanent crops for each IMPLAN PRO crop group was calculated. These percentages are shown in Table 3.14-9.

IMPLAN PRO uses changes in the industry level gross value of production as initial economic changes. To estimate changes in value of production, the average value per acre was estimated for each crop group included in the analysis. These per-acre value estimates were based on Imperial County agricultural commissioners' data from 1987 to 1998. Individual crops were allocated to each of the crop groups. The values in Table 3.14-9 represent acreage-weighted average values of production estimates.

TABLE 3.14-9
Acreage-weighted Average Value of Production Estimates

Crop Group	Percent of Total Non-Permanent Crops[a]	Estimated Gross Value Per Acre[b]
Cotton	2%	1,003
Food Grains	13%	425
Hay and Pasture	51%	444
Grass seed	5%	638
Vegetables	22%	3,400
Sugar	7%	1,227

Source:
[a] IID 1987 - 1999 and CH2M HILL calculations (IID). Annual Inventory of Areas Receiving Water.
[b] CASS and CH2M HILL calculations (California Agricultural Statistics Service (CASS). 1999. "Summary of County Agricultural Commissioners' Report, Gross Values of Agricultural Production--California." August 1999.

To identify the total acreage that would need to be fallowed to conserve a given quantity of water, it is assumed that each acre fallowed would conserve 5.63 AF of water. This estimate is based on historic water use patterns and was determined using IID's hydrologic model, which was developed for the conservation and transfer program. (See the description of the IIDSS in Appendix E.)

Subregions Excluded from the Impact Analysis. With the Proposed Project and alternatives, SDCWA would receive the same amount of water from IID that it purchased previously from MWD. The objective for SDCWA is to increase the reliability of water supply for its service area. No new infrastructure would be needed for the water transfer because the transfer would be through existing infrastructure in an exchange with MWD. No new storage or distribution systems would be needed in SDCWA's service area. Water supply is not being increased (Reclamation 2002). Therefore, the SDCWA service area geographic subregion is not analyzed in this section. See Chapter 5 of this Draft EIR/EIS for the growth-inducement analysis.

3.14.3.2 Interpretation of Results

Certain features of the modeling effort are important to note in interpreting the results of the analysis in this section. As discussed in Section 3.14.3.1 above, the annual changes in local expenditures and agricultural production were calculated for each scenario in Table 3.14-9 for each of the 75 years of the term of the Proposed Project. These annual results were then averaged into six 5-year blocks covering the first 30 years of the Proposed Project and a seventh 45-year block for years 31 through 75. The six 5-year blocks and the seventh 45-year block were then analyzed in IMPLAN PRO. IMPLAN PRO takes input data and predicts equilibrium economic conditions. If the input conditions for any 5-year block were to continue unchanged into the future, the eventual equilibrium economic conditions would be similar to the IMPLAN PRO results for that 5-year block. However, during the first 30 years of the Proposed Project, the actual changes in local expenditures and agricultural production will vary each year as conservation quantities are increasing and improvements are being constructed. Therefore, the equilibrium conditions predicted by the model for a 5-year period would not be reached because the model inputs are continually changing.

For the 45-year period, however, the input conditions are relatively stable because the conservation quantities would have reached their maximum for the scenarios and the construction of on-farm and delivery system improvements would have been completed. Therefore, the model results for this 45-year block could be considered to represent the equilibrium that the economy would actually reach.

Two measures of the economic effects of the Proposed Project and alternatives are discussed: (1) changes in employment in the seventh 45-year block; and (2) changes in business output. These are two different ways to measure the same impact on the economy and should not be added together in assessing the economic impacts of the Proposed Project and alternatives.

There are no accepted or standard criteria for assessing the significance of potential beneficial and adverse economic impacts, and significance assessments are not required or made in this analysis. The analysis presents the estimated effects of the Proposed Project and alternatives.

3.14.3.3 Proposed Project

The installation and operation of on-farm irrigation system improvements or water delivery system improvements, or the fallowing of agricultural land, would each have impacts on the Imperial County economy. The nature and magnitude of the effects are dependent on the mix of conservation measures implemented as well as the recipient of the conserved water because the price payable for the water varies.

Four scenarios have been analyzed to present the full range of potential impacts of the Proposed Project. Proposed Projects A and B both assume that all 300 KAFY are conserved by on-farm irrigation system improvements and water delivery system improvements. On-farm conservation contributes 230 KAFY and water delivery system improvements conserve the remaining 70 KAFY. Proposed Project A represents the scenario in which the QSA is not in effect and all conserved water is transferred to SDCWA.

Proposed Project B assumes that the QSA is in effect and a total of 100 KAFY are transferred to CVWD and/or MWD. To provide the greatest beneficial impact, it is assumed that CVWD does not purchase the first 50 KAFY; therefore, IID would be paid the base price of $125 for the entire 100 KAFY. The two scenarios are presented to highlight the impact the different ramp-up schedules and different transfer prices have on the local economy.

In Proposed Projects C and D, fallowing is used to conserve all 300 KAFY for transfer, with a total of approximately 50,000 acres fallowed. Proposed Project C assumes all water is transferred to SDCWA. Proposed Project D assumes that 200 KAFY are transferred to SDCWA and the remaining 100 KAFY are transferred to CVWD and/or MWD. To create the worst-case impact, it is assumed that CVWD would purchase the first 50 KAFY at the $50 per AF base price and the second 50 KAFY would be purchased by CVWD or MWD at the $125 per AF base price. The IID/SDCWA Transfer Agreement would need to be modified before Proposed Project C or D could be implemented.

LOWER COLORADO RIVER

Water Conservation and Transfer

None of the actions associated with the conservation and transfer of water will have any direct or indirect impact on the socioeconomic resources of the LCR geographic subregion.

Biological Conservation Measures in USFWS' Biological Opinion

Implementation of these conservation measures would not affect population or housing because they would involve fish stocking or fish rearing or the conversion of non-native vegetation or agricultural land to habitat suitable for endangered species. No housing would be displaced or created, nor would any population changes occur. Constructing or restoring backwaters would create a small, short-term increase in employment opportunities, as would creating willow flycatcher habitat. The creation of this habitat could result in the loss of between 372 and 1,116 acres of agricultural land, and the creation of backwaters could result in the loss of 44 acres of agricultural land, depending on the site(s) selected. This could result in the loss of some agricultural employment opportunities. Approximately 30,000 persons are employed in agriculture in the counties that border the Colorado River, and the number of jobs that could be lost would be small in relation to the total number in the Project area. The loss of revenue from the removal of up to 1,156 acres of land from production would have a minor impact on the local economy given the amount of land still in production. Any land acquired for this purpose would come from willing sellers, and fair compensation would be provided pursuant to federal regulations (Reclamation 2002).

Impacts resulting from the implementation of the biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, 4; therefore, they are not discussed under each alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact S-1: Net addition of 710 jobs and increase in business output of $55 million with conservation by on-farm irrigation system improvements and/or water delivery system improvements only. Proposed Projects A and B are the program implementations that represent conservation by on-farm irrigation system improvements and/or water delivery system improvements. Figure 3.14-1 shows the anticipated employment impacts for program year-block 7. Net job increases are anticipated to be 710 jobs for Proposed Project A and 680 for Proposed Project B. Smaller employment gains are anticipated under Proposed Project B because the amount of money being infused into the local economy will be lower under Proposed Project B, which assumes a portion of the conserved water will be transferred to CVWD and/or MWD at a price that is lower that what SDCWA would pay. The construction, trade, and services sectors experience the majority of the employment increases. The net employment increases associated with Proposed Projects A and B represent an increase of about 1.4 percent of the year 2000 total county employment of 48,900.

FIGURE 3.14-1
Net employment impacts by economic sector from on-farm irrigation system improvements and/or water delivery system improvements for Proposed Project A and B program year-block 7

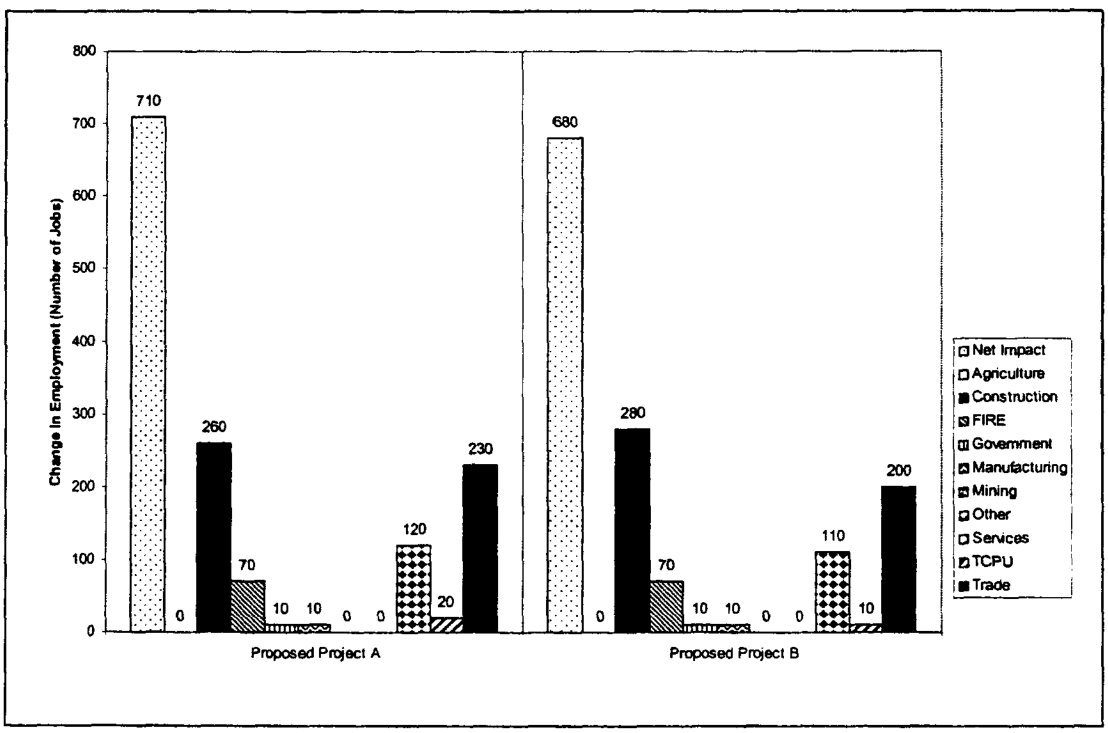
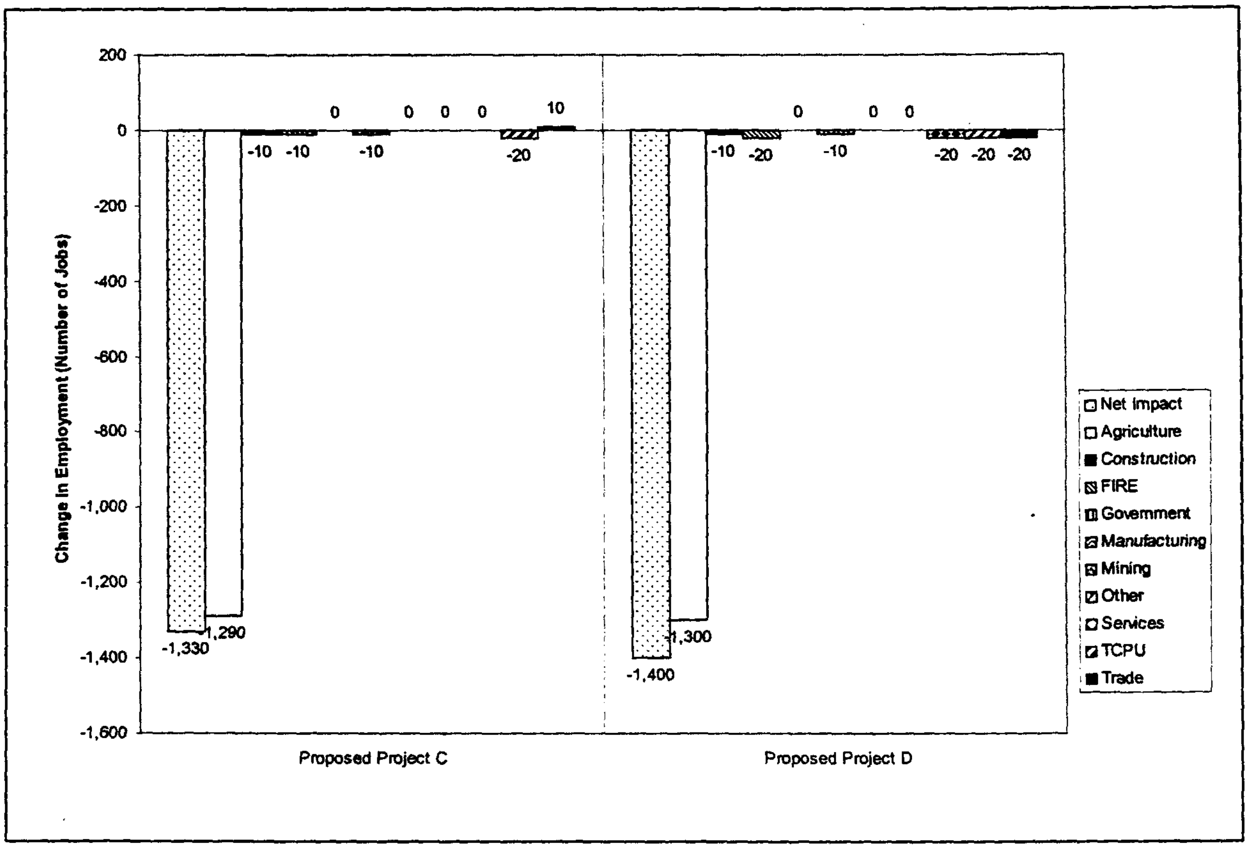


Figure 3.14-2 shows the beneficial impacts to the value of business output anticipated from Proposed Projects A and B. The net increase in the value of business output is estimated to be $55 million for Proposed Project A and $54 million for Proposed Project B. These figures represent approximately 1.2 percent of the estimated $4.8 billion total value of business output for Imperial County. As is true for employment impacts, the construction, trade and services sectors would experience the majority of the beneficial effects.

FIG 3.14-2
Net value of business output impacts by economic sector from on-farm irrigation system improvements and/or water delivery system improvements for Proposed Projects A and B program year-block 7



Impact S-2: Net loss of 1,400 jobs and reduction in business output of $98 million with conservation by fallowing only. Proposed Projects C and D are the program implementations that represent conservation by fallowing. Figure 3.14-3 shows the anticipated employment impacts for program year-block 7. Net job decreases are anticipated to be 1,330 jobs for Proposed Project C and 1,400 for Proposed Project D. The agriculture sectors experience the majority of the employment decreases. The net employment decreases associated with Proposed Projects C and D represent about 2.6 percent and 2.8 percent, respectively, of the year 2000 total county employment of 48,900. Focusing on the agricultural sectors alone, Proposed Project C and D would result in net agricultural sector job losses of 1,290 and 1,300 respectively, representing about 12 percent of the total county agricultural employment estimate of 11,300 jobs.

FIG 3.14-3
Net employment impacts by economic sector from fallowing for Proposed Projects C and D program year-block 7

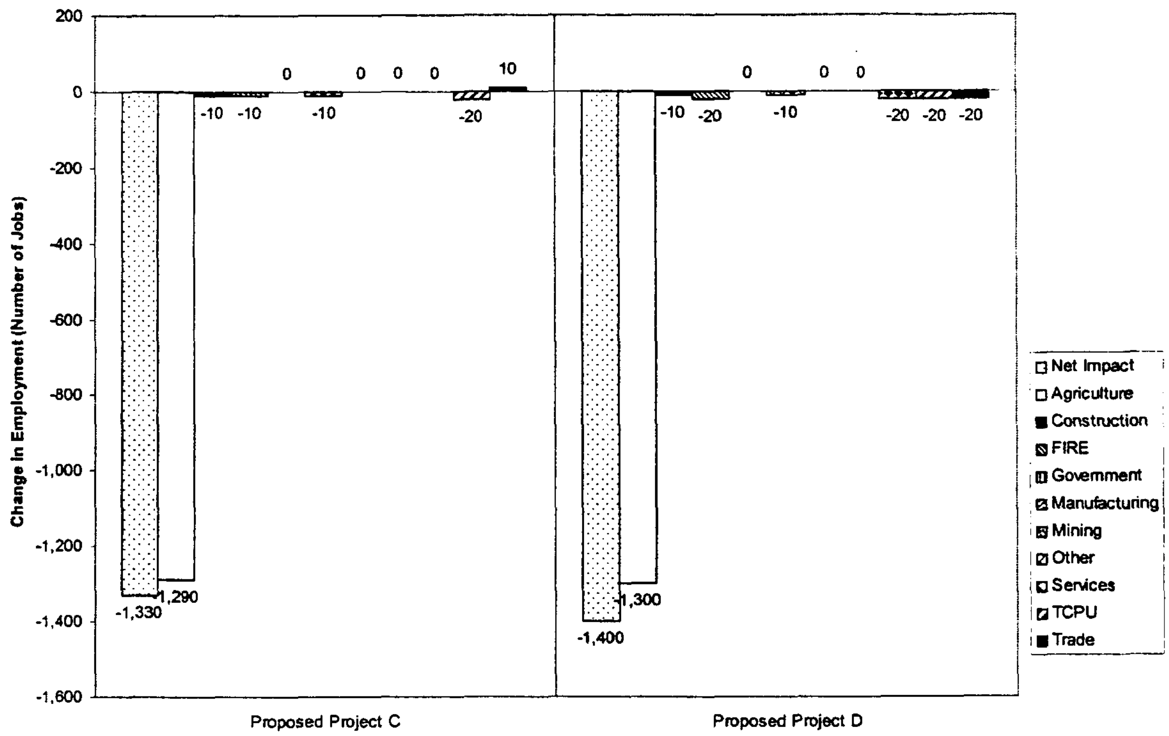


Figure 3.14-4 provides a graphic comparison of the worst-case adverse impacts (Proposed Project D) relative to the counties' annual employment levels and 10-year historical employment variation, for the agricultural sector and for net total county employment. From 1991 to 2000, total farm employment ranged from 11,300 to 14,500, a variation of 3,200 jobs. The estimated net change in agricultural jobs associated with Proposed Project D would represent about 41 percent of this annual variability during the past 10 years. During this same time period, total county employment has ranged from 51,000 to 44,100, for a historic variation of 6,900 jobs. The net employment loss of 1,400 jobs associated with Proposed Project D represents about 20 percent of this historical variation.

FIG 3.14-4
Comparison of Proposed Project D employment losses to annual employment levels and 10-year historic variation, for total county employment and agricultural employment

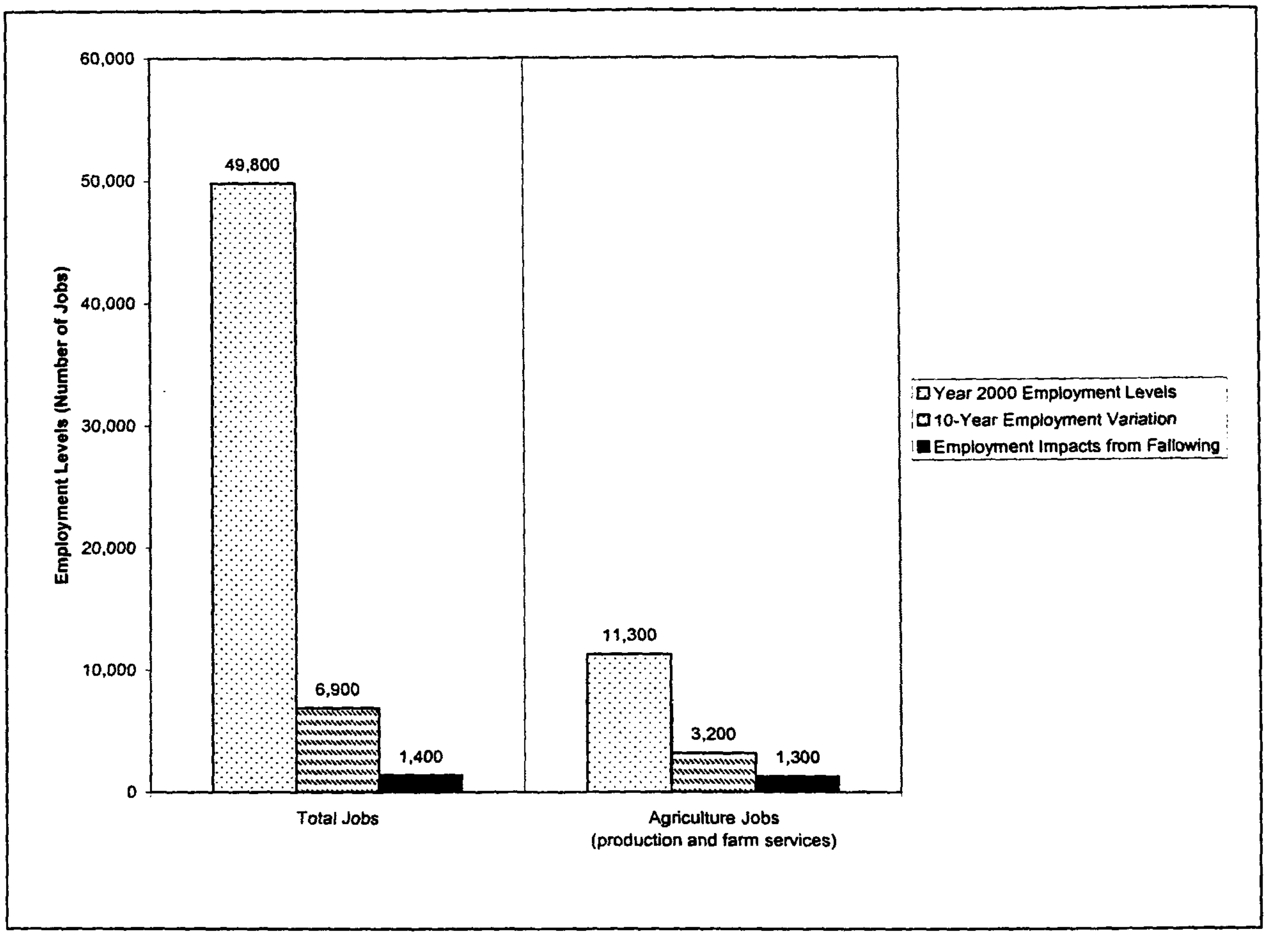
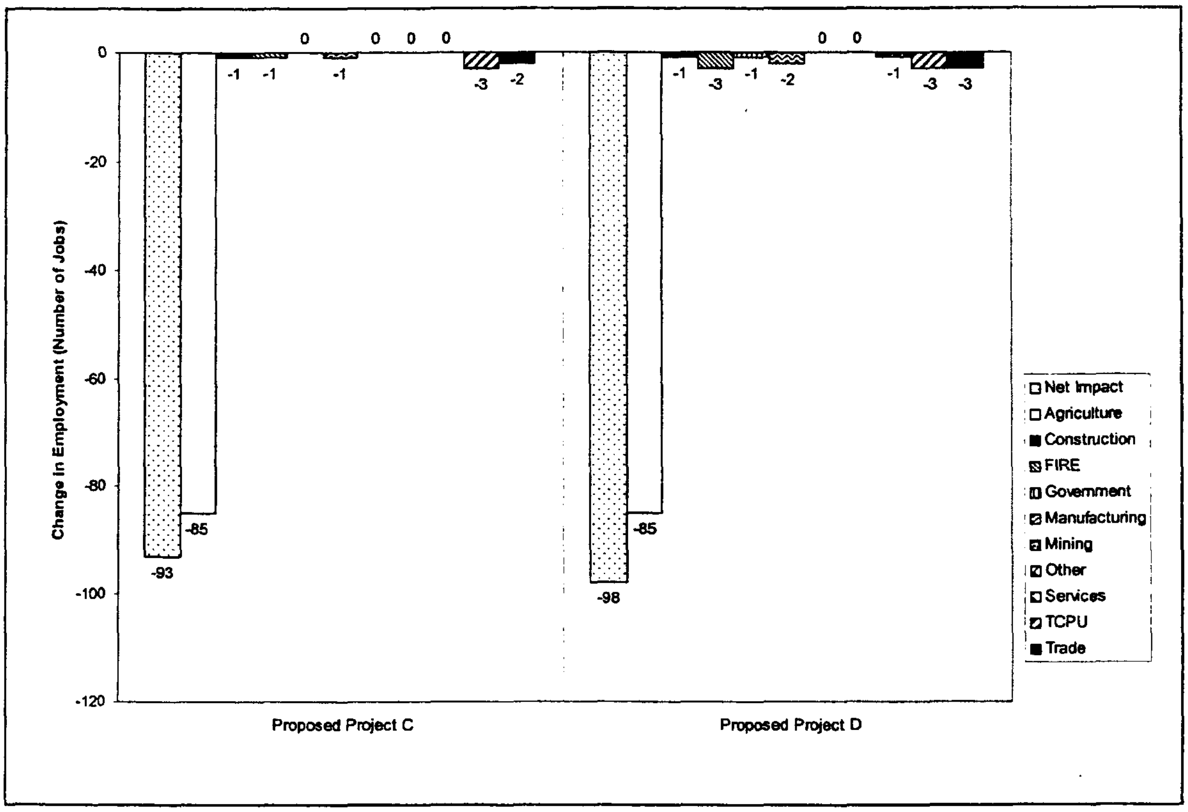


Figure 3.14-5 shows the adverse impacts to the value of business output anticipated from Proposed Projects C and D. The net decrease in the value of business output is estimated to be $93 million for Proposed Project C and $98 million for Proposed Project D. These figures represent approximately 2.0 percent of the estimated $4.8 billion total value of business output for Imperial County. As with the employment impacts the construction, trade, and services sectors would experience the majority of the beneficial effects.

FIG 3.14-5
Net value of business output impacts by economic sector from fallowing for Proposed Projects C and D program year-block 7



Inadvertent Overrun and Payback Policy (IOP)

Impact S-3: Loss of 290 jobs and reduction in business output of $20 million from conserving IOP water by fallowing only. Conservation of 59 KAFY for the IOP can be accomplished by means of fallowing or other conservation measures. This conservation would be in addition to the up to 300 KAFY that would be conserved for transfer under the Proposed Project. If fallowing is selected, about 9,800 additional acres would be required.

The annual fallowing of 9,800 acres would result in the loss of 290 jobs and a reduction in the value of business output of about $20 million. The majority of the lost output and employment would be in the agricultural sectors.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

The actions outlined in the HCP (IID Water Service Area Portion) include the creation of up to approximately 700 acres of managed marsh habitat, native tree habitat, and new drain canals to the Salton Sea. The specific locations of these measures are unknown; however, it is reasonable to assume that up to 700 acres of agricultural lands could be converted, causing a reduction of agricultural output. The total loss of employment throughout the regional economy associated with the fallowing of these 700 acres is estimated to be approximately 20 jobs in the agricultural sectors.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

The selection of HCP (Salton Sea Portion) Approach 1 would result in the fallowing of up to 5,000 acres of farmland in addition to the operation and maintenance of one or more fish hatcheries. The fallowing of 5,000 acres would result in the loss of about 150 jobs in the Imperial County economy, with an associated annual reduction in the value of business output of about $10 million. Along with these adverse impacts there would be some beneficial effects associated with the local expenditure of money to construct, operate and maintain the fish hatcheries and ponds that would eventually be built on the fallowed acreage. It is estimated that the total cost of this approach would be between $350 and $800 million. At this time it is unknown how much of this total would recirculate through the Imperial County economy; therefore, it is not possible to make any credible estimate of the eventual beneficial effects of these expenditures.

In addition to the water that would be made available by fallowing the 5,000 acres to create the ponds, additional water may be required to operate the ponds. At this time the specific location and system design of the ponds is unknown; therefore, the details of how much (if any) additional water would be required are unknown. If fallowing or other conservation measures were required to provide additional water to implement this approach, the impacts of those actions would be addressed in subsequent environmental documentation.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-S-4: Loss of 750 jobs and reduction in business output of $52 million from fallowing under Approach 2. The selection of HCP (Salton Sea Portion) Approach 2 could result in the fallowing of agricultural lands to obtain water that would be sent to the Salton Sea to replace the lost inflow caused by the conservation and transfer program. If the conservation and transfer program results in the full 300 KAFY being conserved and transferred, up to 25,000 acres could be fallowed for this HCP (Salton Sea Portion) Approach. This fallowed acreage would be in addition to any fallowing to conserve water for transfer to SDCWA, CVWD, or MWD. The socioeconomic impact of fallowing for HCP (Salton Sea Portion) Approach 2 could include the loss of up to 750 jobs and a reduction in the value of business output in the Imperial County economy of about $52 million. The lost jobs and lost business output would be concentrated in the agricultural sectors.

HCP impacts would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Aggregate Effects

Tables 3.14-10 and 11 summarize the socioeconomic impacts of the individual components of the Proposed Project: conservation for transfer, IOP, and the HCP. The Proposed Project includes the maximum beneficial and adverse effects of the conservation and transfer program. Therefore, the aggregate effects presented in tables 3.14-10 and 11 provide the full range of impacts. Table 3.14-10 assumes that only on-farm irrigation and water delivery system improvements will be used to conserve water; Table 3.14-11 assumes that only fallowing will be used to conserve water.

TABLE 3.14-10
Proposed Project Component and Aggregated Socioeconomic Impacts Using Only On-farm Irrigation System Improvements and Water Delivery System Improvements for Conserving Water for Transfer

	Transfer Conservation by Measures Other Than Fallowing and HCP (Salton Sea Portion) Approach 1	Transfer Conservation by Measures Other Than Fallowing and HCP (Salton Sea Portion) Approach 2
Conservation and Transfer Impacts	Addition of 710 jobs and increase in value of business output of $55 million.	Addition of 710 jobs and increase in value of business output of $55 million.
Fallowing for IOP Impacts	Loss of 290 jobs and $16 million in value of business output.	Loss of 290 jobs and $16 million in value of business output.
HCP Impacts (IID Water Service Area Portion)	Loss of approximately 20 jobs and potential small increase in the value of business output.	Loss of approximately 20 jobs and potential small increase in the value of business output.
HCP Impacts (Salton Sea Portion)	Loss of up to 150 jobs and $10 million in business output.	Loss of up to 750 jobs and $52 million in business output.
	Short-term benefits from construction activities and temporary benefits from maintenance of wildlife habitat and hatcheries.	
Aggregate Impact	Addition of 250 jobs and increase in value of business output of $29 million.	Loss of 350 jobs and $13 million in value of business output.

TABLE 3.14-11
Proposed Project Component and Aggregated Socioeconomic Impacts Using Only Fallowing Conserving Water for Transfer

	Transfer Conservation by Fallowing and HCP (Salton Sea Portion) Approach 1	Transfer Conservation by Fallowing and HCP (Salton Sea Portion) Approach 2
Conservation and Transfer Impacts	Loss of 1,400 jobs and decrease in value of business output of $98 million.	Loss of 1,400 jobs and decrease in value of business output of $98 million.
Fallowing for IOP Impacts	Loss of 290 jobs and $16 million in value of business output.	Loss of 290 jobs and $16 million in value of business output.
HCP Impacts (IID Water Service Area Portion)	Loss of approximately 20 jobs and potential small increase in the value of business output.	Loss of approximately 20 jobs and potential small increase in the value of business output.
HCP Impacts (Salton Sea Portion)	Loss of up to 150 jobs and $10 million in business output.	Loss of up to 750 jobs and $52 million in business output.
	Short-term benefits from construction activities and temporary benefits from maintenance of wildlife habitat and hatcheries.	
Aggregate Impact	Loss of 1,860 jobs and $124 million in value of business output.	Loss of 2,460 jobs and $166 million in value of business output.

SALTON SEA

Water Conservation and Transfer

Impact S-5: Adverse change in regional economic conditions would be accelerated by up to 11 years. Implementation of Proposed Projects A through D would result in an acceleration of the adverse effects on Riverside and Imperial Counties by up to 11 years as compared to the Baseline conditions (see discussion under Alternative 1, No Project, below). Under the Proposed Project, all operational boat launching and mooring facilities would become non-operational in year 2007 (see Section 3.6, Recreation); under the Baseline they would become non-operational in year 2007. Also, as described in Section 3.2, Biological Resources, Proposed Project would accelerate the salinization of the Salton Sea, resulting in changes to the Sea's sport fishing industry. Relative to the Baseline, under the Proposed Project, the salinity of the Salton Sea would exceed the levels at which sargo, gulf croaker, and tilapia could successfully reproduce 1, 5, and 11 years earlier (i.e., 2007, 2010, and 2012, respectively). As for the baseline condition, continued reproduction by corvina is uncertain at the Sea's current salinity. Above these salinity levels, the populations of these sport fish would be expected to decline and eventually be eliminated. The present value of the lost business output over this period would be about $790 million (present value of $80 million 1987 dollars escalated at 2.2 percent and discounted at 5.4 percent for the 12 years 2012 to 2023).

This annual lost contribution to the economies of the area surrounding the Salton Sea is derived from estimates published in a report to CDFG (CIC 1989). This annual contribution to the regional economy associated with recreational uses of the Salton Sea should be considered an upper bound. It is based on a 1987 survey that estimated annual visitation of 2.6 million visitor days with a daily level of local expenditures of almost $7 per person per day. The report indicates that almost three-quarters of the local expenditures are made on groceries; gasoline and transportation; meals and snacks out; and parking, camping, or R.V. fees.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

The implementation of HCP (Salton Sea Portion) Approach 1 is not anticipated to change the data at which Salton Sea-based recreation activities would become infeasible; therefore, it would not have any socioeconomic impact on the Salton Sea geographic subregion. The potential beneficial impacts of the activities associated with the construction, operation, and maintenance of the hatchery and ponds are discussed in the IID water service area and AAC HCP Approach 1 section.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-S-6: Total offset of adverse economic impacts of accelerating the loss of recreation activities described as Impact S-5. The implementation of HCP (Salton Sea Portion) Approach 2 would result in the same quantity of water flowing to the Salton Sea as under the Baseline for the Proposed Project and Alternatives 2, 3 and 4. Therefore the adverse economic impacts of accelerating the demise of sportfishing and other current Salton Sea-based recreation activities (described as Impacts S-5, A2-S-2, A3-S-3 and A4-S-2) would not occur.

HCP impacts would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

3.14.3.4 Alternative 1: No Project

LOWER COLORADO RIVER

Under the No Project alternative, the existing pattern of socioeconomic conditions in the LCR subregion would be maintained.

IID WATER SERVICE AREA AND AAC

Under the No Project alternative, the existing socioeconomic conditions of Imperial County would continue in a pattern similar to historic conditions. This would include the continuation of the historic fluctuations in farm and non-farm employment, as described in Section 3.14.2.

SALTON SEA

Under the Baseline conditions, which are defined and modeled in Section 3.1, Hydrology and Water Quality, the level of the Salton Sea would continue to decrease and the salinity would continue to increase. The No Project alternative is essentially the same as the Baseline in terms of the rate of decrease of the elevation and surface area of the Sea and the resulting effects on recreation. Under the Baseline, all operational boat launching and mooring facilities would become non-operational in year 2010 (see Section 3.6, Recreation). Also, as described in Section 3.2, Biological Resources, under Baseline conditions, the Salton Sea is predicted to become too saline to support successful reproduction of sargo, gulf croaker, and tilapia in years 2008, 2015, and 2023, respectively. Continued reproduction by corvina is uncertain at the Sea's current salinity. Above these salinity levels, the population of sport fish is expected to decline and eventually be eliminated. A worst-case scenario would be that all recreation activity, which resulted in approximately $80 million dollars of business output in 1987, would be lost to the Imperial and Riverside county economies every year after the ultimate decline of the sport fishing industry, under the Baseline and Alternative 1, No Project.

This annual contribution to the economies of the area surrounding the Salton Sea is an upper bound, which was derived from estimates published in a report to CDFG (CIC 1989). The contribution It is based on a 1987 survey that estimated annual visitation of 2.6 million visitor days with a daily level of local expenditures of almost $7 per person per day. The report indicates that almost three-quarters of the local expenditures are made on groceries; gasoline and transportation; meals and snacks out; and parking, camping, or R.V. fees.

3.14.3.5 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

In Alternative 2, IID would conserve and transfer 130 KAFY to SDCWA. This represents the minimum quantity of water that could be conserved and transferred under the terms and conditions of the IID/SDCWA Transfer Agreement. Alternative 2 involves conserving all 130 KAFY of water through on-farm irrigation system improvements. This would require the installation and operation of TRS on 2,441, fields of 80 acres each.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A2-S-1: Net addition of 430 jobs and increase in business output of $33 million with conservation by on-farm irrigation system improvements and/or water delivery system improvements only. Figure 3.14-6 shows the employment impacts of Alternative 2. Under Alternative 2, a total of 430 jobs would be created, with the majority in the construction, trade, and services sectors. No sectors of the economy would see decreases in employment. The net increase in employment expected under Alternative 2 is less than 1 percent over year 2000 employment levels.

FIG 3.14-6
Net employment impacts by economic sector from on-farm irrigation system improvements and/or water delivery system improvements for Alternative 2, program year-block 7

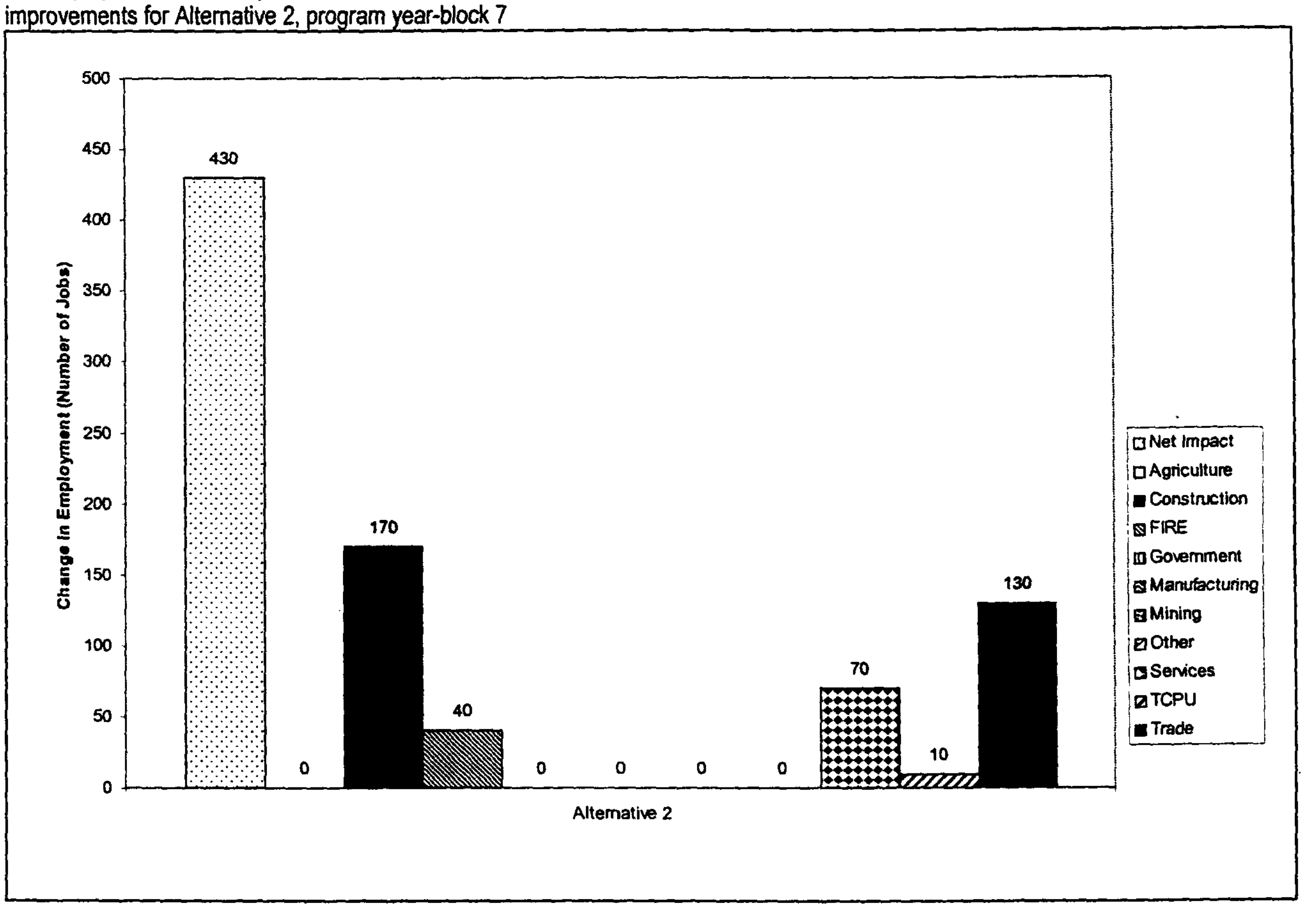
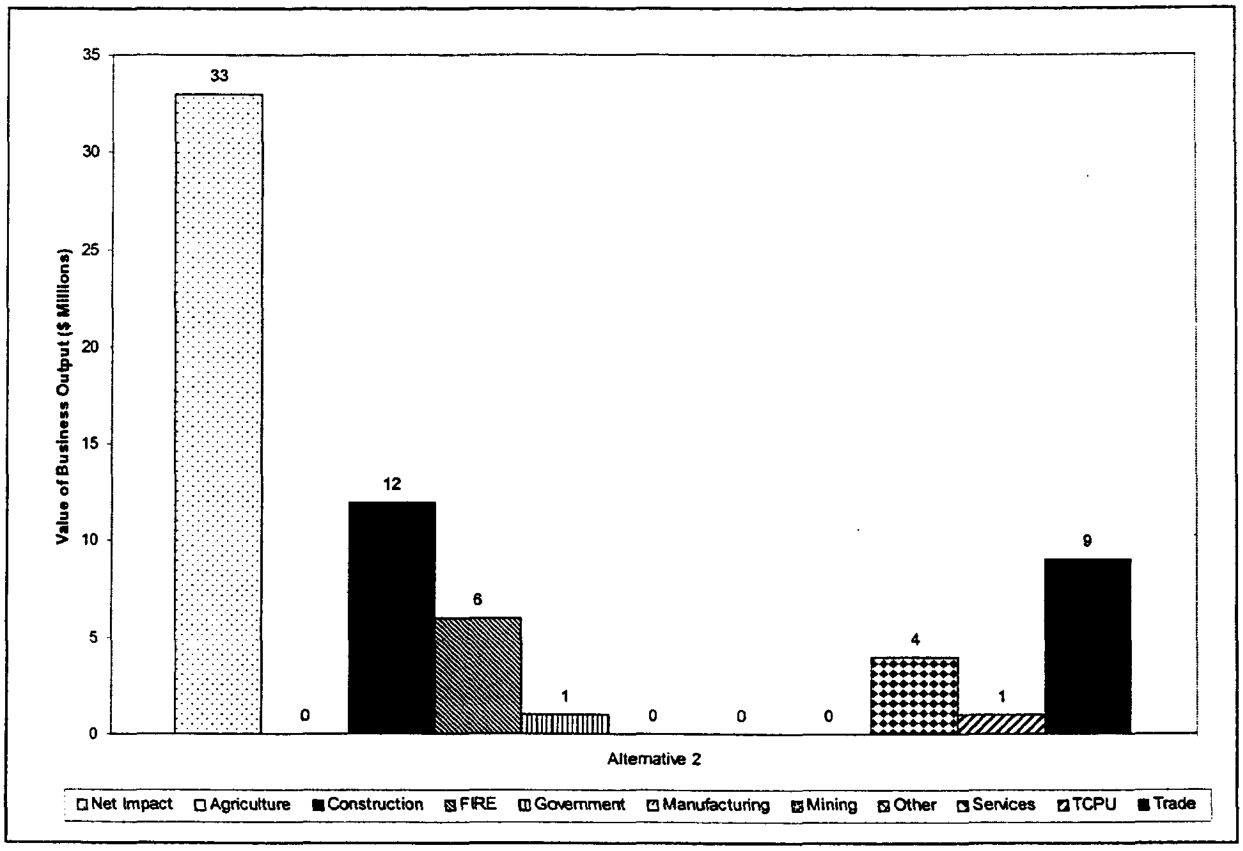


Figure 3.14-7 shows the effect of Alternative 2 on the value of business output. The total county economy would see an expansion of about $33 million, with the construction and trade sectors accounting for the majority of the increase. This net increase represents approximately 0.7 percent of the year 2000 total county output estimate of $4.8 billion. No economic sectors would see reductions in the value of goods and services produced under Alternative 2.

FIG 3.14-7
Net value of business output impacts by economic sector from on-farm irrigation system improvements and/or water delivery system improvements for Alternative 2, program year-block 7



SALTON SEA

Water Conservation and Transfer

Impact A2-S-2: Adverse change in regional economic conditions would be accelerated by up to 11 years. The conservation and transfer of 130 KAFY would result in an acceleration of the adverse effects on Riverside and Imperial Counties by up to 11 years, compared to the Baseline conditions (see discussion under Alternative 1, No Project). The present value of lost business output over this period would be about $790 million (present value of $80 million 1987 dollars escalated at 2.2 percent and discounted at 5.4 percent for the 12 years 2012 to 2023).

This annual lost contribution to the economies of the area surrounding the Salton Sea is derived from estimates published in a report to CDFG (CIC 1989). This annual contribution to the regional economy associated with recreational uses of the Salton Sea should be considered an upper bound. It is based on a 1987 survey that estimated annual visitation of 2.6 million visitor days with a daily level of local expenditures of almost $7 per person per day. The report indicates that almost three-quarters of the local expenditures are made on groceries; gasoline and transportation; meals and snacks out; and parking, camping, or R.V. fees.

3.14.3.6 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

Under Alternative 3, up to 230 KAFY would be conserved, with 130 KAFY transferred to SDCWA. One hundred KAFY would be transferred to CVWD and/or MWD. To represent the full range of effects for this alternative, two implementations have been analyzed. Alternative 3A involves conserving all 230 KAFY of water through on-farm irrigation system improvements. The conservation of this quantity of water would require the installation and operation of on-farm irrigation system improvements on 4,319 fields of 80-acres each. The 100 KAFY of water conserved and transferred for the QSA would be transferred to MWD. This situation would benefit IID and the local economy because under the terms of the QSA, MWD would pay IID a higher price for transferred water.

Alternative 3B represents the worst-case scenario for this alternative, conserving 230 KAFY by land fallowing. This would require an amendment to the IID/SDCWA transfer agreement which stipulates at least 130 KAFY be conserved by on-farm system improvements. Conserving 230 KAFY would require the fallowing of about 40,850 acres of land. As with Alternative 3A, 130 KAFY would be transferred to SDCWA. Of the remaining 100 KAFY, 50 KAFY would be transferred to CVWD, and the other 50 KAFY would be transferred to CVWD and/or MWD.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-S-1: Net addition of 660 jobs and increase in business output of $51 million with conservation by on-farm irrigation system improvements and/or water delivery system improvements only. The net impact of conservation by on-farm irrigation system improvements and/or water delivery system improvements is represented by Alternative 3A. Figure 3.14-8 shows the net employment impacts by economic sector. A total of 660 jobs would be anticipated to be created, representing a 1.3 percent increase of year 2000 employment levels. The construction, trade, and services sectors would experience the majority of the beneficial effects, and no economic sectors would experience loss of jobs.

Figure 3.14-9 shows the net increases in the value of business output associated with conserving water by on-farm irrigation system improvements and/or water delivery system improvements. The value of business output would increase by approximately $51 million, with the construction, trade, and service sectors seeing the majority of the beneficial effect. This increased business output represent about a 1 percent increase over the year 2000 estimate of $4.8 billion.

Impact A3-S-2: Net loss of 1,090 jobs and reduction in business output of $76 million with conservation by fallowing only. Figure 3.14-10 shows the anticipated employment impacts for Alternative 3 B, program year-block 7. Net job decreases are anticipated to be 1,090 jobs. The agriculture sectors experience the majority of the employment decreases. The net employment decrease of 1,090 jobs is about 2.2 percent of the year 2000 total county employment of 48,900. Focusing on the agricultural sectors alone, a total of 990 agricultural sector jobs are assumed to be lost, representing about 8 percent of the total county agricultural employment estimate of 11,300 jobs.

FIG 3.14-8
Net employment impacts by economic sector from on-farm irrigation system improvements and/or water delivery system improvements for Alternative 3 A, program year-block 7

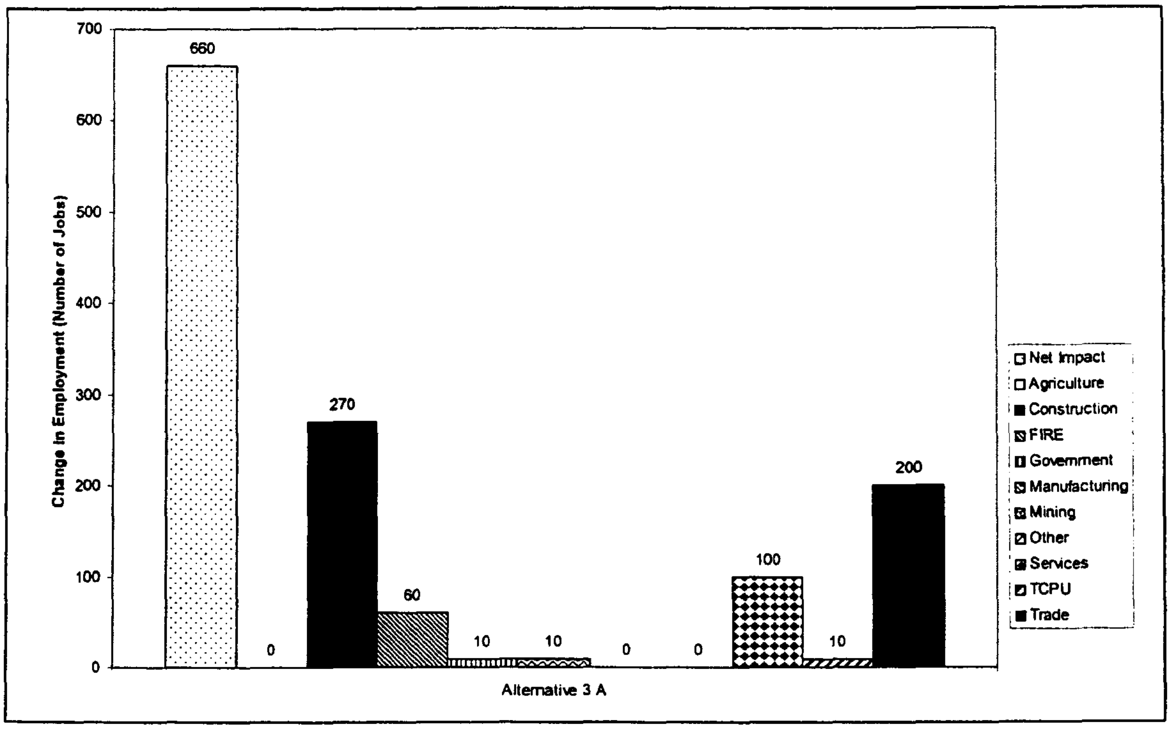


FIG 3.14-9
Net value of business output impacts by economic sector from on-farm irrigation system improvements and/or water delivery system improvements for Alternative 3 A, program year-block 7

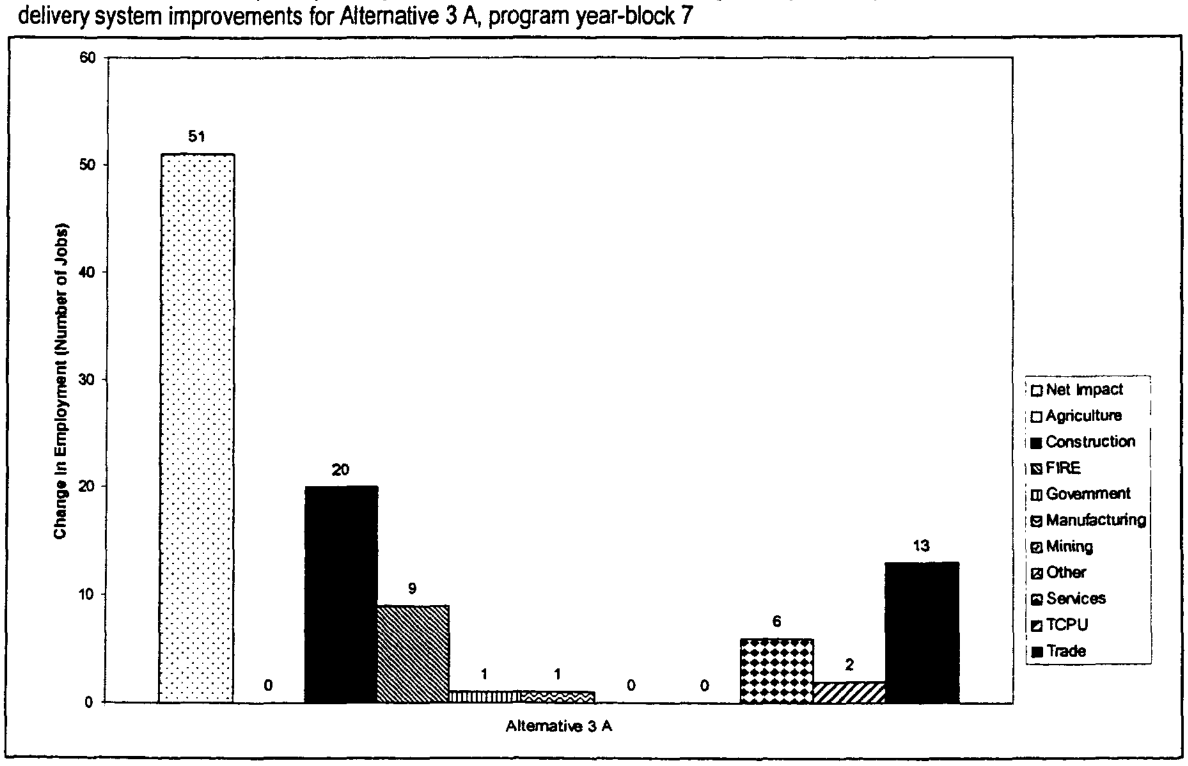


FIG 3.14-10
Net employment impacts by economic sector from fallowing for Alternative 3 B, program year-block 7

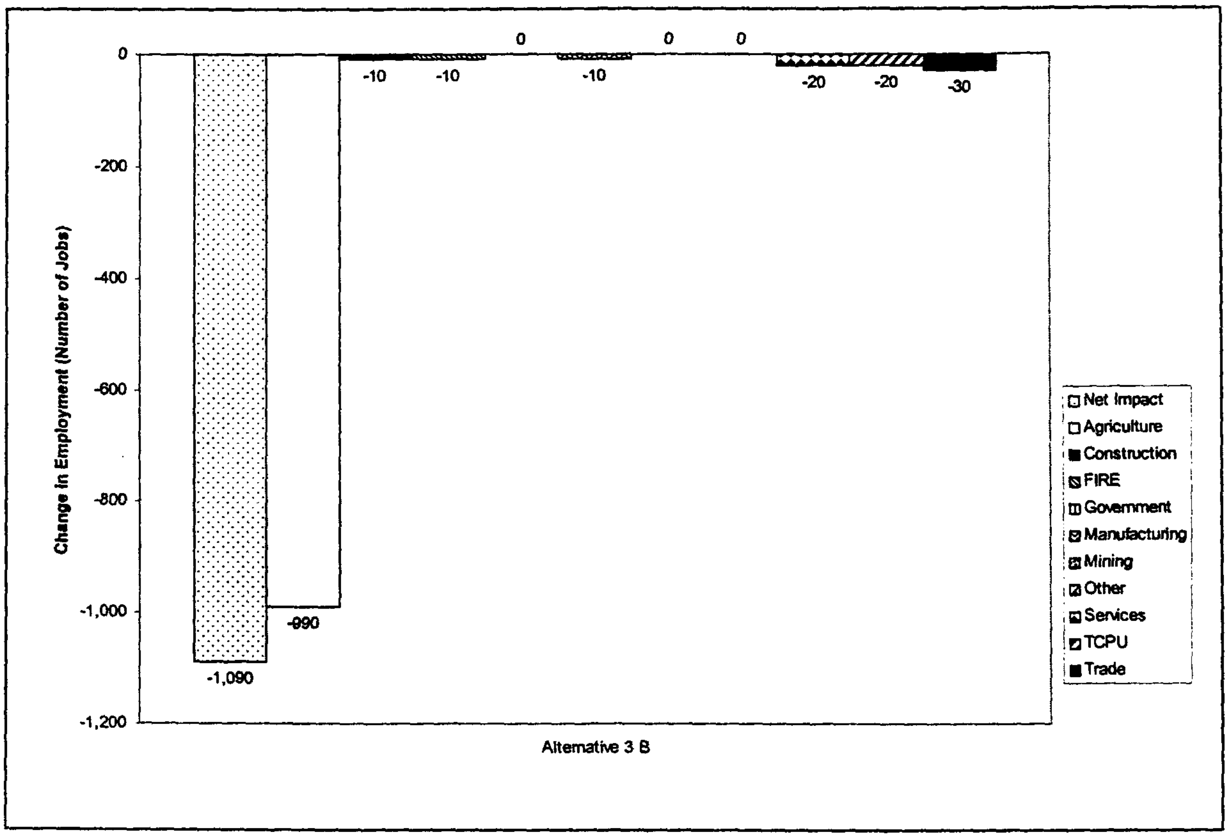


Figure 3.14-11 provides a graphic comparison of the adverse impacts of fallowing for conservation relative to the counties' annual employment levels and 10-year historical employment variation, for the agricultural sector and for net total county employment. From 1991 to 2000, total farm employment has ranged from 11,300 to 14,500 for a variation of 3,200 jobs. The estimated change in agricultural jobs associated with Alternative 3 B represents about 31 percent of this annual variability over the past 10 years. During this same time period, total county employment has ranged from 51,000 to 44,100, a historic variation of 6,900 jobs. The net employment loss associated with Alternative 3 B of 1,090 jobs represents about 16 percent of this historical variation.

FIG 3.14-11
Comparison of Alternative 3 B employment losses to annual employment levels and 10-year historic variation, for total county employment and agricultural employment

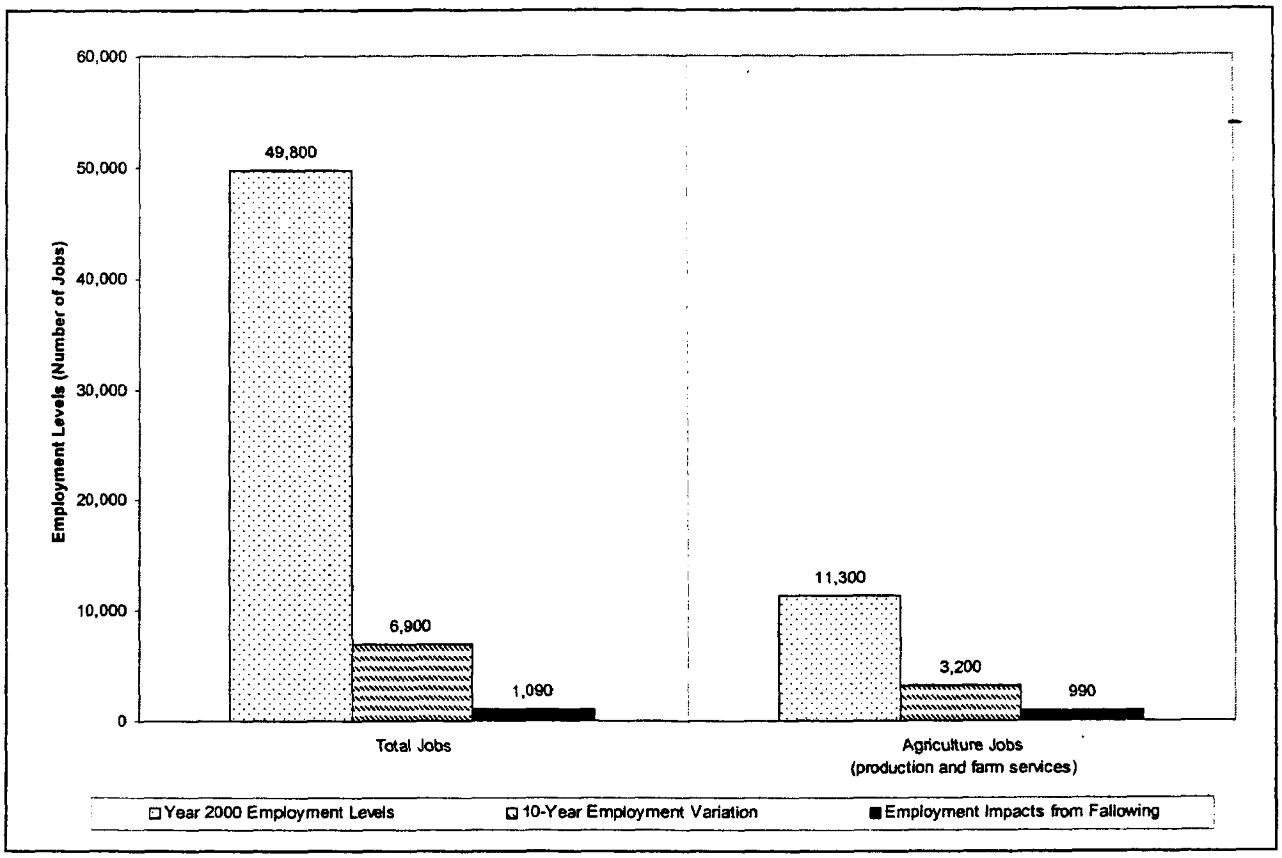


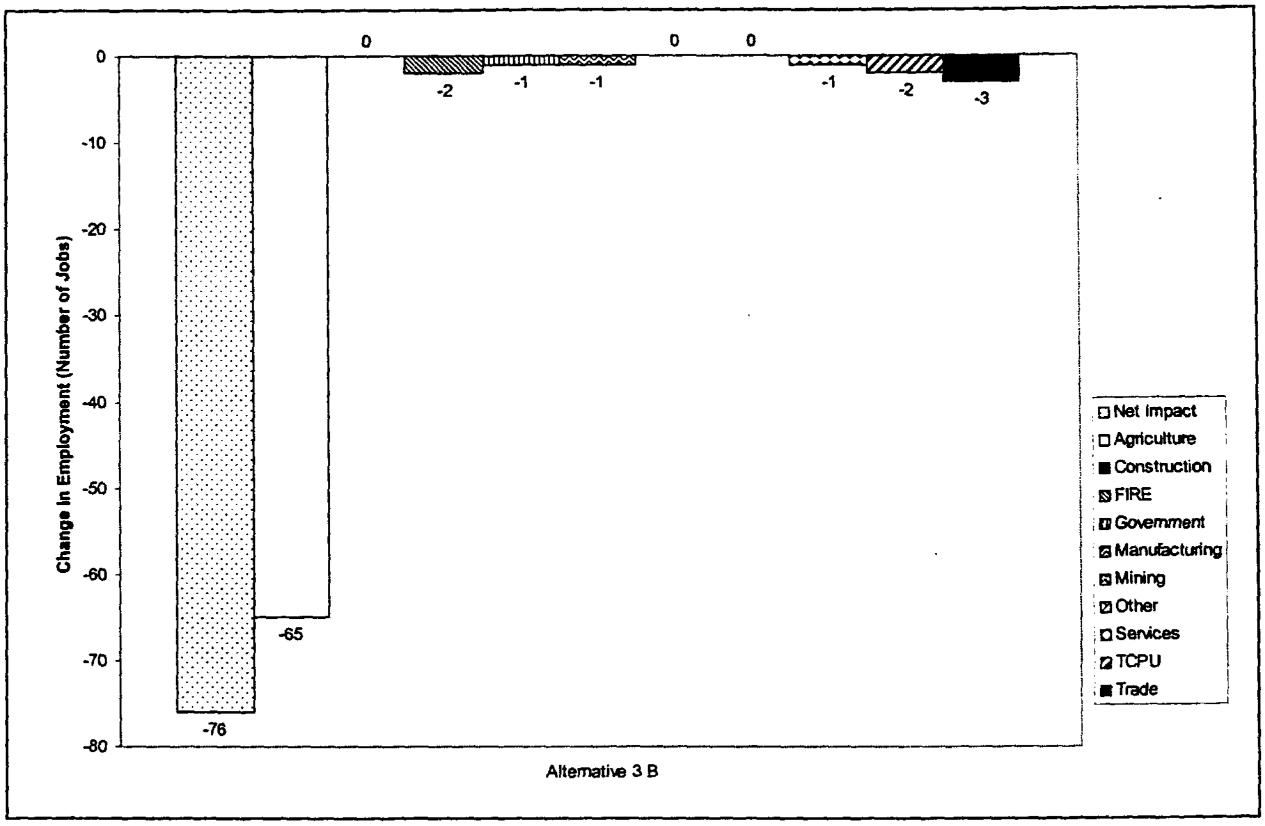
Figure 3.14-12 shows the adverse impacts to the value of business output anticipated from Alternative 3 B. The net decrease in the value of business output is estimated to be $76 million, representing approximately 1.6 percent of the estimated $4.8 billion total value of business output for Imperial County. As is true for employment impacts, the agricultural sectors would experience the majority of the adverse effects.

SALTON SEA

Water Conservation and Transfer

Impact A3-S-3: Adverse change in regional economic conditions would be accelerated by up to 11 years. The conservation and transfer of up to 230 KAFY would result in an acceleration of the adverse effects on Riverside and Imperial Counties by up to 11 years, compared to the Baseline conditions (see discussion under Alternative 1, No Project, below). The present value of the lost business output over this period would be about $790 million (present value of $80 million 1987 dollars escalated at 2.2 percent and discounted at 5.4 percent for the 12 years 2012 to 2023).

FIG 3.14-12
Net value of business output impacts by economic sector from fallowing for Alternative 3 B, program year-block 7



This annual lost contribution to the economies of the area surrounding the Salton Sea is derived from estimates published in a report to CDFG (CIC 1989). This annual contribution to the regional economy associated with recreational uses of the Salton Sea should be considered an upper bound. It is based on a 1987 survey that estimated annual visitation of 2.6 million visitor days with a daily level of local expenditures of almost $7 per person per day. The report indicates that almost three-quarters of the local expenditures are made on groceries; gasoline and transportation; meals and snacks out; and parking, camping, or R.V. fees.

3.14.3.7 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A4-S-1: Net loss of 1,400 jobs and reduction in business output of $98 million with conservation by fallowing only. Alternative 4 assumes that a total of 300 KAFY would be conserved by fallowing. For Alternative 4 to be implemented, the IID/SDCWA Transfer Agreement would have to be modified. These are the same as the worst-case conditions analyzed for the Proposed Project, in which fallowing is used to conserve all water. The reader is directed to the impact discussion of Proposed Projects C and D for the impacts of Alternative 4.

SALTON SEA

Water Conservation and Transfer

Impact A4-S-2: Adverse change in regional economic conditions would be accelerated by up to 11 years. The conservation and transfer of up to 300 KAFY would result in an acceleration of the adverse effects on Riverside and Imperial Counties by up to 11 years as compared to the Baseline conditions (see discussion under Alternative 1, No Project, below). The present value of the lost business output over this period would be about $790 million (present value of $80 million 1987 dollars escalated at 2.2 percent and discounted at 5.4 percent for the 12 years 2012 to 2023).

This annual lost contribution to the economies of the area surrounding the Salton Sea is derived from estimates published in a report to CDFG (CIC 1989). This annual contribution to the regional economy associated with recreational uses of the Salton Sea should be considered an upper bound. It is based on a 1987 survey that estimated annual visitation of 2.6 million visitor days with a daily level of local expenditures of almost $7 per person per day. The report indicates that almost three-quarters of the local expenditures are made on groceries; gasoline and transportation; meals and snacks out; and parking, camping, or R.V. fees.

3.15 Environmental Justice

3.15.1 Introduction and Summary

This section describes environmental justice concepts and issues related to federal actions in three of the four geographic subregions: LCR, IID water service area and AAC, and the Salton Sea. An evaluation of environmental justice effects was not performed for the SDCWA service area because the Project does not provide increased water supply within the service area, and no new construction would occur. The Project would increase the reliability of the water supply for the SDCWA and such benefits would be distributed evenly throughout the service area. Thus, no disproportionate effects would occur within the SDCWA service area, and this area was excluded from further analysis. The direct effects of the federal actions would occur: (1) along the LCR as a result of the Secretary's IA to change the locations of diversions along the River; and (2) in the IID water service area and Salton Sea because USFWS will approve an Incidental Take Permit within these two areas. Table 1-2 in Chapter 1 of this Draft EIR/EIS further describes the federal actions related to the Proposed Project.

The purpose of the environmental justice evaluation is to determine whether the federal actions would disproportionately affect minority and low-income areas. Information on population, demographic characteristics, and income for the three geographic subregions is provided in Section 3.15.2. US Census Bureau income and demographic data were used to identify those communities within the Project region of influence that would be considered low-income or have a high minority and/or Hispanic population compared to the counties in which they are located. Within this section, the term "minority" includes Hispanic population groups (even though the percentage of Hispanics in the Project area exceeds 70 percent).

Table 3.15-1 summarizes the environmental justice impacts of federal actions of the Proposed Project and alternatives for the three geographic subregions.

TABLE 3.15-1
Summary of Environmental Justice Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Same as existing condition.	No impact.	No impact.	No impact.

TABLE 3.15-1
Summary of Environmental Justice Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
IID WATER SERVICE AREA AND AAC				
EJ-1: Potential Effects on Minority and Low-Income Populations.	Same as existing condition.	No impact.	**A3-EJ-1: Potential Effects on Minority and Low-Income Populations.**	**A4-EJ-1: Potential Effects on Minority and Low-Income Populations.**
HCP2-EJ-1: Potential Effects on Minority and Low-Income Populations.	Same as existing condition.	**Same as HCP2-EJ-1.**	**Same as HCP2-EJ-1.**	**Same as HCP2-EJ-1.**
SALTON SEA				
No impact.	Same as Baseline condition.	No impact.	No impact.	No impact.
SDCWA SERVICE AREA				
No impact.	Same as existing condition.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.15.2 Regulatory Framework

3.15.2.1 Federal Regulations and Standards

In 1994, the President of the US issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." The objectives of the Executive Order include developing federal agency implementation strategies, identifying minority and low-income populations where proposed federal actions could have disproportionately high and adverse human health and environmental effects, and encouraging the participation of minority and low-income populations in the NEPA process. For the Proposed Project and alternatives, an analysis was performed to determine whether any of the adverse effects associated with the federal actions would disproportionately affect low-income or minority populations.

3.15.3 Environmental Setting

3.15.3.1 Lower Colorado River

Reclamation performed an analysis of environmental justice effects within the LCR geographic subregion as part of the Draft IA EIS (Reclamation 2002). This analysis identified census tracts in the subregion that contain minority populations. In some census tracts, the percentage of minorities exceed the county average for these population groups. Figure 3.15-1 shows the locations of these census tracts. The Draft IA EIS also documented census tracts within the LCR geographic subregion that contain households with incomes below the poverty level. Poverty level, as defined by the federal government, is used to define low-income households for the purpose of this analysis. In some census tracts, the percentage of low-income households exceeds the county average. Figure 3.15-2 shows which tracts within the subregion have a percentage of low-income households that exceeds the county average.

Some of the census tracts identified for the subregion area consist of tribal lands associated with the Fort Mohave Indian Reservation; Colorado River Indian Tribes; and the Chemehuevi, Quechan, and Cocopah Indian Tribes.

3.15.3.2 IID Water Service Area and AAC

The same approach used by Reclamation in the Draft IA EIS for the LCR subregion was also used for the IID water service area and AAC geographic subregion. Census tracts within the subregion were analyzed to identify those census tracts that are considered to have high minority populations and those tracts that have a percentage of low-income households that exceeds the county average. Figure 3.15-3 shows the locations of minority populations within the subregion. Figure 3.15-4 shows the census tracts with a percentage of low-income households that exceeds the county average.

Some of the census tracts identified for the subregion area consist of tribal lands associated with the Quechan Indian Tribe (Fort Yuma Indian Reservation). In addition, farm laborers, which are a predominantly low-income, minority population group, comprise a substantial component of the overall population demographics within the subregion, though they are not necessarily concentrated permanently at specific geographic locations.

3.15.3.3 Salton Sea

The census tract data for the Salton Sea geographic subregion has been included with the IID water service area and AAC subregion for this analysis. Low-income and minority population areas are shown on Figures 3.15-3 and 3.15-4. In addition to the farm laborer populations mentioned above, the Salton Sea subregion also includes the Torres Martinez Indian Reservation in the northern part of the subregion.

3.15.4 Impacts and Mitigation Measures

3.15.4.1 Methodology

Direct environmental effects associated with the Proposed Project's impacts were evaluated based on their physical proximity to communities that are classified as having high minority and/or low-income populations. Information regarding minority populations for census tracts located in the Project region of influence was obtained from the recent 2000 census (US Census Bureau 2000). Information regarding low-income populations was obtained from the 1990 census (US Census Bureau 1990). Year 2000 census data regarding income are not yet available for all of the Project's region of influence.

For the three geographic subregions analyzed in this section, data regarding minority populations were collected and reviewed for each census tract within the respective subregion. Countywide statistics were reviewed to determine the percentage of the population classified as non-Caucasian and the percentage classified as Hispanic. Using the county average for comparison, each of the census tracts in the study area was evaluated to determine whether the minority population percentages were greater than the county average. If a census tract percentage exceeded the county average, the tract was evaluated for environmental justice effects based on its minority population.

The second criteria for an environmental justice analysis is income. To determine the locations of low-income populations, the income data for each county in the subregions was reviewed to determine the countywide percentage of households that have incomes below poverty levels. Then, the individual census tracts were evaluated to determine the percentage of households within the tract that have incomes below poverty levels. If a census tract percentage exceeded the county average, the tract was included in the analysis based on income levels.

Once the minority and low-income tracts had been identified for each subregion to be analyzed, the environmental effects of the Proposed Project and alternatives were analyzed to determine whether those impacts disproportionately affect the low-income and minority tracts compared to other census tracts.

The analysis of environmental justice effects for the LCR geographic subregion has already been performed by Reclamation in the Draft IA EIS. The conclusions of this analysis are summarized below.

Subregions Excluded from Impact Analysis. An evaluation of environmental justice effects was not conducted for the SDCWA service area because no impacts are anticipated in that subregion, as stated previously in Section 3.15.1.

3.15.4.2 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

As documented by Reclamation in the Draft IA EIS (Reclamation 2002), the Proposed Project would result in a slight lowering of the surface water elevation along the LCR. This could have an adverse effect on biological resources in this area, particularly riparian and aquatic communities. These changes would occur throughout this reach of the river, affecting each community to an approximately equal degree. For this reason, the Proposed Project would not have a disproportionate effect on any low-income and minority populations.

Reclamation also evaluated environmental justice effects associated with the IOP and biological conservation measures in the USFWS' Biological Opinion and found that no disproportionate effects would result from these actions.

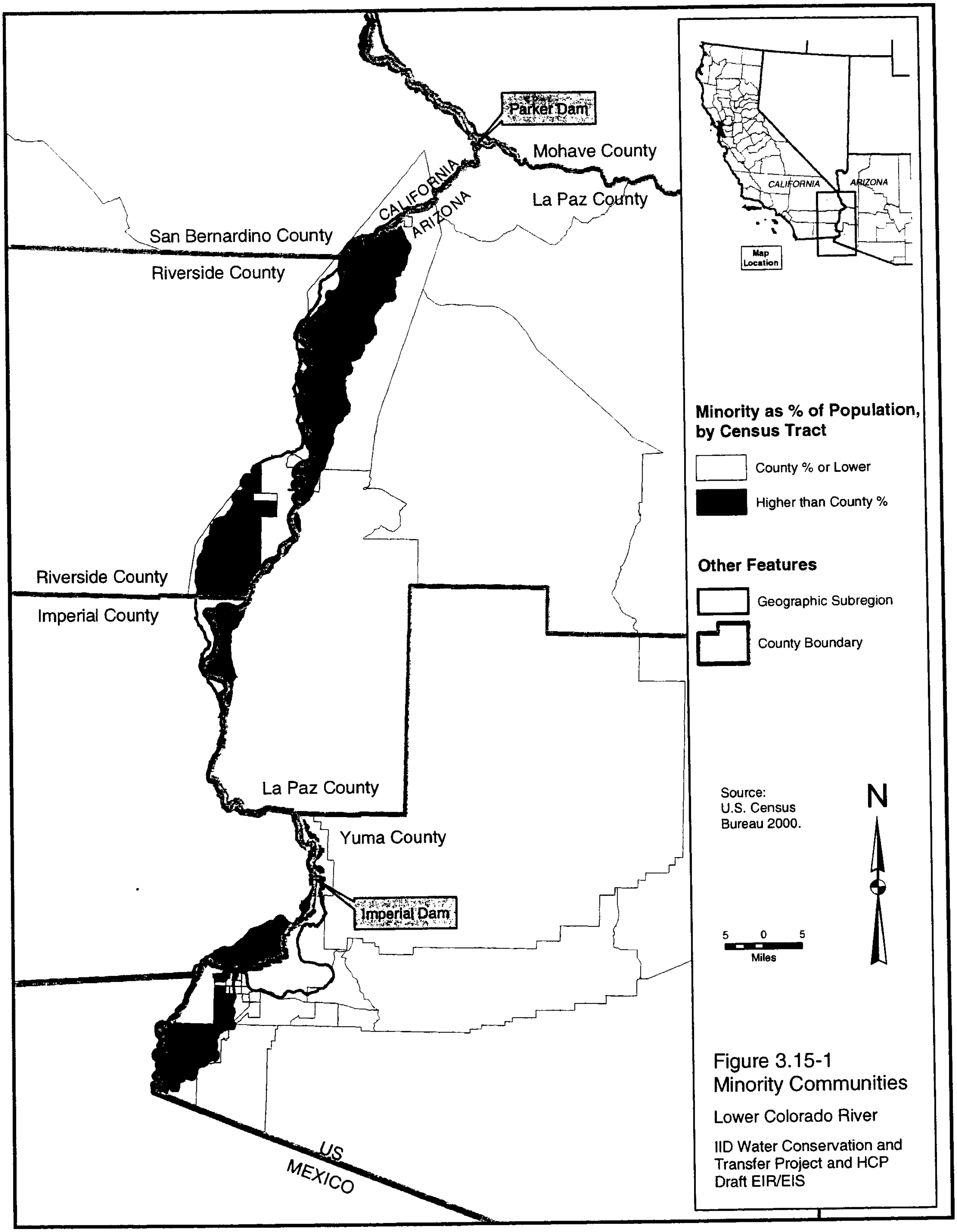


Figure 3.15-1
Minority Communities

Lower Colorado River

IID Water Conservation and Transfer Project and HCP Draft EIR/EIS

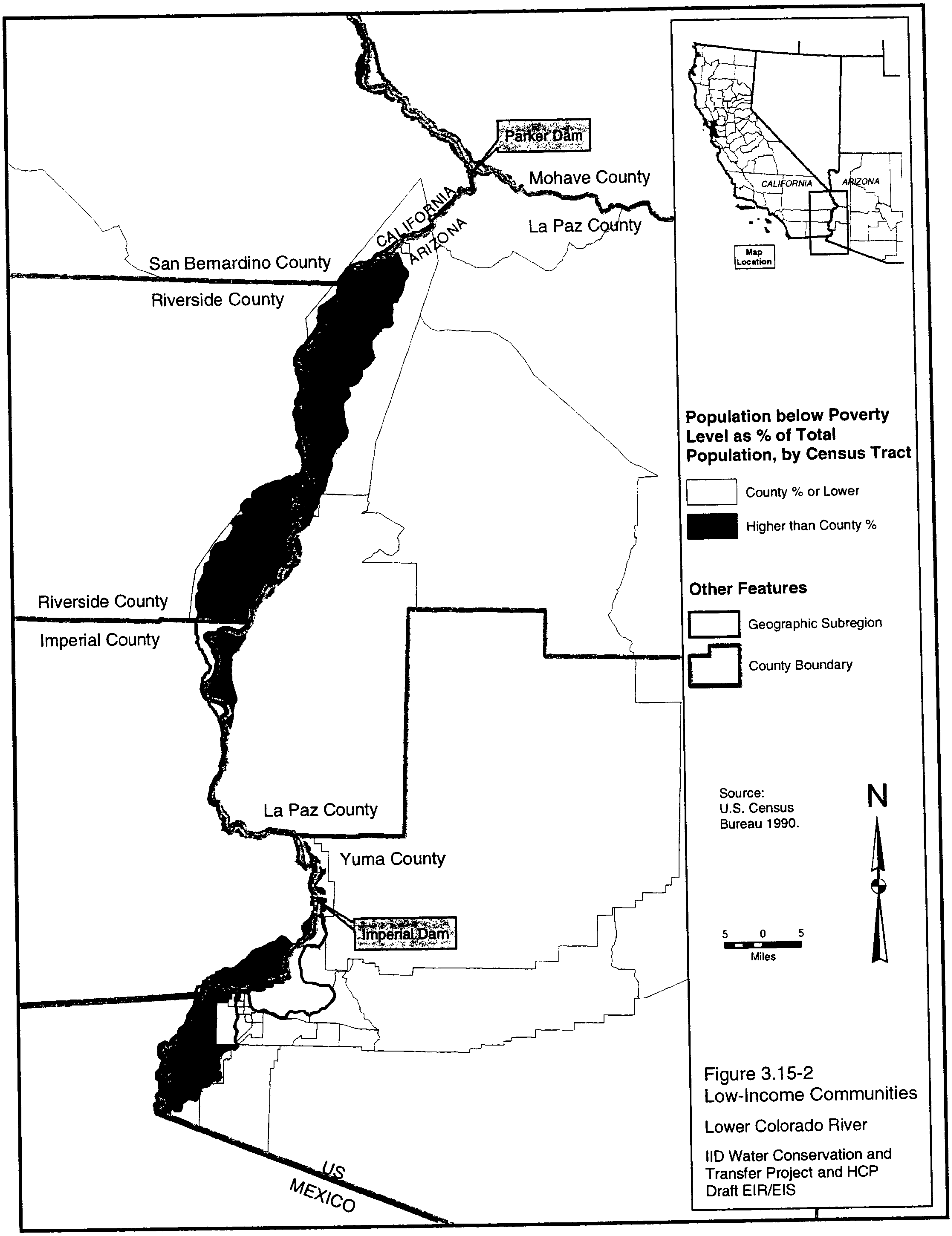


Figure 3.15-2
Low-Income Communities
Lower Colorado River
IID Water Conservation and Transfer Project and HCP Draft EIR/EIS

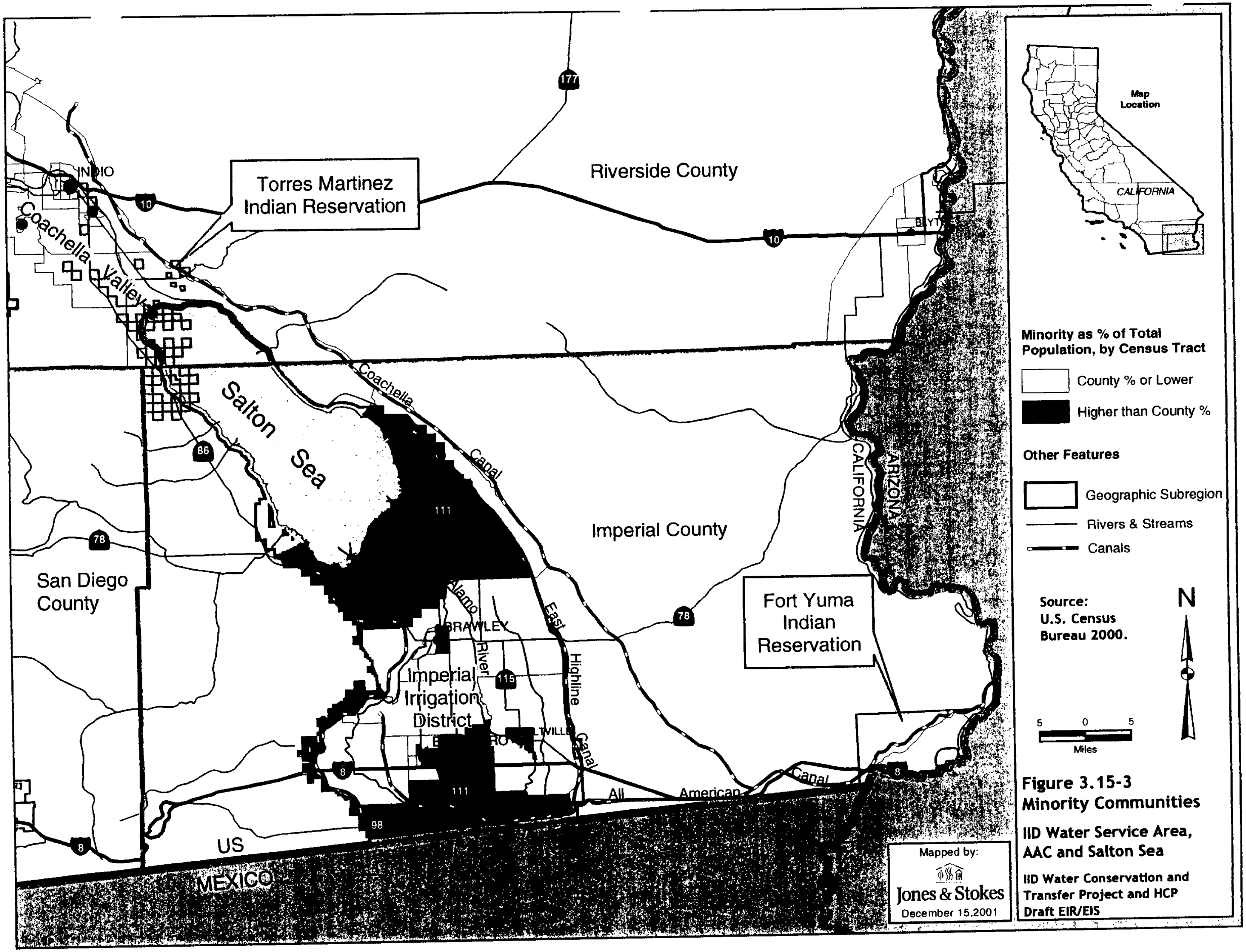


Figure 3.15-3
Minority Communities

IID Water Service Area, AAC and Salton Sea

IID Water Conservation and Transfer Project and HCP Draft EIR/EIS

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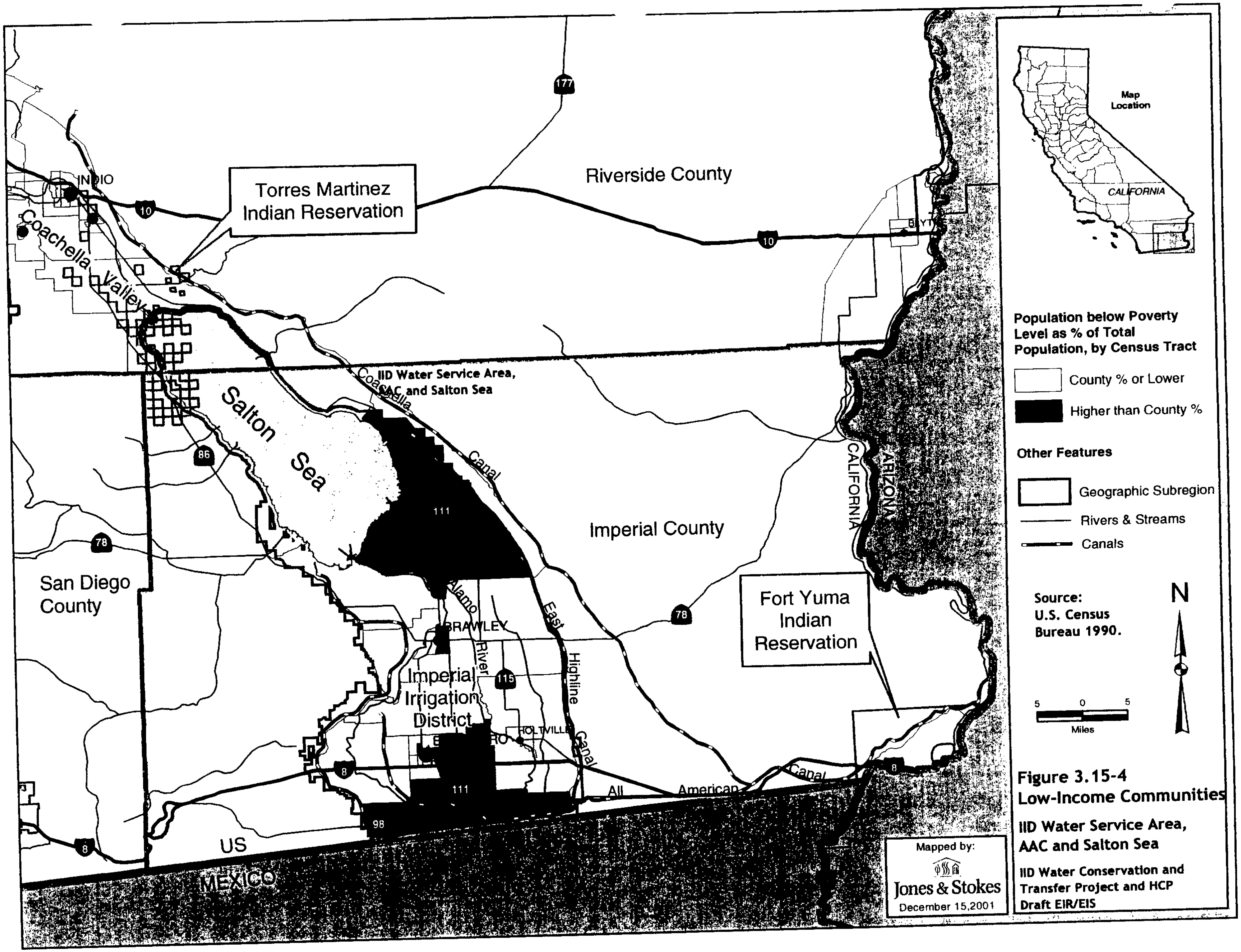

Figure 3.15-4
Low-Income Communities
IID Water Service Area, AAC and Salton Sea
IID Water Conservation and Transfer Project and HCP Draft EIR/EIS

19554

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact EJ-1: Potential Effects on Minority and Low-Income Populations. As indicated on Figures 3.15-3 and 3.15-4, several areas within this subregion have minority and low-income census tracts. Although such populations exist in specific areas within the subregion, the environmental effects associated with water conservation and transfer would not disproportionately affect those areas specifically. Rather, physical impacts would occur throughout the subregion at locations to be determined based on technically feasibility and other factors.

No tribal lands would be disproportionately affected within this subregion. However, farm laborers could be affected as a group by fallowing activities and on-farm irrigation system conservation measures, which would reduce the demand for farm labor in some areas. This effect would not disproportionately affect a specific community or area but could affect farm laborers, which are predominantly minority and low-income, as a population group. At the present time, no specific locations for fallowing have been identified. Under the worst case, up to 50,000 acres could be fallowed to provide conserved water for the transfer. Another 25,000 acres could be fallowed to provide water for mitigation. The locations of land to be fallowed will depend on the willingness of the farmer to do so. Crop selection would likely have a role in determining the locations of fallowed lands. For example, lands that support lower value crops, such as hay, may tend to be the first to be fallowed.

Inadvertent Overrun and Payback Policy (IOP)

In addition to the acres described above, under the IOP another 9,800 acres of land may be fallowed to meet the requirements of the policy.

As described in Section 3.14, "Socioeconomics," the estimated worst case for the loss of farm employment is 1,400 jobs. To put this into context, this represents approximately 2.8 percent of the year 2000 total county employment of 48,900. Focusing on the agricultural sectors alone, this loss of farm employment represents about 12 percent of the total county agricultural employment estimate of 11,300 jobs.

Impacts resulting from the implementation of the IOP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

Habitat Conservation Plan (HCP) (IID Water Service Area Portion)

Implementation of the HCP would not have any disproportionate effects on minority and low-income populations within the IID water service area. Any physical changes within the service area resulting under the HCP would be related to creation of habitat and minimizing disturbance and mortality/injury to covered species and would involve relatively small acres of land. Farm laborer and tribal populations would not be adversely affected.

HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

This approach has only been developed to a programmatic level at this point, and the nature and extent of physical impacts are not known at this time. One of the potential measures under this approach would be creation of 5,000 acres of fish ponds and one or more hatcheries, which could be located on irrigated farmland. If this occurs, a decrease in farm employment could result; however, this effect is still speculative at this point. Details related to this approach will be evaluated for specific project-level impacts at a future date, as necessary. No disproportionate effects on minority or low-income communities, including tribal and farm laborer populations, have been identified thus far under this approach.

HCP (Salton Sea Portion) Approach 2 (HCP2): Use of Conserved Water as Mitigation

Impact HCP2-EJ-1: Potential Effects on Minority and Low-Income Populations. Under this HCP approach, there is the potential for fallowing up to 75,000 acres of land under worst-case conditions. Up to 50,000 acres could be fallowed to provide conserved water for the transfer. Another 25,000 acres could be fallowed to provide water for mitigation. Additionally, fallowing may also be required to comply with the IOP, as described above. As noted previously, land fallowing has the potential to directly affect farm laborer populations depending on the scale of the fallowing program that is implemented. The effect on this population group would be a loss of employment resulting from the reduction in acres that are in agricultural production. It should be noted that 75,000 acres is a worst-case scenario, and that the number of acres to actually be fallowed may be substantially less, with a correspondingly smaller overall effect on farm employment. No other disproportionate effects are expected with respect to other minority and low-income communities, including tribal groups.

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

SALTON SEA

Water Conservation and Transfer

Within the Salton Sea geographic subregion, this component of the Proposed Project would accelerate the decline of the Salton Sea's elevation and water quality, and induce other environmental effects that have been described elsewhere in this Draft EIR/EIS. The environmental effects in this subregion would directly impact communities and landowners located along the shoreline of the Salton Sea, which includes minority and low-income communities. The Torres Martinez Indian Reservation is included within the areas that would be impacted. Although the environmental effects for this component of the Project would be significant within this subregion, these effects would generally impact all communities along the shoreline in an equal fashion. No disproportionate effects are expected to occur within this subregion.

3.15.4.3 Alternative 1: No Project

LOWER COLORADO RIVER

If the No Project alternative were to be implemented, conditions in the LCR geographic subregion would not change dramatically. The changes that would occur would not produce physical conditions that would adversely or disproportionately affect low-income or minority populations (Reclamation 2002).

IID WATER SERVICE AREA AND AAC

Under the No Project alternative, a land fallowing program would not be implemented and there would be no loss of farm employment to farm laborers within the IID water service area. No disproportionate effects to minority or low-income populations would result.

SALTON SEA

As discussed above, a land fallowing program would not be implemented in the Salton Sea subregion under the No Project Alternative and there would be no loss of farm employment to farm laborers within the study area. No disproportionate effects to minority or low-income populations would result.

3.15.4.4 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-Farm Irrigation System Improvements as Exclusive Conservation Method)

LOWER COLORADO RIVER

As described in Section 3.15.4.2, no environmental justice effects would occur with implementation of the Proposed Project in the LCR geographic subregion. This alternative would have even fewer impacts to the LCR's hydrology than the Proposed Project; no environmental justice effects would occur.

IID WATER SERVICE AREA AND AAC

Under this alternative, there would be no land fallowing component implemented as a water conservation method. Thus, there would be no loss of farm employment to farm laborer populations. No disproportionate effects to minority and low-income populations are expected under this alternative.

SALTON SEA

Under this alternative, there would be no land fallowing component used as a water conservation method. Thus, there would be no loss of farm to farm laborer populations. No disproportionate effects to minority and low-income populations are expected under this alternative.

3.15.4.5 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

As described in Section 3.15.4.2, no environmental justice effects would occur with implementation of the Proposed Project in the LCR geographic subregion. This alternative would have even fewer impacts to the LCR's hydrology than the Proposed Project; no environmental justice effects would occur.

IID WATER SERVICE AREA AND AAC

Impact A3-EJ-1: Potential Effects on Minority and Low-Income Populations. Under this alternative, fallowing would be used as one component of the overall water conservation strategy. As described under the Proposed Project, fallowing results in a loss of farm employment that directly affects farm laborers, a population primarily comprised of minority and low-income workers. No tribal lands would be disproportionately affected within this subregion.

As described in Section 3.14, "Socioeconomics," the net employment decrease of 1,090 jobs is about 2.2 percent of the year 2000 total county employment of 48,900. Focusing on the agricultural sectors alone, a total of 990 agricultural sector jobs are assumed to be lost, representing about 8 percent of the total county agricultural employment estimate of 11,300 jobs.

SALTON SEA

Under this alternative, there would be no land fallowing component used as a water conservation method in the Salton Sea subregion. Thus, there would be no loss of farm laborer employment. No disproportionate effects to minority and low-income populations are expected under this alternative.

3.15.4.6 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

As described in Section 3.15.4.2, no environmental justice effects would occur with implementation of the Proposed Project in the LCR geographic subregion. This alternative would have even fewer impacts to the LCR's hydrology than the Proposed Project; no environmental justice effects would occur.

IID WATER SERVICE AREA AND AAC

Impact A4-EJ-1: Potential Effects on Minority and Low-Income Populations. Under this alternative, fallowing would be used as one component of the overall water conservation strategy. As described under the Proposed Project, fallowing results in a loss of farm employment that directly affects farm laborers, a population primarily comprised of minority and low-income workers. No tribal lands would be disproportionately affected within this subregion.

As described in Section 3.14, "Socioeconomics," the estimated worst case for the loss of farm employment is 1,400 jobs. To put this into context, this represents approximately 2.8 percent of the year 2000 total county employment of 48,900. Focusing on the agricultural sectors alone, this loss of farm employment represents about 12 percent of the total county agricultural employment estimate of 11,300 jobs.

SALTON SEA

Under this alternative, there would be no land fallowing component used as a water conservation method in the Salton Sea subregion. Thus, there would be no loss of farm laborer employment. No disproportionate effects to minority and low-income populations are expected under this alternative.

3.16 Transboundary Impacts

19559

3.16 Transboundary Impacts

3.16.1 Introduction and Summary

This section describes transboundary impacts related to federal action in the LCR geographic subregion (see Table 1-2 in Chapter 1 for a description of the federal actions that are associated with the Proposed Project). The other geographic subregions are not discussed because either: (1) no federal action would occur in those subregions (e.g., SDCWA service area); or (2) no federal action would impact those subregions (IID water service area and AAC and Salton Sea).

NEPA directs federal agencies to analyze the reasonably foreseeable consequences of a project or action, regardless of where impacts might occur. Based on this, the CEQ has determined that NEPA requires agencies to include analysis of reasonably foreseeable transboundary impacts a project or action in their analysis of Proposed Projects in the US. The CEQ further states that such effects are best identified during the scoping stage, and should be analyzed to the best of the agency's ability using reasonably available information. Such analysis should be included in the environmental documentation for the Proposed Project (CEQ 1997).

Table 3.16-1 summarizes the transboundary impacts of the Proposed Project's and alternatives' federal actions LCR geographic subregion.

TABLE 3.16-1
Summary of Transboundary Impacts[1]

Proposed Project: 300 KAFY All Conservation Measures	Alternative 1: No Project	Alternative 2: 130 KAFY On-farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
LOWER COLORADO RIVER				
No impact.	Continuation of Baseline conditions.	No impact.	No impact.	No impact.
IID WATER SERVICE AREA AND AAC				
No impact.	Continuation of Baseline conditions.	No impact.	No impact.	No impact.
SDCWA SERVICE AREA				
No impact.	Continuation of Baseline conditions.	No impact.	No impact.	No impact.

[1] Programmatic level analyses of USFWS' biological conservation measures in LCR subregion and HCP (Salton Sea Portion) Approach 1: Hatchery & Habitat Replacement in Salton Sea subregion are not summarized in the table because no significance determinations have been made. Subsequent environmental documentation will be required if potential impacts are identified.

3.16.2 Regulatory Framework

3.16.2.1 Federal Regulations and Standards

As stated in Section 3.16.1, the CEQ determined that NEPA requires an analysis of transboundary impacts that could result from proposed federal actions in the US to be considered in an EIS. The analysis should include reasonably foreseeable transboundary impacts.

3.16.3 Environmental Setting

3.16.3.1 Lower Colorado River

The following information is from the Draft IA EIS (Reclamation 2002):

> ... from Morelos Dam at the NIB (the California-Mexico border), the Colorado River flows southwesterly, roughly paralleling the Arizona-Mexico border. After passing the SIB, the River flows southwest and receives tributary flows from the Rio Hardy before draining into the Sea of Cortez.
>
> The principal potential transboundary effect (with regard to water resources) relates to change in flows to Mexico. Flows in the reach of the Colorado River below Imperial Dam are primarily water to be delivered to Mexico in accordance with the 1944 Treaty. In December of each calendar year Mexico provides the United States with a monthly water order for the upcoming year. By Treaty, the order can be no less than 900 cfs and no more than 5,500 cfs during the months of January, February, October, November, and December; during other months the water order must be no less than 1,500 cfs and no more than 5,500 cfs. Daily water flows are not allowed to vary by more than 500 cfs.
>
> Much of the water intended for Mexico is diverted into the All-American Canal and is later returned to the Colorado River bed at the Siphon Drop and Pilot Knob powerplants. Only a portion of the Mexico deliveries remains in the River, passing through Imperial Dam to Morelos Dam. Flows below Morelos Dam are generally excess flows that result from (1) operational activities upstream (e.g., canceled water orders in the United States, maintenance activities, etc.); (2) a Gila River flood event; or (3) flood control releases along the mainstem of the Colorado River.
>
> Water released from Parker Dam under orders from irrigation districts in Imperial Valley, Coachella Valley, and the LCR Valley, normally takes up to three days to reach its point of diversion. Occasionally unforeseen events, such as localized precipitation, force the irrigation districts to cancel these water delivery orders after the water has been released at Parker Dam. Usually the water is diverted at Morelos Dam for use in Mexico; however, some of this water may flow past Morelos Dam. Gila River flood events are extremely rare. Only once has flow been recorded over 4,000 cfs at the Dome, Arizona, gaging station since 1941. In 1993 up to 27,500 cfs flowed past the Dome gaging station as a result of the 1993 Gila River flood (USGS and Reclamation 1999).
>
> Excess flows to Mexico are almost entirely due to flood control releases originating at Hoover Dam. As discussed in Section 3.1, these flood control releases are dictated by the flood control criteria established for Lake Mead and Hoover Dam and are dependent upon hydrologic conditions.

The waters of the Colorado River, once delivered to Mexico, are under the jurisdiction of Mexico. The 1994 US-Mexico Treaty contains no provisions requiring Mexico to provide water for environmental protection, nor any requirements relating to Mexico's use of that water. As flood flows arrive at Morelos Dam, Mexico has the discretion to divert more water than its water order or allow all the additional flows to move downstream of Morelos Dam. In the past Mexico has generally chosen to increase its diversion for use in agriculture for increased crop production and soil salinity improvement, or for diluting flows delivered at the SIB, municipal industrial uses, or to recharge groundwater aquifers in the Mexicali Valley.

Water Quality

Per Minute No. 242 of the US-Mexico Treaty, the United States must deliver water to Mexico with an average annual salinity concentration no greater than 115 ppm +/- 30 ppm over the average annual salinity concentration of the River at Imperial Dam. Thus, an increase in salinity at Imperial Dam directly translates to an allowable increase in salinity of water delivered to Mexico and an increase in salinity of water flowing past Morelos Dam. Average salinity at Imperial Dam for the period 1990 to 1997 varied from 702 to 797 mg/L, below the objective of 879 mg/L. Salinity is projected to increase at Imperial Dam to 980 mg/L by the year 2015 without additional controls (Reclamation 2002).

3.16.4 Impacts and Mitigation Measures

3.16.4.1 Methodology

Data for this section were obtained and summarized from Reclamation's Draft IA EIS (Reclamation 2002). Further information can be found in the Draft IA EIS in Section 3.1.2.1. In addition, Reclamation's water quantity and quality modeling methodology is described in Section 3.1, Hydrology and Water Quality in this Draft EIR/EIS.

Subregions Excluded From Impact Analysis. The direct transboundary effects of the Proposed Project are limited to federal actions and would occur along the LCR. The indirect effects of this Project are related to local actions and would be generated by non-federal entities in California. For this reason, an analysis of transboundary effects is not required for the indirect project effects that would occur within the SDCWA service area geographic subregion.

In addition, transboundary effects in the IID water service area and AAC and Salton Sea geographic subregion are not analyzed because implementation of the water conservation program/HCP, and the effects on the Salton Sea as a result of the Proposed Project, respectively, would not affect environmental resources in Mexico because no construction or operation of facilities will occur in Mexico. Also, water quantity/quality changes in the IID water service area and Salton Sea will not affect Mexico because the hydrological connection to Mexico is such that water flows from Mexico to the IID water service area rather from the IID water service area to Mexico.

3.16.4.2 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Changing the point of diversion from Imperial Dam to Parker Dam for water transferred to SDCWA and/or MWD would not change the quantity of Colorado River water that would flow to Mexico because the same amount of water would be taken off the River under the Proposed Project as compared to the Baseline – only the diversion point would change. Similarly, changing the point of diversion will not effect the salinity of flows to Mexico.

Biological Conservation Measures in USFWS' Biological Opinion

In addition, implementation of the biological conservation measures in USFWS' Biological Opinion would not adversely affect biological resources in Mexico because the conservation measures will only be constructed in the US portions of the River. Also, the conservation measures will result in beneficial effects biological resources along the River and (Reclamation 2002).

Impacts resulting from implementation of the biological conservation measures would be the same for Alternatives 2, 3, and 4; therefore, they are not discussed under each alternative.

3.16.4.3 Alternative 1: No Project

LOWER COLORADO RIVER

Water Conservation and Transfer

If the No Project alternative were to occur, for the period 2002 to 2026, the probability of flood flows would vary from 20 to 25 percent. After 2030, the probability of flood flows decreases to 10 to 15 percent. The magnitude of flood flows varies from 0 to over 6 MAF, with large flood flows (over 250 KAF) anticipated approximately 20 percent of the time and flood flows over 1 MAF less than 15 percent of time (Reclamation 2002).

With regard to salinity, the average salinity at Imperial Dam for the period 1990 to 1999 varied from 655 to 803 mg/L, below the objective of 879 mg/L (DOI 2001). Salinity is projected to increase at Imperial Dam to 928 mg/L by the year 2015 without additional controls (DOI 1999). While this could correlate to an increase in salinity in water delivered to Mexico and water flowing past Morelos Dam, it is assumed that salinity control programs will continue to be implemented and objectives will be met in all reaches.

Biological Conservation Measures in USFWS' Biological Opinion

The biological conservation measures would not be implemented under the No Project alternative because neither the IA nor the IOP would be implemented.

3.16.4.4 Alternative 2 (A2): Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

As described under the Proposed Project, changing the point of diversion from Imperial Dam to Parker Dam for water transferred to SDCWA and/or MWD would not change the quantity of Colorado River water that would flow to Mexico. This change will also not affect the salinity of the flow to Mexico.

3.16.4.5 Alternative 3 (A3): Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

<u>Water Conservation and Transfer</u>

As described under the Proposed Project, changing the point of diversion from Imperial Dam to Parker Dam for water transferred to SDCWA and/or MWD would not change the quantity of Colorado River water that would flow to Mexico. This change will also not affect the salinity of the flow to Mexico.

3.16.4.6 Alternative 4 (A4): Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing As Exclusive Conservation Measure)

LOWER COLORADO RIVER

<u>Water Conservation and Transfer</u>

As described under the Proposed Project, changing the point of diversion from Imperial Dam to Parker Dam for water transferred to SDCWA and/or MWD would not change the quantity of Colorado River water that would flow to Mexico. This change will also not affect the salinity of the flow to Mexico.

19565

4.0 Alternatives Comparison

4.0 Alternatives Comparison

4.1 CEQA Requirements for Alternatives

CEQA requires that a reasonable range of feasible alternatives be evaluated in an EIR. The CEQA Guidelines, Section 15126.6, Consideration and Discussion of Alternatives to the Proposed Project, specify the following:

"(a) Alternatives to the Proposed Project. An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decisionmaking and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason. (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553 and *Laurel Heights Improvement Association v. Regents of the University of California* (1988) 47 Cal.3d 376)."

4.2 NEPA Requirements for Alternatives

NEPA also requires that alternatives to the Proposed Project be evaluated in an EIS. The Council on Environmental Quality Regulations for Implementing NEPA, Section 1502.14, Alternatives Including the Proposed Project, specifies the following:

"This section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (Sec. 1502.15) and the Environmental Consequences (Sec. 1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. In this section agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the Proposed Project so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the Proposed Project or alternatives.

4.3 Alternatives Evaluated in this Draft EIR/EIS

The alternatives evaluated in this Draft EIR/EIS were selected based on an analysis that considered 14 alternatives against several criteria. The surviving alternatives included those that were shown to be able to reduce impacts compared to the Proposed Project, that were shown to be feasible, and that met most of the project objectives. The entire Alternatives Analysis is included as Appendix D to this Draft EIR/EIS. A summary of the analysis showing each alternative considered, how it performed against the evaluation criteria, and why it was included for or excluded from further analysis in this Draft EIR/EIS is shown in Table 4-4. Alternatives considered but eliminated are further discussed below in Section 4.8.

The alternatives evaluated in this Draft EIR/EIS include the Proposed Project and Alternatives 1 through 4, each of which is summarized below. Table 4-1 shows the key elements of each alternative, and Table 4-2 shows selected environmental effects. The effects on the Salton Sea are included in this table as they are the major environmental effects of the Proposed Project and alternatives. These effects help to differentiate the alternatives from one another according to each alternative's ability to reduce impacts when compared to the Proposed Project. A more detailed comparison of environmental resources that would experience significant unavoidable impacts is shown in Table 4-3.

4.3.1 Proposed Project

The Proposed Project is described in detail in Section 2 of this Draft EIR/EIS. This section below summarizes the major components of the Proposed Project, including the following:

- Voluntary commitment by IID to limit its annual diversions of Priority 3 Colorado River water to 3.1 MAFY.
- Change in the point of diversion for 300 KAFY on the LCR from Imperial Dam to Parker Dam.
- Conservation by IID of water through a combination of on-farm and water delivery system improvements and fallowing in the IID water service area.
- Water transfer by IID to SDCWA under the terms of the IID/SDCWA Transfer Agreement.
- Water transfer by IID to SDCWA, CVWD, and/or MWD under the terms of the QSA.
- Physical conveyance of conserved water and associated approvals needed from Reclamation.
- Implementation of the HCP.

TABLE 4-1
Elements of the Proposed Project and Alternatives

	Limit of IID's Priority 3 Diversion of Colorado River Water	Conservation Measure[1] (KAFY)				Transfer			Compliance with Inadvertent Overrun Policy?	Change Point of Diversion?	Meet Terms of IID/SDCWA Transfer Agreement?	Meet Terms of QSA?	Implement HCP?
		On-farm Irrigation System	Water Delivery System	Fallowing	Total	SDCWA	CVWD	MWD					
Proposed Project	3.1 MAFY	Any combination of conservation measures to conserve up to 300			300	200	Total of 100		Average 58-KAFY-Payback	Yes	Yes[2]	Yes	Yes
Alternative 1: No Project	3.43 MAFY	0	0	0	0	0	0	0	No IOP implemented	No	No	No	No
Alternative 2: 130 KAFY	3.1 MAFY		130		130	130	0	0	Average 58-KAFY-Payback	Yes	Yes	No	Yes
Alternative 3: 230 KAFY	3.1 MAFY	Any combination of conservation measures to conserve up to 230			230	130	Total of 100		Average 58-KAFY-Payback	Yes	Yes	Yes	Yes
Alternative 4: 300 KAFY	3.1 MAFY	0	0	300	300	200	Total of 100		Average 58-KAFY-Payback	Yes	Yes[2]	Yes	Yes

[1]The maximum amount of conservation that can be achieved by on-farm irrigation system improvement measures is 230 KAFY, and the maximum amount of conservation that can be achieved by water delivery system improvements is 100 KAFY (see IIDSS in Appendix E).

[2]Assumes that the IID/SDCWA Transfer Agreement would be amended to allow fallowing to conserve water for transfer.

TABLE 4-2
Major Environmental Effects of Proposed Project and Alternatives

	Biological Effects		Salton Sea Effects		
Alternative	**Year Tilapia Life Cycle Impacted**	**Year Pupfish Life Cycle Impacted**	**Elevation (ft. MSL)**	**Salinity (g/L)**	**Surface Area (square miles)**
Existing (2002)	N/A	N/A	-228	46	364
Proposed Project (2077)	2012	2016	-250	162	261
Alternative 1: No Project (2077)	2023	2042	-235	86	339
Alternative 2 (2077)	2013	2019	-242	113	305
Alternative 3 (2077)	2012	2017	-247	138	278
Alternative 4 (2077)	2017	2025	-241	103	314

(Reclamation 2001b)

4.3.2 Alternative 1: No Project

The No Project alternative is the scenario under which the Proposed Project is not permitted, constructed, or implemented. The No Project alternative is not the environmental status quo. Rather, it is defined as "existing environmental conditions" (see Chapter 3), as well as what would reasonably be expected to occur in the foreseeable future if the Proposed Project were not approved, based on current plans and consistent with available infrastructure (CEQA Guidelines, §15126.6[e][2]). Under the No Project alternative, the IID/SDCWA Transfer Agreement would not be implemented, the QSA would not be finalized and implemented, and the HCP would not be finalized and implemented. Additional, assumed, and future conditions through 2077 under the No Project alternative are described in detail in Section 2.3.2.1. Additional information on the No Project alternative in relation to the HCP can be found in Section 6.1 of the HCP (see Appendix C).

For this EIR/EIS, the No Project alternative plays a key role in the evaluation and comparison of the Proposed Project and alternatives. Comparing the impacts of the Proposed Project and alternatives to the No Project condition of the Sea (projected condition in year 2077) allows us to predict what the added increment of impact to the Sea would be for each alternative.

4.3.3 Alternative 2: Water Conservation and Transfer of Up To 130 KAFY to SDCWA (On-farm Irrigation System Improvements As Exclusive Conservation Measure)

Alternative 2 is a scaled-back version of the Proposed Project/HCP, and includes only the minimum amount of water that could be transferred under the terms of the IID/SDCWA Transfer Agreement, which is 130 KAFY. The 130 KAFY would be conserved exclusively by on-farm irrigation system improvements in the IID water service area. It is important to note that

Alternative 2 would not comply with the QSA (if the QSA is finalized) because no water would be made available for transfer to either CVWD or MWD. Under Alternative 2, the water conveyance methods of the Proposed Project would also apply (i.e., water transferred from IID to SDCWA would be diverted at Parker Dam and conveyed via the CRA).

Alternative 2 was developed to provide an alternative to the Proposed Project that could reduce the impacts of the Proposed Project by reducing the amount of water conserved. As described in Chapter 3, implementation of the water conservation and transfer components of the Proposed Project would result in reduced inflows to the Salton Sea. This reduction in flow to the Sea is directly related to the amount of water conserved under the Proposed Project as well as to the particular conservation measures that would be implemented under the Proposed Project. Under Alternative 2, less water would be conserved and transferred than under the Proposed Project.

Alternative 2 was also anticipated to have an incrementally lower level of take and less impact relative to the amount of water conserved under the Proposed Project. However, reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements for biological resources. Potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar as under the Proposed Project. Habitat conditions along the AAC would remain relatively unchanged. IID's ongoing O&M activities would be the same as those outlined in the proposed HCP. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP. Additional information about this alternative is included in the HCP (see Appendix C).

4.3.4 Alternative 3: Water Conservation and Transfer of Up To 230 KAFY to SDCWA, CVWD, and/or MWD Service Areas (All Conservation Measures)

Alternative 3 provides a middle level of conservation between the Proposed Project and Alternative 2 by providing for water conservation and transfer of up to 230 KAFY using any type of conservation measure, including on-farm irrigation system improvements, water delivery system improvements, and/or fallowing. The first 130 KAFY would be transferred to SDCWA, and the remaining 100 KAFY would be conserved and transferred either to SDCWA or to CVWD and/or MWD. Water transferred from IID to SDCWA or MWD would be diverted at Parker Dam and conveyed via the CRA. Water transferred to CVWD would remain in the LCR; diversion would occur at Imperial Dam and be conveyed to the CVWD service area via the Coachella Canal.

As described under Alternative 2, alternatives were developed to minimize Project-related impacts. Under Alternative 3, the reduced amount of conservation is intended to minimize the impact of reduced flows to the Sea, as well as to minimize related impacts that could occur in relation to reduced flows to the Sea when compared to the Proposed Project. Under Alternative 3, less water would be conserved and transferred than under the Proposed Project.

In addition, this alternative was also anticipated to have an incrementally lower level of take and less impact than the Proposed Project. However, as described under Alternative 2, reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements for biological resources. Potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar as under the Proposed Project. Habitat conditions along the AAC would remain relatively unchanged. IID's ongoing O&M activities would be the same as those outlined in the proposed HCP. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP. Additional information about this alternative is included in the HCP (see Appendix C).

4.3.5 Alternative 4: Water Conservation and Transfer of Up To 300 KAFY to SDCWA, CVWD, and/or MWD Service Areas (Fallowing As Exclusive Conservation Measure)

Alternative 4 assumes that fallowing, rather than other conservation methods, would be the exclusive measure used to conserve water. Although fallowing is part of the water conservation program anticipated by the Proposed Project, fallowing as the exclusive conservation measure has been isolated under Alternative 4 to identify the effects of fallowing separately.

Fallowing of farmland could be used to meet water conservation objectives because it could reduce the amount of irrigation water that IID would be required to deliver to its water service area. Fallowing is defined in Section 2.2.3.4 as the non-use of farmland for crop production to conserve irrigation water, on a short-term or long-term basis. As described in that section, there are a number of ways to implement fallowing to achieve water conservation.

As discussed in Section 2.2.3.4, implementation of Alternative 4 would require that restrictions on fallowing in the IID/SDCWA Transfer Agreement be waived or modified to allow fallowing as an acceptable method of on-farm water conservation under landowner contracts. The IID Board would also have to rescind or modify its adopted policies that do not currently support fallowing by landowners for purposes of transferring water.

Fallowing could be undertaken by landowners on land they own, lease, or purchase; or by IID on land it owns, leases, or purchases. The purpose of the Alternative 4 analyses is to assess the potential environmental impacts of fallowing rather than to predict the exact method of fallowing or by whom it would be done.

As described under Alternatives 2 and 3, alternatives were developed to reduce Project-related impacts. Under Alternative 4, the use of fallowing as a conservation measure would minimize the impact of reduced flows to the Sea under the Proposed Project. However, as described under Alternatives 2 and 3, potential impacts along and within IID's canal and drainage system, and in and around the Salton Sea would be substantially similar as under the Proposed Project. As a result, all of the conservation strategies would be substantially the same as under the Proposed HCP. Additional information about this alternative is included in the HCP (see Appendix C).

4.4 HCP

The HCP for the Proposed Project and alternatives is an inherent part of the project and is described in Section 2.2.6.1 Habitat Conservation Plan Overview and in detail in Appendix C. There is one HCP for the project; however, for environmental analysis purposes, it is useful to divide the HCP into the IID Water Service Area Portion and the Salton Sea Portion.

IID has prepared the HCP as part of the Proposed Project to support its Incidental Take Permit applications in conformance with § 10(a)(1)(B) of ESA and § 2081(b) of CESA. An Incidental

Take Permit allows a project applicant to conduct otherwise lawful activities that incidentally harm (or "take") federal and/or state listed species, either through habitat modification or direct injury. The federal- and/or state- listed species that are included in IID's HCP are called "covered species." These covered species are discussed in Section 2.2.6.4 and further defined in Appendix C.

4.5.1 HCP (IID Water Service Area Portion)

The IID Water Service Area Portion of the HCP mitigates for potential take associated with implementation of the IID/SDCWA Transfer Agreement, the QSA, and/or continuation of its routine O&M activities within the IID water service area. O&M activities are included to ensure that IID obtains all ESA and CESA approvals required to continue operation of its irrigation and drainage system for the duration of the Proposed Project and alternatives. Issuance of an Incidental Take Permit by USFWS constitutes a federal action that requires evaluation under NEPA. The IID Water Service Area and AAC Portion of the HCP includes conservation strategies for tamarisk scrub, drain, desert and agricultural habitats, which are described in detailed in Section 2.2.6.7, Implementation of the HCP Conservation Strategies and in the HCP (Appendix C). The HCP actions associated with the IID Water Service Area Portion are part of the Proposed Project and alternatives 2, 3, and 4.

4.5.2 HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement

Under this approach proposed by USFWS and CDFG, IID would implement a phased approach for maintaining fish to provide foraging opportunities for piscivorous birds at the Salton Sea. In the first phase, IID would construct a hatchery to ensure continued availability of tilapia as forage base for piscivorous birds. It is expected that as salinity in the Salton Sea increases, tilapia reproduction would be affected before adult survival is threatened. IID would stock tilapia in the Salton Sea when the CDFG determines that natural reproduction of tilapia has ceased in the Salton Sea based on annual young-of-year abundance surveys conducted by CDFG. IID would continue stocking tilapia in the Salton Sea for as long as they could continue to survive and grow or until the Salton Sea Restoration Project was funded and its implementation initiated. If the Salton Sea Restoration Project was initiated, that project could fund continued operation of the stocking program until the salinity level of the Salton Sea was low enough to allow fish to naturally reproduce.

The hatchery element would be intended to extend the period of time during which fish would be present in the Salton Sea. Juvenile and adult tilapia are capable of withstanding high salinity levels; tilapia have been collected at salinity as high as 120 ppt. However, the ability of tilapia to reproduce is more sensitive to salinity. At salinity above 60 ppt, tilapia reproduction has been predicted to decline. The hatchery under this approach would be used to replace reproduction of tilapia lost in the Sea because of high salinity. Because juvenile and adult tilapia can tolerate higher salinity levels, the hatchery would extend the time during which the Sea supports fish. This extension would have the dual benefit of continuing to support fish as prey for fish-eating birds and providing additional time for implementation of a long-term restoration project.

Hatchery operations would likely be located near the Salton Sea on land not currently under cultivation. The acreage could vary depending on the level of production needed to augment natural reproduction. For the purpose of planning, it is anticipated that up to 50 acres would be needed to accommodate the hatchery operation. The facility would be designed to ensure that any discharge hatchery effluent to the Salton Sea would be adequately treated to avoid adverse water quality impacts. Water requirements would vary depending on the volume of production.

The second component of the approach would be initiated if a long-term restoration Project was not implemented before the Sea could no longer support fish. Under this component of the approach, IID would create 5,000 acres of ponds at the Salton Sea that would support fish and provide a forage base for piscivorous birds. The purpose of these ponds would be to maintain some foraging opportunities at the Salton Sea for piscivorous birds for the remainder of the permit term. The objective of creating ponds would be to maintain a level of foraging habitat that would help ensure that piscivorous birds would continue to be represented at the Salton Sea. IID would stock the ponds with tilapia (from continued hatchery operations) and manage the ponds to provide foraging opportunities for covered piscivorous bird species for remainder of the 75-year permit term. If the Salton Sea Restoration Project were implemented at any time during the term of the permit, IID would contribute the remaining funding committed to the creation and operation of a hatchery and for creation and management of ponds to the Salton Sea Restoration Project.

The ponds would be about 5 feet deep and constructed using berms. To obtain the soil characteristics necessary for berm construction, the ponds would be constructed on farmland. The construction cut and fill would be balanced such that transport of soil to or from the construction site would not be required. The ponds would likely be constructed along the southern edge of the Salton Sea in land blocks 160 and 640 acres in size. The water supply for the mitigation ponds would be of the same quality as that delivered to farmers. Based on preliminary calculations performed by CDFG, close to 30 KAFY of water would be required to maintain the ponds. The water associated with the 5,000 acres of farmland removed from production to construct the ponds would be sufficient to support the ET losses in the ponds if the historic water use on those acres was equivalent to about 6 AFY per year. If historic water use was less, additional conservation could be required to generate water necessary to maintain the ponds. In addition to the water necessary to support the ponds, additional water could be necessary to provide adequate water circulation in the ponds. The requirements for water circulation would not be defined until the specific pond locations were identified and the characteristics of the pond system design developed. Any impacts associated with obtaining water to maintain circulation in the ponds would be addressed in subsequent environmental documentation.

This acreage requirement and general approach would remain the same regardless of the alternative selected. However, the timing of hatchery operation and possible pond construction would vary depending on the amount of water conserved. Current salinity projections suggest that hatchery operations to augment fish reproduction could be necessary as early as 2012 under conservation of 300 or 230 KAFY and 2013 for conservation of 130 KAFY. Pond construction, if needed, would take place sometime after 2012, depending on how long fish survive in the Salton Sea. Tilapia have been recorded at a salinity of 120 ppt, although the ultimate salinity tolerance of tilapia at the Salton Sea could be less. If tilapia were to persist in the Salton Sea until the salinity reaches 120 ppt, salinity projections suggest that pond construction under conservation of 300 KAFY would not be necessary until about 2052;

conservation of 230 KAFY would not occur until 2073. With conservation of 130 KAFY, tilapia would persist through the entire 75 years of the HCP term. For the purpose of evaluating potential impacts of implementing this approach, however, it was assumed that the 5,000 acres of ponds would be constructed at some time during the permit term. The precise timing of the construction would not substantially influence the impact of implementing this component of the approach.

In addition to the measures addressing impacts to piscivorous birds, IID would implement measures to address:

- Potential impacts to pupfish resulting from the acceleration of salinization of the Sea.
- Potential impacts to the suitability of nesting islands for gull-billed terns and black skimmers that could result from an accelerated decline in the water surface elevation.
- Potential impacts to proposed covered species associated with tamarisk scrub that could result from an accelerated decline in the water surface elevation.

The measures that IID would implement to address these impacts are as follows. For desert pupfish, IID would ensure that connectivity is maintained among pupfish drains in the event that the Salton Sea becomes unsuitable for pupfish. For potential impacts to nesting island for gull-billed terns and black skimmers, IID would construct nesting islands suitable for these species. To address potential impacts to proposed covered species associated with tamarisk scrub, IID would monitor areas of tamarisk scrub adjacent to the Salton Sea and create or acquire, and protect native tree habitat if monitoring shows a net loss in the amount of tamarisk scrub. Additional description of these measures is contained in Section 3.3 of the HCP (Appendix C of this EIR/EIS).

4.5.3 HCP (Salton Sea Portion) Approach 2: Use of Conserved Water as Mitigation

Approach 1 outlines a strategy to mitigate the potential take of piscivorous birds using hatchery production and creating replacement habitat. In lieu of this approach, IID could reduce or avoid Project effects on salinity and mitigate impacts on piscivorous birds by conserving additional water and allowing it to flow to the Salton Sea. This approach, which could be used in combination with other approaches or used to avoid impacts entirely, would make up for Project-related reductions in flow to the Sea. Under this approach, water conserved for mitigation purposes could be generated through on-farm irrigation system improvements, water delivery system improvements, and/or fallowing, or any combination of these measures.

To avoid or mitigate the temporal impacts of reducing flows to the Sea, IID could fallow or otherwise conserve an amount of water equivalent to the Project-related inflow reduction and allow the conserved water to flow to the Sea. (This amount would be in addition to the amount of water conserved for transfer.) For example, if all water conservation was achieved through fallowing, approximately 50,000 acres of fallowed land would be required to generate the water necessary for transfer and an additional 25,000 acres of fallowing would be required to generate the water necessary to offset changes in inflow to the Sea. An additional 9,800 acres of fallowing would be required to provide water necessary for compliance with the IOP. This mitigation would maintain salinity and elevation changes on the baseline trajectory, thereby avoiding salinity increases and elevation decreases related to the Project.

4.5.4 HCP Alternatives

Section 10 of the ESA requires an applicant for an Incidental Take Permit to consider and describe "alternative actions to such takings" with the HCP. Because the HCP is an inherent part of the Proposed Project and alternatives, each of the project alternatives described above is also an alternative to the HCP. However, it was determined that lesser amounts of conservation and transfer would not substantially reduce the level of take and therefore would not reduce the HCP requirements.

4.6 Alternatives Comparison

Table 4-3 compares the significant unavoidable impacts of the Proposed Project and alternatives. Significant unavoidable impacts were identified for hydrology and water quality, agricultural resources, recreation, and air quality. The remaining environmental resources are not shown on the table because there were either no impacts, or the impacts could be mitigated to less than significant with mitigation measures. Biological resources are not included on this table because biological impacts are addressed by the HCP, which is an inherent part of the project and which reduces biological impacts to less than significant, as described in Section 3.2, Biological Resources. Table 4-3 shows the effect that implementation of HCP (Salton Sea Portion) Approaches 1 and 2 would have on significant unavoidable impacts.

A comprehensive listing and summary of the impacts is included as the first table in each of the resource sections. A list of all potentially significant impacts, including those that can be mitigated to less than significant, is included in the Executive Summary.

4.7 Environmentally Superior Alternative

CEQA Guidelines 15126.6(e)2, Consideration and Discussion of Alternatives to the Proposed Project, state, "If the environmentally superior alternative is the No Project alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." For this Project, Alternative 1, the No Project Alternative is environmentally superior to the others; therefore, the next environmentally superior alternative is discussed below.

Determination of the environmentally superior alternative is to some extent driven by the selection of an HCP approach for the Salton Sea. Implementation of HCP (Salton Sea Portion) Approach 2 would avoid significant unavoidable impacts to recreation and air quality by maintaining Baseline flows to the Salton Sea. Approach 2 would *minimize but not avoid* significant unavoidable impacts to water quality, and it would *not avoid or minimize* impacts to agricultural resources. To minimize impacts to water quality (selenium impacts to the drains) and impacts to agricultural resources (conversion of prime farmland and farmland of statewide importance), the amount of water conserved and the method of conservation is the determining factor. Alternative 2, 130 KAFY with on-farm irrigation system improvements only, with HCP Approach 2 would avoid recreation, air quality, and agricultural resources impacts and minimize water quality impacts and is therefore the environmentally superior alternative. However, the Proposed Project includes the flexibility to be implemented using the same methods and quantities as Alternative 2, so, if it is implemented in this manner, the Proposed Project could be considered environmentally superior.

4.8 Alternatives Considered but Eliminated

4.8.1 Water Conservation and Transfer Alternatives Considered

To select alternatives for evaluation in this Draft EIR/EIS, a comprehensive alternatives analysis was conducted, which is included as Appendix D of this Draft EIR/EIS. To prepare the alternatives analysis, a comprehensive list of all potential alternatives was first compiled. Potential alternatives for this project were identified from comments received during the scoping process, the environmental review process for the Draft QSA PEIR, and discussions with IID and SDCWA engineers and other water resource professionals familiar with the IID system and the region.

Fourteen alternatives (including subalternatives) were initially identified for evaluation. Screening criteria were then applied to those 14 alternatives. The screening criteria were developed based on CEQA guidelines for selecting alternatives and are described in detail in Appendix D, Alternatives Screening Analysis. The performance of each of these alternatives, evaluated against the screening criteria, is documented in Appendix D, Alternatives Screening Analysis. Of the 14 alternatives, five, including the Proposed Project and the No Project alternative, are recommended for further evaluation in this Draft EIR/EIS, based on the screening analysis. The other alternatives, which were considered but eliminated, are listed below.

Additionally, Table 4-4 shows how each alternative performed against each of the screening criteria and also indicates which alternatives were carried forward for analysis in this Draft EIR/EIS, and which were eliminated from further consideration. The table also summarizes the rationale for inclusion or exclusion of each of the considered alternatives.

4.8.2 HCP Alternatives Considered

Section 10 of the ESA requires an applicant for an Incidental Take Permit to consider and describe" alternative actions to such takings" within the HCP. IID considered three alternatives in the process of developing the HCP that were determined to be inconsistent with its objectives and/or less likely to be successfully implemented. The alternatives to the HCP that were considered are listed below.

4.8.3 No Take Alternative

An alternative to the HCP that avoided take of all proposed covered species was considered but determined not to be practicable. The Proposed HCP consists of several conservation strategies as follows:

- Salton Sea Conservation Strategy
- Tamarisk Scrub Habitat Conservation Strategy
- Drain Habitat Conservation Strategy
- Desert Habitat Conservation Strategy
- Specific-species Conservation Strategies
- Agricultural Field Conservation Strategy

The Salton Sea Conservation Strategy of the Proposed HCP contains a no take approach. Approach 2, Use of Conserved Water as Mitigation would avoid Project-related inflow reductions to the Salton Sea and in that way avoid take of proposed covered species associated with the Salton Sea. No other means for avoiding take of species associated with the Salton Sea was identified. The Desert Habitat Conservation Strategy incorporates no take practices to the extent possible. In developing this strategy, many of the USFWS and CDFG's standard take avoidance and minimization measures for desert species (e.g., desert tortoise) were incorporated into the conservation strategy. Because IID must conduct O&M activities on the AAC and other canals adjacent to desert habitat, it would not be practicable to further avoid take.

IID is obligated to provide drainage to farm fields in the Imperial Valley. As part of this obligation, IID must conduct O&M activities (e.g., vegetation removal) on the drainage system to maintain gravity flow of drainage water. As a result, avoidance of take of proposed covered species using the drains (including burrowing owls and desert pupfish) would not be practicable. Similarly, IID must conduct O&M activities on its conveyance system such that avoidance of take of species using the conveyance system (e.g., burrowing owls) would not be practicable. Because measures to avoid take are either already incorporated into the Proposed HCP or no take measures would not be practicable to implement, a No Take alternative was not carried forward.

4.8.4 Modification of Water Conservation and Transfer Amounts

Two different levels of water conservation (conservation and transfer of 130 KAFY and 230 KAFY) were examined as alternative actions to the level of take anticipated under the proposed water conservation programs and the HCP. The underlying premise for considering these alternatives was that the potential for impact and the level of take are related to the amount of water conserved and transferred out of the system. Each of these alternatives was anticipated to have incrementally less impact relative to the Proposed Project. However, IID determined that reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements. For these reasons, a reduced HCP alternative was not adopted. However, reduced levels of conservation are Project Alternatives and HCP alternatives as described in Section 4.3 above.

TABLE 4-3
Significant Unavoidable Impacts (SUIs) of the Proposed Project and Alternatives

Resource Area	Proposed Project 300 KAFY All Conservation Measures	Alternative 1 No Project (Baseline)	Alternative 2 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3 230 KAFY All Conservation Measures	Alternative 4 300 KAFY Fallowing Only	Notes
3.1 Hydrology and Water Quality	SUI due to increased selenium concentrations to **9.25 µg/l** in the IID surface drain discharge to the Alamo River.	Baseline selenium concentration in the IID surface drain discharge to the Alamo River **6.32µg/l.**	SUI due to increased selenium concentrations to **6.91 µg/l** in the IID surface drain discharge to the Alamo River.	SUI due to increased selenium concentrations to **8.88 µg/l** in the IID surface drain discharge to the Alamo River.	Less than significant impact due to decreased selenium concentrations to **6.10 µg/l** in the IID surface drain discharge to the Alamo River.	Selenium U.S. EPA ambient water quality criteria is **5 µg/l.** Water quality projections based on IIDSS and project for the year 2077.
	SUI due to increased selenium concentrations to **7.86 µg/l** in Alamo River at the outlet to the Sea.	Baseline selenium concentrations in Alamo River at the outlet to the Sea of **6.25 µg/l**	Less than significant impact due to no change in selenium concentrations - **6.25 µg/l** in Alamo River at the outlet to the Sea.	SUI due to increased selenium concentrations to **7.39 µg/l** in Alamo River at the outlet to the Sea.	Beneficial impact due to decrease in selenium concentrations to **6.13 µg/l** in Alamo River at the outlet to the Sea.	
	SUI due to increased selenium concentrations to **8.30 µg/l** in the IID surface drain discharge to the New River.	Baseline selenium concentration in the IID surface drain discharge to the New River **6.51µg/l.**	SUI due to increased selenium concentration **7.15 µg/l** in the IID surface drain discharge to the New River.	SUI due to increased selenium concentration **7.90 µg/l** in the IID Surface drain discharge to the New River.	Less than significant impact due to slight decrease in selenium concentration to **6.50 µg/l** in the IID surface drain discharge to the New River.	
	SUI due to increased selenium concentrations to **6.69 µg/l** in the IID surface drain discharge to the Salton Sea.	Baseline selenium concentration in the IID surface drain discharge to the Salton Sea of **4.80 µg/l.**	SUI due to increased selenium concentrations to **5.09 µg/l** in the IID surface drain discharge to the Salton Sea.	SUI due to increased selenium concentrations to **6.40 µg/l** in the IID surface drain discharge to the Salton Sea.	Beneficial impact due to decrease in selenium concentrations to **4.61 µg/l** in the IID surface drain discharge to the Salton Sea.	

TABLE 4-3
Significant Unavoidable Impacts (SUIs) of the Proposed Project and Alternatives

Resource Area	Proposed Project 300 KAFY All Conservation Measures	Alternative 1 No Project (Baseline)	Alternative 2 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3 230 KAFY All Conservation Measures	Alternative 4 300 KAFY Fallowing Only	Notes
HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement	With HCP Approach 1, SUI Water Quality Impacts could be minimized but would not be avoided for the Proposed Project and Alternatives 2, 3, and 4. For Alternative 1, Baseline conditions would continue.					
HCP (Salton Sea Portion) Approach 2: Use of Conserved Water for Mitigation	HCP Approach 2 would maintain flows to the Salton Sea at the Baseline levels and could reduce selenium concentrations in the New and Alamo Rivers. However, selenium concentrations in the drain discharge would not necessarily be improved by this approach, as the location of lands generating water for mitigation may not coincide with impacted drains for conservation for transfer.					
3.5 Agricultural Resources	SUI to Prime farmland and Farmland of Statewide Importance due to the potential permanent fallowing of up to **50,000 acres** for conservation for transfer.	None	No impacts to agricultural resources.	SUI to Prime farmland and Farmland of Statewide Importance due to the potential permanent fallowing of up to **38,300 acres** for conservation for transfer.	SUI to Prime farmland and Farmland of Statewide Importance due to the potential permanent fallowing of up to **50,000 acres** for conservation for transfer.	Impacts to Prime farmland and Farmland of Statewide Importance result if lands do not produce irrigated crops for more than four years.
HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement	With HCP Approach 1, SUI to agricultural resources would not be minimized or avoided for the Proposed Project and Alternatives 2,3 and 4. For Alternative 1, Baseline conditions would continue.					

19579

TABLE 4-3
Significant Unavoidable Impacts (SUIs) of the Proposed Project and Alternatives

Resource Area	Proposed Project 300 KAFY All Conservation Measures	Alternative 1 No Project (Baseline)	Alternative 2 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3 230 KAFY All Conservation Measures	Alternative 4 300 KAFY Fallowing Only	Notes
HCP (Salton Sea Portion) Approach 2: Use of Conserved Water for Mitigation	With HCP Approach 2, SUI to agricultural resources would not be minimized or avoided for the Proposed Project and Alternatives 2,3, and 4. If fallowing is used to conserve water for mitigation under this approach, rotational fallowing would be used to avoid additional impacts to agricultural lands. For Alternative 1, Baseline conditions would continue.					
3.6 Recreation	SUI to sportfishing due to projected life cycle impacts on fish beginning in **Year 2010.**	Life cycle of fish impacted beginning in **Year 2015.**	SUI to sportfishing due to projected life cycle impacts on fish beginning in **Year 2010.**	SUI to sportfishing due to projected life-cycle impacts on fish beginning in **Year 2010.**	SUI to sportfishing due to projected life cycle impacts on fish beginning in **Year 2012.**	
HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement	With HCP Approach 1, SUI recreation impacts to sportfishing would not be minimized or avoided for the Proposed Project and Alternatives 2, 3, and 4. For Alternative 1, Baseline conditions would continue.					
HCP (Salton Sea Portion) Approach 2: Use of Conserved Water for Mitigation	HCP Approach 2 would maintain flows to the Salton Sea at the Baseline levels and would **avoid SUI recreation impacts** to sportfishing resulting from the Proposed Project. The life cycle of fish would be impacted in Year 2023 as predicted for the Baseline/No Project.					
3.7 Air Quality	SUI air quality impact due to the potential for windblown dust from exposure of **50,000 acres** of shoreline.	Exposure of **16,000 acres** of shoreline by 2077.	SUI air quality impact due to the potential for windblown dust from exposure of **22,000 acres** of shoreline.	SUI air quality impact due to the potential for windblown dust from exposure of **39,000 acres** of shoreline.	SUI air quality impact due to the potential for windblown dust from exposure of **16,000 acres** of shoreline.	

19580

TABLE 4-3
Significant Unavoidable Impacts (SUIs) of the Proposed Project and Alternatives

Resource Area	Proposed Project 300 KAFY All Conservation Measures	Alternative 1 No Project (Baseline)	Alternative 2 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3 230 KAFY All Conservation Measures	Alternative 4 300 KAFY Fallowing Only	Notes
HCP (Salton Sea Portion) Approach 1: Hatchery and Habitat Replacement	With HCP Approach 1, SUI air quality impacts would not be minimized or avoided for the Proposed Project and Alternatives 2, 3, and 4. For Alternative 1, Baseline conditions would continue.					
HCP (Salton Sea Portion) Approach 2: Use of Conserved Water for Mitigation	HCP Approach 2 would maintain flows to the Salton Sea and prevent exposure of the shoreline, thereby **avoiding SUI impacts to air quality**. Shoreline exposure in year 2077 would be as predicted for the No Project/Baseline.					

TABLE 4-4
Alternative Analysis Summary

	Screening Criteria								
	Project Objectives		Reduce Impacts	Feasibility				Project Specific	
Type of Criteria	C1: Provide SDCWA with reliable source	C2: Support cons. and protect IID's water rights	C3 : Minimize Env. Impacts compared to the Proposed Project	C4: Technically Feasible and Reliable	C5: Institutionally and Politically feasible	C6: Implementable within reasonable schedule	C7: Meets QSA transfer objectives	Evaluate in EIR/EIS?	Rationale for Evaluation in EIR/EIS
									150 miles of conveyance facilities for this alternative prevent this alternative from reducing impacts compared with the Proposed Project, which does not require construction of facilities other than for conservation measures.
6d. Expand capacity of the CRA	Pass	Pass	**Fail**	Unknown	Unknown	Fail	Pass	**No**	Does not reduce impacts compared to the Proposed Project, since diversion would also be at Parker Dam. In addition this alternative has significant additional impacts associated with >100 miles of construction required to expand existing CRA. Additionally this alternative may not be politically feasible.
6e. Construct a New Aqueduct Parallel to the CRA	Pass	Pass	Fail	Pass	Pass	ST-F LT-P	Pass	**No**	Does not reduce impacts compared to the Proposed Project, since diversion would also be at Parker Dam. In addition this alternative has significant additional impacts associated with >100 miles of construction required to construct a new aqueduct parallel to the CRA. Additionally this alternative may not be politically feasible.
7. Other Conservation/Transfer	Fail	**Fail**	Unknown	N/A	Fail	Unknown	Unknown	**No**	Cannot guarantee reliable supply, particularly during drought periods when it is most needed and could compromise IID's water rights because it does not implement a water conservation program in IID as required by the SWRCB. Also, may not reduce impacts when compared to the Proposed Project, depending on origin of water and method of conveyance.
8. Maximize Local Supplies in SDCWA-Desalination	Maybe	**Fail**	Unknown	Pass	Unknown	ST-F LT-P	**Fail**	**No**	Impacts, such as energy use, disposal of byproducts, encroachment onto sensitive marine habitats, associated with development of this alternative may be greater than the Proposed Project. Also the project may not be economically feasible.
9. CVP and SWP Supplies	Fail	**Fail**	Unknown	Unknown	Pass	Pass	**Fail**	**No**	Cannot guarantee reliable supply, particularly during drought periods when it is most needed and could compromise IID's water rights because it does not implement a water conservation program in IID as required by the SWRCB. Also, may not reduce impacts when compared to the Proposed Project, depending on origin of water to be purchased and method of conveyance.
10. Water Banking	Unknown	**Fail**	Pass	Pass	Pass	Pass	**Fail**	**No**	Cannot guarantee reliable supply, particularly during drought periods when it is most needed and could compromise IID's water rights because it does not implement a water conservation program in IID as required by the SWRCB. Also, may not reduce impacts when compared to the Proposed Project, depending on origin of water banked and methods of conveyance.

Notes:
[1] F6 is not rated for this alternative because this criteria is intended to identify alternatives which have the potential to minimize environmental .mpacts when compared to the proposed project.
[2] ST-F LT-P means that the project does not meet the criteria in the Short Term but does in the Long Term.

19582

19583

TABLE 4-4
Alternative Analysis Summary

	Screening Criteria								
	Project Objectives		Reduce Impacts	Feasibility			Project Specific		
Type of Criteria	C1: Provide SDCWA with reliable source	C2: Support cons. and protect IID's water rights	C3 : Minimize Env. Impacts compared to the Proposed Project	C4: Technically Feasible and Reliable	C5: Institutionally and Politically feasible	C6: Implementable within reasonable schedule	C7: Meets QSA transfer objectives	Evaluate in EIR/EIS?	Rationale for Evaluation in EIR/EIS
Alternative									
Proposed Project	Pass	Pass	N/A1	Pass	Pass	Pass	Pass	Yes	N/A – This is the Proposed Project and impacts of alternatives will be compared to impacts of the Proposed Project.
1. No Project	Required for Evaluation by CEQA and NEPA							Yes	Required by CEQA and NEPA
2. 130 KAFY Water Conservation and Transfer (Meet Minimum of IID/SDCWA Transfer Agreement Only)	Pass	Pass	Pass	Pass	Maybe	Pass	Fail	Yes	Meets primary objectives and potentially reduces impacts when compared to the Proposed Project - reduced conservation and transfer reduces impacts to Salton Sea and LCR.
3. 230 KAFY Water Conservation and Transfer (Meet Minimum of QSA and IID/SDCWA Transfer Agreement)	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Yes	See rationale for Alternative 2 above.
4. 300 KAFY Water Conservation and Transfer (Meet Minimum of QSA and IID/SDCWA Transfer Agreement) - Fallowing Only	Pass	Maybe	Pass	Pass	Maybe	Pass	Pass	Yes	Meets primary objectives and potentially reduces impacts when compared to the Proposed Project - fallowing reduces impacts to the Salton Sea.
5. Water Treatment and Reuse	Pass	Pass	Fail	Fail	Maybe	Unknown	Pass	No	Does not reduce impacts compared to the proposed project, may include additional impacts associated with construction of facilities and disposal of treatment byproducts.
6. Alternative Conveyances									
6a. Connect Coachella Canal to CRA	Pass	Pass	Fail	Pass	Maybe	ST-F; LT - P2	Pass	No	Reduces impacts to LCR because does not require change in diversion point on LCR, however impacts to LCR with Proposed Project can be fully mitigated. Significant construction and potentially operation impacts associated with constructing 10 miles of conveyance facilities for this alternative prevent this alternative from reducing impacts compared with the Proposed Project, which does not require construction of facilities other than for conservation measures.
6b. Extend the AAC to SDCWA system	Pass	Pass	Fail	Pass	Pass	ST-N LT-Y	Pass	No	Reduces impacts to LCR because does not require change in diversion point on LCR for 200 or 250 out of 300K (transfers to MWD would be diverted at Parker, however impacts to LCR with Proposed Project can be fully mitigated. Significant construction and potentially operation impacts associated with constructing 150 miles of conveyance facilities for this alternative prevent this alternative from reducing impacts compared with the Proposed Project, which does not require construction of facilities other than for conservation measures.
6c. New conveyance from LCR to SDCWA in Mexico	Pass	Pass	Fail	Pass	Maybe	ST-F LT-P	Pass	No	Reduces impacts to LCR because does not require change in diversion point on LCR for 200 or 250 out of 300K (transfers to MWD would be diverted at Parker, however impacts to LCR with Proposed Project can be fully mitigated. Significant construction and potentially operation impacts associated with constructing

5.0 Other CEQA and NEPA Considerations

This chapter discusses other CEQA and NEPA considerations including cumulative impacts; growth-inducing impacts; applicable regulations, policies, and required permits; significant and unavoidable impacts; relationship between short-term uses of the environment and long-term productivity; and irreversible and irretrievable commitments of resources.

5.1 Cumulative Impacts

This section assesses the cumulative impacts of implementing the Proposed Project when combined with other projects that could result in impacts to the same environmental resources as the Proposed Project. Both CEQA and NEPA provide guidelines for assessing cumulative impacts.

The State CEQA Guidelines (Section 15355) provides the following definition of cumulative impacts:

> The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.

CEQA requires that EIRs discuss cumulative impacts if a project's incremental effect is "cumulatively considerable," which means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, other current projects, and probable future projects (State CEQA Guidelines, Section 15065[c]).

The CEQ regulations implementing NEPA (40 CFR Section 1508.7) define a "cumulative impact" for purposes of NEPA as follows:

> Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Section 5.1.1 describes the projects considered in this cumulative impact analysis. It also describes each project's environmental status and the anticipated impacts of each project that could contribute to a cumulative impact when added to incremental impacts of the Proposed Project. Section 5.1.2 aggregates the potential cumulative impacts of the Proposed Project in conjunction with all of the projects considered in this analysis by resource area.

5.1.1 Projects Included in the Cumulative Impact Analysis

For the purposes of this Draft EIR/EIS, a significant cumulative impact would occur if incremental, cumulatively considerable impacts of the Proposed Project, including the HCP, in conjunction with the related impacts of other past, present, and reasonably foreseeable similar projects, result (in the aggregate) in significant adverse (cumulative) effects.

Projects assessed for their potential to result in cumulative impacts were identified through a review of regional and local environmental documents. Both the type of project and the appropriate geographic scope (i.e., projects that would be located within the same general area as the Proposed Project's geographic subregions), and their incremental impacts, were considered.

The following sections provide a description of the related projects assessed for cumulative impacts when combined with the incremental impacts of the Proposed Project, the potential environmental impacts that relate to the Proposed Project, the status of the environmental review process for the related projects, and the potential cumulative impacts when the incremental contribution of the related projects is combined with the incremental impacts of the Proposed Project. Aggregate cumulative effects of all related projects are discussed in Section 5.1.2.

5.1.1.1 Agreements, Plans, and/or Projects with Potential Related or Cumulative Impacts

Quantification Settlement Agreement

As described in Chapters 1 and 2 of this Draft EIR/EIS, the QSA provides for the implementation of key components of the California Plan, and it comprises an important part of California's strategy to reduce its annual use of Colorado River water to 4.4 MAF in a normal year. In addition to the water transfers under the Proposed Project's second scenario (QSA Implementation), the QSA includes implementation of other water conservation projects, groundwater conjunctive use, water transfers, and exchanges to implement portions of the California Plan. Because of the integrated nature of the QSA components, IID, CVWD, MWD, and SDCWA have prepared the Draft QSA PEIR specifically to review the effects of the QSA components as a whole, at a programmatic level. The assessment set forth in the Draft QSA PEIR is intended to provide a cumulative assessment of the effects of implementation of the Proposed Project together with other QSA components.

The following key projects, which are included in the QSA but are not part of the Proposed Project, could potentially contribute to cumulative impacts:

- **Coachella Canal Lining Project**: This project involves the lining of the remaining 33.4 miles of the Coachella Canal, which currently loses approximately 32,350 AFY through seepage. It is estimated that implementation of the canal lining project would conserve approximately 26 KAFY. Under the terms of the QSA, the conserved water would be diverted into the CRA and portions transferred to MWD's service area (21.5 KAFY) and to the San Luis Rey Indian Water Rights Settlement parties (4.5 KAFY). Although this project is a component of the QSA, it has been separately assessed in the Coachella Canal Lining Project EIS/EIR (Reclamation and CVWD 2001).

  This canal lining project will have certain effects that cumulatively increase impacts that are associated with the Proposed Project. The canal lining project will reduce flow in the LCR between Parker and Imperial Dams by the amount of water conserved by the lining activities, decrease groundwater inflows to the Salton Sea from canal seepage, and adversely affect biological resources by loss of riparian and wetland habitat in Salt Creek and adjacent to the canal, which are supported by canal leakage. The canal lining project will have temporary impacts associated with construction within the right-of-way of the Coachella Canal.

- **AAC Lining Project**: This project involves lining the 23-mile reach of the existing, unlined canal. The project is expected to conserve approximately 67.7 KAFY currently lost through seepage. The conserved water would be diverted into the CRA and portions transferred to MWD's service area (56.2 KAFY) and to the San Luis Rey Indian Water Rights Settlement parties (11.5 KAFY). Although this project is a component of the QSA, it has been separately assessed in the All American Canal Lining Project EIS/EIR (Reclamation 1994).

  This canal lining project will have certain effects that cumulatively increase impacts that are associated with the Proposed Project. The project will reduce flow in the LCR between Parker and Imperial Dams by the amount of water conserved by the lining activities and decrease groundwater inflows to the Salton Sea from canal seepage. It will affect biological resources by decreasing seepage into adjacent areas that support riparian and marsh vegetation; however, this vegetation does not provide habitat for state or federally listed species. The canal lining project will have temporary impacts associated with construction within the proposed right-of-way of the AAC. Temporary and permanent impacts to desert scrub and sand dune habitat would result from construction activities. Special-status species known to inhabit or likely to inhabit these desert habitats are flat-tailed horned lizard, Colorado Desert fringe-toed lizard, giant Spanish needles, Peirson's milkvetch, Wiggin's croton, sandfoot and Andrew's dune scarab beetle. The canal lining project also has the potential to result in the mortality of fish within the canal, as well as a decline in fish productivity. The All American Canal Lining Project EIR/EIS includes mitigation measures to avoid and/or compensate for impacts to riparian and marsh vegetation, fish in the canal, desert habitat, and special-status species associated with desert habitats.

- **MWD/CVWD SWP Water Transfer and Exchange:** This project involves an exchange between MWD and CVWD involving SWP entitlement and Colorado River water. CVWD would transfer 35 KAFY of its SWP entitlement to MWD. The delivery would be made to MWD at the existing Devil Canyon Afterbay located south of Victorville, California. In exchange, MWD would arrange with Reclamation for the delivery of 35 KAFY of Colorado River water to CVWD. It is expected that this water would be diverted at Imperial Dam into the AAC and delivered via the Coachella Canal. However, at MWD's option, the delivery may also be made from the CRA to CVWD.

  If the 35 KAFY of Colorado River water to be transferred to CVWD is diverted at Imperial Dam, the exchange would result in an increase in flow in the LCR between Parker and Imperial Dams. This would not result in a cumulative adverse effect on LCR flows. If diverted into the CRA, the current point of delivery of the water to MWD would be maintained and there would be no adverse effect on LCR flows or elevation. The exchange project would potentially increase Colorado River water available to CVWD and, depending upon its use, could potentially increase drainage inflows to the Salton Sea. Such an increase would be a beneficial effect on the Salton Sea.

These projects and their associated impacts are further described in the Draft QSA PEIR (CVWD et al. 2002).

- **Environmental Review Schedule.** The Draft QSA PEIR is scheduled for public release in early 2002 and is expected to be available for review concurrently with this Draft EIR/EIS. A revised and updated Draft EIS/EIR for the Coachella Canal Lining Project was circulated for public review by Reclamation and CVWD in September 2000, a Final EIS/EIR was released in April 2001, the Final EIS/EIR was certified by CVWD in May 2001, and a ROD is pending. A Final EIS/EIR for the AAC Lining Project was released in March 1994.

- **Potential Cumulative Impacts.**
  Hydrology and Water Quality – Salton Sea. Seepage from the Coachella Canal historically has produced shallow groundwater under the Coachella Canal and under the land west of the canal. This groundwater drains toward the Salton Sea. The Coachella Canal Lining Project would reduce groundwater levels near the lined canal, thereby reducing the groundwater flow to the Salton Sea.

  Most of the groundwater resulting from seepage from the AAC drains toward Mexico, but a portion (approximately 100 KAF) drains to the Salton Sea. The two canal lining projects will reduce inflows from groundwater to the Salton Sea, but the aggregate impact of these two projects is not considered significant and is not anticipated to considerably increase the effects of the Proposed Project. Therefore, no significant cumulative adverse impact due to reduced inflows to the Salton Sea is anticipated.

  As discussed in this Draft EIR/EIS, the reduction in inflows to the Salton Sea resulting from the Proposed Project (not including the HCP) will reduce the elevation and affect the water quality of the Salton Sea, resulting in a significant impact on biological resources in and around the Salton Sea (discussed below) and on the sport fishery, as well as other impacts to air quality, recreation, and aesthetics as a result of exposed shoreline. Implementation of the HCP, and other mitigation measures set forth in this Draft EIR/EIS, will reduce these Proposed Project-related impacts to a level that is less than cumulatively considerable; therefore, no significant cumulative adverse impact to these resources would occur.

  Hydrology and Water Quality – LCR. Implementation of the QSA, including the change in the point of diversion required for implementation of the Proposed Project, would result in an aggregate reduction in flow in the LCR between Parker and Imperial Dams of approximately 388 KAFY. However, according to the Draft IA EIS, changing the point of diversion from Imperial to Parker Dam for up to 400 KAFY could lower the annual median River stage relative to Baseline by as much as 4.4 inches (Reclamation 2002). Overall, the cumulative hydrology impacts on the LCR are not considered to be significant because the LCR water levels would still be within current range of daily fluctuation, even with implementation of the Proposed Project (Reclamation 2002).

  Hydrology and Water Quality – IID Water Service Area and AAC. The impacts of the Proposed Project on drains and rivers in the IID water service area are assessed in this Draft EIR/EIS. As a result of measures provided in the HCP and this Draft EIR/EIS, these impacts are reduced to a level that is less than cumulatively considerable, thus avoiding a significant cumulative adverse impact, except in the case of selenium. The impact of selenium concentrations in the IID drains and rivers is determined to be significant and unavoidable. It is not anticipated that the QSA will contribute to this impact (other than through the Proposed Project); however, there will be a significant, unavoidable adverse impact on water quality in the IID drains and rivers as a result of implementation of the Proposed Project and the QSA.

The aggregate reduction in groundwater in the IID water service area resulting from the QSA projects and the Proposed Project will not significantly affect groundwater resources in the IID water service area because, as noted in this Draft EIR/EIS, groundwater is generally of poor quality and is not utilized for beneficial uses.

Biological Resources – IID Water Service Area and AAC. Lining of the AAC would decrease seepage into adjacent areas that support riparian and marsh habitats and are important for wildlife, plant, and fish species. Mitigation for these impacts will be provided in connection with that canal lining project. The water conservation and transfer component of the Proposed Project would not impact biological resources along the AAC. The HCP component of the Proposed Project includes measures to avoid and minimize impacts to special-status species and their habitats along the AAC that could occur as a result of IID's O&M activities. Because the HCP would avoid or mitigate impacts to biological resources to a level that is less than cumulatively considerable, there would be no significant cumulative impact to biological resources along the AAC.

Biological Resources – Coachella Canal. Lining of the Coachella Canal would decrease seepage into Salt Creek, which supports riparian and marsh vegetation and provides habitat for Yuma clapper rails and California black rails. Desert pupfish that inhabit Salt Creek and could be impacted by reduced seepage flow. Mitigation for these impacts is specified in the Coachella Canal Lining EIS/EIR (Reclamation and IID 2001). Certain aspects of the Proposed Project would also affect Yuma clapper rails, California black rails, and Desert pupfish or their habitats; however, implementation of the HCP would result in a net increase in habitat for these species in Coachella Canal area. Because impacts to these species would be avoided for the Coachella Canal lining project and because the Proposed Project would result in a net benefit, there would be no significant cumulative adverse impacts to biological resources.

Biological Resources – Salton Sea. As stated above, reduced seepage from the lining of the AAC and the Coachella Canal could result in slightly decreased inflows to the Salton Sea, resulting in the reduction of suitable habitat for some wildlife species that inhabit the Sea. Overall, however, these impacts are not expected to be significant because only a very minimal amount of groundwater currently flows toward and drains into the Sea. The water conservation and transfer component of the Proposed Project would reduce inflows to the Salton Sea by substantially more than the canal lining projects. The combined effect of the canal lining projects and the Proposed Project on the rate of salinization of the Salton Sea and resultant effects on biological resources would not be appreciably different from the effects of the water conservation and transfer component of the Proposed Project by itself. Proposed Project-related changes in inflow to the Salton Sea would be avoided with implementation of HCP Approach 2 of the Salton Sea Conservation Strategy. Under HCP Approach 1 of the Salton Sea Conservation Strategy, the biological impacts of the water conservation and transfer component of the Proposed Project would be mitigated. Because the HCP would avoid or mitigate the impacts to biological resources attributable to the Proposed Project to a limit which is less than cumulatively considerable; therefore, no adverse cumulative impact to the biological resources of the Salton Sea would occur.

Biological Resources – LCR. Reclamation consulted with USFWS under Section 7 of the ESA regarding the impacts to biological resources along the LCR as a result of the change in the point of diversion for up to 400 AFY of Colorado River water. This increment covers the change in the point of diversion required for the QSA and the Proposed Project, in the aggregate. As a result of this consultation, USFWS issued a BO (USFWS 2001), which identifies the biological conservation measures that Reclamation will implement to offset these impacts. The biological conservation measures are described below and are assessed in the Draft IA EIS (Reclamation 2002). This Draft EIR/EIS mitigation for impacts to LCR biological resources under CEQA and CESA as a result of the change in the point of diversion required for the Proposed Project, which accounts for most of the 400 AFY, is included in this Draft EIR/EIS. Because the aggregate impacts to LCR biological resources were addressed in the USFWS' BO and are offset by the biological conservation measures, and because the aggregate CESA and CEQA impacts are substantially mitigated by measures required for the Proposed Project, there would be no cumulative adverse impacts to biological resources along the LCR. It is noted that long-term mitigation for aggregate impacts to biological resources along the LCR as a result of anticipated projects, which may affect up to 1.5 MAFY, is expected to be addressed in the LCR MSCP, discussed below.

Recreation Resources – Salton Sea. As stated above, reduced seepage from the lining of the AAC and the Coachella Canal could result in slightly decreased inflows to the Salton Sea, resulting in the reduction of suitable habitat for some wildlife species that inhabit the Sea. Overall, however, these impacts are not expected to be significant because only a very minimal amount of groundwater currently flows toward and drains into the Sea. The water conservation and transfer component of the Proposed Project would reduce inflows to the Salton Sea by substantially more than the canal lining projects. The combined effect of the canal lining projects and the Proposed Project on the rate of salinization of the Salton Sea and resultant effects on recreation resources would not be appreciably different from the effects of the water conservation and transfer component of the Proposed Project by itself. Proposed Project-related changes in inflow to the Salton Sea would be avoided with implementation of HCP Approach 2 of the Salton Sea Conservation Strategy. Under HCP Approach 1 of the Salton Sea Conservation Strategy, the recreation impacts of the water conservation and transfer component of the Proposed Project would be mitigated. Because the HCP would avoid or mitigate the impacts to recreation resources attributable to the Proposed Project to a limit which is less than cumulatively considerable; therefore, no adverse cumulative impact to the recreation resources of the Salton Sea would occur.

Implementation Agreement and Inadvertent Overrun and Payback Policy

Implementation Agreement. Execution of the IA by the Secretary is the federal action approving modifications to the operation of Colorado River facilities by Reclamation that are necessary to allow implementation of the QSA, including components of the Proposed Project. The IA is a condition precedent to implementation of the QSA. The IA would result in a change in the amount of water the Secretary would deliver to the Whitsett Pumping Plant, MWD's diversion point at Lake Havasu (above Parker Dam), and Imperial Dam, which is the diversion point for IID and CVWD. In aggregate (i.e., including the QSA and the Proposed Project), deliveries to Imperial Dam would be reduced by 183 to 388 KAFY, and this water would instead be delivered to the MWD facilities in Lake Havasu. Therefore, a flow reduction between 183 and 388 KAFY would occur in the LCR from Parker to Imperial Dams with implementation of the Proposed Project and the other water transfer projects authorized by the IA (Reclamation 2002). A substantial portion of that amount, up to 300 KAFY, is attributable to the water transfer component of the Proposed Project. The IA is described in detail in the Draft IA EIS, which is incorporated into this Draft EIR/EIS by reference.

Inadvertent Overrun and Payback Policy. The IOP establishes requirements for payback of inadvertent overuse of Colorado River water by Lower Division States. The IOP is triggered by inadvertent water use in excess of a user's annual entitlement. The combination of inadvertent overruns and payback pursuant to the IOP would result in minor year-to-year changes to water levels in Lake Mead and to water surface elevations on the LCR during both overrun years and payback years. The increased releases from Lake Mead and increased flow along the LCR resulting from excess use would lead to less water released from Lake Mead and decreased flows along the LCR resulting from payback requirements in succeeding years. Reclamation has determined that these changes do not create significant biological or hydrological impacts because, on average, it is anticipated that these levels would be near the levels without implementation of the IOP (Reclamation 2002). The IOP and Reclamation's determinations are described in detail in the Draft IA EIS, which is incorporated into this Draft EIR/EIS by reference.

- **Environmental Review Schedule.** A Notice of Public Comment for the NOI was published in the Federal Register on January 18, 2001 and the comment period was extended by a second notice published on March 9, 2001. Also, on January 18, 2001, Reclamation published in the Federal Register an NOI to prepare the Draft IA EIS. The Draft IA EIS, which evaluates the environmental impacts of the IA, the IOP, and the LCR biological conservation measures identified in USFWS' BO (see Section 5.1.1.4) was issued by Reclamation on January 11, 2002.

- **Potential Cumulative Impacts.** Since the IA simply provides federal authorization and implementation of certain QSA components, the cumulative effects of the IA and the Proposed Project are addressed in the discussion of the cumulative effects of the QSA and the Proposed Project in Section 5.1.1.1 above. No new significant cumulative effects will occur when the IA is evaluated in lieu of the QSA.

  Implementation of the IOP and the Proposed Project could result in an aggregate reduction in flow along the LCR between Parker and Imperial Dams which, in some years, would be greater than the reduction resulting from the Proposed Project by itself. In other years, the aggregate effect could be an increase in LCR flow. Based on the analysis in the Draft IA EIS, these changes are minor and no substantial, long-term, aggregate change is anticipated (Reclamation 2002). Therefore, no cumulative adverse impact to hydrology resources in the LCR would occur.

  The impacts to biological resources along the LCR as a result of the IA, IOP, and the Proposed Project are expected to be substantially the same as the impacts of the QSA and IA, as described above and in the Draft IA EIS. The Draft IA EIS identifies changes to the Salton Sea's salinity and elevation levels that would be an indirect effect of the IA/IOP. These are effects of the Proposed Project, which are assessed in this Draft EIR/EIS.

Interim Surplus Guidelines

Reclamation has adopted specific Interim Surplus Guidelines that will be used annually to determine whether conditions exist under which the Secretary might declare the availability of "surplus" water in Lake Mead for use within Arizona, California, and Nevada. The Interim Surplus Guidelines remain in effect through calendar year 2015, subject to 5-year reviews, and are applied each year as part of Reclamation's Annual Operating Plan (Reclamation 2000a).

The Interim Surplus Guidelines are critical to the overall implementation of the QSA because the QSA defines the process by which surplus water could be used to partially offset the effect of reducing of California's use of Colorado River water to its 4.4 MAF normal-year entitlement. Once the Interim Surplus Guidelines period is complete, it is anticipated that the QSA and other programs would be able to meet California's 4.4 MAF normal-year limit without the benefit of special surplus guidelines (CVWD et al. 2002).

A consultation between Reclamation and USFWS resulted in a BO (USFWS 2001), which identifies specific mitigation measures for federally listed species (razorback sucker and other native fish) and their habitats along the LCR which offset the aggregate impacts of the Interim Surplus Guidelines and the IA (including impacts on the LCR as required to implement the QSA and the Proposed Project). The LCR biological conservation measures are described and assessed in the Draft IA EIS, which is incorporated into this Draft EIR/EIS by reference.

- **Environmental Review Schedule.** The Interim Surplus Guidelines EIS was released for public review in July 2000. The Final EIS was released by Reclamation in December 2000. A ROD was issued in January 2001. The Draft IA EIS, released by Reclamation in January 2000, assesses the impacts of the LCR biological conservation measures.

- **Potential Cumulative Impacts.** Reclamation determined that the small changes in the probabilities of occurrence of flows in the LCR as a result of the Interim Surplus Guidelines are within Reclamation's current operational regime and authorities under applicable law (Reclamation 2002). Reclamation determined that implementation of the Interim Surplus Guidelines is expected to result in minor changes in reservoir levels in Lake Mead but would not result in changes in the LCR flows between Parker and Imperial Dams or changes in points of diversion. The Interim Surplus Guidelines apply to the use of surplus water only. Based upon the analyses set forth in the Draft IA EIS, there are no significant cumulative impacts to hydrology associated with implementation of the Interim Surplus Guidelines when combined with the Proposed Project.

  The LCR biological conservation measures offset the aggregate impacts to species and their habitats which could result from the Interim Surplus Guidelines and the IA (which facilitates those QSA components which affect LCR diversions and flows, including the Proposed Project). Therefore, any cumulative impact has been reduced to a less than significant level.

Palo Verde Land Management, Crop Rotation, and Water Supply Program

MWD and PVID are developing a land management, crop rotation, and water supply program in the Palo Verde Valley. The program's objective is to develop a flexible and reliable water supply for MWD of approximately 100 KAFY for 35 years and to assist in stabilizing the farm economy within the Palo Verde Valley through sign-up payments and annual payments for participating farmers and through implementation of specific community improvement programs. Participation in the program would be voluntary. Participating farmers would, at MWD's request and with specific notice periods, not irrigate a portion of their farmland. The same land would not be irrigated for a minimum of a 1-year term and a maximum of a 3-year term at the farmer's option. A base area of 6,000 acres would not be irrigated each year of the 35 years. MWD would have the option to increase the non-irrigated area from 6,000 acres up to a maximum of 26,500 acres per year. Overall, a maximum of 24,000 acres per year in any 25-year period or 26,500 acres per year in any 10-year period during the 35-year program would be dedicated to the program. MWD would provide financial compensation to the participating farmers. Not irrigating a portion of the Palo Verde Valley's farmland would result in less Colorado River water being used by PVID. The amount of water conserved by the program would be determined on an annual basis (CVWD et al. 2002).

It is anticipated that there would be a reduction in flow of the LCR of approximately 111 KAFY between Parker Dam and the Palo Verde Diversion Dam. This could result in loss of marsh and riparian habitat along this portion of the LCR. This could impact sensitive fish and wildlife species including state- and federally listed species such as the Yuma clapper rail, black rail, Southwestern willow flycatcher, yellow-billed cuckoo, and razorback sucker.

It is also anticipated that there would a reduction in agricultural productivity although no permanent conversion of existing farmland is anticipated.

- **Environmental Review Schedule.** An NOP for an EIR assessing the impacts of this program was published on October 29, 2001. The EIR is currently in preparation and is anticipated to be released in early 2002.
- **Potential Cumulative Impacts.** The Proposed Project combined with this project could result in a potential cumulative impact by lowering LCR water levels by nearly 411 KAFY, in the aggregate (300 KAFY from the Proposed Project and 111 KAFY from the Palo Verde program), between Parker Dam and the Palo Verde Diversion Dam. According to the Draft IA EIS and the Draft QSA PEIR, the overall impacts to the LCR's hydrology and water quality are considered adverse but not cumulatively significant since the changes in the River levels would be small when compared to the total volume of water transported annually by the Colorado River.

  The biological impacts of the Proposed Project will be offset by implementation of the biological conservation measures outlined in USFWS' BO, as described above, and this Draft EIR/EIS. This mitigation would reduce the Proposed Project's contribution to any potential cumulative impact to biological resources to a level which is less than cumulatively considerable, and thus avoid any significant cumulative adverse impact to biological resources.

As described in this Draft EIR/EIS, the Proposed Project will have a significant adverse impact on agricultural resources if fallowing, or other mitigation measures, result in the conversion of agricultural land to a non-agricultural use. Based upon the current description of the MWD/PVID project, no adverse impact to agricultural resources is anticipated as a result of the conversion of farmland to non-agricultural use. Therefore, no significant cumulative adverse impact to agricultural resources would occur.

Coachella Valley Water Management Plan

CVWD prepared the Coachella Valley Water Management Plan (CVWD 2000a) to provide an overall program for managing its surface and groundwater resources in the future. The objectives of this Water Management Plan are to:

- Eliminate groundwater overdraft and its associated adverse impacts, including groundwater storage reduction, declining groundwater levels, land subsidence, and water quality degradation.
- Maximize conjunctive use opportunities.
- Minimize adverse economic impacts to Coachella Valley water users.
- Minimize environmental impacts.

The overall Water Management Plan involves a number of actions to reduce the current overdraft of the groundwater in the Coachella Valley through increased use of Colorado River water (thus reducing demand for groundwater pumping) and various recycling and conservation measures to reuse or decrease the consumption of water.

A substantial portion of the additional Colorado River water to be used pursuant to the Water Management Plan (up to 100 KAFY) is the conserved water to be transferred by IID to CVWD under the Proposed Project's second implementation scenario (QSA Implementation). The impacts of the Proposed Project are evaluated in this Draft EIR/EIS; however, the impacts of CVWD's receipt of water transferred by IID and use of this water within the CVWD service area are addressed only at a programmatic level in this Draft EIR/EIS. It is anticipated that the transferred water will be used to recharge groundwater within CVWD's Improvement District No. 1 and that the impacts of such use, in combination with other components of the Water Management Plan, will be assessed in the Draft CVWD Water Management PEIR, which is currently being prepared by CVWD.

The QSA provides for the delivery of an additional 55 KAFY of Colorado River water to CVWD from other sources (20 KAFY from conserved water generated under the 1988 IID/MWD Agreement and 35 KAFY to be obtained from MWD through an exchange of SWP water entitlement). The impacts of this additional 55 KAFY are evaluated at a programmatic level in the Draft QSA PEIR and will be further assessed in the Draft CVWD Water Management PEIR.

Other elements of the Water Management Plan are not dependent upon implementation of the QSA, nor are they part of the Proposed Project; they are addressed in this cumulative impact assessment and will also be addressed in the Draft Program EIR for the Water Management Plan. It is estimated that approximately 63 KAFY of water would be gained through non-QSA related activities provided for in the Water Management Plan, including recycled water, desalted agricultural drain water, municipal and industrial conservation, golf course conservation, and increased sub-surface flows. Implementation of these programs would involve construction of various facilities for treatment of water and development of additional policies to implement increased conservation. Implementation of the Water Management Plan may also result in additional water from other transfers not related to the QSA, including a potential transfer of up to 100 KAFY of SWP water.

The potential environmental impacts of the Water Management Plan have not been fully assessed at this time, but the following potential impacts have been identified: short-term construction impacts, potentially including impacts to biological resources, air quality, transportation, and noise; increased agricultural return flows and decreased water quality to drains that empty into the Salton Sea from the Coachella Valley; and impacts to biological and cultural resources.

- **Environmental Review Schedule.** The Draft CVWD Water Management PEIR is being prepared by CVWD. A NOP was originally filed with the State Clearinghouse in November 1995. A revised NOP was issued in March 2000 to incorporate the changes to the project brought about by the Colorado River allocation negotiations. The Draft CVWD Water Management PEIR is planned for release in early 2002.

- **Potential Cumulative Impacts**

  Hydrology and Water Quality – CVWD Service Area and Salton Sea. It is difficult to distinguish the impacts of CVWD's receipt and use of up to 100 KAFY under the Proposed Project from the impacts of other components of the Coachella Valley Water Management Plan. In addition, final environmental documentation for the Water Management Plan has not yet been released to the public. Overall, implementation of the Water Management Plan, however, is anticipated to increase agricultural return flows to the drains within the CVWD service area that empty into the Salton Sea. As the groundwater level in the Coachella Valley increases, flows in the drains and CVSC would increase, partially offsetting decreased flows to the Salton Sea as a result of the Proposed Project. Thus, no cumulative adverse impact resulting from reduced inflows to the Salton Sea is anticipated.

  The salinity of Coachella Valley drain flows is predicted to increase with implementation of the Water Management Plan, which would increase the salt load delivered to the Salton Sea. The Proposed Project will also accelerate the rate of salinity increases in the Salton Sea. However, as described in this Draft EIR/EIS, there is no water quality standard for salinity in the Salton Sea, although increasing salinity is expected to affect fish populations that support piscivorous birds, as discussed below in connection with biological resources. Therefore, there will be no significant cumulative impact to water quality due to salinity increases at the Salton Sea.

  Increased use of Colorado River water for agriculture in the Coachella Valley may increase the selenium concentration in the drains and the CVSC. However, the projected flow-weighted average concentration of selenium in the drains and the CVSC is currently below the established water quality standard, and no significant impact as a result of exceedance of this standard is anticipated as a result of the Water Management Plan. It is also not anticipated that the aggregate effects of the Proposed Project and the Water Management Plan will result in a significant cumulative adverse water quality impact to the Salton Sea due to selenium.

Other components of the Water Management Plan may result in additional use of the groundwater resources or drain water in the CVWD service area. This use would be small when compared to the overall benefit of the Proposed Project to the groundwater aquifer. There is a potential however, that the water quality within shallow groundwater aquifers (not those aquifers primarily used within the CVWD service area for water supply) and within the drains may deteriorate both from the use of the saltier Colorado River water and the movement of the higher saline groundwater into the canal system due to higher groundwater levels. This impact is considered a potentially adverse cumulative impact and will be assessed in the Draft CVWD Water Management PEIR (release pending).

Biological Resources – Salton Sea. As noted above, both the Proposed Project and the Water Management Plan contribute to increased salinity in the Salton Sea. The salinity of the Salton Sea will increase under Baseline conditions without the Proposed Project or the Water Management Plan; this Baseline trend will have a significant impact on biological resources at the Salton Sea, as discussed in this Draft EIR/EIS. Existing conditions, agricultural drainage practices, the Proposed Project and the Water Management Plan contribute to a significant cumulative impact to fish populations supporting piscivorous birds. Proposed Project-related changes in inflows to the Salton Sea would be avoided with implementation of HCP Approach 2 of the Salton Sea Conservation Strategy. Under HCP Approach 1 of the Salton Sea Conservation Strategy, the biological impacts of the Proposed Project would be mitigated. Since the HCP would avoid or mitigate Proposed Project-related impacts, the contribution of the Proposed Project will not be cumulatively considerable, and, therefore, no significant cumulative adverse impact involving the Proposed Project would occur.

The Proposed Project-related impacts to biological resources resulting from selenium discharge into the Salton Sea will be mitigated through the HCP to a level which is less than cumulatively considerable; therefore, no significant adverse cumulative impact to biological resources due to selenium will occur.

The water conservation and transfer component of the Proposed Project is anticipated to adversely affect Desert pupfish in drains in the IID water service area. The increased flow in drains within the CVWD service area, which is anticipated under the Water Management Plan, has not currently been identified as an adverse impact to Desert pupfish in those drains. If such an impact is subsequently identified as a result of project-specific analysis of the Water Management Plan, it could result in a cumulative adverse impact to Desert pupfish in the Salton Sea area. However, the HCP is designed to mitigate the impacts of the Proposed Project to Desert pupfish, which would reduce those impacts to a level which is less than cumulatively considerable; therefore, no significant cumulative impact to Desert pupfish would result.

Recreation Resources– Salton Sea. As stated above, the Water Management Plan could result in increased salinity of inflows to the Salton Sea. The combined effect of the Water Management Plan and the Proposed Project on the rate of salinization of the Salton Sea and resultant effects on recreation resources would not be appreciably different from the effects of the water conservation and transfer component of the Proposed Project by itself. Proposed Project-related changes in inflow to the Salton Sea would be avoided with implementation of HCP Approach 2 of the Salton Sea Conservation Strategy. Under HCP Approach 1 of the Salton Sea Conservation Strategy, the recreation impacts of the water conservation and transfer component of the Proposed Project would be mitigated. Because the HCP would avoid or mitigate the impacts to recreation resources attributable to the Proposed Project to a limit that is less than cumulatively considerable; therefore, no adverse cumulative impact to the recreation resources of the Salton Sea would occur.

Short-term Construction Impacts. There is a potential cumulative impact as a result of localized construction-related impacts (air quality, traffic, noise, and biological and cultural impacts) in connection with the construction of facilities related to the Proposed Project, facilities related to CVWD's use of water transferred under the Proposed Project, and facilities implementing other components of the Coachella Valley Water Management Plan. Mitigation measures required under this Draft EIR/EIS for Proposed Project-related construction impacts will reduce those impacts to a level which is less than cumulatively considerable; and, therefore, no significant cumulative adverse impact due to construction will occur.

Cabazon Power Plant

Southern Energy, Inc. (SEI) is proposing to build a 500-MW, gas-fired generation facility on the Cabazon Indian Reservation in the Coachella Valley. SEI wants to purchase approximately 5 KAFY of Coachella Canal water for use at the facility, primarily for cooling. The plant proposes to discharge spent cooling water to the Whitewater River/CVSC (CVWD 2000b).

- **Environmental Review Schedule.** SEI is currently in discussions with the RWQCB to determine the feasibility and requirements for this plan. The date of anticipated first operation is unknown (CVWD 2000b).
- **Potential Cumulative Impacts.** Because of the lack of environmental documentation on this project, cumulative effects are speculative. The quality of the discharged cooling water's salinity depends on the cooling process used, whether it is pass-through or recycled multiple times before blowdown. If the salinity substantially exceeds that in the CVSC, the effect could be cumulatively considerable in conjunction with the Proposed Project's second scenario (QSA Implementation). If it were substantially lower, then the effect would be beneficial in diluting the salts (CVWD 2000b).

  Cumulative impacts could also result from the construction of the Cabazon Power Plant and the groundwater recharge facilities under the Proposed Project's second scenario. However, construction-related impacts would not result in long-term alteration of the environment, and it is anticipated that the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to a less than cumulatively considerable level through the use of standard construction measures and BMPs that will be identified in the Coachella Valley Water Management Plan PEIR (release pending); therefore, no significant cumulative impact as a result of construction would occur.

Salton Sea Restoration Project

This project is described in Chapter 1, Section 1.6.

- **Environmental Review Schedule.** A revised draft EIS/EIR, including revised alternatives and modeling and impact analyses, is being prepared.
- **Potential Cumulative Impacts.** It is not known at this time what the project alternatives or modeling results will be; therefore, any conclusions regarding potential cumulative impacts would be speculative. The stated purpose of the Salton Sea Restoration Project is to stabilize the salinity and elevation levels for all or a portion of the Salton Sea. This could ameliorate the future conditions anticipated in the Baseline description for the Salton Sea included in this Draft EIR/EIS and could reduce Proposed Project-related effects on the salinity, elevation and biological resources of the Sea.

  Certain potential restoration measures could reduce inflows to the Salton Sea or its elevation or adversely impact water quality or air quality. If such measures are proposed as part of the Salton Sea Restoration Project, the would contribute to impacts to water quality, hydrological resources, air quality and other impacts resulting from reduced Salton Sea elevation, which have been identified as Proposed Project-related impacts. However, since the restoration measures have not been specifically identified at this time, and sine Proposed Project-related impacts will be reduced to a level which is less than cumulatively considerable, no significant cumulative adverse impacts to these resources have been identified.

  Certain potential restoration measures could convert farmland to non-agricultural use. If such measures are proposed, as part of the Salton Sea Restoration Project, they would exacerbate the significant, unavoidable impact to agricultural resources which would result from the Proposed Project if fallowing, HCP measures or mitigation measures under this Draft EIR/EIS convert farmland to non-agricultural use, resulting in a significant, unavoidable cumulative impact to agricultural resources. Since the restoration measures have not been specifically identified at this time, no such significant cumulative adverse impact can be determined to occur.

  There may be short-term construction-related impacts associated with the restoration measures, such as short-term impacts to air quality, noise, traffic, and biological or cultural resources. Mitigation for construction-related impacts of the Proposed Project is included in this Draft EIR/EIS and will reduce those impacts to a level which is less than cumulatively considerable; therefore, no significant cumulative adverse impact due to construction will occur.

SDCWA Capital Improvement Plan (CIP) Projects

The SDCWA Capital Improvement Plan (CIP) (SDCWA 2000b) is designed to provide facilities needed for a safe, reliable, and operationally flexible water storage, treatment, and delivery system (SDCWA 2000b). SDCWA initiated the CIP in 1986 to meet the needs of its service area through 2010 and, for some projects, through 2030. The approved CIP for Fiscal Year 1999/2000 includes 79 individual projects and has a total planned budget of $99.4 billion. SDCWA's four major goals for the CIP are to:

- Increase pipeline capacity to meet present and future demands, particularly during times of peak usage.

- Eliminate bottlenecks in the present pipeline system.
- Increase reliability where water delivery is dependent on a single pipeline or source.
- Increase operational flexibility to facilitate pipeline maintenance (SDCWA 2000b).

CIP projects are intended to respond to projected demands for water supply facilities. They generally involve the improvement of existing facilities or the construction of new facilities in the following categories: (1) pipeline projects; (2) system-wide improvements; (3) emergency storage projects; (4) water supply projects; and (5) flow control and pumping facilities (SDCWA 2000b).

Pipeline projects included in the CIP are designed to meet the goals of increasing the capacity, operational flexibility, and reliability of the aqueduct system. Many of the major pipeline projects in the CIP would provide an additional pipeline along the Second Aqueduct corridor through the entire SDCWA service area, from Lake Skinner to Lower Otay Reservoir (SDCWA 2000b). The additional pipeline will provide expanded capacity to meet projected increasing water demands and relieve capacity limitations within portions of the aqueduct system. It would also provide the ability to maintain both treated and untreated water deliveries in most of the area during extended pipeline outages for maintenance or emergencies where one pipeline may be out of operation. The construction of a second pipeline in the south portion of the county has been completed. It allows the delivery of both treated and untreated water to southern member agencies.

The Ramona Pipeline and the North County Distribution Pipeline have extended the Authority's aqueduct system to provide additional service to member agencies. The Valley Center Pipeline would increase the flexibility of the treated water system by providing a means of transferring treated water between the First and Second Aqueducts for operational needs and emergencies (SDCWA 2000b).

Other pipeline projects extend the service life of existing pipeline facilities by rehabilitation, replacement, or protection. These projects include the Aqueduct Protection Program, the Prestressed Concrete Cylinder Pipe Relining/Replacement, and the Pipeline Relocations at Bradley Park.

System-wide improvements enhance the entire aqueduct system. They provide better operational control, improved accounting, and budget control, and increased service life for existing facilities (SDCWA 2000b).

The Emergency Storage Project is designed to provide adequate storage to meet emergency needs. In April 1998, the Board approved agreements with Olivenhain Municipal Water District and the City of San Diego for design, construction, and operation of the initial components of the project. The SDCWA Board formally adopted the project in June 1998. Design of the initial components the Olivenhain Dam, Pipeline, and Pump Station began in Fiscal Year 1998/1999 (SDCWA 2000b).

Projects are planned to increase the water supply to the entire SDCWA service area or to specific regions of the county. These projects include efforts to monitor treated and untreated water demands to ensure that adequate treatment plant capacity and conveyance facility capacity are available to meet the needs of the SDCWA's member agencies (SDCWA 2000b).

Flow control and pumping facilities are designed to deliver water to the member agencies from the aqueduct system. Additional flow control facilities are requested by the member agencies and their full cost is reimbursable to SDCWA (SDCWA 2000b).

- **Environmental Review Schedule.** Implementation of the CIP began in 1998. For various reasons, the design and construction of the CIP projects have largely been delayed, and approximately 28 percent of the appropriated budget for Fiscal Year 1999/2000 had been spent by the end of the Third Quarter (SDCWA 2000b).

- **Potential Cumulative Impacts.** The potential impacts of SDCWA's CIP projects include temporary construction impacts, such as air quality, traffic and transportation, and noise. No construction-related effects of the Proposed Project will occur within the SDCWA service area, and, therefore, no cumulative adverse effect would occur.

  Implementation of the CIP projects would result in increased water supply capacity and reliability for SDCWA's service area to meet projected water supply demands. Implementation of the CIP projects in conjunction with the Proposed Project is expected to result in increased reliability of water for the SDCWA service area. This reliability would not change the assumptions on which regional population projections are based and would not, therefore, result in a significant cumulative adverse impact on population or growth.

North Baja Powerline

The North Baja Powerline is a 6-mile power line project in the southwest portion of the IID water service area. Two new power lines, parallel to the existing line, are proposed to run from the Imperial Valley substation to the Mexican border. The parties involved with the project are the Simpia/Baja California Power Company and BLM.

- **Environmental Review Schedule.** BLM has submitted the Draft EIR/EIS for public review. The Final EIR/EIS is expected for release by March 2002.

- **Potential Cumulative Impacts.** The project could impact desert tortoise habitat, flat-tailed horned lizard habitat, and riparian habitat, occupied by the clapper rail, desert tortoise, and flat-tailed horned lizard. Although the Proposed Project could affect these species, implementation of the HCP would avoid and/or mitigate Project-related impacts, thereby avoiding adverse cumulative impacts to biological resources.

  In addition to the biological impacts, the North Baja Powerline project could also result in short-term, construction-related impacts to air quality, traffic, and noise. The construction impacts of the North Baja Powerline project added to the impacts of the Proposed Project would result in cumulatively considerable short-term impacts to air quality, noise, and traffic in the IID water service area. Construction activities could be locally intensified if the projects are constructed concurrently. However, such impacts would occur during brief activity periods over the course of 75 years under the Proposed Project. In addition, construction-related impacts would not result in long-term alteration of the environment, and the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to less than significant levels through the use of standard construction measures and BMPs.

The North Baja Powerline project could potentially result in the permanent conversion of Prime Farmland or Farmland of Statewide Importance to a non-agricultural use in the IID water service area. If permanent fallowing is used as a conservation measure, the Proposed Project would have the same impact in the IID water service area, resulting in a significant unavoidable impact. The Proposed Project's contribution to this impact would be cumulatively considerable. No measures have been proposed to mitigate or avoid this impact unless the Proposed Project does not employ permanent fallowing as a conservation measure.

5.1.1.2 Agreements, Plans, and/or Projects with Potential Short-term Related or Cumulative Impacts

Gateway of the Americas Specific Plan as the New Port of Entry

The Gateway of the Americas Specific Plan Area (Gateway) is a master-planned industrial and commercial complex consisting of approximately 1,775 acres owned by private parties, as well as federal, state, and local agencies. The planning area is adjacent to the International Boundary, approximately 6 miles east of Calexico. It surrounds the new 87-acre International Port of Entry on the US side of the border. Gateway would provide a broad array of industrial-, commercial-, and transportation-related services, as well as retail shopping, business offices, and lodging, which would be required throughout the area as a result of the traffic generated by the International Port of Entry. The area is bounded on the west by the Ash Canal, on the north by a line parallel to the centerline of State Route 98, on the east by the Alamo River, and on the south by the northern right-of-way of the AAC (SSA and Reclamation 2000).

- **Environmental Review Schedule.** Imperial County prepared the Final PEIR for the Gateway Specific Plan in 1997 (Imperial County Planning Department 1997). The project is in various stages of development in the initial construction phase (Phase 1). Phase 2 is expected to continue for 20 to 40 years (Jones 2000).
- **Potential Cumulative Impacts.** Implementation of the Gateway project would result in short-term air quality, noise, and transportation impacts from construction in and around Calexico. The construction impacts of the Gateway project added to the impacts of the Proposed Project would result in cumulatively considerable short-term impacts to air quality, noise, and traffic in the IID water service area. Construction activities could be locally intensified if the projects are constructed concurrently. However, such impacts would occur during brief activity periods over the course of 75 years under the Proposed Project and 20 to 40 years under the Gateway project. In addition, construction-related impacts would not result in long-term alteration of the environment, and the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to less than significant levels through the use of standard construction measures and BMPs.

  The Gateway project could potentially result in the permanent conversion of Prime Farmland or Farmland of Statewide Importance to a non-agricultural use in the IID water service area. If permanent fallowing is used as a conservation measure, the Proposed Project would have the same impact in the IID water service area, resulting in a significant unavoidable impact. The Proposed Project's contribution to this impact would be cumulatively considerable. No measures have been proposed to mitigate or avoid this impact unless the Proposed Project does not employ permanent fallowing as a conservation measure.

Te' Ayawa Energy Center

The Torres Martinez Band of Desert Cahuilla Indians has concluded negotiations for construction of a $275 million Te'Ayawa Energy Center, a 600-megawatt (MW) natural-gas-fired power plant on leased reservation land near Mecca. The Calpine Corporation of San Jose, California is developing the plant. Te'ayawa Energy Center is negotiating with Reclamation and CVWD for use of Coachella Canal water for cooling the facility. The plant plans to pump up to 4 KAFY of water from the Coachella Canal and additional groundwater would be pumped for potable water supply.

- **Environmental Review Schedule.** A revised NOI was issued in January 2001. A NOA for the draft EIR/EIS was published in the Federal Register on October 5, 2001.
- **Potential Cumulative Impacts.** The project would use Coachella Canal water and pump groundwater. Increased pumping would increase overdraft in the Lower Coachella Valley. No adverse cumulative impact would occur related to groundwater.

  The project would use a "zero liquid discharge" system for treatment of process wastewater, including cooling tower blowdown. Water cycled in a cooling tower would be concentrated into a sludge-like consistency and evaporated from onsite ponds. The resulting mineral concentration that builds up in the ponds would be stored, dried, and eventually hauled offsite for disposal at an appropriate landfill. Because no water is proposed to be discharged into the CVSC or agricultural drain system, no additional inflows to the Salton Sea are attributable to this project, and no cumulative hydrology and water quality impacts are anticipated in association with the Proposed Project.

  Cumulative impacts could, however, result from the construction of the energy center and the groundwater recharge facilities under the Proposed Project's second scenario. However, construction-related impacts would not result in long-term alteration of the environment, and it is anticipated that the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to a less than cumulatively considerable level through the use of standard construction measures and BMPs that will be identified in the Coachella Valley Water Management Plan PEIR (release pending); therefore, no significant cumulative impact as a result of construction would occur.

5.1.1.3 Agreements, Plans, and/or Projects with Potential Short-term Related or Cumulative Impacts as well as Beneficial Effects

Heber Wastewater Treatment System Project

The Heber Wastewater Treatment Plant serves the community of Heber, which is located approximately 5 miles north of the Mexican border in Imperial County. The plant discharges to an agricultural drain that is a tributary to the Alamo River, and then to the Salton Sea. The plant is expanding capacity from 0.402 to 0.810 mgd and upgrading disinfection (Ringle 2000).

- **Environmental Review Schedule.** The wastewater facilities were expanded in September 2001. Plans for renovation of the older portion of the plant are currently in progress, with a construction completion scheduled for June 2002.

- **Potential Cumulative Impacts and Beneficial Effects.** When the expanded plant is at full capacity, it would increase the flow of freshwater to the Salton Sea by approximately 457 AFY out of a total 1.363 MAFY (Heber Public Utility District 1998). This project could result in a beneficial impact to the Salton Sea from improved water quality of the discharge to the Sea.

  Implementation of this project would result in short-term air quality, noise, and transportation impacts from construction in the IID water service area. The construction impacts of this project added to the impacts of the Proposed Project would result in cumulative short-term impacts to air quality, noise, and traffic in the IID water service area. Construction activities could be locally intensified if the projects are constructed concurrently. However, such impacts would occur during brief activity periods over the course of 75 years under the Proposed Project. In addition, construction-related impacts would not result in long-term alteration of the environment, and the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to a less than cumulatively considerable level through the use of standard construction measures and BMPs; therefore, no significant cumulative impacts as a result of construction would occur.

  The Heber Wastewater Treatment Plan project could potentially result in the permanent conversion of Prime Farmland or Farmland of Statewide Importance to a non-agricultural use in the IID water service area. If permanent fallowing is used as a conservation measure, the Proposed Project would have the same impact in the IID water service area, resulting in a significant unavoidable cumulative impact to agricultural resources. The Proposed Project's contribution to this impact would be cumulatively considerable. No measures have been proposed to mitigate or avoid this impact unless the Proposed Project does not employ permanent fallowing as a conservation measure.

Mexicali Wastewater System Improvements

Untreated or partially treated wastewater from Mexicali, Mexico, is discharged into the New River, which flows north into the US and ultimately empties into the Salton Sea (SSA and Reclamation 2000). The purpose of the Mexicali Wastewater System Improvement project is to improve the water quality of the New River by improving wastewater treatment facilities in Mexicali.

The Mexicali Wastewater System Improvements consists of 41 projects in Mexicali to resolve problems related to the quality of water treated by the existing Mexicali wastewater system and treatment plant. The existing plant serves the Mexicali I zone of the city, as well as untreated wastewater discharges to the New River from the sewer system that serves the Mexicali II zone of the city. Projects include the rehabilitation and expansion of the Mexicali I wastewater system and treatment plant to treat 30 million- gallon- per- day (mgd) and the construction of a 20-mgd wastewater treatment plant and associated facilities. After improvements are made, the water may be redirected for recycling in Mexico. If all the wastewater were recycled, inflow to the Salton Sea could be reduced by approximately

55 KAFY. The general impact of the Mexicali wastewater system work would be a beneficial impact on the quality of inflows to the Salton Sea (CVWD et al. 2002).

Beneficial effects on water quality in the New River, which drains into the Salton Sea, are generally anticipated as a result of the treatment improvements (IBWC 1997). If water is redirected for recycling in Mexico, the loss of freshwater inflow to the New River could result in water quality impacts.

- **Environmental Review Schedule.** Contracts for portions of Mexicali I have been awarded, and construction of these components began in the fall of 2000. Construction is planned for completion by 2004 (Pena 2000). The construction of the Mexicali II wastewater treatment plant is estimated to be completed by the end of 2003 (Aibarra 2001).
- **Potential Cumulative Impacts and Beneficial Effects.** The project would be expected to result in a beneficial effect on the quality of the New River and ultimately the Salton Sea. Although, in the event that water is redirected for recycling in Mexico, the loss of up to approximately 55 KAFY of freshwater inflow into the Salton Sea could result in increased salinity concentration in the New River. Although the Proposed Project would also increase the salinity concentration in the New River, the incremental effect of the Mexicali Wastewater System Improvement project would not result in a cumulatively considerable impact because the salinity concentration levels in the New River would remain well below the appropriate water quality criteria.

Whitewater River Basin Flood Control Project

The Whitewater River Basin Flood Control project is a cooperative effort between the Corps and CVWD to evaluate flood protection measures within the Thousand Palms area of the Whitewater River Basin. The 45-square-mile project area is located in Riverside County and includes unincorporated territory, as well as portions of Cathedral City and Indio. The project consists of constructing three levees to protect the Thousand Palms area from flooding and convey stormwater to the Coachella Valley fringe-toed lizard preserve. The preferred alternative of the feasibility study (Corps 2000) proposes a number of levees and a 550-acre floodway that would protect developed areas from flood flows from the Indio Hills, while allowing sediment carried by flood flows to be deposited in the wind corridor or directly in the Coachella Valley Preserve.

- **Environmental Review Schedule**. Environmental documents for the project have been completed. The Corps started final design in November 2001. CVWD estimates a 2-year design period to be completed by December 2002, followed by a 5-year construction period. The project is expected to be operational in late 2005 to early 2006 (CVWD 2000).
- **Potential Cumulative Impacts and Beneficial Effects.** The project would reduce peak flood flows and decrease scour in the CVSC, leading to a beneficial impact on wetland habitat in the CVSC. Implementation of this project would also result in beneficial impacts to biological resources in the Coachella Valley and Salton Sea area.

  Cumulative impacts could also result from the construction of the levees and the groundwater recharge facilities for the Project's second scenario. However, construction-related impacts would not result in long-term alteration of the environment, and it is anticipated that the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to a level that is less than cumulatively considerable through the use of standard construction measures and BMPs that will be identified in the Draft CVWD Water Management PEIR (release pending); therefore, no significant cumulative impacts as a result of construction would occur.

5.1.1.4 Agreements, Plans, and/or Projects with Potential Beneficial Effects

Biological Conservation Measures in USFWS' Biological Opinion

As discussed above, Reclamation entered into consultation with the USFWS under Section 7 of the federal ESA to address the potential impacts to federally listed species and their habitats along the LCR as a result of implementation of the Interim Surplus Guidelines and the IA. The IA facilitates those QSA components which affect LCR diversions and flows, including the Proposed Project. In connection with that consultation, Reclamation prepared a BA in August 2000 (Reclamation 2000), and a BO was issued by USFWS in January 2001 (USFWS 2001).

Pursuant to the BO, Reclamation has committed to implement certain biological conservation measures that are intended to offset the aggregate impacts of the changes in LCR diversions and flows resulting from the IA and the Interim Surplus Guidelines.. The BO does not specifically distinguish biological conservation measures which offset the Proposed Project's impacts as distinct from the impacts of other IA actions. Therefore, this cumulative impact analysis focuses on the overall impacts of the BO. The biological conservation measures are described in detail and assessed in the Draft IA EIS, which is incorporated into this Draft EIR/EIS by reference.

- **Environmental Review Schedule.** Impacts of the biological conservation measures identified in the BO are evaluated for NEPA compliance in the Draft IA EIS, which was released by Reclamation on January 11, 2002. Future, site-specific environmental analyses will evaluate site-specific impacts prior to implementation of these measures.
- **Potential Cumulative Impacts.** The BO, which set forth the biological conservation measures, provides ESA compliance for the aggregate LCR impacts of the Proposed Project, QSA, IA, and Interim Surplus Guidelines. This Draft EIR/EIS relies upon those measures to mitigate the LCR impacts of the Proposed Project. This Draft EIR/EIS assesses, for CEQA purposes, the issuance of incidental take permits under CESA for impacts to state-listed species along the LCR as a result of the Proposed Project and provides for appropriate mitigation. On a long-term basis, implementation of the biological conservation measures and other measures required under CESA would result in beneficial impacts to biological resources along the LCR, and no significant cumulative adverse impacts are anticipated.

  There may be short-term construction-related impacts associated with the habitat restoration efforts, such as short-term impacts to biological resources, potential impacts to cultural resources, and potential water quality impacts resulting from sedimentation. It is expected that these impacts would be reduced to less-than-significant levels through site-specific measures once sites are identified and detailed project plans are developed to implement these conservation measures. Mitigation for construction-related impacts of the Proposed Project is included in this Draft EIR/EIS and will reduce those impacts to a level which is less than cumulatively considerable; therefore, no significant cumulative adverse impact due to construction will occur.

The biological conservation measures may also require additional use of Colorado River water for habitat construction and maintenance. Issues associated with the Decree accounting and water allocations have not been fully resolved. It is anticipated, however, that this water use would be relatively small and would result in a less-than-significant impact to water resources; therefore, no significant cumulative adverse impacts to water resources would result.

Lower Colorado River Multi-Species Conservation Program

The LCR MSCP is a partnership of state, federal, tribal, and other public and private stakeholders with an interest in managing the water and related resources of the LCR Basin. The purposes of the LCR MSCP are as follows:

- Conserve habitat and work toward the recovery of "covered species" within the historic floodplain of the LCR, pursuant to the federal ESA, and reduce the likelihood of additional species listings under the ESA.
- Accommodate current water diversions and power production, and optimize opportunities for future water and power development, to the extent consistent with law.
- Provide the basis for federal ESA and CESA compliance via incidental take authorizations resulting from the implementation of the first two purposes.

The LCR MSCP covers the mainstem of the LCR from below Glen Canyon Dam to the southerly international boundary with Mexico. The program area includes the historic floodplain and reservoir full-pool elevations. Potential conservation measures would focus on the LCR from Lake Mead to the southerly international boundary. More than 100 federal or state-listed, candidate, and sensitive species and their associated habitats, ranging from aquatic, wetland, and riparian habitats to upland areas, would be addressed. The program would address the biological needs of mammals, birds, fish, amphibians, and reptiles, as well as invertebrates and plants.

The comprehensive program is planned to be implemented over a 50-year period and would address future federal agency consultation needs under the ESA's Section 7, and non-federal agency needs for endangered species incidental take authorization approval under ESA's Section 10.

The LCR MSCP is intended to cover any incidental take associated with a number of actions, including changes in the point of diversion of up to approximately 1.574Y MAF of Colorado River water from below Parker Dam. This volume is based on a series of conceptual transfers and changes in points of diversion that would maintain full aqueducts to urban users and provide water for anticipated federal programs. With the exception of the 400 KAFY addressed in the BO, none of the conceptual "covered projects" are proposed and considered reasonably foreseeable from a CEQA perspective (CVWD et al. 2002).

- **Environmental Review Schedule.** An EIS/EIR and BA will be prepared to analyze the impacts of the LCR MSCP. Reclamation and USFWS are the lead agencies under NEPA, and MWD is the lead agency under CEQA. An NOI and an NOP were filed in May 1999, and seven scoping hearings were held in June and July 1999 to inform the public about the LCR MSCP and solicit input. A Supplemental NOI to prepare an EIS/EIR on the project was published in the Federal Register on July 12, 2000, and additional scoping meetings were held in July and August 2000. The LCR MSCP is scheduled for public release in late 2002. Completion of environmental review, a ROD by the Secretary, federal ESA and CESA permitting, and execution of an implementation agreement among LCR MSCP participants is scheduled for 2003. The details of the impacts of the projects covered by the ESA/CESA compliance provided by the LCR MSCP would undergo separate environmental evaluation when and if such projects are proposed.

- **Potential Cumulative Impacts.** Implementation of the LCR MSCP is designed to have a beneficial impact on habitat along the LCR. Conservation measures necessary to account for the incidental take of protected species within the historic floodplain of the LCR would be implemented within the next 50 years. Additional conservation measures are planned to assist in the recovery of the covered species. These conservation measures are expected to include the restoration of existing degraded and/or the construction of new open water, marsh, and riparian forest habitats. The first phase of these actions is likely to restore cottonwood-willow habitat suitable for southwestern willow flycatcher and western yellow-billed cuckoo, mesquite habitat, and marsh habitat suitable for the Yuma clapper rail and other similar species. In addition, native fish refugia would be created, and native fish populations may be supplemented by hatchery-raised fish. Later phases would add more habitat based on adaptive management principles. Implementation of the conservation measures associated with the LCR MSCP is expected to mitigate any adverse effects of current and future diversions of the Colorado River, and no significant cumulative adverse impacts to biological resources will result from the LCR MSCP in combination with the Proposed Project.

  Short-term construction-related impacts associated with the restoration efforts could occur, such as short-term impacts to biological resources and water quality and potential impacts to cultural resources. It is expected that these impacts would be reduced to less-than-significant levels through site-specific measures once sites are identified for the conservation efforts. Mitigation for construction-related impacts of the will be identified by Reclamation in subsequent documentation. No adverse significant cumulative impact due to construction would occur.

  LCR MSCP conservation measures may also require additional use of Colorado River water for habitat construction and maintenance. Issues associated with the Decree accounting and water allocation have not been fully resolved. It is anticipated, however, that this water use would be relatively small and would result in a less than significant cumulative impact to water resources; would result in a less-than-significant impact to water resources; and, therefore, that no cumulatively considerable adverse impacts to water resources would result from the LCR MSCP in combination with the Proposed Project.

Colorado River Salinity Control Program

The Colorado River Basin Salinity Control Forum determined that 1,477,700 tons of salt must be removed or prevented from entering the Colorado River annually to maintain the numeric criteria established by 1974 Colorado River Basin Salinity Control Act, Public Law 93-320, as amended, through 2015. The salinity control plan includes projects that remove the required salt tonnage. To meet the goal of 1.48 million tons of salinity control through 2015, it would be necessary to fund and implement additional measures, which would ensure the removal of an additional 756,000 tons annually.

With respect to federal funding for the Colorado River salinity control program, the goal is to help secure the Forum's estimated funding of federal agencies necessary to maintain salinity at or better than the numeric criteria through year 2015:

- Reclamation - $17.5 million/year
- USDA - $12.0 million/year
- BLM - $5.2 million/year

With respect to legislation to increase the authorized funding ceiling of Reclamation's new Basinwide Salinity Control Program by $100 million, the goal is enactment in year 2000.

This action, pursuant to the 1974 Colorado River Basin Salinity Control Act, Public Law 93-320, as amended, provides for the construction, operation, and maintenance of projects in the Colorado River Basin to control the salinity of water delivered to Mexico. A wide range of salinity control actions have been undertaken in the Colorado River basin as part of this program. These actions include the construction of a desalting plant at Yuma, Arizona, the development of a protective well field along the US/Mexico border, a replacement flow study, a salinity control program on BLM land, a voluntary on-farm salinity control program by USDA, and a program for funding basinwide salinity control projects through competitive bid. These actions would be implemented by a variety of stakeholders; an interagency group, the Colorado River Basin Salinity Control Forum, coordinates the actions (Reclamation 2000b).

- **Environmental Review Schedule.** The salinity control program is not subject to environmental review.

- **Potential Beneficial Effects.** To achieve future reduction goals, a variety of Colorado River salinity control methods are being investigated. Existing salinity control measures under this program would prevent more than a half-million tons of salt per year from reaching the Colorado River (Reclamation 2002). The Proposed Project assumes the continued implementation of these salinity control projects as needed to maintain the quality of the Colorado River water diverted by IID, or transferred to other parties by IID as part of the Proposed Project, as identified in salinity control objectives. No adverse cumulative impacts would result from implementation of the Colorado River Salinity Control Program in conjunction with the Proposed Project.

CRB RWQCB'S Watershed Management Initiative

The Watershed Management Initiative is CRB RWQCB's internal planning mechanism for the Salton Sea Transboundary Watershed basin planning unit, the Priority Watershed in the Region. The watershed was identified as impaired under the 1998 California Unified Watershed Assessment (UWA). The UWA was a collaborative process between California and USEPA, developed to guide allocation of new federal resources for watershed protection. The watershed contains five main surface water bodies: the Salton Sea, New River, Alamo River, Imperial Valley agricultural drains, and the Coachella Valley Stormwater Channel (CVSC) (CRB RWQCB 1999).

- **Environmental Review Schedule.** The Watershed Management Initiative is not a project, but an overall plan that is not subject to environmental review. The Total Maximum Daily Load (TMDL) program, discussed in Section 5.1.1.8 would implement this initiative.

- **Potential Beneficial Effects.** The Watershed Management Initiative would result in beneficial water quality impacts in the Salton Sea Transboundary Watershed. Refer to Section 3.1, Hydrology and Water Quality, for additional information on TMDLs in this watershed. No adverse cumulative impacts would result from implementation of TMDLs in conjunction with the Proposed Project.

Total Maximum Daily Load Program

Pursuant to the requirements of the Clean Water Act, the CRB RWQCB identified and ranked "impaired waterbodies" for which TMDLs need to be established. The Board will develop and adopt an implementation plan for each TMDL/water body combination, and identify implementing actions, monitoring and surveillance for compliance, and for technical and economic feasibility. The Salton Sea tributaries have been identified as quality-limited waters. CRB RWQCB identified the New River, Alamo River, Imperial Valley drains, Salton Sea, Palo Verde outfall drain, and CVSC as quality-limited waters. The Salton Sea Watershed has also been identified as a priority watershed (CRB RWQCB 1998).

- **Environmental Review Schedule.** Table 5-1 identifies the schedule for establishment of TMDLs for the water bodies listed above. The schedule is subject to change based on regional and state priorities.
- **Potential Beneficial Effects.** The TMDL program is anticipated to improve the quality of the individual water-quality-limited waterbodies and the Salton Sea; therefore, the TMDL program is expected to have a beneficial effect on the quality of the waterbodies listed in Table 5-1, including the Salton Sea. Improvement in the water quality may have additional benefits affecting local and regional socioeconomic, biological, recreational, and other resources. The Proposed Project reduces the amounts of TSS and other COCs associated with irrigation drain water, which improves water quality in drains and rivers discharging into the Salton Sea; however, an increase in the concentrations of selenium and salt in these waterbodies is projected as a result of the Proposed Project. The TMDL process could result in beneficial impacts to the same water bodies and habitat areas that could be negatively affected by the Proposed Project. Water quality impacts of the Proposed Project are assessed in this Draft EIR/EIS and no significant adverse cumulative impacts to water quality would occur as a result of implementation of the Proposed Project in conjunction with the TMDL program.

Brawley Constructed Wetlands Demonstration Project

The Brawley Constructed Wetlands Demonstration Project (Brawley Wetlands Project) involves the construction of two pilot treatment wetlands to improve water quality in the IID water service area's agricultural drains, the New River, and the Salton Sea. A 5-acre wetland is being constructed on a 7-acre site near Brawley; this wetland is designed to divert and improve the quality of approximately 2.4 million gallons of New River water per year. A second, larger wetland (40 acres) is being constructed on a 68-acre site near Imperial. This 40-acre wetland would collect 6.9 million gallons of agricultural water per year from IID's Agricultural Rice 3 Drain. Both wetlands are designed to remove silt from inflows as they pass through the first sedimentation basin and to reduce nutrient loads, pesticide/herbicide toxicity, and selenium concentrations as water flows through a series of shallow ponds. A monitoring program will be conducted during the 3-year project term to

TABLE 5-1
Schedule for TMDL Implementation

Water Body	Priority	Pollutant	Start/Completion Dates
New River	High	Silt Bacteria Nutrients Pesticides VOCs	1998-2002 1998-2005 2002-2010 2002-2013 2007-2013
Alamo River	High	Silt Selenium Pesticides	1998-2010 2000-2010 2002-2011
Imperial Valley Drains	High	Silt Selenium Pesticides	1998-2010 2000-2010 2005-2011
Salton Sea	Medium	Salt Selenium Nutrients	1998-2001 2002-2007 2002-2010
Palo Verde Outfall Drain	Medium	Bacteria	2005-2011
CVSC	Low	Bacteria	2005-2009

Source: CRB RWQCB 2001

determine relative water quality improvements and the effects on wildlife (SSA and Reclamation 2000).

The long-term goal of this project is to find cost-effective and reliable water quality treatment that would have beneficial local and statewide impacts on agricultural drain pollution. The short-term goal is to improve impaired agriculture drain water quality to meet and support water quality objectives and designated beneficial uses. IID is the lead agency for the study, which is supported by a single congressional appropriation with no secure long-term funding (SSA and Reclamation 2000). The data generated would assist in determining the TMDL (see Section 5.1.1.8) for silt by providing a pilot study of silt reduction. Data also would be collected for TMDLs for selenium, pesticides, and nutrients (SSA and Reclamation 2000).

- **Environmental Review Schedule.** The project and associated monitoring program would be conducted for 3 years. Once vegetation is established, the site could be used to treat New River water. An extensive monitoring program would then begin, and it would continue for 3 years. If the demonstration project is successful, the wetlands will remain in service beyond the initial 3-year project term. IID would seek additional funding for operation, maintenance, and continued monitoring (Grubaugh 2000).
- **Potential Beneficial Effects.** Implementation of this project is anticipated to improve the water quality of the agricultural drains in the IID water service area, the New River, and the Salton Sea although the degree of improvement is not yet known. Wetlands could remove significant amounts of nitrogen, up to 80 or 90 percent, and less phosphorus (on the order of 30 to 40 percent). There is some concern over potential adverse impacts from this project with respect to the bioaccumulation of drainwater-related contaminants (e.g., selenium and organochlorine pesticides) (USFWS 1999); however, a

significant impact may be identified as the study evolves. The wetlands were constructed on lands that do not support federally listed species and they will not permanently take agricultural land out of production. Overall, this project could result in beneficial effects on the same water bodies and habitat areas that could be adversely affected by the Proposed Project. Water quality and biological resources impacts of the Proposed Project are assessed in this Draft EIR/EIS, and no significant adverse cumulative impacts would occur as a result of implementation of the Proposed Project in conjunction with the Brawley Constructed Wetlands Project.

Coachella Valley Multiple Species Habitat Conservation Plan
The purpose of the Coachella Valley Multiple Species HCP/Natural Communities Conservation Plan (CV MSHCP) would be to conserve adequate habitat to provide for the long-term viability of the designated species of concern and to simplify compliance with federal and state endangered species-related laws and regulations. CVAG and the Coachella Valley Mountains Conservancy are preparing the CV MSHCP, which would be subject to the approval of USFWS and CDFG. Participating agencies include NPS, NRCS, USFWS, US Forest Service, BLM, CDFG, California Department of Parks and Recreation, Riverside County, CVWD, MWD, and private landowners and organizations.

Thirty-one species of concern and 24 natural communities would be considered for coverage under the CV MSHCP, based on current habitat conditions and the extent of available information. The CV MSHCP area includes the entire Coachella Valley watershed, except those portions outside Riverside County or outside the boundaries of CVAG. The area covers more than 1.2 million acres (approximately 1,950 square miles) that include the valley floor and surrounding mountains up to the ridgeline.

In December 1999, a *Biological Analysis of Three Conservation Alternatives* for the CV MSHCP was prepared for review by the involved agencies. Preliminary draft maps of known locations of sensitive species were prepared concurrently. The plan does not include the fringe-toed lizard because this species has an existing HCP that is undergoing revision, but it does include the peninsula bighorn sheep, for which critical habitat has been adopted (CVAG 2000).

- **Environmental Review Schedule.** An administrative draft of the CV MSHCP containing three alternatives was prepared in August 2000. A single preferred alternative is now being considered, and a public draft CVMSHCP should be available in 2002.
- **Potential Beneficial Effects.** The CV MSHCP is expected to have a beneficial impact on habitat and special-status species in the Coachella Valley. Thus, no significant adverse impact would result from the CV MSHCP, and no significant cumulative adverse impact would result when considered in combination with the Proposed Project.

Lower Colorado River Desert Region Plan or Environmental Quality Incentives Program
Since 1997, the Natural Resources Conservation Service (NRCS) has been implementing a matching funds program to address water and air quality issues for 520,000 acres of irrigated cropland in the Imperial and Coachella Valleys. Cooperating parties are private landholders, Native American groups, IID, and the Bard Resource Conservation District. Reported project goals are the following:

- Reduce salinity levels in soil; reduce soil compaction and stratification.
- Reduce nitrate and pesticide concentrations in runoff agricultural drainage.
- Reduce nitrates leached into groundwater.
- Reduce PM_{10} levels during "the critical periods."

Every year, the program provides 50 percent matching funds to applicants for on-farm improvements in the valleys. Improvements could include slip plowing, cover crops to reduce erosion, planting windbreaks to reduce dust, nutrient (fertilizer) management, installation of tile drains, installation of drip systems, and other environmentally sound practices (NRCS 2000, Cameron 2000).

- **Environmental Review Schedule.** The program is not subject to an environmental review process.

- **Potential Beneficial Effects.** Implementation of projects partially funded by the program would benefit the quality of water in agricultural drains, reduce sediment in the drains, improve water use efficiency, improve drainage, and reduce nutrient and pesticides in drain water. The estimated degree of improvement is not available. The project could also improve the efficiency of agricultural practices in the IID water service area and the economic status of farmers in Imperial County. Water quality and socioeconomic impacts of the Proposed Project are assessed in this Draft EIR/EIS, and no significant adverse cumulative impacts would occur as a result of implementation of the Proposed Project in conjunction with this program.

Dos Palmas Habitat Restoration/Enhancement

BLM administers the Dos Palmas Preserve, which is an approximately 14,880-acre wildlife refuge and nature preserve near the town of North Shore on the northeast shore of the Salton Sea. The purposes of the preserve are to

- Protect habitat (i.e., land acquisition, onsite caretaker, signing and fencing, fire management)
- Restore and manage habitat (i.e., fish pond reconfiguration, restoration of native plant communities and wildlife habitat, borrow pits)
- Provide public outreach and visitor services (i.e., interpretive information and education program, road and trail system, and public access)
- Conduct ecosystem studies and monitoring programs

An interdisciplinary team developed a restoration plan; components of the plan, including modifying 25 acres of wetlands to create habitat for endangered species and a tamarisk removal program, have been implemented. Sensitive species in the preserve include the Yuma clapper rail, black rail, Desert pupfish, flat-tailed horned lizard, prairie falcon, Colorado Valley woodrat, and Orocopia sage. The fan palm oasis is fed by artesian springs and seepage from the nearby Coachella Canal (BLM 1998).

- **Environmental Review Schedule.** This project is not subject to environmental review.

- **Potential Beneficial Effects.** The pond reconfigurations are complete and the ponds are growing vegetation to emulate more natural plant communities which is attracting wildlife. Tamarisk eradication efforts continue. Implementation of the Dos Palmas Habitat Restoration/Enhancement project would result in beneficial effects to Desert pupfish and Yuma clapper rail. Biological resources impacts of the Proposed Project are assessed in this Draft EIR/EIS and no adverse cumulative impacts would occur as a result of implementation of the Proposed Project in conjunction with the Dos Palmas program.

Caltrans Route 86 Expressway Mitigation

Caltrans is implementing a phased mitigation project in association with impacts on wildlife habitat and Section 404 jurisdictional wetlands during construction of State Route 86 between Oasis and Indio in Riverside County. The biological mitigation completed for the project includes the reconstruction of 18.5 acres of wetlands and the creation of 20 acres of Desert pupfish habitat, including 2 years of monitoring of Desert pupfish habitat for plant establishment. Restoration of 112 acres of alkali sink scrub habitat is scheduled for completion in 2 to 3 years. Additional biological mitigation includes the implementation of visual mitigation planting at the interchange with Dillon Road (Caltrans 1994).

- **Environmental Review Schedule.** Biological mitigation for Phase I began in November 1996. Desert pupfish habitat creation and alkali sink marshland acquisition are complete, and negotiations with USFWS for additional alkali sink habitat are ongoing. Caltrans will establish a management plan under the proposed agreement that Caltrans will be responsible in perpetuity for the management of the acquired lands. Visual mitigation planting is scheduled to occur June 2001 through February 2005.
- **Potential Cumulative Impacts and Beneficial Effects.** Creation of the Desert pupfish habitat and wetland/marshland acquisition would have a beneficial effect on Desert pupfish. Biological resources impacts of the Proposed Project are assessed in this Draft EIR/EIS and no adverse cumulative impacts would occur as a result of implementation of the Proposed Project in conjunction with the mitigation program.

West Mojave Coordinated Management Plan

The West Mojave Coordinated Management Plan is a cooperative effort between BLM and 27 other federal and state agencies, cities, and counties to define a regional strategy for conserving plant and animal species and their habitats. The plan will address the management of the desert tortoise and 95 other special-status plant and wildlife species within a planning area approximately of 9.4 million acres. The planning area extends from Olancha in Inyo County, south to the San Gabriel and San Bernardino Mountains, and from Antelope Valley to as far east as Twenty-nine Palms.

Benefits of the plan would extend to landowners, land developers and users, and land management and regulatory agencies. Benefits would include providing a streamlined, predictable permit process; consistent mitigation and compensation obligations; reduced project costs from eliminating the need for biological surveys in some areas; reduced the need for project-specific incidental take permits; and reduced uncertainty related to the requirements for long-term species and habitat conservation.

- **Environmental Review Schedule.** The planning effort is now in its 10th year.
- **Potential Beneficial Effects.** Beneficial biological resources impacts are anticipated through the creation/management of habitat (specifically with respect to the desert tortoise and the other targeted species). The HCP, which is included as part of the Proposed Project, includes measures to avoid and minimize impacts to special-status

species associated with desert habitat that could occur as a result of IID's O&M activities. Because the HCP would reduce these impacts to biological resources to a less than cumulatively considerable level, and because, in combination with the Western Mohave Coordinated Management Plan, it will have a beneficial effect on biological resources, no adverse cumulative impacts to biological resources would occur. Biological resources impacts of the Proposed Project are assessed in this Draft EIR/EIS and no adverse cumulative impacts would occur as a result of implementation of the Proposed Project in conjunction with the management plan.

Northern and Eastern Colorado Desert Coordinated Ecosystem Management Plan

The Northern and Eastern Colorado Desert Coordinated Ecosystem Management Plan (NECO) is a multi-agency management plan for a wide range of habitats and species of concern. The planning area is approximately 5.5 million acres northeast of the Salton Sea. The project has two main goals. The first is to review the current land use plan, in view of the 1990 listing of the desert tortoise, which mandates new decisions on ground prescription proposals and land use. The land affected includes each of the recovery units in the northern Colorado Desert, the eastern Colorado Desert, and the eastern half of Joshua Tree National Park. The second goal is to expand the planning effort to include other species and habitats of concern. Approximately 30 wildlife species and 50 plant species are included (SSA and Reclamation 2000).

BLM is the lead agency for plan development, with cooperation from NPS, the US Marine Corps (USMC), USGS, USFWS, CDFG, Imperial County, and Riverside County. The management plan would become a binding plan for BLM, NPS, and the USMC gunnery range. Data gathering and analyses have been completed, and the plan is being finalized (Reclamation and SSA 2000).

- **Environmental Review Schedule.** BLM released a Draft EIS in association with this project in February 2001. The Final EIS is planned for completion by July 2001; a ROD is scheduled to be issued in September 2001.
- **Potential Beneficial Effects.** NECO would result in beneficial impacts on biological resources. Specifically, the plan would manage and preserve habitat for the federally threatened desert tortoise and several other sensitive plant and animal species.

  The HCP, which is included as part of the Proposed Project, includes measures to avoid and minimize impacts to special-status species associated with desert habitat that could occur as a result of IID's O&M activities. Because the HCP would reduce these impacts to a level that is less than cumulatively considerable, and because NECO will have a beneficial effect on biological resources, no adverse cumulative impacts to biological resources would occur as a result of implementation of the Proposed Project in conjunction with NECO.

Valley Sanitary District Wetlands Expansion Project

The Valley Sanitary District wastewater treatment facility is located in Indio, which is south of the CVSC. Three wetland treatment cells were developed in 2000 at a 29-acre site adjacent to the facility. The wetlands treat 1.0 mgd of effluent from the trickling filter plant clarifiers. After 4 to 24 days of treatment, effluent is expected to meet typical secondary effluent quality standards before discharge to the CVSC.

19614

- **Environmental Review Schedule.** The wetlands have been constructed and are currently operational.

- **Potential Beneficial Effects.** The project creates wetlands habitat, resulting in beneficial effects on biological resources in the Coachella Valley. Inflows to the CVSC would be slightly reduced because of evapotranspiration from the wetlands. Nutrient loading to the CVSC would also be reduced. Water quality effects in the CVSC will be addressed in the Draft CVWD Water Management PEIR. No adverse cumulative impacts to water quality are anticipated to occur as a result of implementation of the Proposed Project in conjunction with the expansion project.

Coachella Valley/Salton Sea Nonpoint Original Source Project

The Whitewater River/CVSC carries agricultural drainage, treated municipal effluent and runoff to the Salton Sea. This project seeks to address nonpoint source pollution entering the Salton Sea and Whitewater River/CVSC. The lead agency for the project is the Morongo Consortium of Coachella Valley Tribal Bands. Objectives of the project are as follows:

- Develop and implement groundwater protection measures.
- Develop a cooperative water quality monitoring effort.
- Construct wetlands test cells for treating agricultural drainage water with aquatic vegetation just upstream of the Salton Sea.
- Implement BMPs for controlling nonpoint source pollution.
- Increase public awareness and participation in pollution prevention.

- **Potential Beneficial Effects.** The nature of the proposed groundwater protection measures has not been completely defined, but the project would include construction of wetlands. Wetlands could remove nitrogen and some phosphorus from CVSC flows - up to 80 to 90 percent of nitrogen in non-winter seasons, but much less phosphorus, up to 30 or 40 percent. The impact on the eutrophication process of the Salton Sea, the amount of phosphorus limiting, would therefore be minor (CVWD et al. 2002). Implementation of this project would result in beneficial impacts to biological resources in the Coachella Valley and Salton Sea area. The wetlands would also increase evapotranspiration, thus decreasing the flow and the increasing salinity in the CVSC. Water quality effects in the CVSC will be addressed in the Coachella Valley Water Management Plan PEIR. No adverse cumulative impacts to water quality are anticipated to occur as a result of implementation of the Proposed Project in conjunction with the nonpoint source project.

5.1.2 Summary of Cumulative Impacts from All Related Projects

This section discusses the cumulative impacts to specific environmental resources resulting from the aggregate impacts of the Proposed Project and the other projects described in Section 5.1.1. Implementation of the Proposed Project, with or without the QSA, would not increase water supplies to the MWD and SDCWA service areas, and no construction in these service areas would occur; therefore, no direct or indirect cumulative impacts were identified within the water service areas of these two agencies; therefore, these water service areas are not addressed below.

5.1.2.1 Water Quality and Hydrology

The Proposed Project is a significant component of the QSA and the IA, which, when implemented with other related QSA/IA projects, would implement the California Plan, resulting in a beneficial effect on California's ability to reduce its use of Colorado River water to its annual normal-year apportionment (4.4 MAFY). Under the Proposed Project, QSA, and IA, California's diversions would be reduced and certain amounts redistributed, thereby increasing the reliability of SDCWA's and other southern California water agencies' water supply. Specific aggregate, cumulative impacts to hydrology and water quality as a result of the Proposed Project and other projects included in this cumulative impact assessment are described below.

Lower Colorado River

Implementation of the water transfers under the Proposed Project and other projects in this cumulative impact analysis, including the Palo Verde program, would result in changes in the amounts of water diverted at existing points of diversion in California. These changes in diversion points could reduce flow in the LCR between Parker and Imperial Dams. The Proposed Project would account for up to 300 KAFY of the total change in diversions (nearly 550 KAFY). The Interim Surplus Guidelines and IOP would result in minor changes in storage and reservoir levels. The overall hydrological impacts are considered adverse, but not cumulatively significant since the changes in LCR levels would be small when compared to the total volume of water transported annually by the LCR; in addition, the changes in River elevation are within the historic fluctuation of the River's elevation.

There is expected to be an increase in salinity in the LCR as a result of the Proposed Project and other projects in the cumulative impact analysis, such as the Interim Surplus Guidelines and IOP. At Imperial Dam, the IA could result in higher salinity levels of as much as 8 mg/L. Modeling results from the Draft IA EIS show that the Proposed Project and other related projects could result in higher salinity levels below Parker Dam after year 2040 (as much as 1 mg/L) (Reclamation 2002). However, it was assumed as part of Reclamation's modeling efforts that the Colorado River Salinity Control Project will control increased salinity levels and ensure that salinity standards will continue to be met on the Colorado River (Reclamation 2002). Reclamation has stated that the implementation of the Colorado River Salinity Control Program will control salinity so that it does not exceed 879 mg/L at Imperial Dam. Therefore, no adverse cumulative impact to the water quality of the LCR would occur.

IID Water Service Area

Conservation of water in the IID water service area and the transfer of that water to other water agencies would decrease the amount of water in the IID drainage system. Depending on the type and amount of conservation measures implemented within the IID water service area as a result of the Proposed Project, the proportion of tailwater and tilewater entering the drains would vary and the water quality of the drains would change over time as the conservation measures are implemented to meet IID's obligations under the terms of the IID/SDCWA Transfer Agreement and/or the QSA. In general, the conservation of irrigation water through on-farm and water delivery system measures results in less flow in the IID water service area drains and rivers, an increase in selenium concentrations in the drains and rivers, and a decrease in TSS and other water quality constituents associated with the tailwater that would be conserved for transfer. Reduced water in the IID drains and in the

New and Alamo Rivers as a result of the Proposed Project results in reduced inflows to the Salton Sea. This Draft EIR/EIS provides for mitigation of Proposed Project-related impacts, other than impacts related to increased selenium concentrations, which are considered significant and unavoidable.

Although the Proposed Project and other projects described in this cumulative impact analysis could have a minor effect on groundwater in the IID water service area, the effect is not considered a significant adverse cumulative impact to groundwater resources or water quality in the IID water service area. No additional significant cumulative impacts to hydrology or water quality in the IID water service area would occur.

Salton Sea

Implementation of the water conservation and transfer component of the Proposed Project is expected to accelerate increases in the salinity and decreases in water surface elevation of the Salton Sea. Implementation of the some of the other projects described in this cumulative impact analysis could add to these effects; however, the incremental effect of these projects is not substantial. Transfer of water conserved under the Proposed Project's second scenario (QSA Implementation) to the CVWD service area would increase the flow of drainage water into the Salton Sea from that source. This water may be more saline than present inflows but would nevertheless offset some of the inflow reduction associated with the Proposed Project. In addition, implementation of HCP Approach 2 would avoid the Proposed Project's hydrological and water quality-related effects on the Sea. Programs, such as TMDL, the Salton Sea Restoration Project, and the Brawley Wetland Project, would ameliorate water quality degradation of the Salton Sea by removing salts from the Sea itself or by limiting the inflow of salts and/or other water quality COCs.

As described in this Draft EIR/EIS, there is no water quality standard for salinity in the Salton Sea, although increasing salinity is expected to affect fish populations that support piscivorous birds, as discussed below in connection with biological resources. Therefore, there will be no significant cumulative impact to water quality due to salinity increases. No significant cumulative impact would occur to hydrology and water quality of the Salton Sea with implementation of the Proposed Projects and other related projects.

CVWD Service Area

Implementation of the Proposed Project second implementation scenario (QSA Implementation) within the CVWD service area would result in the availability of additional Colorado River water to the Coachella Valley as a result of conserved water in the IID water service area. Transfer of up to 100 KAFY of conserved water to CVWD under the Proposed Project would allow for the reduction of the use of groundwater so that current rates of groundwater overdraft could be reduced. This would result in a beneficial effect on the flows to the Salton Sea. The increased amount of Colorado River water would also be expected to result in increased flows within the agricultural drains.

The other projects identified in the cumulative impact analysis may result in additional use of the groundwater resources or drain water in the CVWD service area. This use would be small when compared to the overall benefit of the Proposed Project to the groundwater aquifer. There is a potential however, that the water quality within shallow groundwater aquifers (not those aquifers primarily used within the CVWD service area for water supply) and within the drains may deteriorate both from the use of the saltier Colorado River water and the movement of the higher saline groundwater into the canal system due to higher groundwater levels. This impact is considered a potentially adverse cumulative impact and will be assessed in the Coachella Valley Water Management Plan PEIR (release pending).

5.1.2.2 Biological Resources

The water conservation and transfer component of the Proposed Project would accelerate impacts to biological resources in the Salton Sea. Implementation of the HCP component of the Proposed Project would avoid and/or mitigate these impacts. One approach proposed for mitigating the impacts to biological resources of the Salton Sea (HCP Approach 2) consists of increasing the use of fallowing for water conservation to offset inflow reductions to the Salton Sea from the transfer of water. Implementation of this approach would reduce Project-related impacts to the Sea's biological resources to a level that is less than cumulatively considerable. Other programs, such as the Salton Sea Restoration Project, the TMDL program, and other wetland enhancement projects, would also offset cumulative impacts to biological resources in the Salton Sea.

Implementation of the biological conservation measures on the LCR would mitigate impacts to federally listed species. Consultation with CDFG will be conducted to identify any additional measures needed to mitigate impacts to state-listed species along the LCR.

5.1.2.3 Agriculture Resources

Implementation of the Proposed Project could result in the permanent reduction of Prime Farmland or Farmland of Statewide Importance in the IID water service area if permanent fallowing is employed to conserve water.

Under the PVID Land Management, Crop Rotation, and Water Supply Program agricultural land may be taken out of production for periods of time. While the PVID Program is outside of the region of influence directly affected by the Proposed Project, the projects considered in the cumulative impact analysis may have a combined cumulative impact on the amount of agricultural land in Imperial County and in California in general. Most California counties have shown a net decrease in agricultural land. Areas in Arizona have shown either a moderate to high reduction in agricultural land or a substantial increase (Reclamation 2002b). The impact to agricultural land under the Proposed Project in conjunction with the PVID program is considered cumulatively considerable; unless permanent fallowing is not employed as a conservation measure under the Proposed Project, this impact will remain cumulatively considerable.

Under the biological conservation measures, land along the LCR may be converted to habitat, which would contribute to the reductions in farmland and cumulative losses described above. The amount of land that may be converted to habitat along the LCR is negligible when compared to the agricultural land that may be affected in the IID water service area or Palo Verde area.

5.1.2.4 Recreation and Aesthetics

Implementation of the Proposed Project would accelerate the rate of salinity increase in the Sea, thereby reaching thresholds of salinity that impair the reproduction of sport fish at an earlier date as compared to the Baseline. Other projects in the cumulative impact analysis, including the Coachella Valley Water Management Plan, are expected to also accelerate the rate of salinity increase in the Sea, which, combined with the Proposed Project, would lead to a cumulatively considerable impact on the sport fish industry. Selection and implementation of the HCP Approach 2 could, however, offset the Proposed Project's contribution to this cumulative impact. Until an HCP approach is selected, the cumulative impact to the sport fish industry that is attributable to the Proposed Project remains significant and unavoidable.

If the Salton Sea Restoration Project were implemented, it is unknown if the selected restoration project would maintain sport fishing opportunities at existing levels, although they would be maintained if the rate of salinity increase were to stabilize. The feasibility and benefits of the restoration effort is not known at this time.

A decline in Salton Sea elevation would result from implementation of the Proposed Project that would be greater than the decline predicted under the Baseline. While the magnitude of the decline is greater than under the Baseline, the impact on aesthetics would be similar. Implementation of the mitigation measures would reduce the impact to less than significant levels. Other projects that have the potential to reduce inflow to the Sea could increase the magnitude of the impact to the viewer. Transfer of up to 100 KAFY of conserved water to CVWD would partially mitigate the impact on sea elevation. Selection of HCP Approach 2 would avoid the impact to Sea elevation.

5.1.2.5 Air Quality

Construction of on-farm irrigation or water delivery system water conservation measures may result in temporary air quality impacts. Implementation of construction dust control measures would mitigate this impact to less than significant levels. Similar measures would normally be employed for other construction projects, therefore, the cumulative impacts of these projects would be at levels less than significant.

Fallowing of agricultural lands could result in additional dust emissions. The PVID project may also result in increase in dust emissions, however, the area is remote from the Imperial Valley and therefore, no cumulative impact would be expected in the region.

The long-term impact of conserving water in the IID water service area may result in an increase in fugitive dust emissions from the exposure of the seabed of the Salton Sea as the elevation declines with reduced inflows. Other projects considered in this analysis would have no or a positive impact on Salton Sea elevation. The Salton Sea Restoration Project could reduce the impact depending on the type and location of restoration proposed.

5.1.2.6 Noise and Transportation

Implementation of the Proposed Project would result in minor construction impacts to noise and transportation in the IID water service area and CVWD service area as a result of the Proposed Project. Similarly, implementation of some of the projects listed in this cumulative impact analysis, such as the Gateway project and the Whitewater River Basin Flood Control Project, would result in construction impacts to these resource areas. Construction-related impacts would not result in long-term alteration of the environment, and the Proposed Project's contribution to the cumulative impact would be avoided and/or mitigated to less than significant levels through the use of standard construction measures and BMPs. The

Proposed Project, therefore, would not result in cumulatively considerable impacts to these resource areas.

5.1.2.7 Socioeconomics

A range of potential impacts to the Imperial County's socioeconomic conditions is expected to result from implementation of the Proposed Project. A reduction in employment opportunities may result depending on the specific type and amounts of water conservation methods that are selected. Employment opportunities may decline if the amount of land that is fallowed increases, while jobs would be created by the construction and operation of either on-farm irrigation or water delivery system water conservation measures. Depending on the relative proportion of the conservation measures, an impact or benefit may accrue through implementation of the Proposed Project. The other projects identified above could also result in construction and operational demands that increase employment opportunities in Imperial County. The Proposed Project would therefore, have no or a minor impact to the socioeconomic resources and would not be contribute to a cumulative impact.

5.2 Growth-inducing Impacts

This subsection describes the development and growth trends in southern California and the growth-inducing potential of the Proposed Project.

5.2.1 Introduction and Summary

Under both NEPA and CEQA, indirect and growth-inducing impacts associated with the Proposed Project must be considered. Therefore, this Draft EIR/EIS assesses and discloses the potential environmental consequences of approving the Proposed Project relative to potential indirect, growth-inducing, and related cumulative effects.

The Council on Environmental Quality's Regulations (Section 1508.8[b]) provide guidance to federal agencies for evaluating indirect effects:

> Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

A growth-inducing impact is defined by the State CEQA Guidelines (Section 15126.2[d]) as:

> [T]he ways in which the Proposed Project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects that would remove obstacles to population growth...It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment].

Based on the NEPA and CEQA guidelines and regulations, this Draft EIR/EIS uses two tests to make a growth-inducement determination. First, would the Proposed Project remove a barrier to growth, and second, could the Proposed Project provide additional water for consumptive use, thereby fostering population or economic growth or new construction. The Proposed Project does not trigger either of these criteria because no additional water would be supplied, and maintenance of current and historic water supply levels does not constitute removal of an existing barrier to growth.

The QSA was negotiated to quantify the amount of water available to all of southern California from the Colorado River. This amount would be substantially less than has been diverted historically. The delivery of Colorado River water to MWD's service area would be very similar to the historical averages for the past 15 years. The same is true for the SDCWA service area as well as for the rest of MWD's member agencies. CVWD's increased water deliveries of Colorado River water would be used to directly offset groundwater pumping. There would be a net-zero increase of water used in its service area.

5.2.2 Population Growth Trends in Southern California

Population projections for southern California prepared by DOF, southern California Association of Governments (SCAG), and San Diego Association of Governments (SANDAG) anticipate steady growth over the next 20 to 40 years. It is anticipated that by 2040, southern California will house as many people as live in the entire state today. Although estimates prepared by SCAG (see Table 5-2) sometimes differ from DOF and SANDAG forecasts, all the numbers reflect an expectation of substantial growth in the area. All of the projections are based on the assumption that the necessary water supplies would continue to be available to the region into the future (DOF 2000; SCAG 1999; SANDAG 1999).

TABLE 5-2
Southern California Population Forecast

County	1990	2000	2010	2020	2040[2]
Imperial	109,000	149,000	207,000	280,000	504,000
Los Angeles	8,860,000	9,810,000	10,870,000	12,250,000	13,890,000
Orange	2,410,000	2,850,000	3,090,000	3,250,000	4,007,000
Riverside	1,170,000	1,680,000	2,220,000	2,820,000	4,450,000
San Bernardino	1,420,000	1,770,000	2,230,000	2,830,000	4,420,000
San Diego[1]	2,510,000	2,940,000	3,440,000	3,850,000	5,120,000
Ventura	670,000	712,000	804,000	932,000	1,280,000
Total	**14,576,000**	**16,971,000**	**19,421,000**	**22,362,000**	**33,500,000**

Source: SCAG 1999 - projections from "State of the Region – April 1999"

[1] With the exception of the 2040 projections, the San Diego projections are from SANDAG's "2020 Cities/County Forecast" 1998
[2] State of California, California Department of Finance, Table 2, July 2000

SCAG adopted the Regional Comprehensive Plan and Guide (RCPG) in 1996 for the purpose of setting regional growth goals and identifying strategies for agencies to use in implementing the proposals in the plan through the year 2015. The RCPG includes goals for the economy, growth management, transportation, air quality, housing, open space, water resources, and their implementation. In addition, SCAG has adopted, and is now revising, the Regional Transportation Plan, which identifies transportation needs within the region, including automobile, transit, and other transportation modes, future transportation projects, and funding. SANDAG, in collaboration with San Diego County and the county's 18 cities, adopted a Regional Growth Management Strategy in 1993. The Regional Growth Management Strategy provides goals for improving the quality of life in San Diego County through specific growth management, conservation, and social measures. The county and cities have incorporated the provisions of the strategy into their individual general plans (SANDAG 1998). SANDAG has adopted the Regional Transportation Plan for San Diego County.

5.2.3 Growth-Inducing Impacts

This section assesses the growth-inducement potential of the Proposed Project in the LCR, IID water service area and AAC, Salton Sea, SDCWA service area, MWD service area, and CVWD service area geographic subregions. Further information on the growth-inducement potential of the Proposed Project in these areas can be found in the Draft QSA PEIR and the Coachella Valley Water Management Plan PEIR (release pending).

5.2.3.1 Lower Colorado River

Because no change in land use, water supply, or population would be involved in implementation of the Proposed Project in the LCR geographic subregion, no impact on population or housing in this subregion would occur; hence no growth-inducing impacts would occur.

5.2.3.2 IID Water Service Area and AAC

Approximately 98 percent of IID's water entitlement is delivered to agricultural users. That sector is where IID is directing its conservation programs. Programs may include, but are not limited to, canal lining, changes in delivery hours, non-leak gates, system automation, and water-efficient on-farm management. The Proposed Project is not growth inducing as it would require IID to continue to provide service to both agricultural and urban clients from a reduced water supply (CVWD et al. 2002).

Growth and Water Demand. The IID water service area is currently undergoing steady growth in excess of the overall state growth rate. Projections, based on the continued availability of water, indicate that the population of the county will increase by 96 percent over the next 20 years to approximately 280,000 persons (SCAG 1999).

Water conserved by these users would not be replaced by other sources. IID would continue to provide water services to both agricultural and urban clients from a smaller water supply. Because the Proposed Project would reduce the water supply delivered to the IID water service area, it would not contribute to an increase in population; hence, no growth-inducing impacts would occur. Other than the lining of canals and installation of on-farm and water delivery system conservation measures, the Proposed Project would not require construction of facilities within the IID water service area. Further, the construction of facilities for implementation of the Proposed Project would be for the purpose of more efficient delivery of agricultural water, not new development (CVWD et al. 2002).

Water Supplies Without the Proposed Project. If the Proposed Project is not implemented, IID would continue the conservation program begun under its 1989 agreement with MWD and transfer water under that separate agreement.

5.2.3.3 Salton Sea

Implementation of the Proposed Project would reduce the elevation of the Salton Sea and increase the Sea's salinity. Such changes could indirectly result in a decrease in population and/or housing growth in the communities surrounding the Sea as recreational resources associated with the Salton Sea would be adversely impacted (see Section 3.6, Recreation).

5.2.3.4 SDCWA Service Area

The Proposed Project would not increase the amount of water delivered to southern California. Rather, it would reallocate the existing water supply to ensure drought reliability of that supply. Improvements in drought reliability would not increase the average annual quantity of water imported by SDCWA. The Proposed Project would not alter the capacity of MWD's CRA, nor would it entail any expansion of SDCWA's existing water delivery and storage systems. Therefore, the Proposed Project would not have the potential to induce or deter greater economic development or population growth because it would not modify any future increases of water supply that have already been planned and approved. Overall, the Proposed Project and the QSA would assist in the reduction of the overall historic water supply diverted from the Colorado River to southern California.

Growth and Water Demand. Projected increases in population in the San Diego County would require substantial investments in new public facilities and infrastructure over the next decades, including, among other things, roads and transportation facilities, water and sewer treatment facilities, fire and police stations, and schools. The Proposed Project would not involve any construction in the SDCWA service area, such as new water pipelines or aqueducts that would facilitate population growth or open undeveloped areas to construction.

Year 2000 water demand within the SDCWA service area was approximately 670 KAF. Based on SANDAG population projections, the SDCWA estimates that water demand will increase to approximately 813 KAF per year by 2020. Projected future supply would match the year 2020 demand (SDCWA 2000). The Proposed Project would not change the assumptions upon which SANDAG has based its population projections for the region.

Local Land Use Decision-making Authority. The California Legislature has established a careful balance that preserves, in local governments, the authority to plan and regulate land use while simultaneously requiring water agencies to assist local governments by compiling and providing them information necessary to make informed land use decisions. Therefore, local governments are ultimately responsible for land use decisions, and the role of water agencies in land use planning is limited to advising local governments concerning the availability of water within their respective districts. Any development projects that occur during and after implementation of the Proposed Project would still require permits and approvals from cities and counties with such authority.

In addition, the planning goals, policies, and decisions that are embodied in general plans, community plans, and related land use regulations, as well as in SDCWA's Water Resources

Plan (SDCWA 2000a), do not assume significant seasonal or year-to-year variability in the water supply. Rather, they are predicated on an assumed consistency in water quantity and quality. All current and pending San Diego regional water system improvement projects were designed to meet the demand figures suggested by such plans and were reviewed pursuant to CEQA prior to approval. The Proposed Project would not modify the growth projections that these existing regional plans encompass nor would it alter the approved water system improvement projects, but it would improve the reliability of SDCWA's water supply by elevating SDCWA's priority for Colorado River allocations during times of shortage.

Water Supplies Absent the Proposed Project. If the Proposed Project is not implemented, SDCWA would rely upon continued delivery of its share of imported water from MWD, water transfers, recycling (including wastewater treatment), groundwater supplies (and associated treatment facilities), and seawater desalination to address the shortfall. As described in Chapter 2, SDCWA entered into an agreement for IID to transfer conserved water to SDCWA in 1998. This agreement has been incorporated into the QSA, but if the QSA does not proceed, SDCWA and IID would pursue their transfer agreement as a separate project. The means of delivering the transfer water to the SDCWA service area has been identified in the Exchange Agreement between SDCWA and MWD. However, implementation of the Exchange Agreement is subject to the satisfaction of certain conditions, some of which would be satisfied under the QSA. If the QSA were not implemented, other means would have to be found to satisfy those conditions. In a shortage condition, it is uncertain what SDCWA's water supplies would be. As a Priority 3a Colorado River source, Proposed Project would provide a more reliable source than MWD imported water (SDCWA 2000).

5.2.3.5 MWD Service Area

The Proposed Project would not be growth inducing because the capacity of the Colorado River Aqueduct is a limiting factor in the delivery of water from the Colorado River to the MWD service area. No changes in historic levels of aqueduct flows or expansion of aqueduct capacity are proposed as part of the QSA. The Proposed Project would maintain the reliability of water supplies to the MWD service area (which includes the SDCWA service area) by establishing Colorado River budgets for IID, CVWD, and MWD.

Growth and Water Demand. As noted earlier, the MWD service area continues to grow in population. The QSA would ensure that the service area continues to receive reliable water supplies even as the amount of water available to California from the Colorado River is reduced. No new delivery facilities are proposed as part of this Project. MWD estimates that water demand within its service area was between 3.3 and 3.9 MAFY during the period of 1990 to 1999 (3.8 MAF in 1999). Projected future demand, based on SCAG population projections, is 4.9 MAF in 2020.

Water Supplies Without the Proposed Project. Without the Proposed Project, MWD has other water supplies by which it may meet the water demands of the service area. These include increased water conservation through implementation of urban water management Best Management Practices; water recycling undertaken by wastewater treatment plants in the region for groundwater recharge, saltwater intrusion barrier, industrial, and irrigation uses; increased storm water conservation through increased levels of groundwater replenishment; enhanced local groundwater recovery (and associated treatment); desalination; regional surface reservoir storage, and water marketing from other sources such as the SWP, (including spot transfers, option transfers, storage transfers, and exchange agreements). Pursuant to its 1996 Integrated Resources Program, MWD has undertaken many of these initiatives under its "preferred resources mix." However, the Integrated Resources Program identified a "local emphasis mix" that would meet future needs without the QSA at a cost of approximately 20 percent more per AF by the year 2020 (MWD 2000).

Separate from the QSA, MWD has a 1989 agreement with IID whereby conserved Colorado River water is made available to MWD. MWD also has agreements with the Semitropic and Arvin-Edison Water Storage Districts in Kern County whereby MWD provides the districts with SWP water during years of plentiful supply and will call in an equivalent amount of groundwater during dry years. MWD is also pursuing conjunctive use/groundwater storage in desert aquifers in California (Cadiz, Hayfield, and Chuckwalla) and Arizona (Arizona Water Bank) where it would bank Colorado River water in times of available supply (MWD 2000).

5.2.3.6 CVWD Service Area

CVWD will receive additional water for the sole purpose of offsetting the existing overdraft of its groundwater basins. To the extent that increased water supply reliability may be a factor influencing growth, the Proposed Project would not be growth inducing because these supplies will be used to improve the Coachella Valley's ongoing groundwater overdraft condition. In 1999 the overdraft was estimated to be approximately 136 KAFY. Water transfers under the QSA would result in changes in water deliveries to CVWD of up to 155 KAFY. This additional water as a result of the Proposed Project will be used solely to offset the valley's existing groundwater overdraft.

Growth and Water Demand. The Coachella Valley, particularly in existing cities, has shown the same steady growth as all of southern California. Coachella Valley water demand was estimated to be approximately 669 KAF in 1999. Demand, based on SCAG/CVAG population projections extrapolated by CVWD, is projected to grow to approximately 891 KAF by 2035. The projected available water supply without the Proposed Project is estimated to be approximately 890.6 KAF by 2035. Providing this amount of water without outside supplementation would increase the level of groundwater overdraft to approximately 166.7 KAFY (CVWD 2000b). Implementation of the Proposed Project would provide the Valley with a reliable supply of water for groundwater recharge while avoiding the chronic groundwater overdraft that currently exists. Because CVWD would manage water resources so as to offset a groundwater overdraft, the Proposed Project would not have growth-inducing impacts within the CVWD service area. The water supply that would result from the Proposed Project is considered in more detail in the draft Coachella Valley Water Management Plan prepared by CVWD, the specific purpose of which is to address and reduce groundwater overdraft.

Water Supplies Without the Proposed Project. CVWD will undertake efforts to reduce its dependence on groundwater whether the Proposed Project is implemented or not. CVWD has other sources of water available that would support the region's projected growth in the absence of the Proposed Project. As described in the draft Coachella Valley Water Management Plan, CVWD would undertake the projects described below, proceed with intensified efforts in water recycling (including both wastewater and agricultural run off), increase conservation (including golf course, agriculture, and urban programs), and pursue additional water under the QSA and from the SWP in the event that the Proposed Project is not implemented. These projects are identified in the interim *2000 Urban Water Master Plan* that CVWD has filed with DWR pending completion of the Coachella Valley Water Management Plan. Conceptual projects described in the draft Coachella Valley Water Management Plan include:

- future construction of a 10-mgd desalination plant that would treat agricultural drain water for reuse in irrigation;
- future expansion of recycled wastewater; future pumping stations and pipelines to serve Upper Valley golf courses and eliminate their groundwater pumping;
- future construction of conveyance facilities to serve agricultural uses to eliminate groundwater pumping;
- future improvements related to converting municipal users in the Lower Valley from groundwater to canal water supplies;
- and construction of new groundwater recharge facilities to serve the Lower Valley.

The Coachella Valley Water Management Plan PEIR (release pending) analyzes the potential impacts of these activities.

5.3 Applicable Regulations, Policies, and Required Permits

In compliance with NEPA and CEQA, this Draft EIR/EIS is intended to provide decision-makers and the public with information regarding the environmental effects associated with the proposed action. In addition to NEPA and CEQA, there are a number of other environmental laws, rules, and regulations that may be applicable to actions taken as part of implementation of the Proposed Project. Compliance with environmental statutes that are applicable to the Proposed Project is discussed below.

5.3.1 Federal Regulations and Permits

- **Federal Endangered Species Act (ESA) of 1973, (16 USC §§1531 *et seq.*; 50 Code of Federal Regulations [CFR] Part 402).** In August 2000, Reclamation transmitted a BA to USFWS, and requested formal consultation for the IA water transfers for up to 400 KAFY as well as adoption of Interim Surplus Guidelines. The USFWS issued a final BO in January 2001 (a non-jeopardy opinion with reasonable and prudent measures for incidental take). These documents are included in an appendix in the Draft IA EIS. The biological conservation measures that were developed by Reclamation and modified by USFWS to mitigate the impacts of the Proposed Project on the LCR are included as part of the Proposed Project in this Draft EIR/EIS and as part of the proposed action in the Draft IA EIS. Reclamation's implementation of the IA encompasses the Proposed Project's effects on the LCR. Thus, the BO covered impacts on the LCR attributable to the Proposed Project and provides ESA compliance for the LCR subregion.

As part of the Proposed Project, IID has prepared an HCP to support its application for an incidental take permit under Section 10 of the ESA. Pursuant to the ESA, the USFWS will conduct an internal Section 7 consultation on the effects of issuance of the incidental take permit to IID on federally listed species. Issuance of the incidental take permit by USFWS and the accompanying BO resulting from the internal Section 7 consultation will provide ESA compliance for effects of the Proposed Project on federally listed species in the IID water service area and AAC and Salton Sea.

- **Migratory Bird Treaty Act of 1918 (16 USC 703-712; 50 CFR 10).** The Migratory Bird Treaty Act makes it unlawful to pursue, hunt, capture, kill, or possess or attempt to do the same to any migratory bird or part, nest, or egg of such bird listed in wildlife protection treaties between the US and Great Britain, United Mexican States, Japan, and the Union of Soviet States. As with the federal ESA, the act also authorizes the Secretary of the Interior to issue permits for take. The procedures for securing such permits are found in CFR Title 50, together with a list of the migratory birds covered by the act. The USFWS has determined that an incidental take permit issued under Section 10 of the ESA also constitutes a Special Purpose Permit under 50 CFR 21.27 for migratory birds that are listed under the ESA. For unlisted migratory bird species, the incidental take permit would serve as a Special Purpose Permit should a covered species become listed in the future. USFWS has determined that take of listed migratory bird species allowed under an incidental take permit will not be in violation of the Migratory Bird Treaty Act of 1918 (USFWS 1996).

- **Fish and Wildlife Coordination Act of 1958 (16 USC 661-667[e]).** Consultation with USFWS and state fish and wildlife agencies is required when the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted...or otherwise controlled or modified" by an agency under a federal permit or license. This consultation is intended both to promote the conservation of wildlife resources by preventing loss of or damage to wildlife resources, and to provide for the development and improvement of wildlife resources in connection with water projects. IID has worked closely with USFWS and CDFG in developing the HCP, which is part of the Proposed Project, covering the IID water service area and AAC and Salton Sea. As a permitting agency for the incidental take permit, USFWS is a cooperating agency with Reclamation for NEPA review of the Proposed Project. Similarly, CDFG is a responsible agency for CEQA review for the Proposed Project. The involvement and responsibilities of these two agencies in the HCP and environmental review processes ensure that the intent of the Fish and Wildlife Coordination Act is fully addressed.

- **Executive Order 11990 - Protection of Wetlands, 1977.** The purpose of the Protection of Wetlands Executive Order is to minimize the destruction or degradation of wetlands and avoid new construction in wetlands wherever a reasonable alternative exists. The Proposed Project would not impact jurisdictional wetlands but could adversely affect marsh-like habitats that perform similar functions. Implementation of the HCP, which is part of the Proposed Project, would mitigate adverse effects to marsh-like habitats in the Project region of influence resulting from the Proposed Project.

- **National Historic Preservation Act of 1966, as amended.** Federally funded actions that have the potential to affect historic properties are subject to Section 106 of the NHPA. Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the National Register of Historic Places (NRHP). Under this act, federal agencies are required to identify, manage, and nominate cultural resources affected by federal actions to the NRHP. As described in the IA EIS (Reclamation 2002), the effects of the Proposed Project as a result of the federal action of changing the point of diversion of Colorado River water from its current point of diversion at Imperial Dam upstream to Parker Dam will best be considered within the broader framework provided by the Section 110 consultation effort it has committed to conducting under the Interim Surplus Guidelines; this effort covers all activities involved in its on-going operation of the LCR. Compliance with NHPA is further discussed in Section 3.8, Cultural Resources.
- **American Indian Religious Freedom Act of 1978.** The American Indian Religious Freedom Act establishes as US policy protection and preservation for American Indians of their inherent right to freely believe, express, and practice their traditional religions, which includes, but is not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites. Federal agencies are required to make a good faith effort to learn about Indian religious practices, consult with Indian leaders and religious practitioners and consider any adverse impacts on Indian religious practices during decisions making. Consultation with Indian Tribes about the potential affects of the Proposed Project was conducted by USFWS (see Section 1.8 in Chapter 1).
- **Native American Graves Protection and Repatriation Act of 1990.** This act provides for the repatriation of human remains and funerary items to identified Native American descendants. If human remains are discovered on federal lands, a 30-day delay in project work activities is required. The Proposed Project includes measures to avoid adverse affects on human remains and funerary items.
- **Executive Order 13007 - Indian Sacred Sites on Federal Land, 1996.** This order requires that to the extent practical and as permitted by law, federal agencies with statutory or administrative responsibility for management of federal lands shall accommodate access to Indian sacred sites for ceremonial use by Indian religious practitioners and also avoid adversely affecting these sites. When possible, federal agencies must also maintain the confidentiality of these sites. The Proposed Project will not affect Indian Sacred Sites.
- **Farmland Protection Policy Act of 1981.** This act is intended to minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The act also requires these programs to be compatible with state, local, and private efforts to protect farmland. Under certain circumstances, the Proposed Project would result in the conversion of farmland to nonagricultural uses. The only way to avoid or minimize this impact is to prohibit the use of permanent fallowing under the Proposed Project.
- **Clean Water Act (CWA) (33 USC §§1344) of 1977, as amended.** The primary objective of this act is to restore and maintain the integrity of the nation's waters. Established goals to meet this objective are to: (1) eliminate the discharge of pollutants into the nation's

waters; and (2) achieve water quality levels for recreational purposes. CWA provides a comprehensive framework of standards to address water quality. Specific applicable environmental permit regulations dictated by the CWA include Section 401, Water Quality Certification; Section 402, NPDES permit program; and Section 404, Dredge and Fill permits for waters of the US. Construction activities associated with implementation of the Proposed Project, including implementation of biological conservation measures and water conservation measures, may require a permit under Section 404, depending on the location and nature of the construction.

- **National Toxics Rule and California Toxics Rule (40 CFR 131.36 and 131.37).** These Rules established ambient water quality criteria for aquatic life and human health as they apply to inland surface waters such as the Salton Sea. Construction activities associated with implementation of the Proposed Project, including implementation of biological conservation measures and water conservation measures, may require a permit under Section 401, depending on the location and nature of the construction. Additional water quality certification may be needed for discharge of any materials to surface waters of California.
- **Clean Air Act (CAA) of 1970, as amended.** This act established federal standards for air pollutants. The act is designed to improve air quality in areas that do not meet the NAAQS and to prevent significant deterioration in areas where air quality exceeds those standards. To be conservative, this analysis concludes that windblown dust from exposed Salton Sea shoreline would result in potentially significant air quality impacts. This impact could be mitigated by implementing HCP Approach 2.
- **Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994.** This order requires federal agencies to develop strategies to ensure that the adverse impacts of their programs to not disproportionately affect minority and low-income populations. The Secretary has directed all DOI agencies to consider the effects of program, policy, and activities on minority and low-income populations. The Proposed Project could affect farm laborers in Imperial County by fallowing activities, which would reduce the demand for farm labor in some areas. Although the proposed project would not disproportionately affect a specific community or area, farm laborers are a predominantly minority and low-income population group.

5.3.2 State Regulations and Permits

- **California Endangered Species Act (California Fish and Game Code §§2050 et seq.).** CESA is part of the California Fish and Game Code (Fish and Game Code). As a guide to state agencies, Section 2053 of the Fish and Game Code states that, " . . . it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives consistent with conserving the species or its habitat which would prevent jeopardy." Section 2080 of the CESA prohibits import, export, take, possession, purchase, or sale of listed plant and animal species except as otherwise provided in other provisions of the CESA or the

Fish and Game Code. Take of state-listed species may be authorized under CESA Section 2081.

As part of the Proposed Project, IID has prepared an HCP that will support incidental take authorization under Section 2081 for take of state listed and unlisted species in the IID water service area and AAC and Salton Sea. In addition, IID is pursuing authorization under Section 2081 for incidental take of state-listed species that inhabit the LCR and could be affected by the change in the point of diversion of water conserved by IID and transferred to SDCWA or MWD.

- **California Fully Protected Wildlife Species Provisions (California Fish and Game Code §§3511, 4700, 5050, and 5515).** These provisions prohibit the taking of certain species of birds, mammals, amphibians, and fish designated as fully protected. A mechanism for ensuring Project compliance with this regulation is currently being pursued.
- **Fish and Wildlife Protection and Conservation: Streambed Alteration Agreements (California Fish and Game Code §1600).** Section 1600 of the Fish and Game Code regulates the alteration of the bed, bank, or channel of a stream, river, or lake, including dry washes. Activities that could affect jurisdictional areas can be authorized through issuance of a Streambed Alteration Agreement (SAA). Site-specific implementation of mitigation measures and the HCP would consider potential impacts to streambed features and a permit would be obtained from CDFG if necessary.
- **California Clean Air Act of 1988.** This act requires each local air district in the state to prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. To be conservative, this analysis concludes that windblown dust from exposed Salton Sea shoreline would result in potentially significant air quality impacts. These impacts could be mitigated by implementing HCP Approach 2.
- **California Safe Drinking Water Act (CCR Title 22).** This act provides primary and secondary MCLs for drinking water sources. Compliance with this act is discussed in Section 3.1, Hydrology and Water Quality.

5.3.3 Local Regulations and Permits

- **Air Quality Regulations.** Local air districts provide rules for implementing federal and state air quality objectives within their jurisdictions. Air quality permits from relevant management districts and pollution control districts may be required for the implementation of water conservation measures. To be conservative, this analysis concludes that windblown dust from exposed Salton Sea shoreline would result in potentially significant air quality impacts. These impacts could be mitigated by implementing HCP Approach 2. Conformance with local air quality regulations is discussed further in Section 3.7, Air Quality.

5.4 Significant Unavoidable Impacts

Under the State CEQA Guidelines (§15126.2[b]), an EIR must describe any significant impacts, including those that can be mitigated but not reduced to a level of insignificance. According to the analysis conducted in Chapter 3 in this Draft EIR/EIS, with the implementation of identified mitigation measures, the Proposed Project would result in the following significant, unavoidable impacts:

5.4.1 Hydrology and Water Quality

WQ-2: Increased selenium concentration in IID surface drain discharges to the Alamo River. Selenium concentration to 9.25 μg/l in the IID surface drain discharge to the Alamo River exceeding water quality criteria of 5 μg/l.

WQ-4: Increase in selenium concentration in the Alamo River at the outlet to the Salton Sea. Selenium concentration to 7.86 μg/l in Alamo River at the outlet to the Sea exceeding water quality criteria of 5 μg/l.

WQ-5: Increase in selenium concentration in the IID surface drain discharge to the New River. Selenium concentration to 8.30 μg/l in the IID surface drain discharge to the New River exceeding water quality criteria of 5 μg/l.

WQ-7: Increase in selenium concentrations in the IID surface drains discharging directly to the Salton Sea. Selenium concentration to 6.69 μg/l in the IID surface drain discharge to the Salton Sea exceeding water quality criteria of 5 μg/l.

5.4.2 Agricultural Resources

AR-1: Reclassification of up to 50,000 acres of Prime Farmland or Farmland of Statewide Importance. If fallowing were used as a conservation measure, it could be either rotational or permanent fallowing, or a combination of the two. The worst-case impact of the Proposed Project would be the permanent fallowing of up to about 50,000 acres of land. This represents up to about 11 percent of the total net acreage in agricultural production within the IID water service area. Assuming all acreage included in the water conservation program was permanently fallowed, this would represent a significant, unavoidable impact to the agricultural resources of the IID water service area.

HCP-AR-2 Conversion of agricultural lands from implementation of the HCP. The worst -case impacts to agricultural resources from the implementation of these components of the HCP, which is part of the Proposed Project, would result in approximately 700 acres of agricultural lands converted to marsh habitat, native forest habitat, or new drainage channels to the Salton Sea. This represents less than 0.5 percent of the average annual net acreage in agricultural production within the IID water service area. However, if these lands are located on Prime Farmland or Farmland of Statewide Importance, implementation of the HCP (IID Water Service Area Portion) would result in a significant, unavoidable impact to agricultural resources.

5.4.3 Recreation

R-8: Reduced sport fishing opportunities. Impacts to fisheries, including sport fish and aquatic habitat, potentially would result from an accelerated decrease in the number of fish that inhabit the Salton Sea, as described in Section 3.2, Biological Resources. No change to anglers' ability to catch sargo would be expected when compared to the Baseline; however, life cycle impacts to other key sport fish are predicted to occur by year 2012 with implementation of the Proposed Project.

Note that impacts to recreation at the Salton Sea would be avoided if HCP Approach 2 were selected and implemented. This approach would maintain flows to the Salton Sea at Baseline levels and avoid Project-related impacts to the decline of sport-fishing opportunities. However, until an HCP Approach is selected, this impact remains significant and unavoidable. See Mitigation Measure R-8 in Section 3.6, Recreation, for more details.

5.4.4 Air Quality

AQ-7: Indirect air quality impacts due to the potential for windblown dust from exposed shoreline. The predicted decrease in Sea level and increase in exposed area (36,000 acres compared to the Baseline) would increase the potential for dust suspension. Spatial variations in sediment characteristics and soil erodibility, temporal variations in wind conditions, and variation in factors contributing to the formation of salt crusts prevent any reasonable quantitative estimate of emissions and associated impacts from the exposed shoreline. Therefore, a qualitative assessment of the potential for dust suspension is provided in this Draft EIR/EIS. To be conservative, this analysis concludes that windblown dust from exposed shoreline may result in potentially significant air quality impacts. (Additional details are provided in Section 3.7, Air Quality, Impact AQ-7.)

Note that impacts to air quality would be avoided if HCP Approach 2 were selected and implemented. This approach would maintain flows to the Salton Sea at Baseline levels and prevent additional exposure of the Salton Sea's shoreline. However, until an HCP Approach is selected, this impact remains significant and unavoidable. See Mitigation Measure AQ-7in Section 3.7, Air Quality, for more details.

In accordance with PRC §21081.6 and State CEQA Guidelines §15091(d), IID would prepare a mitigation and monitoring plan stating the impact, mitigation, and who would monitor and report that the mitigation has been implemented for all impacts determined to be significant. This mitigation and monitoring plan would be developed prior to IID approving the Proposed Project.

5.5 Relationship between Short-term Uses of the Environment and Long-term Productivity

Construction of on-farm irrigation and water delivery system improvements to conserve water for transfer, to comply with the IOP or to implement HCP Approach 2 would have short-term effects on the environment. These effects include such things as construction-related air pollutant emissions and noise and temporary disturbances to biological communities. However, most of these short-term impacts would be mitigated to less-than-significant levels. For example, if the water delivery system improvements removed vegetation, the impact would be mitigated by creating replacement habitat elsewhere. If the construction of an on-farm irrigation system improvement would erode soil, or create noise, BMPs would be implemented to prevent significant erosion-related impacts and control noise.

Implementation of certain aspects of the HCP also would have short-term construction-related effects, such as air pollutant emissions, noise, and temporary disturbances to biological communities. However, the long-term benefits of the HCP would be substantial since the amount and quality of habitat for federally listed species in the IID water service area would be improved and increased. Implementation of HCP Approach 1 of the Salton Sea Conservation Strategy would have long-term benefits for fish-eating birds by maintaining foraging opportunities at the Salton Sea over the 75-year life of the project. Improvement of habitat for special-status species would also have long-term benefits for other species without special-status. Given the existing habitat quality in the IID water service area, and the projected reduction in fish abundance at the Salton Sea in the absence of the Proposed Project, IID's commitment to an HCP would provide long-term benefits to wildlife in the IID water service area and Salton Sea that otherwise would not have occurred.

The operation of the Proposed Project would have long-term effects on resources such as recreation and air quality at the Salton Sea, water quality in the drains and New and Alamo River and, if permanent fallowing is implemented, on agricultural resources. However, implementation of the Project would greatly contribute to California's ability to implement the California Plan and increase the predictability of water use for water diverted from the Colorado River by the participating agencies in California. This predictability is expected to have a stabilizing effect on the use of water in the region by ensuring that all parties stay within their annual allocations thus ensuring long-term productivity (Reclamation 2002).

5.6 Irreversible and Irretrievable Commitments of Resources

5.6.1 Irreversible Commitments of Resources

Irreversible commitments are decisions affecting non-renewable resources. Such decisions are considered irreversible because their implementation would affect a resource to the point that renewal can occur only over a long period of time or at a great expense, or because they would cause the resource to be destroyed or removed. The term irreversible describes the loss of future options and applies to the effects of using nonrenewable resources or resources that are renewable only over a long period of time.

Implementation of the Proposed Project would result in the commitment of resources during the 75-year duration of the Project. The primary area that would experience the most likely irreversible change is the Salton Sea and the lands adjacent to the Sea. With implementation of the water conservation and transfer component of the Proposed Project and/or alternatives, the surface elevation of the Sea would drop and salinity would increase more rapidly than under the No Project alternative. Such environmental affects would adversely affect the Salton Sea and associated resources irreversibly. However, as noted in this Draft EIR/EIS, these changes to the Salton Sea would occur under the No Project alternative with or without implementation of the Project. The Project would, however, accelerate the irreversible change by up to 11 years. If HCP Approach 2 were implemented, the Proposed Project would not result in these irreversible changes.

The Proposed Project and alternatives would also lower the elevation of the LCR, which would result in an adverse effect on biological communities along the LCR. This change would be irreversible because of the legal considerations associated with the IID/SDCWA Transfer Agreement and the QSA, which are described in detail in Chapter 2. Thus, the changes in biological resources along the LCR may also be irreversible, although they are considered mitigable.

The Proposed Project would provide SDCWA with a more reliable supply of water for its service area. The Proposed Project would not alter the capacity of MWD's CRA, nor would it entail any expansion of SDCWA's existing water delivery and storage systems. Therefore, the Proposed Project would not have the potential to induce or deter greater economic development or population growth because it would not modify any future increases of water supply that have already been planned and approved. Overall, the Proposed Project and the QSA would assist in the reduction of the overall historic water supply diverted from the Colorado River to southern California.

Compliance with the IOP would not cause an irreversible commitment of resources as the IOP is an administrative policy that establishes a procedure for Lower Basin water users to pay back water used beyond their legal entitlement. IID's compliance with the IOP would also be handled administratively without resulting in any environmental changes.

Implementation of the biological conservation measures in the BO would result in the monitoring, improvement, and/or creation of habitat along the LCR. These activities would have a positive ecological effect along the LCR, although any creation of new habitat could be considered irreversible.

5.6.2 Irretrievable Commitments of Resources

An irretrievable commitment of natural resources means a loss of production or use of resources as a result of a decision. It represents opportunities foregone for the period of time that a resource cannot be used. "Irretrievable" also refers to the permanent loss of a resource, including production, harvest, or use of natural resources.

Certain aspects of the Proposed Project would result in the irretrievable commitment of resources, such as the construction associated with the water conservation program because construction activities would consume fossil fuels, which are finite sources of energy that cannot be regenerated. In addition, in the Salton Sea area, a number of recreational and aesthetic resources would become irretrievable as the Sea elevation declines. As stated above, the Salton Sea's elevation decline would occur under the No Project alternative with or without implementation of the Project. The Project would, however, accelerate the irretrievable change by up to 11 years.

Additionally agricultural lands that are converted for habitat restoration or permanent fallowing could be considered an irretrievable commitment of a resource.

A similar commitment of resources during construction of the water conservation program would be associated with construction of habitat areas with the adoption of biological conservation measures. Implementation of the cap on IID's Colorado River water diversions or compliance with the IOP would not result in an irretrievable commitment of resources.

19635

6.0 List of Persons, Agencies, and Organizations Consulted

This section presents the persons, agencies, and organizations consulted to develop this Draft EIR/EIS.

Aibarra, Arturo. North American Development Bank (NADB). Personal communication with Kirsten Garrison, CH2M HILL. August 17, 2000.

Allan, Bill. Bureau of Indian Affairs, Pacific Regional Office.

Andrew, Nancy. Colorado River Program, California Department of Fish and Game.

Bezdeck, John. Office of the Solicitor, U.S. Department of Interior.

Birkenfeld, Greg. Coachella Valley National Wildlife Refuge. Personal communication with Kirsten Garrison, CH2M HILL. August 17, 2000.

Black, Glenn. Environmental Resource Supervisor, California Department of Fish and Game, Region 6.

Bryant, Bill. Senior Geologist, California Department of Conservation, Division of Mines and Geology (CDMG). Email to Katherine Carrasco, CH2M HILL. July 25, 2001.

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Concannon, Julie. U.S. Fish and Wildlife Service, Pacific Region 1.

Corbett, Miel. U.S. Fish and Wildlife Service.

Cox, Lynn. U.S. Fish and Wildlife Service.

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Curtis, Dave. Environmental Protection Specialist, U.S. Bureau of Reclamation.

Desgalier, Kari. Attorney at Law, Allen, Matkins, Leck, Gamble, and Mallory.

Devine, Anisa. Imperial Irrigation District.

Ellis, Bruce. U.S. Bureau of Reclamation, Phoenix Area Office.

English, Marshall. Colorado State University.

Eto, Sandra. U.S. Bureau of Reclamation, Phoenix Area Office.

Fagot, Kevin. U.S. Bureau of Reclamation, Boulder Canyon Operations Office.

Gilbert, Nancy. Habitat Conservation and Planning Supervisor, San Diego County, U.S. Fish and Wildlife Service.

Gould, Glen. U.S. Bureau of Reclamation, Lower Colorado Regional Office.

Green, James. Environmental Protection Specialist, U.S. Bureau of Reclamation.

Gregor, Carolina. Telephone conversation with Kirsten Garrison, CH2M HILL. September 12, 2000.

Grubaugh, E.K. General Superintendent Resource Management, Imperial Irrigation District. Personal communication with Kirsten Garrison, CH2M HILL. August 25, 2000.

Harkins, Jayne. U.S. Bureau of Reclamation, Boulder Canyon Operations Office.

Hayes, Chris. Colorado River Program, California Department of Fish and Game.

Hill, Laura. United States Fish and Wildlife Service, Pacific Region 1.

Hess, Gordon. Director of Imported Water, San Diego County Water Authority.

Imhoff, Dennis. California DPR. Facsimile communication with Kirsten Garrison. CH2M HILL. July 28, 2000.

Jones, Tim. Director of Public Works, Imperial County. Personal communication with Kirsten Garrison, CH2M HILL. October 2, 2000.

Kirk, Tom. Executive Director, Salton Sea Authority.

Knell, Steve. Special Projects Coordinator, Imperial Irrigation District.

Labadie, John. Colorado State University.

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Nicol, Kim. California Department of Fish and Game.

Partin, Cheryl. United States Geological Survey (USGS). Personal communication with Elizabeth Cutler, CH2M HILL. April 21, 2000.

Pelizza, Silvia. Project Leader, Sonny Bono Salton Sea Wildlife Refuge Complex.

Pena, Carlos. International Boundary Water Commission (IBWC). Personal Communication with Kirsten Garrison, CH2M HILL. August 11, 2000.

Peshchel, Paul. Supervisor of Engineering Services, Imperial Irrigation District.

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Redlinger, John. Deputy Area Manager, U.S. Bureau of Reclamation Lower Colorado River Region.

Remington, Michel. Environmental Compliance Coordinator, Imperial Irrigation District.

Ringle, Dave. Montgomery Watson Harza.

Rinne, William. Area Manager, U.S. Bureau of Reclamation Lower Colorado River Region.

Robbins, Steve. Coachella Valley Water District.

Roberts, Carol. Branch Chief Contaminants, Ecological Services, U.S. Fish and Wildlife Service.

Rodriguez, Cheryl. U.S. Bureau of Reclamation, Lower Colorado River Regional Office.

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Ryan, Tom. Metropolitan Water District of Southern California.

Saint, Debbie. Native American Affairs Office, U.S. Bureau of Reclamation.

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Simon, Benjamin. Office of Policy Analysis, U.S. Department of Interior.

Sorenson, Peter. U.S. Fish and Wildlife Service.

Spellman, Ellen. Attorney at Law, Allen, Matkins, Leck, Gamble & Mallory, Swan, William H. Attorney at Law, William H. Swan Consulting & Legal Services.

Taucher, Curt. Regional Manager, California Department of Fish and Game, Inland Deserts-Eastern Sierra Region.

Taylor, Jim. San Diego County Water Authority.

Thomas, Lenore. U.S. Fish and Wildlife Service.

Thompson, Steve. U.S. Fish and Wildlife Service.

Thornton, Robert. Nossaman, Gunther, Knox, and Elliott.

Treasure, Don. U.S. Bureau of Reclamation, Office of Policy and Analysis.

Weghorst, Paul. Principal Hydraulic Engineer, U.S. Bureau of Reclamation, Groundwater and Water Usage Group.

Winchell, Clark. Fish and Wildlife Biologist, U.S. Fish and Wildlife Service.

7.0 List of Preparers

19640

7.0 List of Preparers

The following individuals were involved in the preparation of this Draft EIR/EIS.

Preparer	Agency/Firm	Expertise and Issues Worked On	Title	Education/Experience
		Technical Resources		
Jim Bard	CH2M HILL	Cultural Resources Indian Trust Assets	Cultural Resources Specialist	Ph.D., Anthropology, University of California, Berkeley, 1979 M.A., Anthropology, University of California, Berkeley, 1976 B.A., Anthropology, University of California, Berkeley, 1974 8 years (Other Firms – 24)
Bob Charley	CH2M HILL	IIDSS	Hydrologist	M.S., Civil Engineering, Montana State University B.S., Civil Engineering, Utah State University 35 years (Other Firms – 0)
David Christophel	CH2M HILL	HCP	Biologist	M.S., Biological Sciences, California State University, Sacramento, 1989 B.S., Biological Sciences, California State University, Sacramento, 1979 2 years (Other Firms – 12)
Mike Concannon	CH2M HILL	Executive Summary Cumulative Impacts Overall Project Management	Senior Project Manager	B.A., Marine Biology - San Francisco State University, 1972 A.A., Chemistry - Merritt College, 1967 21 years (Other Firms –5)
Elizabeth Cutler	CH2M HILL	Public Services and Utilities Geology and Soils	Environmental Planner	M.S., Geology, University of Wyoming B.S., Geology, University of California, Los Angeles 3 years (Other Firms – 10)

19641

Preparer	Agency/Firm	Expertise and Issues Worked On	Title	Education/Experience
John Eckhardt	CH2M HILL	Hydrology and Water Quality IIDSS – Structure and Review	Program Manager; Hydrologist	Ph.D., Civil Engineering - Colorado State University, 1991 M.S., Civil Engineering - Colorado State University, 1976 B.S., Civil Engineering - Colorado State University, 1970 1 year (Other Firms – 21)
Farshad Farhang	CH2M HILL	Noise	Senior Acoustics Specialist	M.B.A., California State University, Fresno, 1994 B.S., Electrical Engineering, California State University, Fresno, 1986 2 years (Other Firms – 11)
Dan Folta	CH2M HILL	IIDSS – On-farm Irrigation System	Agricultural/Water Resources Engineer	M.S., Irrigation Engineering and Water Resources Management, Agricultural and Biosystems Engineering, University of Arizona B.S., Mechanical Engineering, Virginia Polytechnic Institute and State University 5 years (Other Firms – 6)
Kirsten Garrison	CH2M HILL	Aesthetics Recreation Transportation	Environmental Planner	B.S., Environmental Horticulture, University of California, Davis 2 years (Other Firms – 2)
James Gorham	CH2M HILL	Biological Resources	Biologist	Graduate Studies, Geography, San Francisco State University B.S., Wildlife Management, Humboldt State University 2 years (Other Firms – 18)
Chris Goz	CH2M HILL	IIDSS - Configuration Manager Development	Environmental Engineer	B.E., Civil Engineering, McMaster University, 1993 8 years (Other Firms – 0)
Laura Harnish	CH2M HILL	Alternatives Analysis Recreation Transportation	Environmental Planner	M.S., Environmental Planning, University of California at Berkeley B.A., Environmental Science, University of California at Santa Cruz 13 years (Other Firms – 2)

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Tim Hill	CH2M HILL	Geographic Information System IIDSS – MODSIM Network Development IIDSS – Data Management	Geospatial Consultant	M.S., Natural Resources, Humboldt State University, 1994 B.S., Forest Management, Humboldt State University, 1988 5 years (Other Firms – 7)
Ed Lance	CH2M HILL	IIDSS	Agricultural Irrigation Specialist	B.S., Agricultural Engineering - Oregon State University, 1956 35 years (Other Firms – 8)
Karen Mino	CH2M HILL	Geographic Information System	GIS Specialist	B.A., Geography, Humboldt State University, 1999 1 year (Other Firms – 1)
Neil Nikirk	CH2M HILL	Biological Resources Hydrology and Water Quality	Environmental Scientist	M.S., Fisheries, University of Washington B.S., Fisheries Science, Oregon State University 3 years (Other Firms – 5)
John O'Connor	CH2M HILL	Socioeconomics Agricultural Resources	Economist	Ph.D., Agricultural Economics - Washington State University, 1999 M.S., Agricultural and Resource Economics - University of Maine, 1994 B.A., Economics - University Of North Carolina-Charlotte, 1990 2 Years (Other Firms – 4)
Mike Pappalardo	CH2M HILL	Hydrology and Water Quality	Environmental Planner	B.S., Geology, University of Oregon, 1988 2 years (Other Firms – 12)

Preparer	Agency/Firm	Expertise and Issues Worked On	Title	Education/Experience
Diana Sokolove	CH2M HILL	Introduction Project Description Cumulative Impacts Transboundary Impacts	Assistant Project Manager; Environmental Planner	M.R.P., City & Regional Planning, University of North Carolina, Chapel Hill, North Carolina B.A., Political Science & Environmental Policy, University of Rochester, Rochester, New York 3.5 years (Other Firms – 1)
Sandy Taylor	CH2M HILL	Biological Resources HCP	Biologist	M.S., Zoology and Physiology, University of Wyoming, WY, 1993 B.A., Biology, Colgate University, NY, 1989 3 years (Other Firms – 7)
Pamela Vanderbilt	CH2M HILL	Air Quality	Air Quality Specialist	M.A., Biology, University of South Dakota B.S., Biology, University of South Dakota 14 years (Other Firms – 8)
Rick Allen	Allen Engineering	IIDSS – Evapotranspiration Analysis	Professor of Water Resources Engineering	Ph.D., Civil Engineering, University of Idaho, 1984 M.S., Agricultural Engineering, University of Idaho, 1977 B.S., Agricultural Engineering, Iowa State University, 1974 15 years (Other Firms – 15)
Marc Baldo	Colorado State University	IIDSS – MODSIM coding and operations	Research Associate	M.S., Mechanical Engineering, Colorado State University, 1997 B.S., Engineering Science / Math minor, Colorado State University, 1993 8 years (Other Firms – 1.5)
Grant Davids	Davids Engineering	IIDSS – On-farm Hydrology	Principal Agricultural Engineer	B.S., Agricultural Engineering, California Polytechnic State University at San Luis Obispo 8 years (Other Firms – 12)
Dave Miller	Davids Engineering	IIDSS – On-farm Hydrology and Water Quality	Project Manager	Ph.D., Biological and Agricultural Engineering, North Carolina State University M.S., Irrigation Engineering, Utah State University B.A., English Literature, University of North Carolina 4 years (Other Firms – 10)

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Bryan Thoreston	Davids Engineering	IIDSS – Data Management	Agricultural Engineer	Ph.D., Biosystems and Agricultural Engineering, University of Arizona M.S., Agricultural Engineering, South Dakota State University B.S., Agricultural Engineering, South Dakota State University 5 years (Other Firms – 0)
Marcia Gale	Environmental Vision	Aesthetics	Visual Resources Specialist	Masters of Landscape Architecture University of California, Berkeley Masters of City & Regional Planning University of California, Berkeley B.S., Landscape Architecture University of Illinois at Champaign/Urbana 8 years (Other Firms – 19)
Charles Cornwall	Environmental Vision	Aesthetics	Visual Resources Specialist	M.S., Landscape Architecture University of California at Berkeley B.S., Natural Resources University of California, Berkeley 8 years (Other Firms – 8)
Jeff Harvey	Greystone Environmental Consultants	Growth-inducing Impacts	Regional Manager	Ph.D., University of California, Los Angeles, 1994 M.A., California State University, Chico, 1983 B.A., California State University, Chico, 1981 7 (Other Firms – 13)
Karen Holdsworth	Imperial Valley Environmental Services	Project Description IIDSS – Data Collection and System Conservation	Civil Engineer	M.S., Civil Engineering, Specializing in Water Resources, Utah State University, 1985 B.S., Civil Engineering Carnegie-Mellon University, 1981 3 years (Other Firms – 11)
Albert Herson	Jones and Stokes	Growth Inducing Impacts	CEQA Compliance Specialist	J.D., McGeorge School of Law, Sacramento, California M.A., Urban Planning, University of California, Los Angeles B.A., Psychology, University of Illinois 25 years (Other Firms – 21)

19645

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Michael Langley	Jones and Stokes	Environmental Justice	Environmental Planner	B.S., Meteorology, University of Oklahoma 6 years (Other Firms - 6)
Ron Bliesner	Keller-Bliesner	IIDSS - Assistant IIDSS Project Manager	Agricultural Engineer	M.S., Agricultural and Irrigation Engineering, Utah State University, 1975. B.S., Agricultural and Irrigation Engineering, Utah State University, 1971. 23 years (Other Firms – 2)
Andy Keller	Keller-Bliesner	IIDSS - Configuration Manager and Model Operations	Civil Engineer	Ph.D., Agricultural and Irrigation Engineering, Utah State University, 1987 M.S., Agricultural and Irrigation Engineering, Utah State University, 1982 B.S., Agricultural Engineering, Colorado State University, 1979 12 years (Other Firms – 14)
Jack Keller	Keller-Bliesner	IIDSS	Irrigation Engineer	Ph.D., Agricultural & Irrigation Engineering, Utah State University, 1967 M.S., Irrigation Engineering, Colorado State University, 1955 B.S., Civil Engineering, University of Colorado, 1953 41 years
Mike Peterson	Keller-Bliesner	IIDSS – Water Quality	Irrigation Scientist	Ph.D., Chemical Oceanography, University of California-San Diego, 1971 M.S., Irrigation Science, Utah State University, 1985 B.S., Chemistry, Utah State University, 1966 14 years (Other Firms: 10)
Bruce Ellis	US. Bureau of Reclamation	Indian Trust Assets	Environmental Protection Specialist	B.A., Anthropology 24 years
		Production Resources		
Annette Baker	CH2M HILL	Word Processing	Document Specialist	B.A., Business, Diablo Valley College (in progress) 1 year (Other Firms – 8 years)

Preparer	Agency/Firm	Expertise and Issues Worked On	Title	Education/Experience
Heidi Garfield	CH2M HILL	Technical Editing	Editor	B.A., San Francisco State University, 1981 B.A., University of California, Santa Barbara, 1978 1 year (Other Firms – 20)
Sara Miller	CH2M HILL	Graphic Design	Lead Graphic Designer	B.F.A., Fine Arts, University of New Hampshire, Durham, 1986 9 years (Other Firms – 2)
Elizabeth Ridley	CH2M HILL	Production Management	Sales Manager	B.A., Zoology - University of California, Davis, 1985 6 years (Other Firms – 8)
David Roy	CH2M HILL	Technical Editing	Managing Editor	B.A., Political Science, University of California, Berkeley 1 year (Other Firms – 11)
Amy Schweizer	CH2M HILL	Graphic Design	Graphic Designer	B.A., English, University of Oregon, 1996 8 years (Other Firms – 0)
Mary Ellen Sharifzadeh	CH2M HILL	Technical Editing	Editor	M.A., English, California State University, Los Angeles, 1977 B.A., English, California State University, Los Angeles, 1973 9 years (Other Firms – 14)
Barbara Spreadbury	CH2M HILL	Graphic Design	Graphic Design Supervisor	B.S., Graphic Design, Bournemouth University, UK (in progress) 24 years (Other Firms – 7)

19648

8.0 List of Recipients

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During the preparation of the Draft EIR/EIS, federal, state, and local agencies, Indian Tribes, environmental groups, and other interested members of the public were notified of the proposed project. This section presents those resource agencies, environmental groups, Indian Tribes, and other entities that have been identified to receive a copy of the Draft EIR/EIS at the time of publication. In addition, all individuals who indicated interest during the public scoping process for the project will receive a Notice of Availability (NOA) identifying that the document is available for viewing on the IID Water Conservation and Transfer Project public web site at http://www.is.ch2m.com/iidweb.

Federal Agencies

Advisory Council on Historic Preservation, Washington, D.C.
Assistant Secretary for Indian Affairs, Bureau of Indian Affairs, Washington, D.C.
Bureau of Indian Affairs, Colorado River Agency, Parker, AZ
Bureau of Indian Affairs, Fort Yuma Field Office, Yuma, AZ
Bureau of Indian Affairs, Office of Trust and Economic Development, Washington, D.C.
Bureau of Indian Affairs, Pacific Region, Sacramento, CA
Bureau of Indian Affairs, Palm Springs Field Office, CA
Bureau of Indian Affairs, Southern California Agency, Riverside, CA
Bureau of Indian Affairs, Western Regional Office, Phoenix, AZ
Bureau of Land Management, El Centro, CA
Bureau of Land Management, Phoenix, AZ
Bureau of Land Management, Sacramento, CA
Bureau of Land Management, Washington D.C.
Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, NV
Bureau of Reclamation, Lower Colorado Region Native American Affairs Office, Phoenix, AZ
Bureau of Reclamation, Southern California Area Office, Temecula, CA
Bureau of Reclamation, Yuma Area Office, Yuma, AZ
Council on Environmental Quality, Washington, D.C.
Department of Energy, Washington, D.C.
Department of the Interior, Office of Environmental Affairs, San Francisco, CA
Department of the Interior, Office of Environmental Policy and Compliance, Washington, D.C.
Environmental Protection Agency, Region IX, San Francisco, CA
Environmental Protection Agency, Washington, D.C.
Fish and Wildlife Service, Arizona Ecological Services Field Office, Phoenix, AZ
Fish and Wildlife Service, Bill Williams National Wildlife Refuge, Parker, AZ
Fish and Wildlife Service, Cibola National Wildlife Refuge, Cibola, AZ
Fish and Wildlife Service, Ecological Services, Carlsbad, CA
Fish and Wildlife Service, Havasu National Wildlife Refuge, Needles, CA
Fish and Wildlife Service, Imperial National Wildlife Refuge, Yuma, AZ
Fish and Wildlife Service, Pacific Regional Office 1, Portland, OR

Fish and Wildlife Service, Sonny Bono Salton Sea National Wildlife Refuge, Calipatria, CA
Fish and Wildlife Service, Washington D.C.
International Boundary and Water Commission, U.S. Section, El Paso, TX
International Boundary and Water Commission, Yuma, AZ
National Environmental Coordinator, Natural Resource Conservation Service, Department of Agriculture, Washington, D.C.
National Park Service, Lake Mead National Recreation Area, Boulder City, NV
National Park Service, Western Region, San Francisco, CA
National Park Service, Washington, D.C.
Native American Heritage Commission, Sacramento, CA
Natural Resources Conservation Service, El Centro, CA
Office of Management and Budget, Washington, D.C.
U.S. Geological Survey, Water Resources Division, Sacramento, CA
U.S. Geological Survey, San Diego, CA
Western Area Power Administration, Golden, AZ
Western Area Power Administration, Phoenix, AZ
Western Area Power Administration, Washington, D.C.

US Congress

U.S. House of Representatives, CA, Joe Baca
U.S. House of Representatives, CA, Mary Bono
U.S. House of Representatives, CA, Ken Calvert
U.S. House of Representatives, CA, Randy "Duke" Cunningham
U.S. House of Representatives, CA, Bob Filner
U.S. House of Representatives, CA, Duncan L. Hunter
U.S. House of Representatives, CA, Jerry Lewis
U.S. House of Representatives, CA, Darrell Issa
U.S. House of Representatives, CA, Susan Davis
U.S. Senate, CA, Senator Barbara Boxer
U.S. Senate, CA, Senator Dianne Feinstein

State Agencies

Arizona Fishery Resources Office, Parker, AZ
Arizona Game and Fish Department, Phoenix, AZ
California Air Resources Board, Sacramento, CA
California Association of Resource Conservation Districts, Oceanside, CA
California Department of Fish and Game, Blythe, CA
California Department of Fish and Game, Sacramento, CA
California Department of Fish and Game, San Diego, CA
California Department of Fish and Game, Chino Hills, CA
California Department of Health Services, Sacramento, CA
California Department of Parks and Recreation, Sacramento, CA
California Department of Transportation
California Department of Water Resources, Glendale, CA

California Department of Water Resources, Sacramento, CA
California Environmental Protection Agency
California Farm Bureau, Sacramento, CA
California Natural Resources Defense Council
California Office of Historic Preservation, Sacramento, CA
California Public Utilities Commission, Los Angeles, CA
California Regional Water Quality Control Board, Palm Desert, CA
California Resources Agency, Sacramento, CA
California State Clearing House, Sacramento, CA
California State Lands Commission, Sacramento, CA
California Water Resources Control Board, Sacramento, CA
State of Nevada, Department of Conservation and Natural Resources, Carson City, NV
State of Nevada, Department of Conservation and Natural Resources, Las Vegas, NV

Tribes

Agua Caliente Band of Cahuilla Indians, Palm Springs, CA
Augustine Band of Mission Indians, Coachella, CA
Cabazon Band of Mission Indians, Indio, CA
Fort Mohave Indian Tribe, Needles, CA
Morongo Consortium of Coachella Valley Tribes, Morongo Band of Mission Indians, Banning, CA
Torres-Martinez Desert Cahuilla Indians, Thermal, CA

Environmental Organizations

Center for Biological Diversity, Santa Ysabel, CA
Defenders of Wildlife, Washington, D.C.
National Audubon Society, Sacramento, CA
Pacific Institute, Boulder, CO
Pueblo of San Diego Watershed (Audubon), San Diego, CA
Save Our Forests and Ranchlands, Descanso, CA
Sierra Club, Sacramento, CA
Sierra Club, San Francisco, CA

Water Agencies, Organizations, and Irrigation Districts

Coachella Valley Water District, Coachella, CA
Imperial Irrigation District, Imperial, CA
Metropolitan Water District, El Centro, CA
Metropolitan Water District, Los Angeles, CA
San Diego County Water Authority, San Diego, CA

Libraries

Brawley Public Library, 400 Main Street, Brawley, CA 92227
Bureau of Reclamation, Denver Office Library, Building 67, Room 167, Denver Federal Center, 6th and Kipling, Denver, CO 80225
Bureau of Reclamation, Lower Colorado Regional Office, Nevada Highway and Park St., Boulder City, NV 89006
Bureau of Reclamation, Southern California Area Office, 27710 Jefferson Ave., Suite 201, Temecula, CA 92590-2628
Bureau of Reclamation, Yuma Area Office, 7301 Calle Agua Salada, Yuma, AZ 85364-9763
Department of the Interior, Natural Resources Library, 1849 C St., NW, Washington, DC 20240
El Centro Public Library, 539 State Street, El Centro, CA 92243
Los Angeles Central Library, 630 W. 5th St., Los Angeles, CA 90071
Palo Verde Valley Library, 125 W. Chanslor Way, Blythe, CA 92225
Riverside Central Library, 3581 Mission Inn Avenue, Riverside, CA
San Bernardino County Library, 104 West 4th Street, San Bernardino, CA 92363
San Diego Central Library, 820 E Street, San Diego, CA 92101
San Diego County Public Library, 201 E Douglas Street, El Cajon, CA
Yuma County Library, 350 S. 3rd Avenue, Yuma, AZ 85364

Others

Allen, Matkins, Leck, Gamble, and Mallory, Legal Counsel for IID, San Diego, CA
Bombay Beach Community Service District, Niland, CA
Brawley City Council, Brawley, CA
Cadiz, Inc., Santa Monica, CA
Calexico City Council, Calexico, CA
Calipatria City Council, Calipatria, CA
City of Brawley, Brawley, CA
City of Holtville City Clerk, Holtville, CA
City of Imperial City Clerk, Imperial, CA
County of Riverside County Clerk, Riverside, CA
County of San Bernardino Auditor-Controller/Recorder, San Bernardino, CA
County of San Diego Chief Administrative Officer, San Diego, CA
County of San Diego Director, San Diego, CA
County of San Diego County Clerk, San Diego, CA
El Centro City Council, El Centro CA
Environmental Science Associates, Los Angeles, CA
Fallbrook PUD, Fallbrook, CA
Greystone, Sacramento, CA
Imperial County Air Pollution Control District, El Centro, CA
Imperial County Counsel Office, El Centro, CA
Imperial County Farm Bureau, El Centro, CA
Imperial County Planning Department, El Centro, CA
Imperial County Public Works Department, El Centro, CA

Imperial Valley Administration Center, El Centro, CA
Los Angeles County Department of Regional Planning, Los Angeles, CA
Morisset, Schlosser, Ayer & Jozeiak, Legal Counsel for the Quechan Indian Tribe, Seattle, WA
Mr. Joshua J. Meyer, Attorney-at-Law, Legal Counsel for Highlander "C" Irrigation District, Yuma, AZ
Nossaman, Gunther, Knox, and Elliott, LLP, Legal Counsel for IID, Irvine, CA
Orange County Planning and Development Services, Santa Ana, CA
ReWater Systems, Inc., Chula Vista, CA
Riverside County Planning Department, Riverside, CA
Salton Community Service District, Salton City, CA
Salton Sea Authority, La Quinta, CA
Salton Sea Authority Citizens Advisory Committee, Salton Sea, CA
San Bernardino County Clerk's Office, San Bernardino, CA
San Bernardino County Land Use Services Department, San Bernardino, CA
SANDAG, San Diego, CA
San Diego County Department of Planning and Land Use, San Diego, CA
San Diego County Farm Bureau, Escondido, CA
Southern California Edison Company, Mohave Generating Station, Laughlin, NV
Ventura County Planning Division, Ventura, CA
Westmoreland City Council, Westmoreland, CA
Whiteing and Smith, Special Water Counsel for the Fort Mojave Indian Tribe, Boulder, CO
William H. Swan Consulting and Legal Services, Legal Counsel for IID, Scottsdale, AZ
Yuma County Clerk's Office, Yuma, AZ

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10.0 Index

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19694

11.0 Appendices

All appendices can be found in the IID Water Conservation and Transfer Project Draft EIR/EIS Volume 2.